IoT Finca Gran Canaria

Project Idea: LoRa based sensor network.

IoT Finca is an interdisciplinary project developing hardware and software for embedded sensor systems using LoRaWAN for wireless data transmission.

Students from the **Formacion Profesional IES Rincon** are developing a LoRaWAN based wireless sensor network (WSN) as part of an internship with the company **Dr. Stetter ITQ** in Las Palmas. The project is supported by the German **Rhine-Waal University** of Applied Sciences.

The LoRaWAN technology is a major IoT technology for long ranging lower power wireless sensors. The WSN will be deployed at the **Finca El Viso** to monitor environmental conditions such as temperature, humidity, soil moisture, etc.

About the Finca El Viso

The Finca El Viso is an Agroecological Social Entrepreneurship Incubator. The Cabildo Insular, the City Council of Telde, Fundación MAPFRE Guanarteme and the Association for the Development of Social and Community Economy (ADESCO) join forces to support this initiative, which serves as an incubator for social entrepreneurship projects in the primary sector aimed at raising awareness of organic farming, environmental sustainability, circular economy and the generation of employment opportunities for the most needy segments of the population through the ecological exploitation of agricultural areas.

El Viso is the perfect place to demonstrate state of the art IoT technologies supporting organic farming.



Video: About the Finca El Viso

Distributed System Architecture

The LoRa nodes equipped with environmental sensors send their data wirelessly via the LoRaWAN protocol to a gateway which forwards the data to a stack of different LoRaWAN servers provided by the **TTN (The Things Network)** community based LoRaWAN infrastructure. The data collected in a specific application on the server can be requested from an integrated MQTT broker. The **MQTT protocol** implements a **publisher-subscriber** software design pattern. The sensor data is published under a certain **topic**, a kind of name of a data end point. Clients, i.e. own software systems, can

subscribe to the topics. Whenever a sensor updates its measurement data under a specific topic, a message containing the data will be sent to all subscribers.

The project uses **Node-RED** as one main system subscribing to the sensor data topics provided by the TTN MQTT broker. Node-RED is ideal to branch the message stream, to convert the data and to redistribute it further, e.g. to different databases, dashboards or other applications. The transformed messages can even be republished again enabling other systems to subscribe to it.

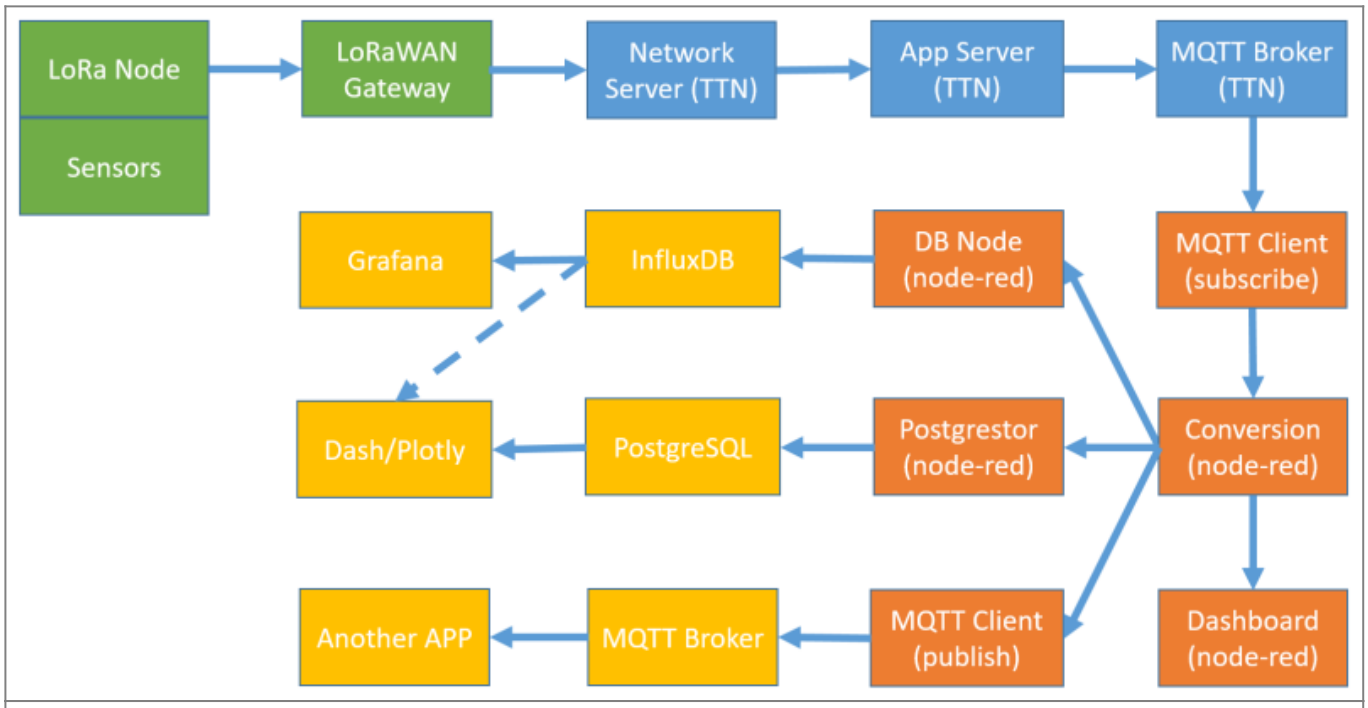


Fig.: Distributed system architecture used in the IoT Finca project.

Hardware

- Dragino DLOS8 LoRaWAN Gateway with 4G
- Heltec CubeCell LoRaWAN enabled microcontroller dev. board
- SHT40 Sensirion Temperature/Humidity sensor (I2C):
- LiPo Cell, 500 - 1000mAh: Connector must match the CubeCell

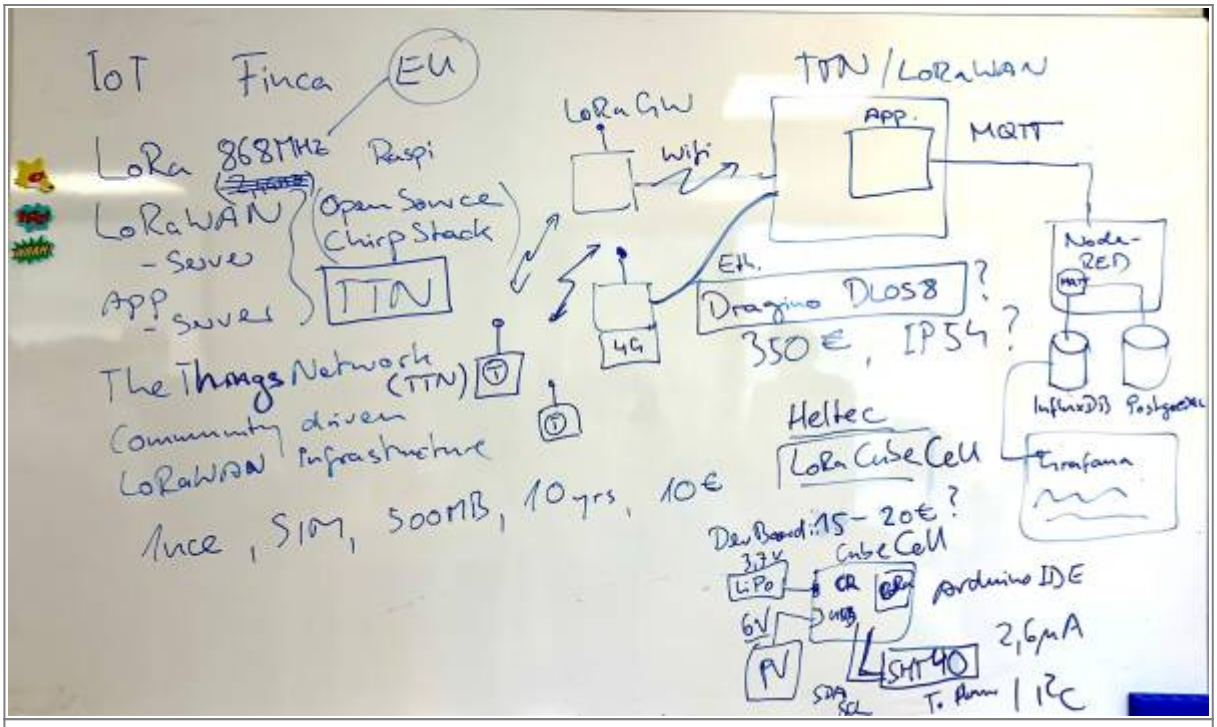


Fig.: Discussion at ITQ: rough project outline (2022-03-10).

Suppliers

- Lopacan Electronica
- Anesco

Meetings / Tasks

2022-03-28

- Students: TinkerCAD to learn basic Arduino, ongoing activity
- Students: TTN account + background knowledge, LoRaWAN Server Stack, end of week
- Students: MQTT howto? Publisher-Subscriber SW pattern, next week
- HSRW: Send material to GC, by end of the week

Getting Started, Setting up the Toolchain

Getting Started

- CubeCell Arduino Extension: https://heltec-automation-docs.readthedocs.io/en/latest/cubecell/quick_start.html
- https://docs.arduino.cc/learn/starting-guide/getting-started-arduino

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