Beacon südtirol - Alto Adige

FESR-2023

CUP: B31H17000060001

D5.2

Testbed final report

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1 - Introduction

The goal of the WP5 - Wireless Sensor Network is the implementation of a pilot area covered by a free access IoT Network. In order to identify the best place for the implementation of the IoT Network the IoT community has been involved.

One of the first activities, after choosing the area for the installation of the test IoT Network, was the implementation of a first pilot IoT Network at the NOI Techpark during the Vertical Innovation Hackathon 2018. The event was the perfect context to run a testbed since:

- it was limited in the seminar area of the A1 building which is underground and difficult to reach by radio signals in general;
- a large number of people using IoT devices to build prototypes was concentrated in a small area.

2 - The Testbed

During the Vertical Innovation Hackathon 2018 the project team provided the participants with two platforms based on two different chipset. The two chosen platforms were: Pycom and Arduino (see Figure 1).
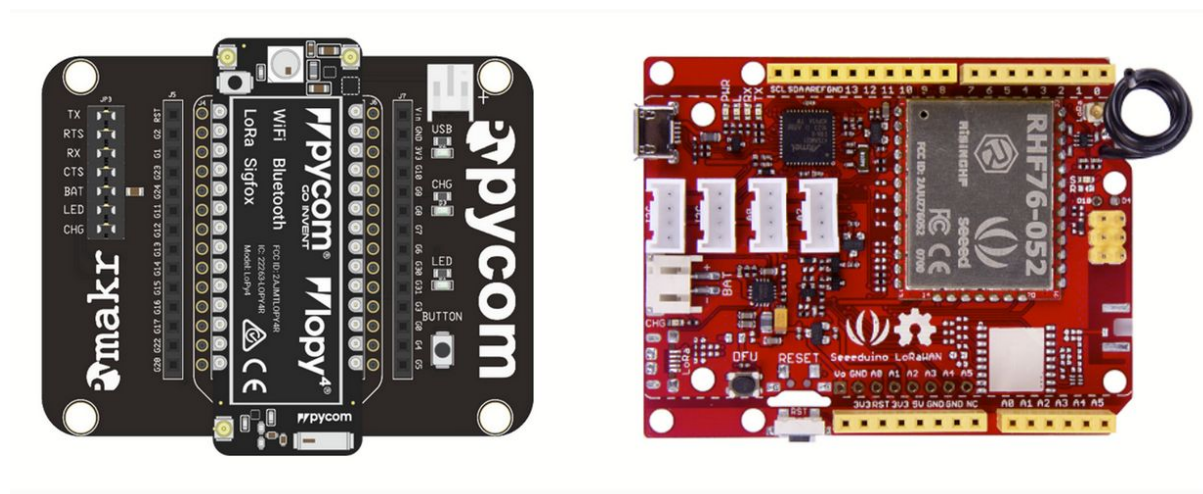

Figure 1: the two microcontrollers provided to the hackathon participants..

The event organized by NOI Techpark (one of the project's partner) was the perfect context to run a testbed since:

- it was limited in the seminar area of the A1 building which is underground and difficult to reach by radio signals in general;
- a large number of people using IoT devices to build prototypes was concentrated in a small area.

During the events the IoT platform has been monitored from both point of view:

- backend in order to understand if the resources dedicated to the backend where sufficient to guarantee a high level service;
- signal coverage in order to be able to simulate the coverage on the whole area and define the numbers of gateways needed.

All data collected during the event were used in order to optimize the hardware, find the right places for the LoRaWAN@NOI Gateways. Moreover, the feedback of the users were collected in order to optimize the online platform.

2.1 - LoRaWAN@NOI Gateway e Network Server

The LoRaWAN gateway that has been used during the test were based on a Raspberry Pi mod. 3b with the expansion shield Rising HF. This configuration allowed the development of a gateway with 10 channels (8 x Multi-SF + 1 x Standard LoRa + 1 x FSK) centered on the 868 MHz frequencies of the ISM band.

Figure 2: LoRaWAN gateway.

The gateway was authenticated on a dedicated LoRaServer in order to guarantee a better service to the participants and a backup of all packages. After the event Eurac Research analysed the data collected to find possible optimizations. In Figure 3 are reported the analysis of the data and the packages transmitted during the event.
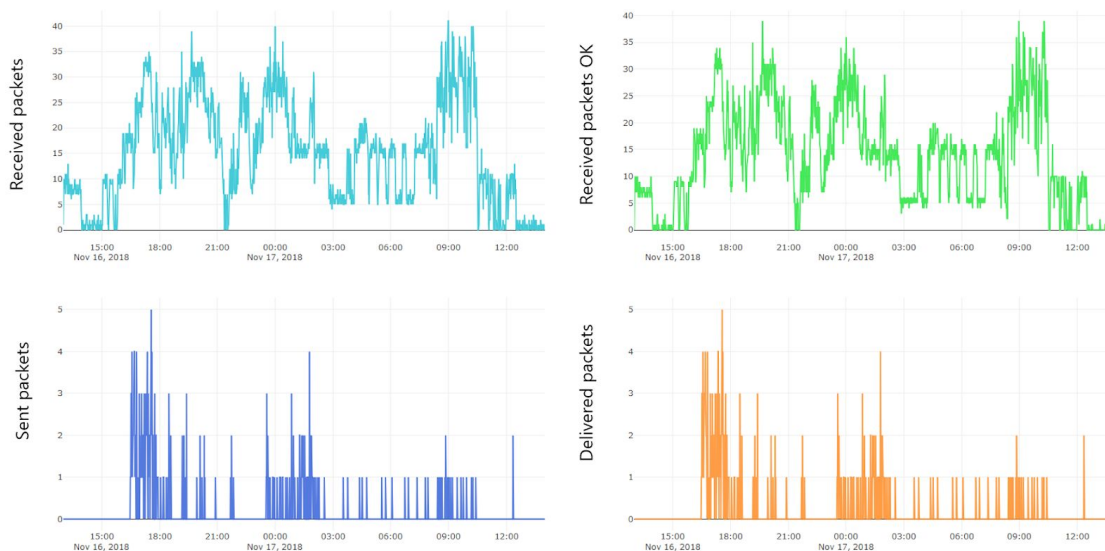

Figure 3: traffico dati sul LoRaServer durante il Vertical Innovation Hackathon 2018.

3 - Testbed results

On top of the data and the information collected during the Vertical Innovation Hackathon 2018 and of the results of the simulation of the signal coverage over the whole NOI Techpark area it has been decided to install 5 Gateway distributed over the whole area.

Figure 4: signal coverage simulation at the 3rd floor of the A2 building of the NOI Techpark.

In Table 1 are listed also the locations proposed by the project team to the building managers of the NOI for the LoRaWAN@NOI gateway.

Gateway ID	Edificio	Stanza
GW1	A1	NOI Reception
GW2	A1	A1.1.07a
GW3	A1	A1.2.46m
GW6	A2	A2.3.18b
GW7	D2	D1.4.05

Table 1: position proposal for the LoRaWAN@NOI Gateways.