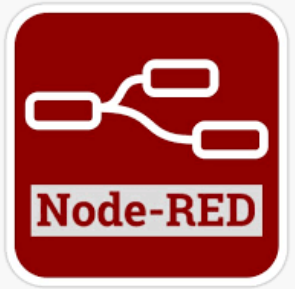


Exploring MicroPython, MQTT, Node-RED and TIG Stack

21SO - 1DT305

Applied Internet of Things, Introduction

Mats Pettersson

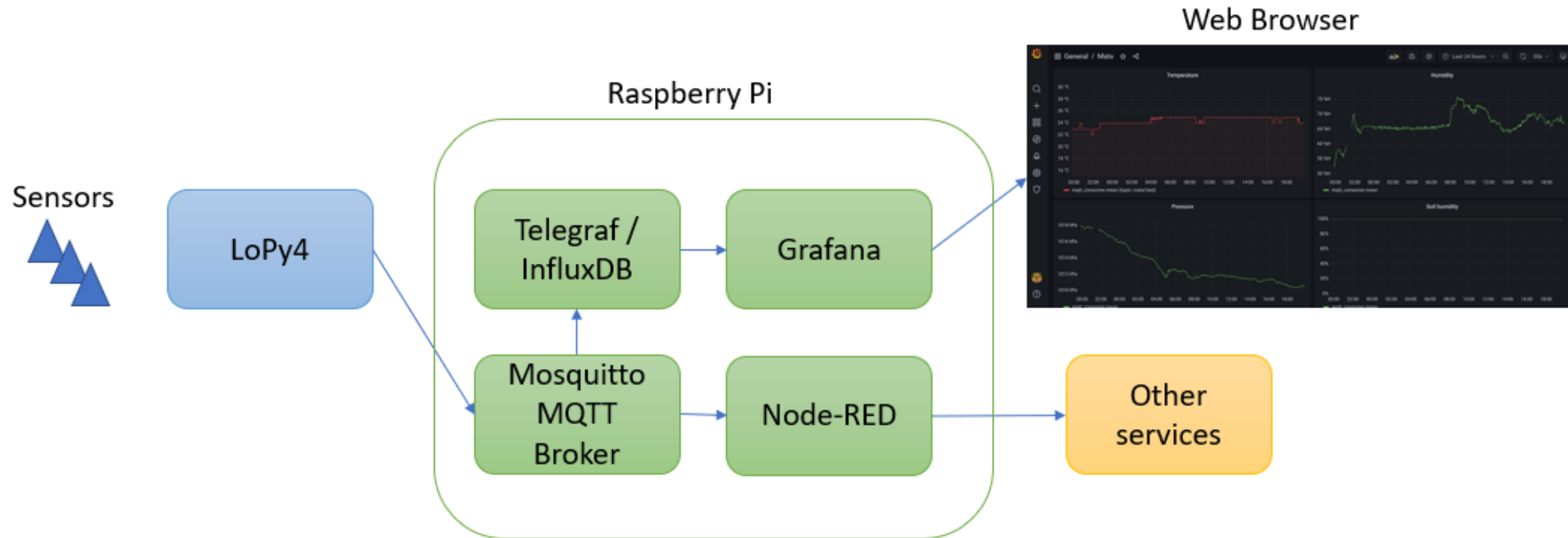


Areas I explored in the summer project

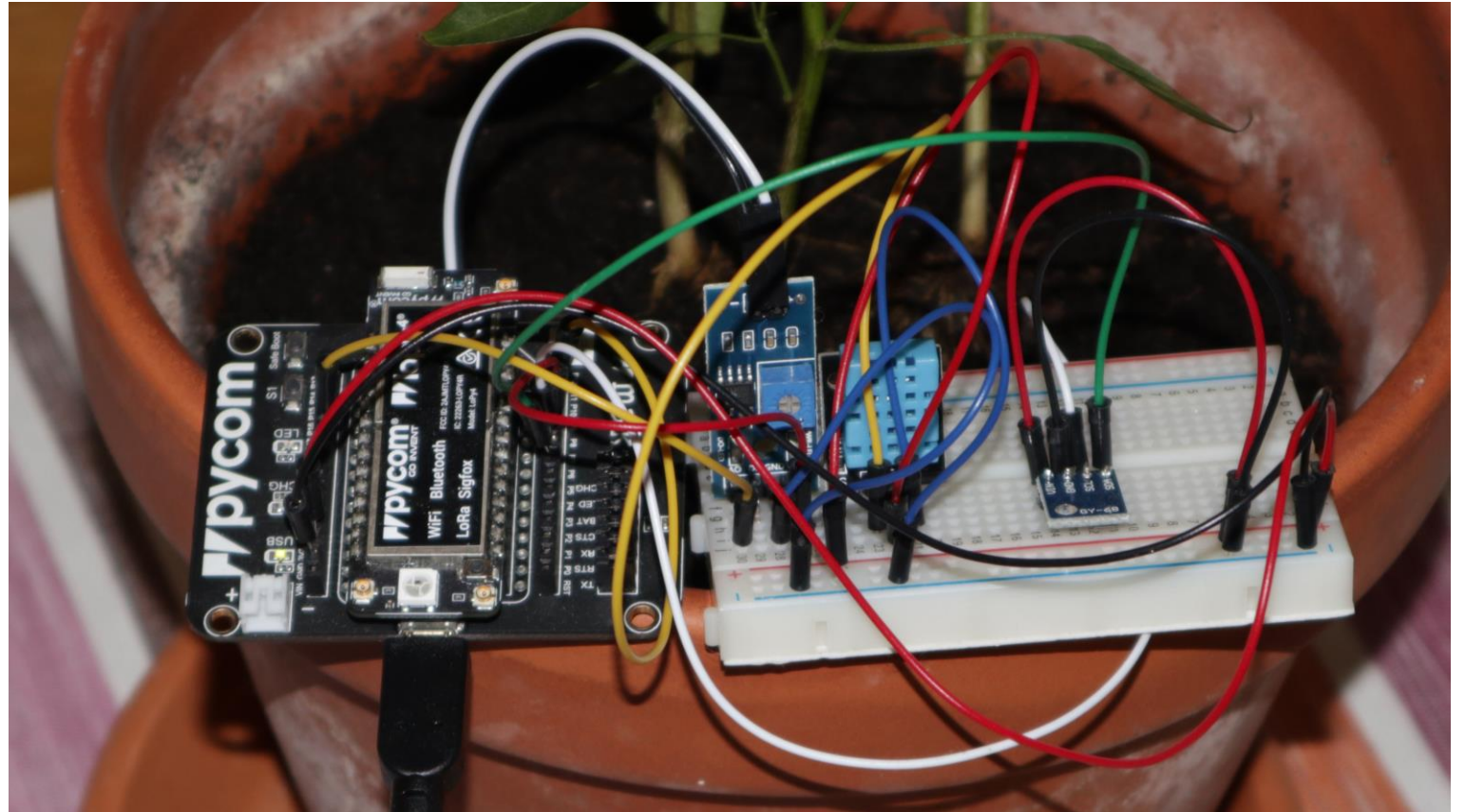
- Develop a simple Pycom Lopy 4 solution that measures temperature, air humidity, air pressure and soil humidity.
- Send the data formatted as JSON objects to a Mosquitto server running on a Raspberry Pi.
 - Focus on understanding the importance of naming conventions and information concepts, rather than the technology itself.
 - Visualize the sensor data using TIG Stack on the Raspberry Pi.
- Forward the events from the Raspberry Pi to test.mosquitto.org using Node-RED for my friend to pick them up.
- Free API hosting is not easy to find, and if it is free one has to pay for the database connectivity.



Building blocks of my project



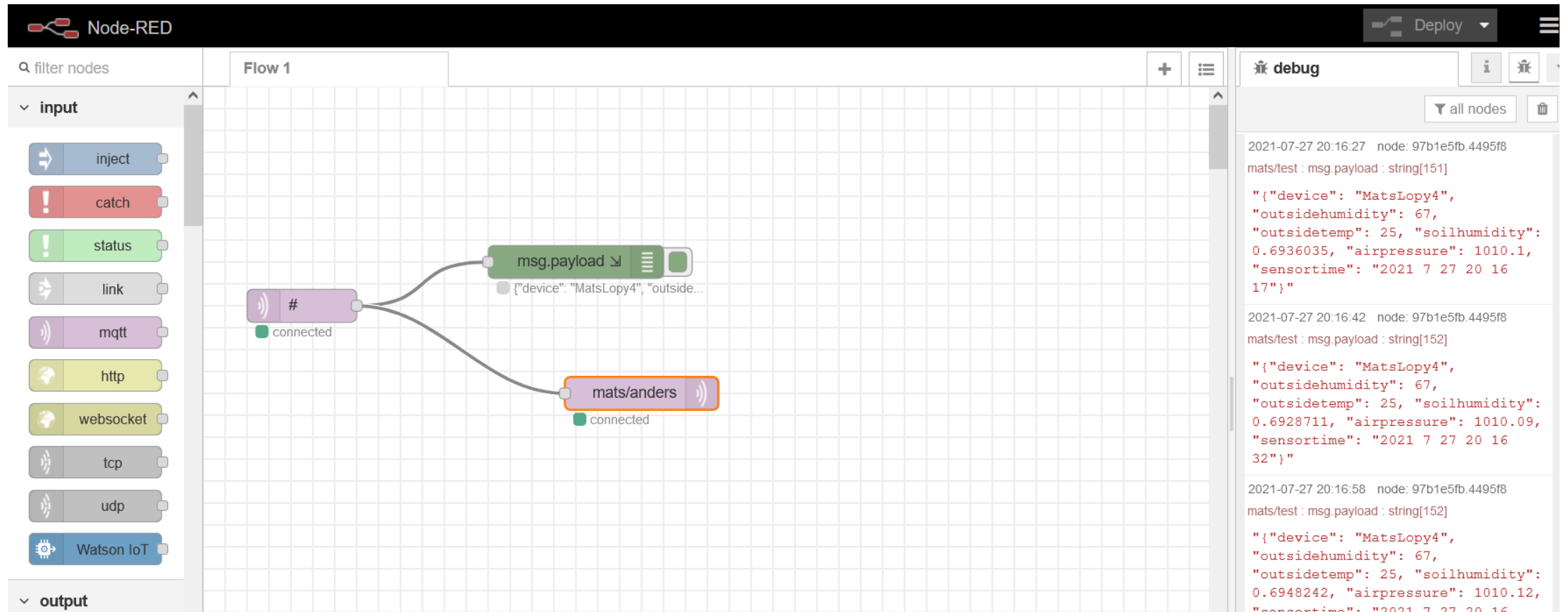
My setup



A dashboard



Very simple Node-RED flow



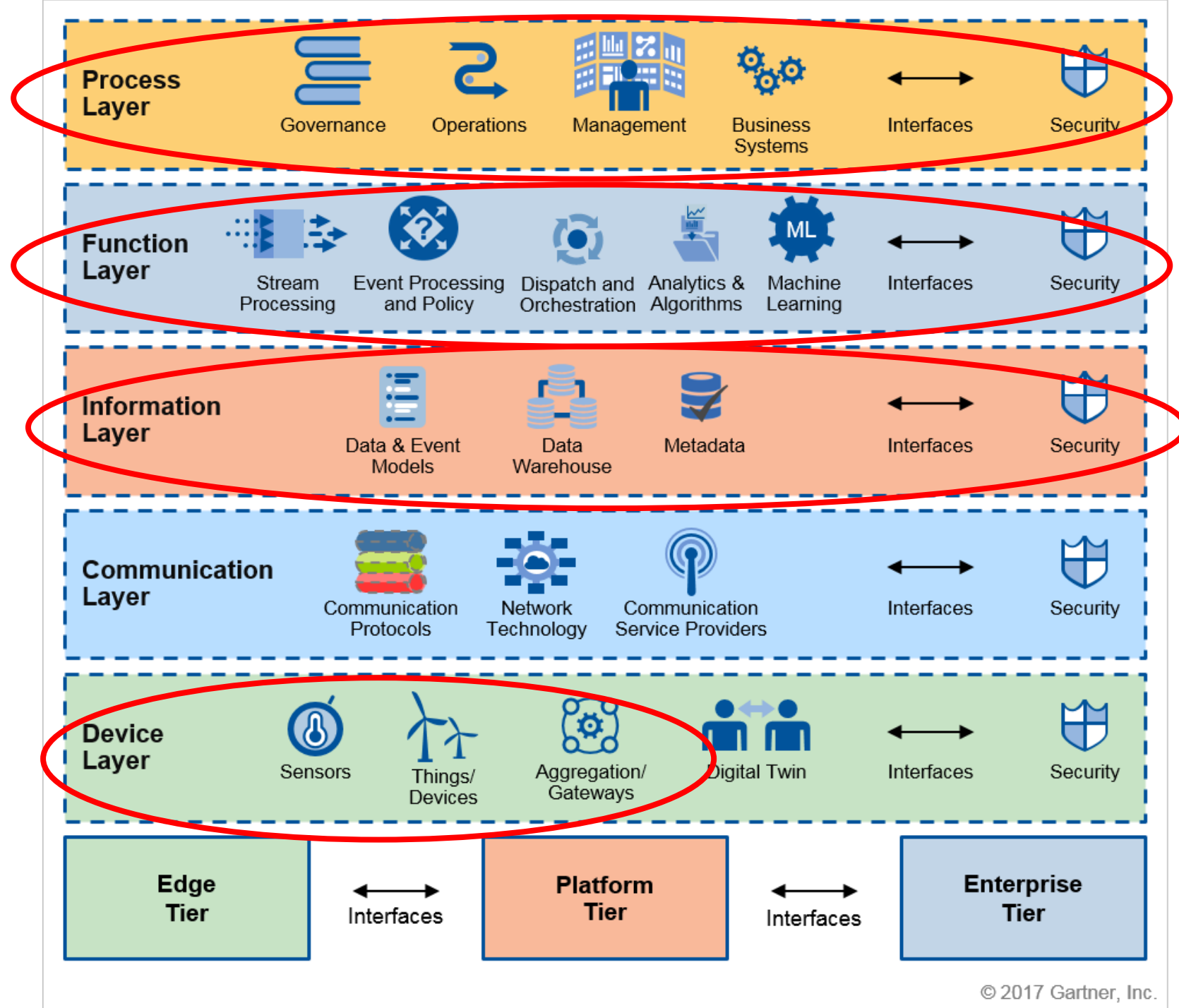
My journey was basically these five steps

- Becoming familiar with the LoPy device and how to program it.
 - Didn't manage to connect to the device, but erasing the filesystem helped.
 - Lots of sources of information, but quite unstructured and maybe also immature community compared to Arduino (?)
- Connecting the sensors
 - DHT11 (digital), BMP180 (I2C) and soil humidity (analogue)
 - Useful guides in Arduino places 😊
- Code
 - It would be nice to use standard build tools to transfer the code to the device. I didn't manage to do that, but REPL works fine.
- Middleware
 - Installed the Mosquitto broker on my Raspberry Pi and connect to it.
 - If the broker goes down, the MQTT client on the LoPy terminates.
- TIG stack
 - Played with Docker on my development machine first, but realized fairly quick I instead wanted a local install on my Raspberry Pi.

From an IoT Reference Architecture perspective, these are the areas I briefly explored.

Other areas I want to further explore

- Security
- Metadata and information models
- Architecture and design patterns
- AI/ML
- More sensors
- LoRa
- ...





Thank you