https://wiki.teltonika-networks.com/view/Modbus_TCP_Master_MQTT_Gateway

Modbus TCP Master MQTT Gateway

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Summary

In this guide, Modbus TCP master MQTT Gateway function will be configured with two different types of MQTT Brokers. First using third-party MQTT Broker services (in this example *Flespi.io*). Second, using another router as MQTT Broker. Two RUT955 routers will be used as Modbus TCP Master and Slave, and the PC acts as MQTT Publisher and Subscriber.

Configuration overview & prerequisites

- Two RUT955 routers - one acts as Modbus TCP Master, another as Modbus TCP Slave
- Flespi.io account to act as an MQTT Broker/Publisher/Subscriber (for first configuration example)
- RUT with a Public IP address to act as MQTT Broker (for second configuration example)
- An end device (PC, Laptop) to act as MQTT Subscriber/Publisher (for second configuration example)

Configuration using flespi.io as MQTT Broker

Configuring RUT955 Modbus TCP Slave

Go to **Services → Modbus → Modbus TCP Slave**:

1. Check **Enable**
2. Enter port that will be used, in this example 502 will be used
3. Enter device ID
4. Press **Save & Apply**

In this configuration LAN port is used hence "Allow Remote Access" is not needed

Modbus TCP Slave RUT955 is now configured.

Configuring RUT955 Modbus TCP Master

Go to **Services → Modbus → Modbus TCP Master**

1. Press **Add**
2. Check **Enable**
3. Enter the name for the slave device
4. Slave ID must match with the previously configured Slave device ID
5. Enter the IP address of the Modbus TCP Slave device
6. Chose same Port as in Slave device - 502
7. Enter Period in seconds, how often requests will be sent to the Slave device
8. Enter new request name and press **Add** in Requests configurations
9. Choose Data type and Function, enter First register/coil/input to be read or written and Register count. You can name each individual configuration, and then select enable on configurations that you want to use. In this example, register to get Routers name is used.
10. Press the Test button in Request Configuration Testing to see if the Slave device responds to requests, a response similar to the image below should be shown.
11. Press Save & Apply

List of available Modbus parameters can be found here

Configuring Flespi.io MQTT Broker

1. Log in or create an account on https://flespi.io

Once logged in:

1. Navigate to MQTT Board on the left side of the screen and press it.
2. On the right-hand panel, top right corner, next to the name of the MQTT board, press the cogwheel-looking icon to open *Connection Settings*
3. In the opened window, press "Get flespi token" to generate a username
4. Enter Client name
5. Copy Host address
6. Copy Username
7. Create a password
8. Press Save

Configuring MQTT Gateway on RUT955 Modbus TCP Master

Open routers WebUI and navigate to **Services → Modbus → MQTT Gateway**

1. Select Enable
2. Enter Host (copied from flespi connection settings without 'wss://' and port)
3. Enter Username (Copied from flespi Connection settings generated token)
4. Enter Password

You can change Request and Response topics that you will have to publish and subscribe to get information from Modbus TCP Master through MQTT Gateway, but for this example, they are left on default topics

Message format for MQTT publisher

The format is in the text - heavier and slower, but less difficult to edit.

1. Format version	**0**
2. Cookie	from **0** to **2^{64} -1**
3. IP Type	**0** - IPv4; **1** - IPv6; **2** - hostname
4. IP	IPv6 must be in full format (for example: **2001:0db8:0000:0000:0000:8a2e:0370:7334**)
5. Port	Port number (for example: **502**)
6. Timeout in seconds (time to wait for response)	from **1** to **999**
7. Slave ID - Indicates to which slave request is sent	from **1** to **255**
8. Function	**3** - read registers; **6** - write single register; **16** - write multiple registers

9. Number of the first register from which information will be read or written	from **1** to **65535**
10. Registry value	If function is 3 - from **1** to **123** (first register + registry value can not go out of range); If function is 6 - from **0** to **65535** If function is 16 - from **1** to **123** (first register + registry value can not go out of range), Registry values separated by commas without spaces. Example.: **1,2,3,654,21,789**. There has to be as many values, as specified number of registers, and each value must be between **0** and **65535**. If number of registries is 0, there should be **no registry values**

Examples

Setting relay (on) (Relay address is 202, which means 'Number of first register will be 203)	**0 65432 0 192.168.1.1 502 5 1 6 203 1**
Getting uptime	**0 65432 0 192.168.1.1 502 5 1 3 2 2**

Testing MQTT Publisher and Subscriber on flespi.io

Log in and navigate to MQTT Board on https://flespi.io

Add a Subscriber:

1. Press **'+'** button on the top right corner
2. Select **'*Subscriber*'**
3. In the topic field enter **'*response*'**
4. Press **'*Subscribe*'** button

Add a Publisher:

1. Press **'+'** button on the top right corner
2. Select **'*Publisher*'**
3. In the topic field enter **'*request*'**
4. In the message field enter message, for this example **'*Getting uptime*'** is used
5. Press **'*Publish*'** button

Check the response in the **'*Subscriber*'** tab, you should receive a message similar to the one below.

When the value climbs over 65535 the counter resets and the value held by the first register increases by **1**. So one way to interpret the results would be to multiply the value in the first register by 2^{16} and add it to the value of the second register. In this example: **9 * 65536 + 3502 = 593326s** or **6 days 20 hours 48 minutes and 46 seconds.**

This Means that MQTT Gateway on Modbus TCP Master router is working correctly and Modbus TCP Slave receives requests.

Configuration using a router as MQTT Broker

Configuring Modbus TCP Master, MQTT Gateway MQTT Broker on RUT240, and MQTT Publisher/Subscriber on PC

The same configuration will be used for Modbus TCP Master and Slave RUT955 routers as in the previous example, only settings in Modbus TCP Master router RUT955 will be changed to match MQTT Broker on RUT240 router

Navigate to **Services → Modbus MQTT Gateway**

1. **Enable**
2. Host: **Enter Public IP address of MQTT Broker (RUT240)**
3. Username: **N/A**
4. Password: **N/A**
5. Press **Save & Apply**

Configuring RUT MQTT Broker

Navigate to **Services → MQTT → Broker**

1. Select **Enable**
2. Check **Enable Remote Access**
3. Press **Save & Apply**

Testing MQTT Gateway

For testing purposes, two terminal windows will be used on the same PC.

To get Ubuntu terminal on Windows 10/11, refer to the following link for instructions: https://tutorials.ubuntu.com/tutorial/tutorial-ubuntu-on-windows#0

- Open first terminal, which will act as **Subscriber**. Type in:

mosquitto_sub -h [Host_address] -p [Port] -t [Topic]

- Open second terminal, which will act as **Publisher.** Type in:

mosquitto_pub -h [Host_address] -p [Port] -m [‘Message’] -t [Topic]

- On the first window - **Subscriber**, a response should appear

See Also

- Modbus Master RutOS configuration example
- RUT955 Monitoring via Modbus#Get Parameters