

For the Lab 2: Free Project, the group has chosen to design and implement an IoT application. The project in question will use a CO2 sensor to automatically send out warnings about air quality, more precisely the staleness of it, which has repercussions on the brain such as loss of concentration.

To implement it, the group will use the aforementioned sensor in conjunction with a Raspberry Pi for the computational part of the project and using MQTT as middleware.

A second type of middleware might be used to equate possible different results.

For results, tests will most likely be run on our home rooms, as the pandemic makes it difficult to test it on uni's classrooms, not only because their availability is limited but also, and primarily, because the new guidelines appeal for ventilated classrooms, with windows and doors open, which make them unsuitable for testing this specific project.

## 1. APPLICATION

- Raspberry Pi with the CO2 sensor. Raspberry Pi is also the MQTT publisher and MQTT broker.
- Phone app is the MQTT subscriber and gets an alert when the CO2 levels are too high.

## 2. MEASUREMENTS

- PC acts as the MQTT subscriber and we measure the latency of the MQTT packets (through Wireshark). PC and Raspberry Pi should be in a different network. MQTT has 3 levels of QoS: At most once, At least once, Exactly once. We can measure the latency of these services.
- Add more MQTT subscribers and measure the latency for one of them.
- We could change the MQTT broker to be in a different network (not on Raspberry Pi) and then measure latency.
- Measure the packet overhead of MQTT packets.

## 3. IMPROVEMENTS

- A web app with the graph of the CO2 levels.
- MQTT usually works unencrypted, but allows the option of TLS. We can implement it and test the latency.
- Use second middleware and measure the latency, packet overhead

## 4. HARDWARE NEEDED

- CO2 sensor

## 5. TIMELINE

- week 1 test hardware
- week 2 implement MQTT functionalities
- week 3 MQTT apps final details
- week 4 finish MQTT part and start testing
- week 5 finish tests and write report