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Escola Superior de Tecnologia

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Soluções para a Indústria de Futuro

Industrial IoT Smartbox for the Shop Floor

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INTRODUTION

This research focuses on the development and testing of a Smartbox demonstrator, which allows sensing, monitoring and storage of equipment parameter's data from industrial environments through Wireless and Ethernet networks, using OPC UA (OPC Unified Automation), Message Queuing Telemetry Transport (MQTT) protocols.

OPC UA ARCHITECTURE IMPLEMENTATION

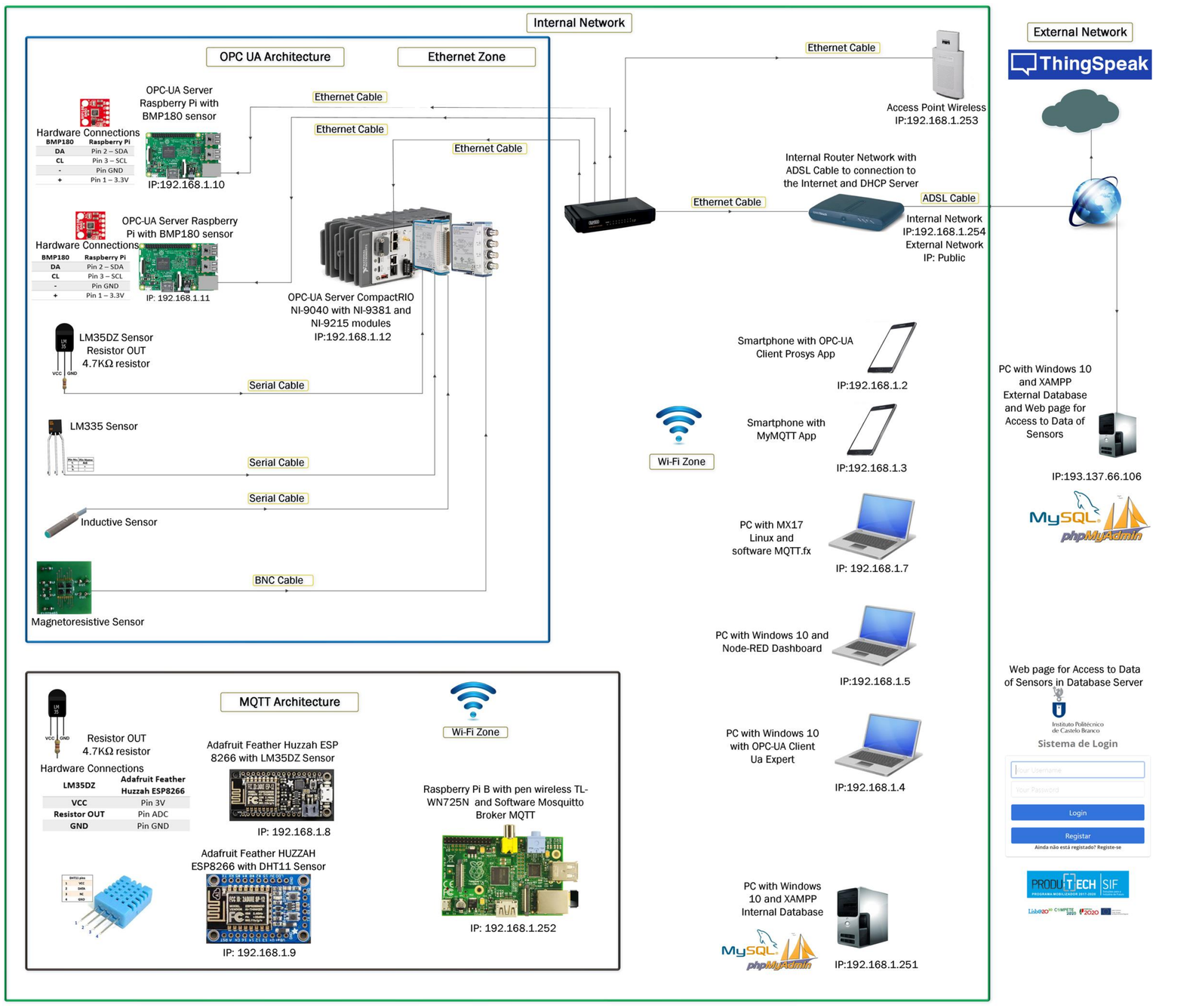
The network architecture show the acquisition of data using the CompactRIO and Raspberry Pi platforms as OPC UA Server having been necessary develop a script in LabVIEW for CompactRIO and a script in Python for Raspberry Pi with the libraries to make them OPC UA Servers in order to acquire the parameters of the LM35, LM335 and Magnetoresistive Sensor (CompactRIO) and BMP180 and Magnetorresistive Sensor (Raspberry Pi). The URL endpoint and set_endpoint consist of an IP address, communication port, library and configured class, as well as the parameters of the object, they will have a node ID to access them, as well as the access and permission rules of the OPC UA clients through the Ua Expert software and the Prosys App.

MQTT ARCHITECTURE IMPLEMENTATION

The network architecture presented show data acquisition using MQTT protocol with the Adafruit Huzzah ESP8266 hardware platform. Two ESP8266 modules were configured as Publishers and connected to a temperature sensor (LM35DZ) and humidity/temperature sensor (DHT11). Topics (data) are sent from Publishers to a Broker (MOSQUITO) installed on a Raspberry Pi platform. All authorized Subscribers can subscribe to the Broker platform for Topics; for the LM35DZ module the topics is "esp8266" and for the DHT11 module, the topics are "dht11humidity" and "dht11temperature".

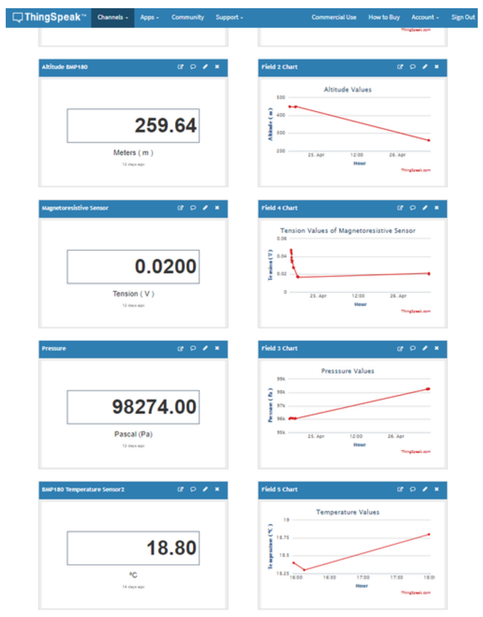
CONCLUSIONS

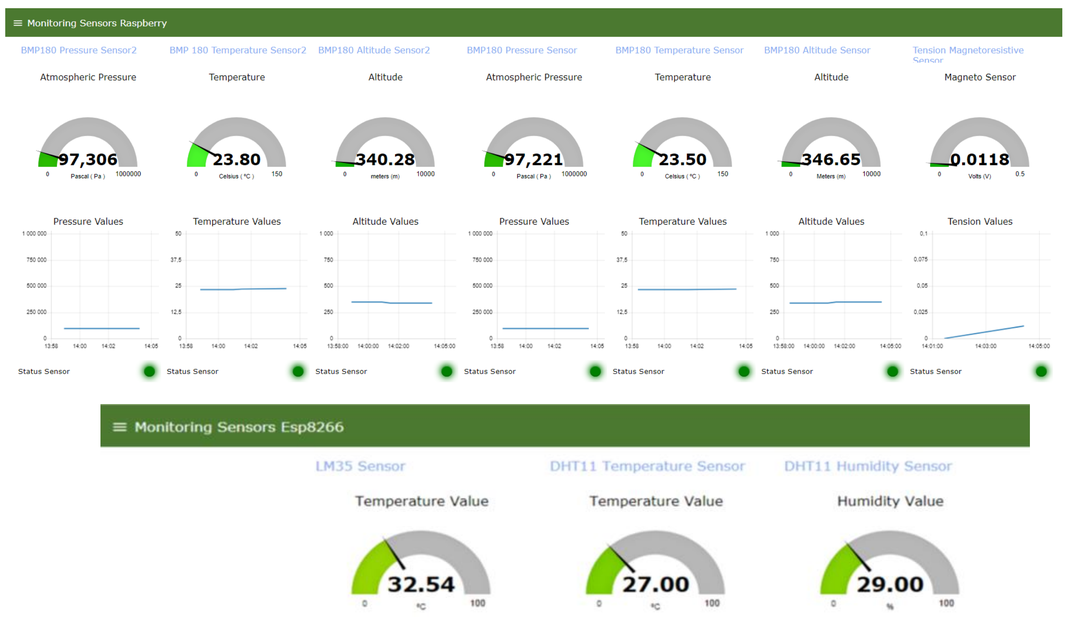
With the development of SmartBox through the CompactRIO and Raspberry Pi hardware platforms it was possible to develop a solution for the OPC UA architecture over the Ethernet network, this platform being the hardware modules used for data acquisition suitable for industrial environments. The MQTT solution is a good M2M solution for the shop floor with limited Ethernet network or non-existent network infrastructure, which can be programmed/configured through free software platforms, as well as hardware platforms for use low cost.



RESULTS

Results of sensor data acquired by SmartBox and viewed in a dashboard configured in the Node-RED software with the configuration of storing the data in the MySQL database and sending them to the IoT Cloud ThingSpeak.





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