

MQTT

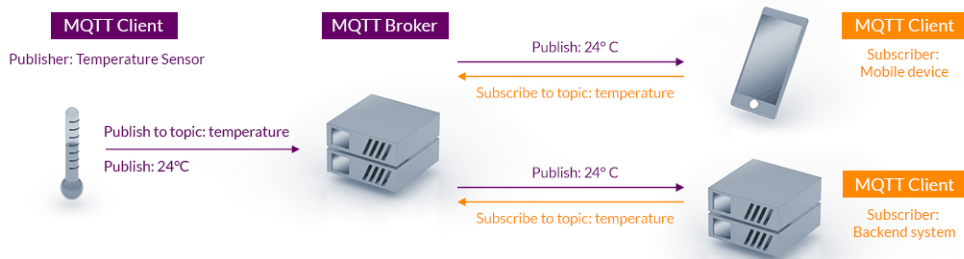
IoT for Wisconsin Chemists

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February 17, 2023





Graphic from <https://mqtt.org/>





<https://mosquitto.org/download/>

```
mosquitto_sub -h mqtt.chem.wisc.edu -t "#" --verbose  
  
-t "homie/+/+/temperature"  
  
mosquitto_pub ...
```



```
pip install paho-mqtt
```

```
conda install paho-mqtt
```



`https://gist.github.com/untzag/
32ce545cdf315419af6174c71562b7c4`



Quality of Service level

- ▶ 0 - at most once
- ▶ 1 - at least once
- ▶ 2 - exactly once

More quality is more expensive on the network.



Retention





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



homie/device/node/property

A convention for structured MQTT data.



homie/device/node/property

homie/device123/\$homie → 4.0.0

homie/device123/\$name → My device

homie/device123/\$state → ready

homie/device123/\$nodes → mythermostat



homie/device/node/property

.../device123/mythermostat/\$name → My thermostat

.../device123/mythermostat/\$properties → temperature



homie/device/node/property

```
.../mythermostat/temperature → 22  
.../mythermostat/temperature/$name → Temperature  
.../mythermostat/temperature/$unit → deg_C  
.../mythermostat/temperature/$datatype → integer  
.../mythermostat/temperature/$settable → false
```



Property datatype options

- ▶ string
- ▶ integer
- ▶ float
- ▶ percent
- ▶ boolean
- ▶ enum
- ▶ color (rgb, hsv)
- ▶ datetime (ISO 8601)
- ▶ duration (ISO 8601)

Units

- ▶ anything you want
- ▶ recommend standard unit strings
- ▶ pint library



Feed data how you wish...

- ▶ manually with generic MQTT client
- ▶ microhomie, ESP8266
- ▶ <https://github.com/mjcumming/Homie4>





<https://graphiteapp.org>

<http://graphite.chem.wisc.edu>



all published topics which...

- ▶ follow Homie convention
- ▶ is numerical

...gets stored to Graphite

Data aggregated

- ▶ 12 seconds for 10 days
- ▶ 2 minutes for 100 days
- ▶ 2 hours for 10 years

Downsampled via averaging



render

[http://graphite.chem.wisc.edu/render/
?width=704
&height=500
&fontSize=18
&target=shop.weather.000000.bme680.temperature
&from=-1w](http://graphite.chem.wisc.edu/render/?width=704&height=500&fontSize=18&target=shop.weather.000000.bme680.temperature&from=-1w)

&format=csv



render

<http://graphite.chem.wisc.edu/render/>

?width=704

&height=500

&fontSize=18

&target=shop.weather.000000.bme680.temperature

&target=shop.weather.000001.bme680.temperature

&from=-1w

&format=csv



render

[http://graphite.chem.wisc.edu/render/
?width=704
&height=500
&fontSize=18
&target=aliasByNode\(room.weather.*.*.temperature,2\)
&from=-1w](http://graphite.chem.wisc.edu/render/?width=704&height=500&fontSize=18&target=aliasByNode(room.weather.*.*.temperature,2)&from=-1w)

&format=csv



dashboard websites



- ▶ Broker WILL go down occasionally
- ▶ Database WILL go down occasionally
- ▶ Data is NOT permanent
- ▶ Things WILL change
- ▶ Do not use for crucial control

