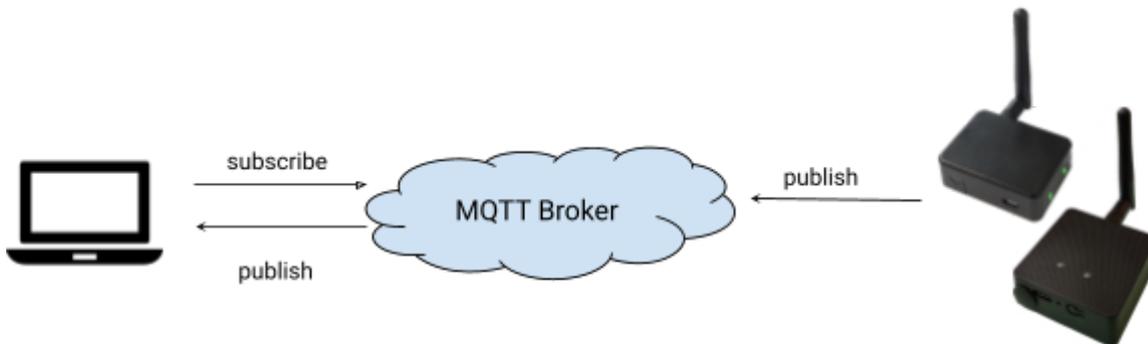


Beacon Gateway MQTT Tutorial

Introduction

This application note provides a guide to configure the Ingics Beacon Gateway to a MQTT broker and receive data from it.



Gateway Configuration

To set up the Ingics Beacon Gateway (iGS03) to publish data, the first step is to configure the network settings to ensure internet accessibility. Please refer to the iGS03 User Manual for network settings.

Reminder:

After SAVE all changed settings, REBOOT is required for iGS03 to apply the new settings.

Require reboot for the changes to take effect.

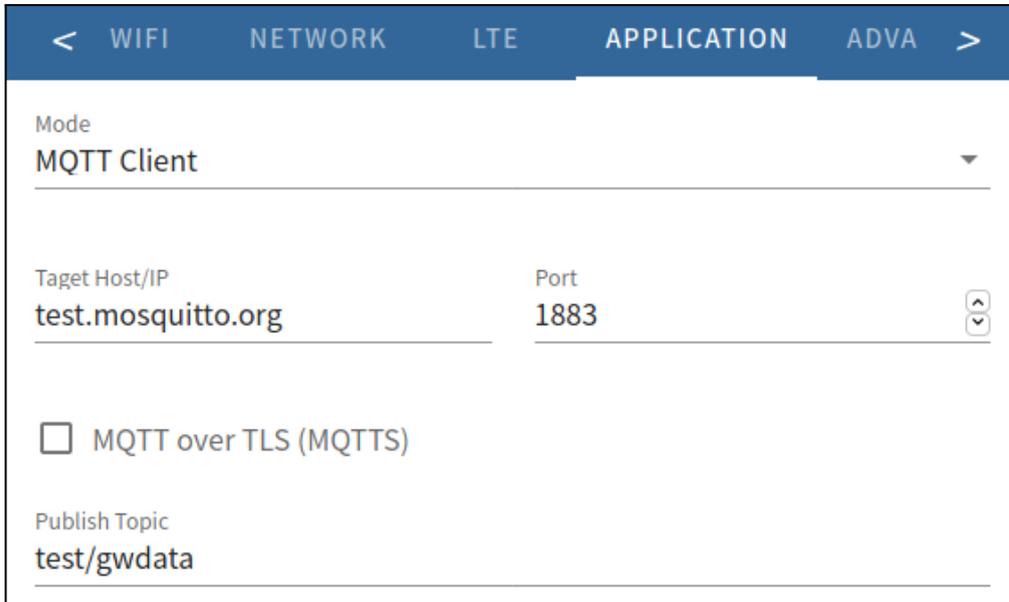
REBOOT

The Ingics Beacon Gateway is run as a BLE observer, receives the advertisement data of BLE beacons around it and transfers to the network server (MQTT broker in this case). So, please also make sure there are BLE beacons around the gateway device when testing.

Below sections will list some MQTT broker services as examples to demonstrate the MQTT functionality of the Ingics Beacon Gateway. You may choose to use one of them, or alternatively, you can utilize your own broker.

Use Mosquitto Public Broker

The test.mosquitto.org hosts a publicly available MQTT broker. To use it, just set up iGS03 APPLICATION as below.



Mosquitto Command Line Tools (MQTT Client)

Mosquitto also provides command line tools for testing MQTT functions. You can find it by following the link <https://mosquitto.org/download/>. We can use it to subscribe to the Publish Topic for receiving the data easily. Here is the command line for this.

```
$ mosquitto_sub -h test.eclipse.org -p 1883 -t test/gwdata
```

Here is an example of the output. The output data depends on what kinds of the beacons around the gateway, and e publish settings of iGS03. Please refer to the iGS03 User Manual for detail.

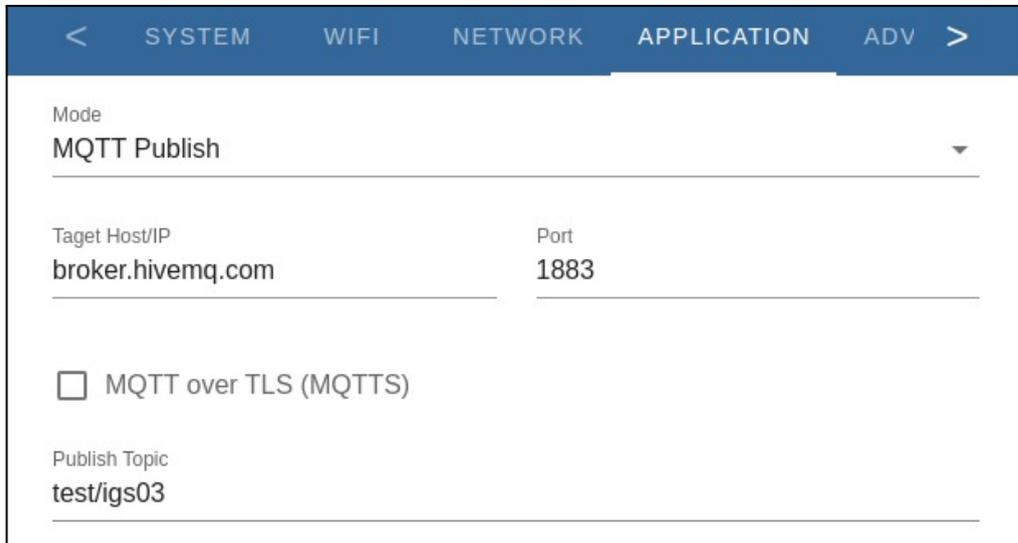
```
$ mosquitto_sub -h test.eclipse.org -p 1883 -t test/gwdata

$GPRP,3CE002070901,F008D1798BA4,-45,02010618FF2C0887BC250100EB0A970100000000000000
0041060F00,1725608007.113

$GPRP,3CE002070901,F008D1798BA4,-58,02010618FF2C0887BC250100EA0A990100000000000000
0041060F00,1725608017.120
```

Use HiveMQ Public Broker

The HiveMQ also hosts a free public MQTT broker (<https://www.hivemq.com/mqtt/public-mqtt-broker/>). Simply set up iGS03 as (if you want to test security connection, change the port to 8883, and enable the MQTTTS checkbox).



The screenshot shows the configuration page for MQTT Publish in the iGS03 interface. The top navigation bar includes SYSTEM, WIFI, NETWORK, APPLICATION, and ADV. The main content area has the following fields:

- Mode: MQTT Publish (dropdown menu)
- Target Host/IP: broker.hivemq.com
- Port: 1883
- MQTT over TLS (MQTTS)
- Publish Topic: test/igs03

Again, we can use the [Mosquitto MQTT client](#) to subscribe to the Publish Topic for receiving data.

```
ingics@X411UA:~$ mosquitto_sub -h broker.hivemq.com -p 1883 -t test/igs03

$GPRP,3CE002070901,F008D1798BA4,-45,02010618FF2C0887BC250100EB0A970100000000000000
0041060F00,1725608007.113

$GPRP,3CE002070901,F008D1798BA4,-58,02010618FF2C0887BC250100EA0A990100000000000000
0041060F00,1725608017.120
```

HiveMQ Free MQTT Browser Client

HiveMQ provides a web-based MQTT client that can run on your browser:

<https://www.hivemq.com/demos/websocket-client/>.

Reminder:

The web-based MQTT client uses *WebSocket* protocol to connect to the MQTT broker. Make sure your broker has WebSocket support before using it.

Setup the connection as below pic and click the [Connect] button to get connect.

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Connection

Host: Port: ClientID:

Username: Password: Keep Alive: SSL: Clean Session:

After getting connected, click [Add New Topic Subscription], fill the Topic we used and start subscribing.

Connection connected

Publish QoS: Retain:

Subscriptions

Messages

Here is an example of data received.

Connection connected

Publish

Messages

2024-09-06 15:14:18 Topic: test/igs03 Qos: 0
\$GPRP,3CE002070901,F008D1798BA4,-48,02010618FF2C0887BC25010
0E80A9B01000000000000000041060F00,1725606857.352

2024-09-06 15:14:08 Topic: test/igs03 Qos: 0
\$GPRP,3CE002070901,F008D1798BA4,-42,02010618FF2C0887BC25010
0EA0A9B01000000000000000041060F00,1725606847.346

Subscriptions

Qos: 0

Use HiveMQ Cloud

If you want to test with an environment with more privacy, HiveMQ cloud may be a better choice than public broker. To use HiveMQ Cloud, creating an account for it is required.

Serverless Cluster

After login, you should see an empty clusters view, click [Create New Cluster] to start. Choose the [Serverless] plan for our test, it's free and easier to start up.

Select the HiveMQ Cloud plan you need

Plan	Price	Features	Buttons
Serverless	FREE	By selecting Get Started you agree to our current SaaS Terms .	Create Serverless Cluster No credit card required
Starter	Starts from \$0.34/hour + \$0.80/million messages \$249 / month *	*estimated total	Get Started FREE 15 day trial - no credit card required

You should see your cluster created after clicking the [Create Serverless Cluster] button.

Serverless
FREE

URL
b816b4c4bd3f44cabc324f323683482d.s1.eu.hivemq.cloud

Port (TLS)
8883

Started
Fri Sep 06 2024 16:18:26

Manage Cluster

Obviously, we have the host name and port we need. But the cluster requires login credentials before use. Otherwise, it will refuse any client connection. So, click [Manage Cluster] -> [Access Management] and add a credential for our test.

Credentials

Currently you have not created any credentials. Fill out the following form to create an access credentials pair and limit access to your HiveMQ Cloud MQTT instance. To learn more [check out our Security Fundamentals guide](#).

Username *

At least 5 characters

Password *

At least 8 characters, 1 digit, 1 uppercase character

Confirm Password *

Passwords must match

Permission *

Add permissions to limit access

> CREATE CREDENTIAL

Set permission as "Publish and Subscribe". The beacon gateway requires Publish permission to send data, and we need Subscribe permission to receive the data.

Now, we can configure the iGS03 for it. Follow your cluster info to set up the hostname. Remember to enable MQTTS and fill the username and password you just created.

< SYSTEM WIFI NETWORK APPLICATION ADV >

Mode
MQTT Publish

Target Host/IP Port

MQTT over TLS (MQTTS)

Publish Topic

Client ID

Username

Password

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To verify the published data, click [Web Client] on your cluster view. Filling the credential (username/password) you created and start to connect.

Connection Settings

Connect to your HiveMQ Cloud Cluster with your credentials. Do not worry you can quickly connect with autogenerated credentials.

Username * **Password ***

Connect or **Connect with autogenerated credentials**

After getting connected, fill the subscription.

Topic Subscriptions 1

Subscribe to topics to receive messages from the HiveMQ cluster. You can also set the Quality of Service (QoS) for each topic message delivery is. You can always subscribe to the (#) wildcard to receive all messages.

TOPIC	QOS
<input type="text" value="test/igs03"/>	<input type="text" value="QoS: 0"/>

Then you should see the messages sent from iGS03.

Messages 15

Send and see messages that are published to the topics you are subscribed to. If you cannot see any messages, make sure you are subscribed to the correct topics. You can always subscribe to the (#) wildcard to receive all messages.

MESSAGE
<input type="text" value="Your message"/>
\$GPRP,3CE002070901,F008D1798BA4,-40,02010618FF2C0887BC250100E10A990100000000
\$GPRP,3CE002070901,F008D1798BA4,-43,02010618FF2C0887BC250100E20A9A0100000000
\$GPRP,3CE002070901,F008D1798BA4,-47,02010618FF2C0887BC250100E10A990100000000

Also we can use the [Mosquitto MQTT client](#) to check the published data.

```
ingics@X411UA:~mosquitto_sub -h
b816b4c4bd3f44cab324f323683482d.s1.eu.hivemq.cloud -p 8883 -t test/igs03 -u
tester -P Tester123

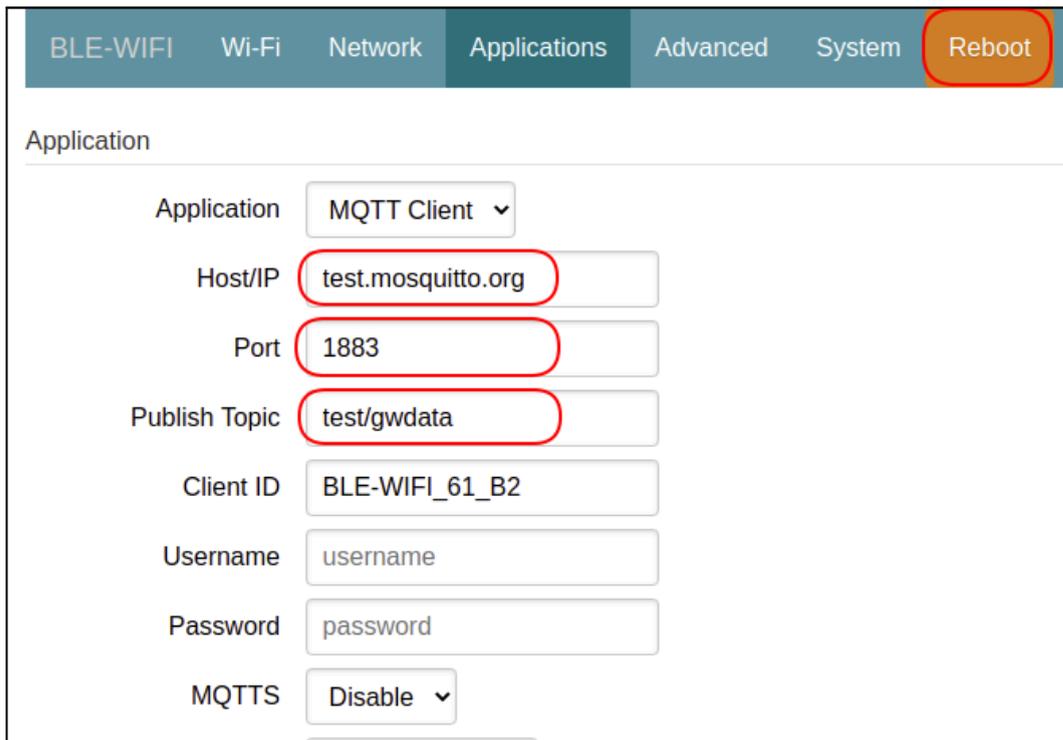
$GPRP,3CE002070901,F008D1798BA4,-47,02010618FF2C0887BC250100E20A9C0100000000000000
0041060F00,1725612085.896

$GPRP,3CE002070901,F008D1798BA4,-41,02010618FF2C0887BC250100E30A9B0100000000000000
0041060F00,1725612095.896
```

Appendix

iGS01S/iGS02E Setting

The setting page of iGS01/iGS02 differs slightly from iGS03, but the main fields are the same (Host/IP, Port, Topic, Username, Password, MQTTS). Below is an example of test.mosquitto.org test case. Remember to SAVE and REBOOT the device to apply the new setting.



Revision History

INGICS TECHNOLOGY

DATE	REVISION	CHANGES
May 16, 2019	1	Initial release
Nov 26, 2020	2	Update test broker url Add iGS03W/iGS03M configuration Add Ingics DemoBoard usage