Let Events Drive

PYTHON + MQTT

OP Kompetensdag 10/9 2021

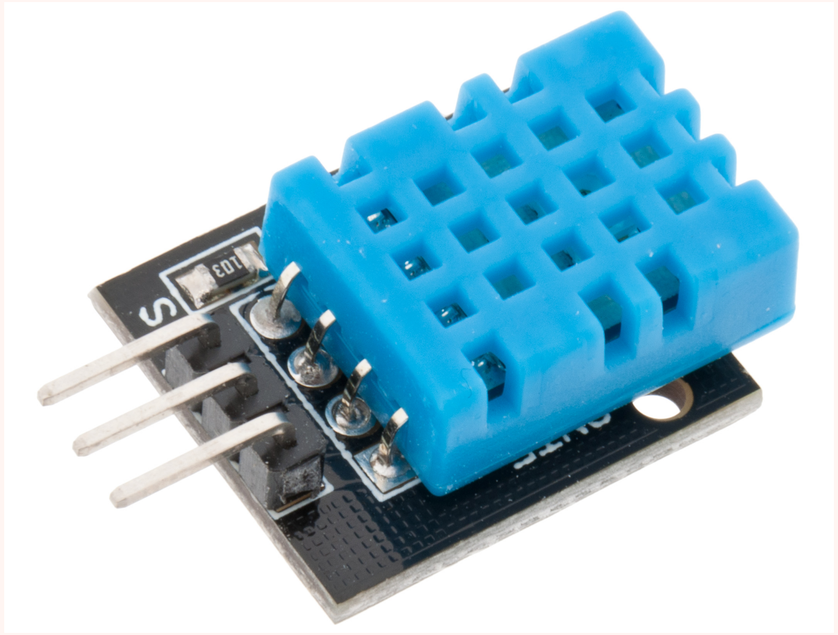
MEET SPIKE!

RUDIMENTARY HUMIDITY CONTROL

Spray bottle

Hygrometer

FIRST DIGITAL SENSOR



DHT11

Raspberry Pi

AUTOMATING WATERING

12v Water Pump

AUTOMATING WATERING

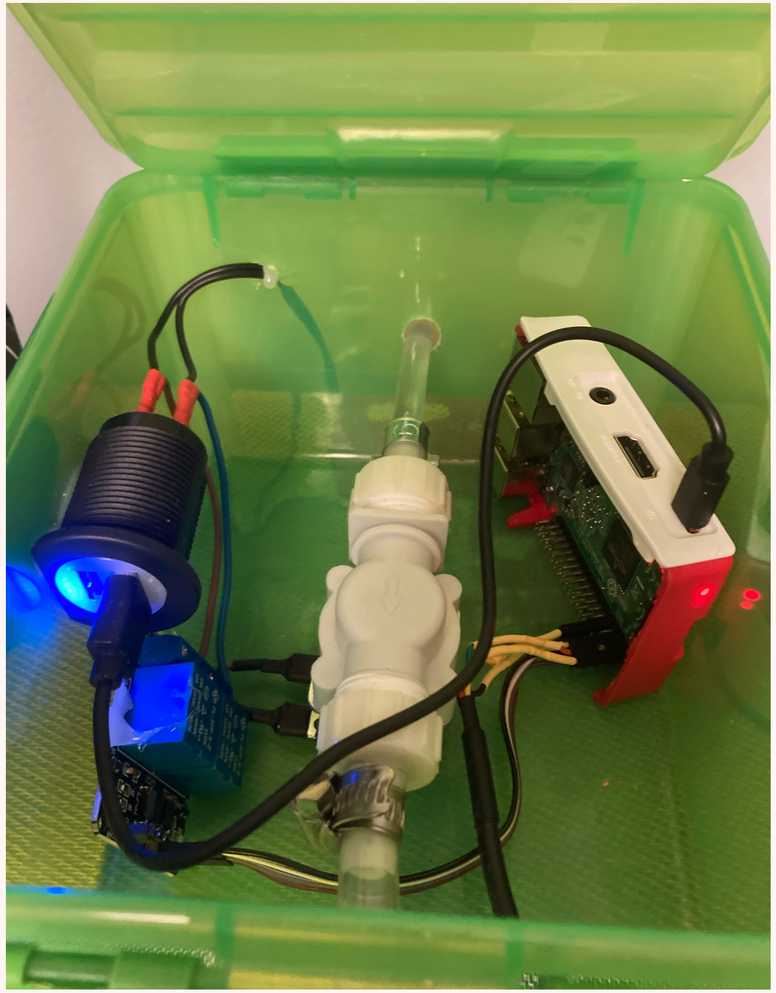
12v Water

AUTOMATING WATERING

Gardena 5L Water Sprayer

12v Water Valve

THE CURRENT SETUP



SHT 30 Sensor

REQUIREMENTS

- Spray for 6 seconds when the relative humidity drops below 75%
- Wait min. 10 minutes before spraying again
- Upload data to cloud storage for monitoring
- If sensor is down, spray for 6 seconds every 6 hours
- Spray at 20:00 if not recently sprayed

V1

- Cron job
- Single process

V1

- Have we just watered?
  - Persist last watering time
- Uploading data
  - Keep history -> expensive
  - Just current state -> very limited
- Read sensor failure
  - Should also be monitored

V1

- Explosion of main process
  - In length
  - In complexity
  - Due to unexpected failures

RE-THINK

- Not fun to extend
- Extension risks breaking core functionality
- Not pretty

SEPARATION TO THE RESCUE!

- Local persistence + multiple cron jobs/services
  - ugh
- Events?
  - Yay!

Sensor Reader

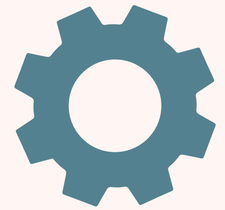
Temperature Changed ⇒

Humidity Changed ⇒

Error ⇒

Humidity Monitor

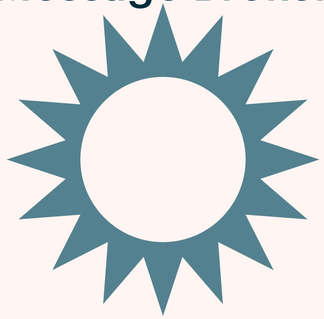
Humidity Changed ⇒



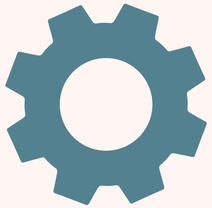
⇐ Low Humidity

⇐ Humidity Alarm

Message Broker



Event Store



⇐ Temperature Changed

⇐ Humidity Changed

⇐ Low Humidity

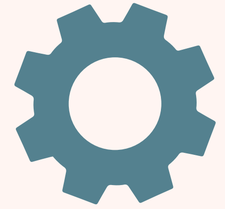
⇐ Humidity Alarm

⇐ Water Valve Opened

⇐ Error

Water Valve

Low Humidity ⇒



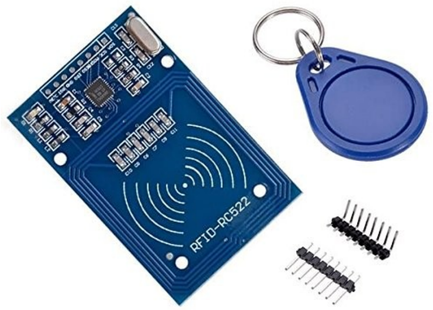
⇐ Water Valve Opened

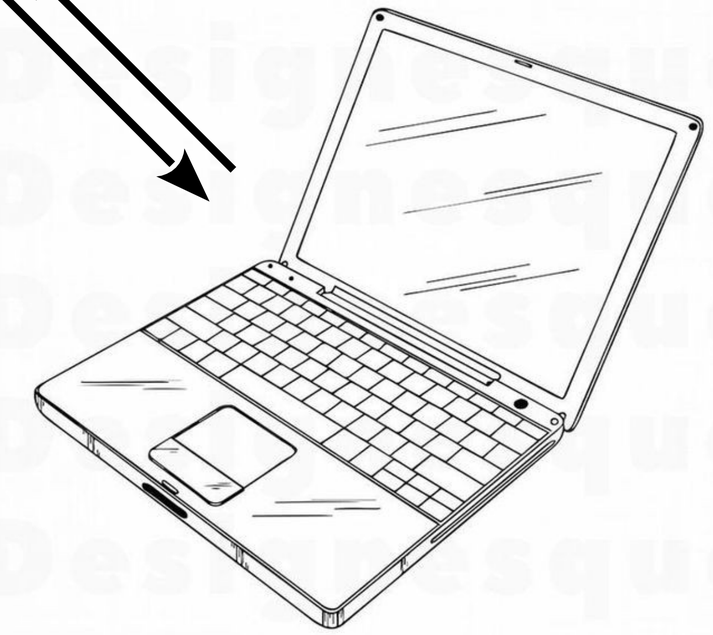
MQTT

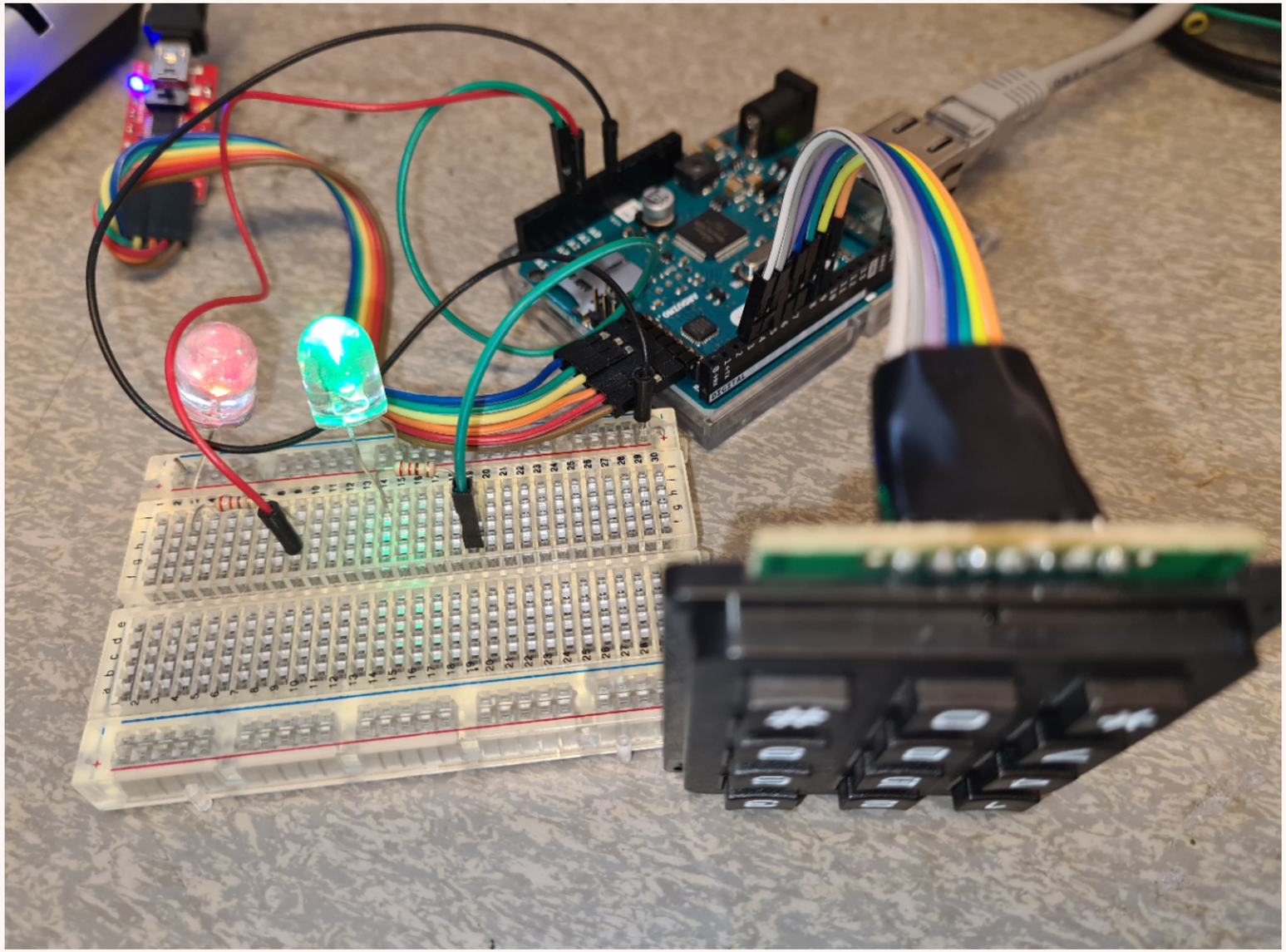
- A message broker
- Not necessarily a message queue!
- OASIS standard since 2014
- IoT Messaging
- Many implementations


MQTT


LOLIN TFT-2.4


RFID-RC522





MQTT CONCEPTS

- Client
  - Publish to a topic
  - Subscribe to a topic
- QOS
  - Three levels

MQTT CONCEPTS

- QOS 0
  - At most once
- QOS 1
  - At least once
- QOS 2
  - Exactly once

MQTT CONCEPTS

- Connecting
  - Client ID
  - Clean Session

MQTT CONCEPTS

- Publishing
  - Topic
  - Payload
  - QOS
  - Retain

MQTT CONCEPTS

- Subscribing
  - Topic
  - QOS

MICROSCRIPTS

- Lets have a look at some code...

MQTT PLAY

- Aims
  - Get a feel for how to write small pub-sub services in python
  - Explore some of the MQTT concepts discussed
    - Retained messages
    - Persistent sessions

MQTT PLAY

- Part 1
  - Get an MQTT message broker running
  - Write a producer
- Meet back in 30 minutes

MQTT PLAY

- Part 2
  - Write a consumer
  - Play with some MQTT options
- Meet back in 30 minutes

FIN

Thank you for attending MQTT + Python Kompetenspass 2021!