



CHAOS IM QUADRAT
WWW.CCC-MANNHEIM.DE

Nächster Level von MQTT (mim ESP)

Olo

Agenda

- ESP
- MQTT
- Homie
- Firmware
- Beispiel

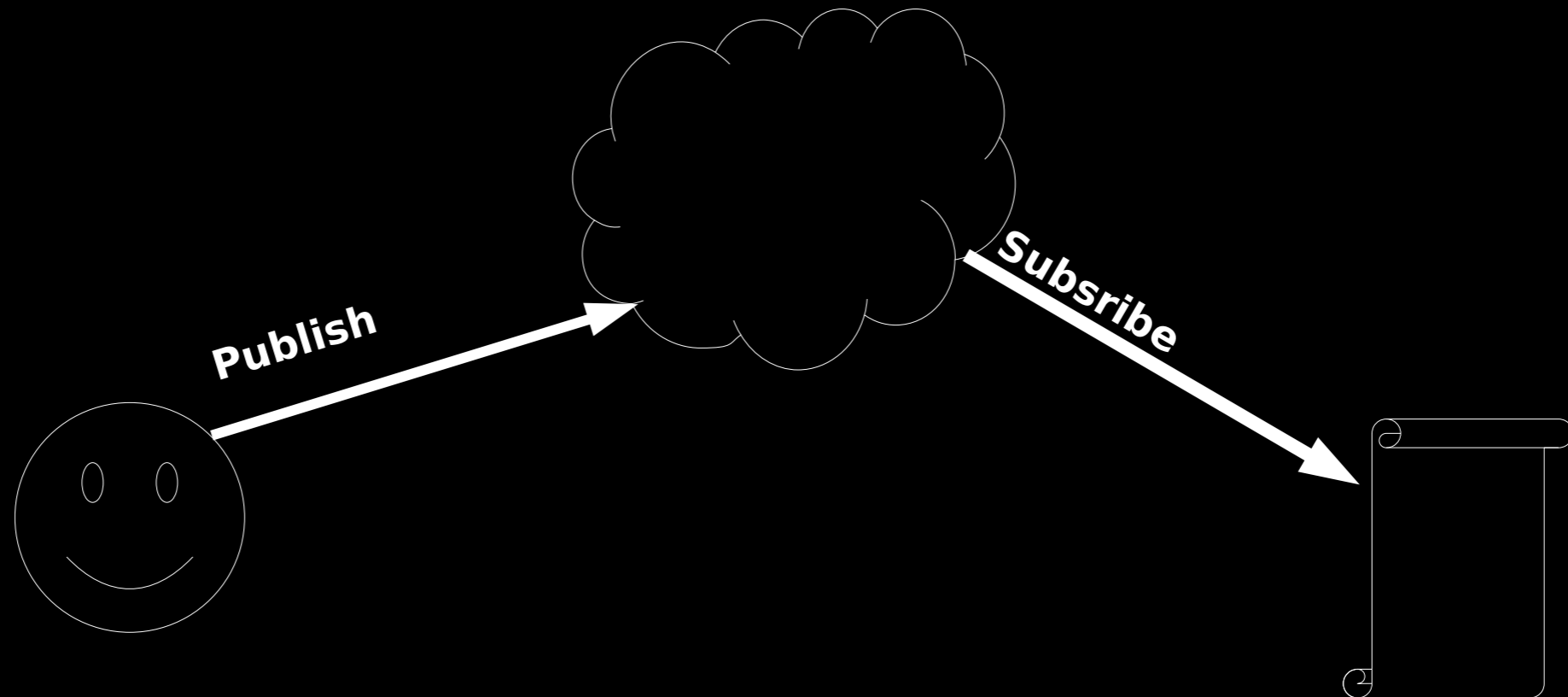
ESP

- ESP
 - ESP8266 (der “alte” Anno 2014)
 - Single Core
 - IEEE 802.11 b/g/n Wi-Fi
 - 17 GPIOs
- ESP32
 - “Neu”
 - Dual Core
 - 802.11 b/g/n & Ethernet & Bluetooth
 - 34 GPIOs

MQTT

Publish – Subscriber

→ Zentraler Server (Broker) notwendig



Topic z.B.: clubraum/werkstatt/licht

MQTT - Werkzeug

The screenshot displays the MQTT Explorer interface. On the left, a tree view shows a hierarchy of topics. The 'kitchen' folder is expanded to show 'sensor1', which is further expanded to show 'temp'. The 'temp' topic is selected, showing its properties: \$name = Room Temperature, \$type = number, \$properties = temp, and a current value of 22.31. Below these properties, a log entry is visible: log = {"level":90,"message":"Temp22.44\tPressure:1024.68\tAltitude:-94.73","statusCode":10:}. On the right, the 'Value' section shows the current value of 22.31 with a green bar and a checkmark, compared to the previous message of 22.26 with a red bar and a minus sign. Below this, a 'History' section contains a line graph showing temperature fluctuations over time, with a data point for 11.01.2022 21:43:10 at 22.31.

MQTT Explorer
<https://mqtt-explorer.com/>



Homie



MQTT Convention for IoT/M2M

- Feste vorgegebene Struktur in MQTT
- Auto-Discovery (z.B. OpenHAB2.x)

```
homie / device123 / $homie → 3.0
homie / device123 / $name → My device
homie / device123 / $state → ready
homie / device123 / $nodes → mythermostat
homie / device123 / mythermostat / $name → My thermostat
homie / device123 / mythermostat / $properties → temperature
homie / device123 / mythermostat / temperature → 22
homie / device123 / mythermostat / temperature / $name → Temperature
homie / device123 / mythermostat / temperature / $unit → °C
homie / device123 / mythermostat / temperature / $datatype → integer
homie / device123 / mythermostat / temperature / $settable → true
(Quelle: https://homieiot.github.io/)
```



MQTT-ESP8266

Funktionalität

- Homie Abstraktion
- Eigenschaften
- Webserver zur Konfiguration
- Over-the-Air Update

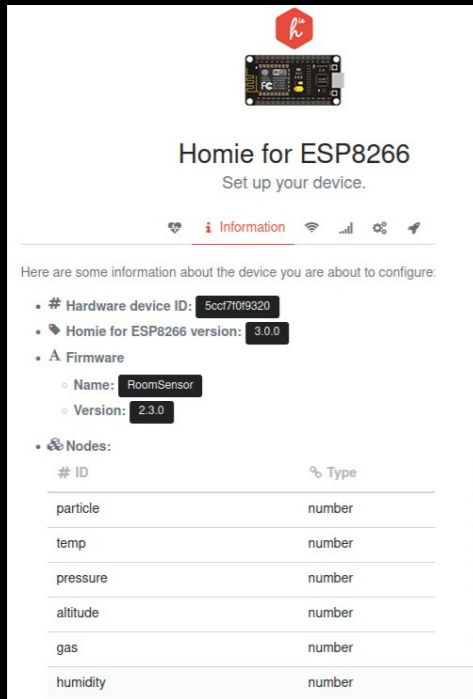
Arduino basiert

- Große Auswahl an Bibliotheken

PlatformIO und VSCode nutzend

- Abstraktions-Ebenen mehr

Homie-RaumSensor



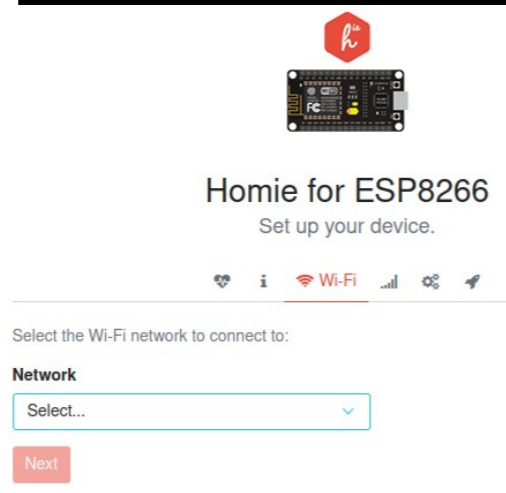
Homie for ESP8266
Set up your device.

Information

Here are some information about the device you are about to configure:

- # Hardware device ID: 5ccf71019320
- Homie for ESP8266 version: 3.0.0
- Firmware
 - Name: RoomSensor
 - Version: 2.3.0
- Nodes:

| # ID | Type |
|----------|--------|
| particle | number |
| temp | number |
| pressure | number |
| altitude | number |
| gas | number |
| humidity | number |



Homie for ESP8266
Set up your device.

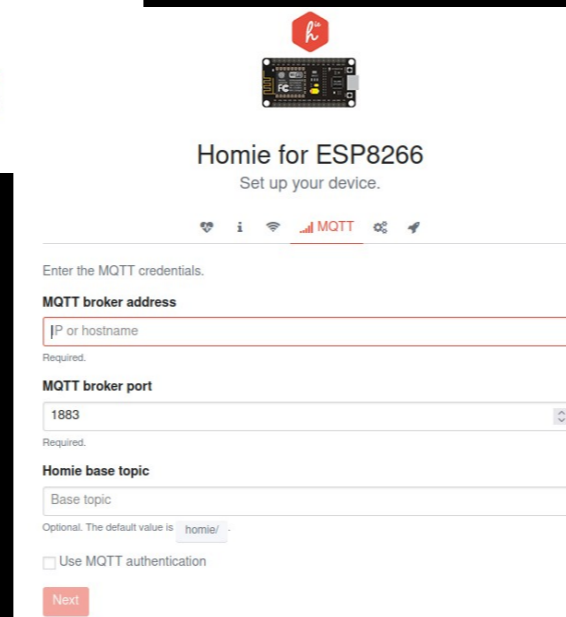
Wi-Fi

Select the Wi-Fi network to connect to:

Network

Select...

Next



Homie for ESP8266
Set up your device.

MQTT

Enter the MQTT credentials.

MQTT broker address

IP or hostname

Required.

MQTT broker port

1883

Required.

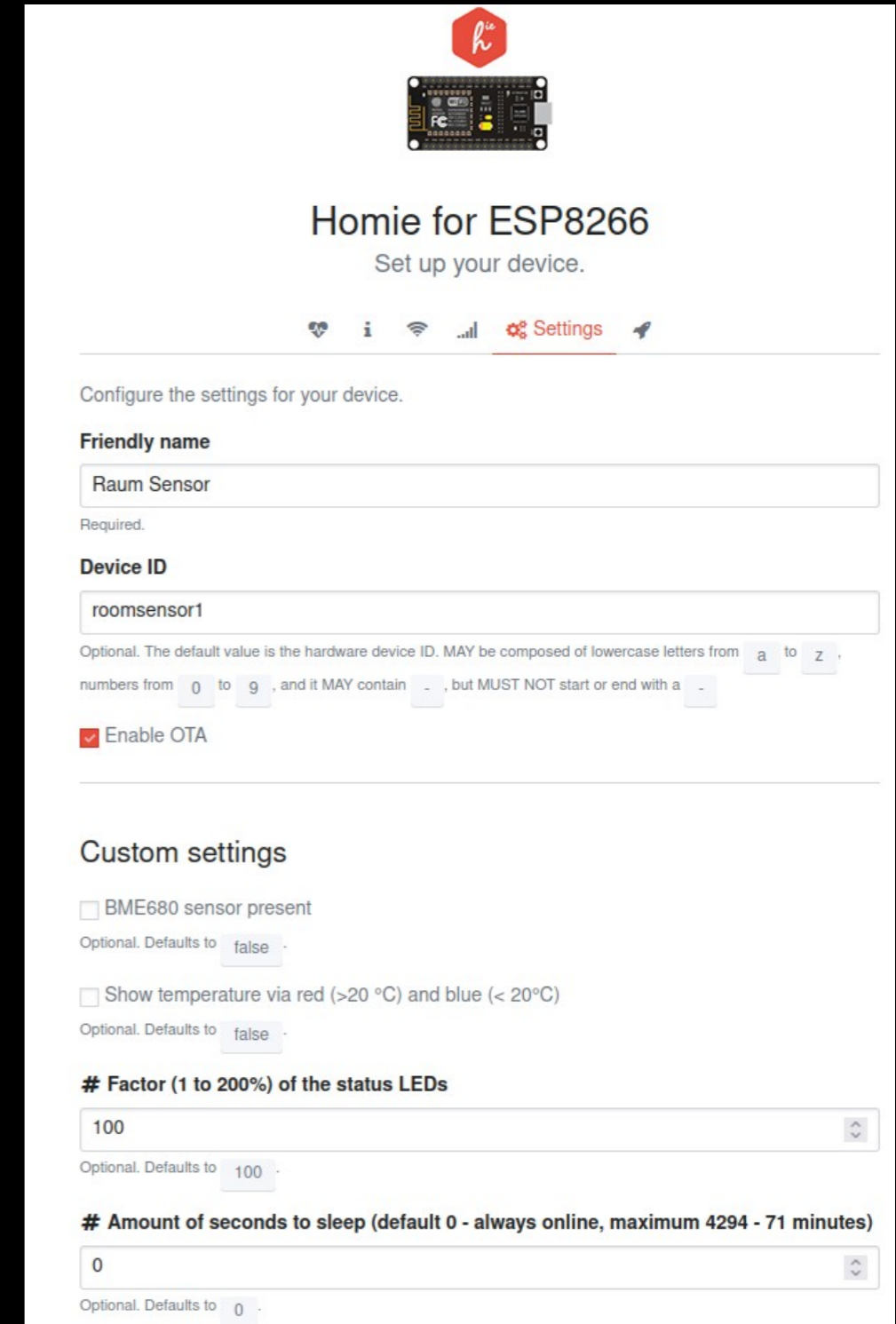
Homie base topic

Base topic

Optional. The default value is homie/.

Use MQTT authentication

Next



Homie for ESP8266
Set up your device.

Settings

Configure the settings for your device.

Friendly name

Raum Sensor

Required.

Device ID

roomsensor1

Optional. The default value is the hardware device ID. MAY be composed of lowercase letters from a to z, numbers from 0 to 9, and it MAY contain -, but MUST NOT start or end with a -.

Enable OTA

Custom settings

BME680 sensor present

Optional. Defaults to false.

Show temperature via red (>20 °C) and blue (< 20°C)

Optional. Defaults to false.

Factor (1 to 200%) of the status LEDs

100

Optional. Defaults to 100.

Amount of seconds to sleep (default 0 - always online, maximum 4294 - 71 minutes)

0

Optional. Defaults to 0.

MQTT-RaumSensor Interna

Eigenschaft (zum Beispiel Partikel in der Luft)

```
HomieNode particle(NODE_PARTICLE, "particle", "number");  
...  
particle.advertise(NODE_PARTICLE).setName("Particle")  
                                     .setDatatype(NUMBER_TYPE)  
                                     .setUnit("micro gram per quibik");  
...  
particle.setProperty(NODE_PARTICLE).send(String(mParticle_pM25));
```

Einstellung (z.B.: Helligkeit)

```
HomieSetting<long> rgbDim("rgbDim", "Factor (1 to 200%) of the status LEDs");  
...  
rgbDim.setDefaultValue(100).setValidator([] (long candidate) {  
    return (candidate > 1) && (candidate <= 200);  
});  
...  
strip.setPixelColor(0, strip.Color(0,0,128 * rgbDim.get()));
```

Fazit

- ESP8266 und ESP32
- Auto-Discovery
- Arduino-Bibliotheken verfügbar
- OTA Update
- Nur MQTT kein Webserver o.ä. aufm ESP

Danke für Eure
Aufmerksamkeit

Fragen

Anregungen Ideen

Diskussion

Quellen

<http://defcon-cc.dyndns.org/wiki/ESP8266>

<https://en.wikipedia.org/wiki/ESP8266>

<https://en.wikipedia.org/wiki/ESP32>

<https://mqtt-explorer.com/>

<https://homieiot.github.io/>

<https://www.ccc-mannheim.de/wiki/ESP8266/HomieRoomSensor>