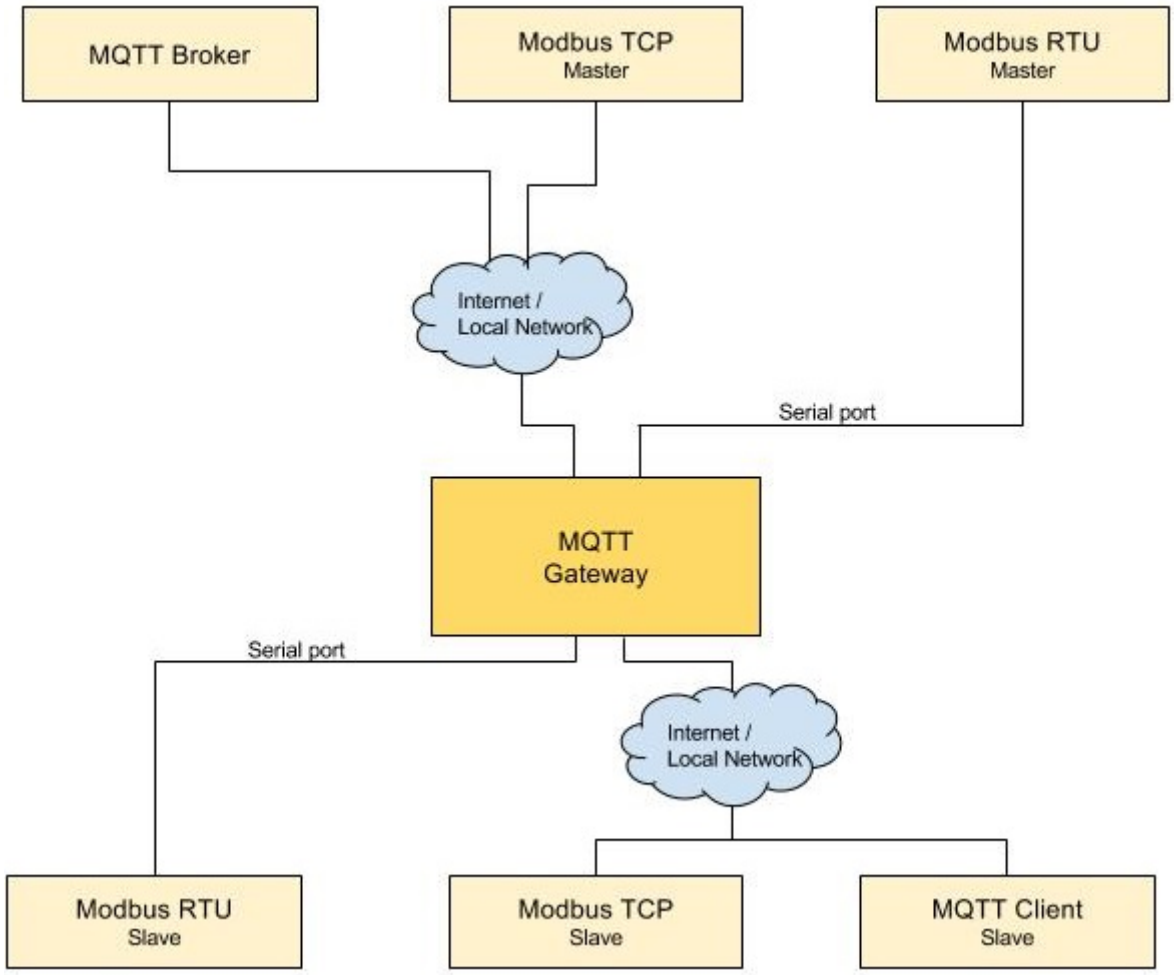
MQTT Gateway

1. Introduction

MQTT Gateway is device based on iMod software, designed for easy integration of MQTT and Modbus RTU/TCP networks. Configuration of MQTT Gateway is the same as iMod configuration. The device can be used as master, slave or multi-master for both protocols. Additionally **MQTT Gateway** has the ability to cache data, which greatly speeds up the response and minimizes the use of data packets.



1.1 What is iMod software

iMod is a software that can be configured using an simple XML file. iMod supports multiple data protocols.

1.2 What is MQTT

MQTT (MQ Telemetry Transport) is a publish-subscribe-based “lightweight” messaging protocol. It is designed for connections with remote locations where a “small code footprint” is required or the network bandwidth is limited. The publish-subscribe messaging pattern requires a message broker. The broker is responsible for distributing messages to interested clients based on the topic of a message.

1.3 What is Modbus

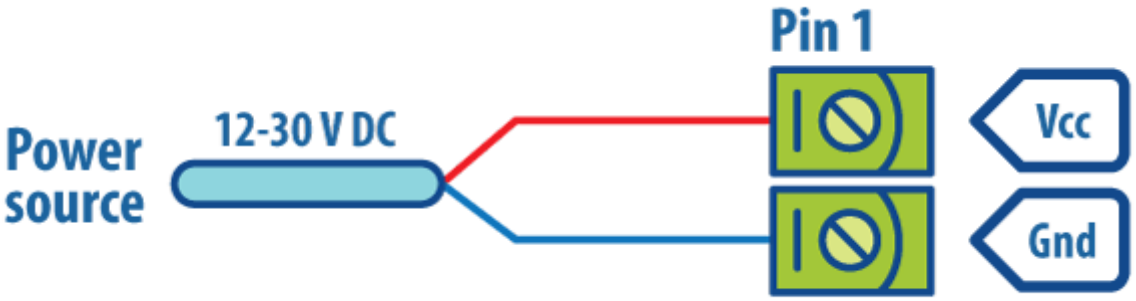
Modbus is a serial communications protocol for use with programmable logic controllers (PLCs).

Simple and robust, it has since become a de facto standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices.

2. Startup

2.1 Powering up

The first step is connect the power supply.



2.2 SSH

You can login to the device by port 22 (default in SSH) e.g., using PuTTY in Windows or *ssh* command in Linux.

- **port: 22**
- **Login**: pi
- **Password**: raspberry

3. Configuration

Main file of iMod configuration (named Mainconfig.xml) is located in /mnt/mtd/iMod/config/MainConfig.xml. You can edit configuration using FTP.

- **protocol: sftp**
- **Login**: pi
- **Password**: raspberry

3.1 Modbus to MQTT Gateway

Modbus to MQTT Gateway need Modbus Source-Channel (RTU or TCP) to get data and MQTT Access-Channel to share data.

Source-channel is one of the basic iMod channels. It is used to retrieve data from different sources, eg. Energy meter with Modbus RTU protocol.
Access-channel is one of the basic iMod channels. It is used to access any values stored in iMod

Source-Channel: Modbus Slave side
For Modbus RTU:

```
<source-channel name="Modbus_S1">
    <protocol name="MODBUS">
        <property name="type" value="RTU"/>
    </protocol>
    <port>"/dev/ttySC0-9600-8N1"</port>
    <property name="device-id" value="2"/>
    <read-timeout>"2s"</read-timeout>
</source-channel>
```

For Modbus TCP:

```
<source-channel name="Modbus_S1">
    <protocol name="MODBUS">
        <property name="type" value="TCP"/>
    </protocol>
    <port>"192.168.0.1"</port>
    <property name="device-id" value="2"/>
    <read-timeout>"2s"</read-timeout>
</source-channel>
```

Message-Channel: MQTT Broker side

```
<message-channel name="MQTTMChannel">
    <protocol name="MQTT"/>
    <port>"192.168.0.1"</port>
    <property name="client-id" value="id2"/>
    <property name="use-any-topic" value="true"/>
```

```
</message-channel>
```

Example parameter:

```
<parameter type="int16">
    <id>"Parameter2"</id>
    <source-channel channel-name="Modbus_S1" parameter-id="102"/>
    <event type="OnChange">
        <message-channel channel-name="MQTTMChannel"
parameter-id="topic/parameter_102"/>
    </event>
</parameter>
```

3.2 MQTT to Modbus Gateway

MQTT to Modbus Gateway need MQTT Source-channel to get data and Modbus (RTU or TCP) Access-Channel to share data.

Source-Channel: MQTT Client

```
<source-channel name="MQTTSChannel">
    <protocol name="MQTT"/>
    <port>"192.168.0.1"</port>
    <property name="client-id" value="id"/>
    <property name="use-any-topic" value="true"/>
</source-channel>
```

Access-Channel: Modbus Master
For Modbus RTU:

```
<access-channel name="Modbus_M1">
    <protocol name="MODBUS">
        <property name="type" value="RTU"/>
    </protocol>
    <port>"COM3-9600-8N1"</port>
    <property name="device-id" value="1"/>
    <property name="varspace" value="INPUT"/>
</access-channel>
```

For Modbus TCP:

```
<access-channel name="Modbus_A1">
    <protocol name="MODBUS">
            <property name="type" value="TCP"/>
    </protocol>
    <port>"ET-502-TCP"</port>
    <property name="device-id" value="1"/>
</access-channel>
```

Example parameter:

```
<parameter type="int16">
    <id>"Parameter1"</id>
    <source-channel channel-name="MQTTSChannel"
parameter-id="main/topic/parameter_101"/>
    <access-channel channel-name="Modbus_A1" parameter-id="101"/>
</parameter>
```

4. Example configuration

Below is an example configuration:

```
<imod version="1.0.0" parameter-db="true">
    <group name="Definicje kanalow">
        <!-- MQTT Client -->
        <source-channel name="MQTTSChannel">
            <protocol name="MQTT"/>
            <port>"192.168.0.138"</port>
            <property name="use-any-topic" value="true"/>
        </source-channel>
        <!-- Modbus Master -->
        <access-channel name="Modbus_M1">
            <protocol name="MODBUS">
                <property name="type" value="TCP"/>
            </protocol>
            <port>"ET-502-TCP"</port>
            <property name="device-id" value="1"/>
        </access-channel>
        <!-- Modbus Slave -->
        <source-channel name="Modbus_S1">
            <protocol name="MODBUS">
                <property name="type" value="TCP"/>
            </protocol>
            <port>"ET-192.168.0.138-502-TCP"</port>
            <property name="device-id" value="1"/>
        </source-channel>
        <!-- MQTT Broker -->
        <message-channel name="MQTTMChannel">
            <protocol name="MQTT"/>
            <port>"192.168.0.1"</port>
            <property name="use-any-topic" value="true"/>
        </message-channel>
        <!-- MQTT to Modbus TCP -->
        <parameter type="int16">
            <id>"Parameter1"</id>
            <source-channel channel-name="MQTTSChannel"
parameter-id="main/topic/parameter_101"/>
```

```
            <access-channel channel-name="Modbus_M1" parameter-id="101"/>
        </parameter>
        <!-- Modbus TCP to MQTT-->
        <parameter type="int16">
            <id>"Parameter2"</id>
            <source-channel channel-name="Modbus_S1" parameter-id="102"/>
            <event type="OnChange">
                <message-channel channel-name="MQTTMChannel"
parameter-id="main/topic/parameter_102"/>
            </event>
        </parameter>
    </group>
</imod>
```