Assignment MQTT

ITT

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# Mosquitto MQTT Broker

A Raspberry Pi 4B (RPI) will be used to run the Mosquitto MQTT Broker. The setup process will be explained below. First, we will set up a fresh operating system (OS) installation on the RPI, after that we will set up the Mosquitto MQTT Broker. Fater that we can test if our installation was correct.

## Setup

### OS installation on Raspberry Pi

In order to install a OS on our RPI we will need a empty micro SD-Card (min 8 GB) and the Raspberry Pi Imager Tool.

A screenshot of a computer

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Figure 1 raspberry pi imager tool

We chose Raspberry Pi OS Lite (64-bit).

Following configuration will be set in the Raspberry Pi Imager Tool. The username and password can be chosen arbitrarily. The WiFi configuration needs to be changed to the network configuration of the desired network.

A screenshot of a login form

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Figure 2 general configuration tab in raspberry pi imager

A screenshot of a computer

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Figure 3 services configuration tab in raspberry pi imager

### Connect to RPI using ssh or serial

##### SSH

To connect to the RPI using ssh you need to get the IP address of your Raspberry Pi. You may retrieve this from the configuration page of you WiFi router. Afterwards you can access the device using:

ssh <username>@<IPAddress>

The username is the one chosen in the configuration above.

##### Serial

To connect to the RPI via Serial interface you need to plug in the RPIs SD-card back to your computer and edit the “config.txt” file. You will need to add the following line to the file:

enable\_uart=1

Save the file, disconnect the SD-card and put it back into the raspberry-pi and reboot it.

You can now use a TTL-to-USB adapter to access the RPIs serial interface on TH GPIO Pins. Connect the TTL\_to\_USB adapter to pins 6 (GND), 8 (TX) and 10 (RX). You can use a sowarte like putto to access the device now.

### Mosquitto MQTT Broker installation

In order to install the Mosquitto MQTT Broker on our RPI we will run following commands:

To update all installed packages to their newest versions:

sudo apt update && sudo apt upgrade

To install the actual Mosquitto MQTT Broker software.

sudo apt install -y mosquito mosquito-clients

To add the MQTT Broker as a service to the auto start of the device:

sudo systemctl enable mosquitto.service

To ensure a secure connection and access only by authorized clients we want to setup a username and password. First we need to create a password file. Replace “username” with your desired username. You will then be asked to input a password:

sudo mosquitto\_passwd -c /etc/mosquitto/passwd username

In order to enable remote access we need to edit the mosquito.conf. A listener port will be defined and the password file will be added to the configuration:

sudo nano /etc/mosquitto/mosquitto.conf

Add the following lines:

# Enable authentication   
allow\_anonymous false   
password\_file /etc/mosquitto/passwd   
  
# Configure standard MQTT port   
listener 1883

After the install we can reboot the system using

sudo reboot

### Setup avahi deamon

As the IP address of our MQTT Broker may change we want to be able to access it using a name instead of an IP address when trying to connect to it.   
In order to do so we will install a local DNS or mDNS service calles Avahi.  
Runn following commands to set it up:

Installation of avahi:

sudo apt update

sudo apt install avahi-daemon

Change hostname to the one desired, you can also use the hostname given in the setup configuration earlier.:

sudo raspi-config -> “System Options” -> “Hostname”

You can now access device ssh or the mosquito MQTT broker using:

ssh user@hostname.local

## Testing

In order to test the MQTT Broker we need to install the Mosquitto MQTT Tools on a separate Computer or device. In this case we installed Mosquitto on a Windows PC in the same network as the RPI.

Use a command line tool and go to the folder of you mosquito installation. On Windows usually:

c:\Program Files (x86)\mosquitto>

User following command to subscribe to a test topic on our MQTT Broker.   
You can use -h “hostname.local” or the IP address of the RaspberryPi. -t “test” is the test topic. Username and password are the ones chosen earlier when setting up the Mosquitto MQTT Broker.

mosquitto\_sub.exe -h hostname.local -t test -u "username" -P "password"

This command will run a MQTT subscriber waiting for data to be published:

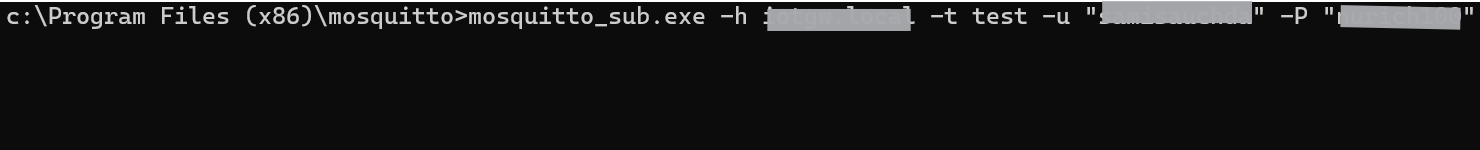


Figure 4 command line running mosquitto subscriber on windows

In a second command line (also inside the mosquito installation folder) we will run the publish command using the same settings. -m defines the message to be send:

mosquitto\_pub.exe -h hostname.local -t test -m “Test” -u "username" -P "password"

This will publish a message to the MQTT Broker. The subscriper will receive the message

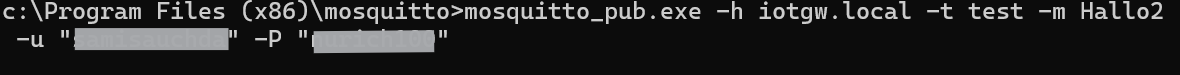


Figure 5 message "Hallo2" published on MQTT Broker

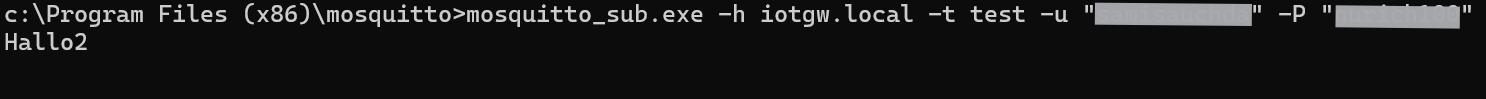


Figure 6 Subscriber received the test message

# MQTT Client (Sensor)

## Setup

A diagram of a computer chip

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<https://github.com/samisauchda/TechnikumITT_DHT_MQTT>

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Tabelle 1: Meine Tabellenbeschriftung

# MQTT Client (Receiver)

# Functionality Summary

# Abbildungsverzeichnis

[Abbildung 1: Ein Zitronenfisch (Zitronenfischzeichner, 2022) 5](#_Toc129777719)

# Literaturverzeichnis

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