



UNIVERSIDADE DE COIMBRA

FCTUC – Licenciatura em Engenharia e Ciência de Dados

Sistemas e Redes de Sensorização e Atuação

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- Essencialmente o objetivo do projeto é fornecer-nos a capacidade de manipular dados em tempo real, transferir e coletar dados usando MQTT, processar dados de sensores, fornecer alarmes e exibir dados em tempo real num dashboards.
- Criámos um publisher(“publisherA”) que tem a função de coletar dados ambientais de sensores e publicá-los em tópicos específicos no broker MQTT. Neste caso os tópicos gerados foram (‘18_temperature’, ‘18_pressure’ e ‘18_luminosity’).
- De seguida criámos um subscriber/ processing unit que tem a tarefa específica de receber os dados publicados pelos publishers no broker MQTT e processá-los. O subscriber é programado para se inscrever em tópicos específicos no broker MQTT para receber os dados publicados pelos publishers. Após receber os dados, o processing unit deve processá-los para extrair informações relevantes e armazená-las num banco de dados(InfluxDB). Além disso, o processing unit também deve ser capaz de detetar anomalias ou situações críticas com base nos dados recebidos e gerar alarmes em tempo real para alertar os users sobre essas situações. Criámos também a aplicação client RealData Surveillance, que recebe alertas em tempo real sempre que os valores dos sensores estão fora dos limites estabelecidos como saudáveis. A aplicação é responsável por exibir esses alertas numa tela de consola em tempo real, mostrando informações sobre o sensor.

```
"C:\project\group10@isa-pi-9i->\project & python publisherA.py

Raw value: 187
Luminosity from sensor = 223.80 Lux
Temperature = 20.90 C
Pressure = 100835.23 Pa

Raw value: 187
Luminosity from sensor = 222.34 Lux
Temperature = 20.90 C
Pressure = 100835.49 Pa

Raw value: 187
Luminosity from sensor = 223.80 Lux
Temperature = 20.90 C
Pressure = 100835.45 Pa

Raw value: 187
Luminosity from sensor = 223.80 Lux
Temperature = 20.90 C
Pressure = 100844.92 Pa

Raw value: 187
Luminosity from sensor = 223.80 Lux
Temperature = 20.90 C
Pressure = 100834.75 Pa
```

Fig1. Output publisherA no Putty

```
Received Message: 18_luminosity 223.79679144385028
Received Message: 18_temperature 20.9
Average Temperature in Celsius: 20.9 C
Average Temperature in Fahrenheit: 69.62 F
Received Message: 18_pressure 100831.05488328057
Received Message: 18_luminosity 223.79679144385028
Received Message: peak 132589.45614479118
Received Message: off_peak 66172.05773471981
Received Message: sensor_data_hum_1 35.0
Received Message: 18_temperature 20.9
Average Temperature in Celsius: 20.9 C
Average Temperature in Fahrenheit: 69.62 F
Received Message: sensor_data_hum_2 65.0
Received Message: 18_pressure 100836.94674556213
Received Message: 18_luminosity 223.79679144385028
Received Message: 18_temperature 20.9
Average Temperature in Celsius: 20.9 C
Average Temperature in Fahrenheit: 69.62 F
Received Message: 18_pressure 100831.79455013463
Received Message: 18_luminosity 223.79679144385028
Received Message: peak 132589.45614479118
Received Message: off_peak 66172.05773471981
Received Message: sensor_data_hum_1 38.0
Received Message: 18_temperature 20.9
Average Temperature in Celsius: 20.9 C
Average Temperature in Fahrenheit: 69.62 F
Received Message: sensor_data_hum_2 70.0
Received Message: 18_pressure 100844.88955294536
Received Message: 18_luminosity 223.79679144385028
```

Fig2. Output subscriberB no kernel

```
(base) C:\Users\valice\SRSA_final_project\ddigipr\python RTsurveillance.py
Received alarm message: 29/05/2023 21:33:39 sensor_data_hum_1 - Value: 25.0 (ALARM CANCELLED)
Extracted sensor info: hum_1
Extracted value: 25.0
ALARM: 29/05/2023 21:33:39 sensor_data_hum_1 - Value: 25.0 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:33:39 sensor_data_hum_2 - Value: 75.0 (ALARM CANCELLED)
Extracted sensor info: hum_2
Extracted value: 75.0
ALARM: 29/05/2023 21:33:39 sensor_data_hum_2 - Value: 75.0 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:33:41 18_temperature - Value: 20.9 (ALARM CANCELLED)
Ignoring malformed alarm message: 29/05/2023 21:33:41 18_temperature - Value: 20.9 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:33:42 18_pressure - Value: 100846.39457956092 (NEW ALARM)
Ignoring malformed alarm message: 29/05/2023 21:33:42 18_pressure - Value: 100846.39457956092 (NEW ALARM)
Received alarm message: 29/05/2023 21:33:42 18_luminosity - Value: 223.79679144385028 (ALARM CANCELLED)
Ignoring malformed alarm message: 29/05/2023 21:33:42 18_luminosity - Value: 223.79679144385028 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:34:00 sensor_data_hum_1 - Value: 60.0 (ALARM CANCELLED)
Extracted sensor info: hum_1
Extracted value: 60.0
REPEATED ALARM: 29/05/2023 21:34:00 sensor_data_hum_1 - Value: 60.0 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:34:00 sensor_data_hum_2 - Value: 40.0 (ALARM CANCELLED)
Extracted sensor info: hum_2
Extracted value: 40.0
REPEATED ALARM: 29/05/2023 21:34:00 sensor_data_hum_2 - Value: 40.0 (ALARM CANCELLED)
Received alarm message: 29/05/2023 21:34:03 18_temperature - Value: 20.9 (ALARM CANCELLED)
Ignoring malformed alarm message: 29/05/2023 21:34:03 18_temperature - Value: 20.9 (ALARM CANCELLED)
```

Fig3. Output RTsurveillance na linha de comandos

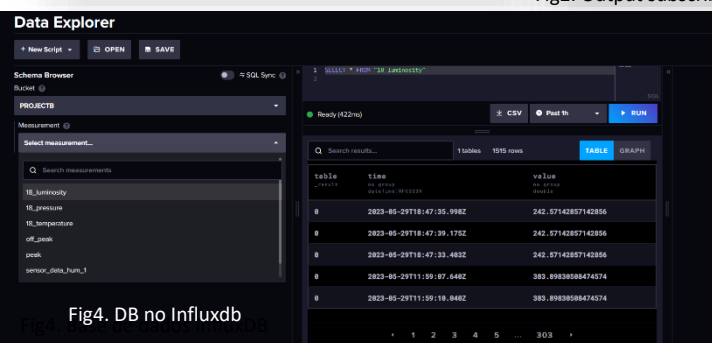


Fig4. DB no Influxdb

- Finalmente realizamos a **Dashboard** com as visualizações necessárias(last values,history,healthy intervals,moving averages,variations and costs)

