2. LEARN

When it's time to approach a new technology and apply it to a real application, such as a pilot study, it's important to investigate the current available options of the hardware and software. The first step was to learn how to connect an end-device to Internet via The Things Network. The second step was the investigation in LoraWAN network in the area of my interest to see if it was necessary to provide and implement extra infrastructures, the gateways.

Fig2.1, sensor kit and gateway network. https://www.cooking-hacks.com/

2.1 The Things Network (TTN) workshop

We invited the experts, The Things Network, to give a workshop at the Waag. You can find the contents of the workshop here: https://github.com/TheThingsNetwork/workshops/tree/workshop/kickoff/workshops/TheThingsUno

TTN provided the hardware, the sweet and friendly The Things Uno, an Arduino Leonardo based IoT board, with embedded Lora Radio Module. It's the perfect solution for fast learning and prototyping.

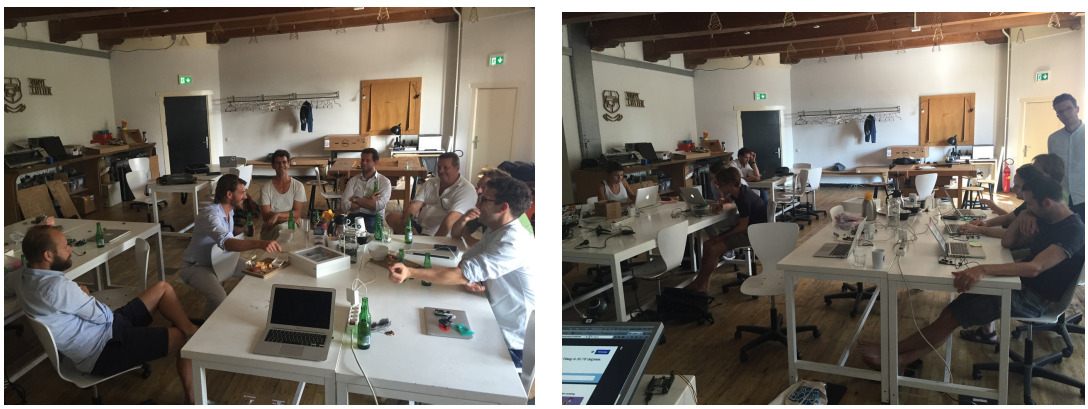

Fig2.2, TTN workshop at the Waag. September 2016

Thanks to the compatibility with Arduino environment, I didn't need to install any new software and the only tools I used were: Arduino IDE and the TTN dashboard web interface. The dashboard is a browser page that allows you to configure your devices, to monitor them, to see the upcoming data.

During the workshop I learnt:

- to register a device in the TTN Dashboard
- to program my device so it can send data to TTN server
- to see my data on the dashboard

Many other features were explained and tested but these three were my goal.
I highly suggest to follow the step-by-step instructions provided by The Things Network.

For the pilot study I couldn't use The Things Uno because it was under productions, so for my sensor kit I selected and assembled different hardware (see chapter 3).

2.2 TTN Gateway

After I made a first TTN standalone end-device (see chapter 3), I simply went around the schools with the sensor kit supplied by a power bank to verify network and connectivity.
At that time it was necessary to employ new gateways, the schools were not yet completely covered by TTN network and I got the chance to join the perfect meet-up for my purpose: "Build and connect your own Things Network Gateway", **https://www.meetup.com/Eindhoven-Internet-of-Things/events/234101548/**.

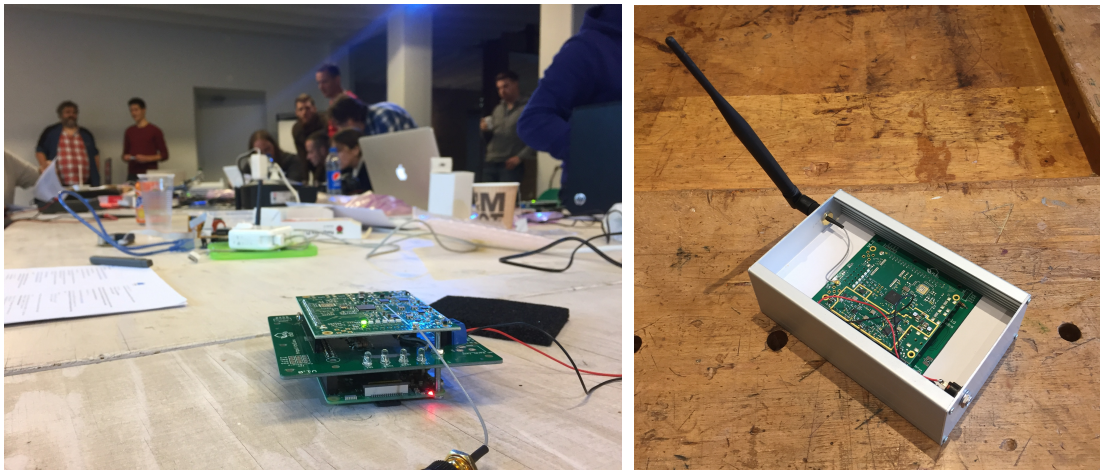

Fig2.3, gateway workshop. September 2016

In one day we build and configure our own TTN gateway, raspberry pi based using the iC880A-SPI concentrator board.