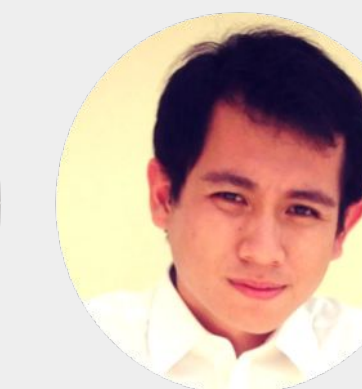


ALVAREZ Josué
I

Skills:
Software Engineering
Networking
Embedded systems



ANAK STELL Cyril
RT

Skills:
Network Routing
C/C++/Java
Arduino/Galileo



CHAUVIN Axel
TBS

Skills:
Management
Agile development
Business development



DIOP Aminata
RT

Skills:
Network
Telecommunications
Java/C/Arduino



DUTHOIT Cécile
RT

Skills:
Telecom &
Network
C/C++/Java/Arduino



MJELSTAD Linn
AE

Skills:
Electronic
Embedded system
C++/Javascript



OUEDRAOGO Clovis
RT

Skills:
Electronic
Embedded system
Arduino/Java

This project is a collaboration between INSA and the Lérans Sailing Ship's Club (CVRL)

We are working on a solution to make the regattas more interactive for the spectators

In January we will test the first prototype at Lérans Lake (Ariège, France)

What is needed

- ★ A user-friendly application for everyone
- ★ Different services depending on the user
- ★ Position, speed, and direction from boats
- ★ Data transmission to the application server

The constraints

- Compatible smartphones and computers
- Protection of personal data
- Good precision to allow reliable tracking
- No existing network on the site (at all...)

Final choices

- A web application to be compatible with every browser
- Access by authentication with login and password
- GPS and accelerometer mounted on the boats
- Deployment of a LoRa network using local WiFi

Regular meetings with CVRL and our tutor

Specifications

Study of needs

Design

Prototype

Tests

November

November-December

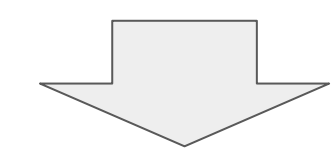
December - January

January

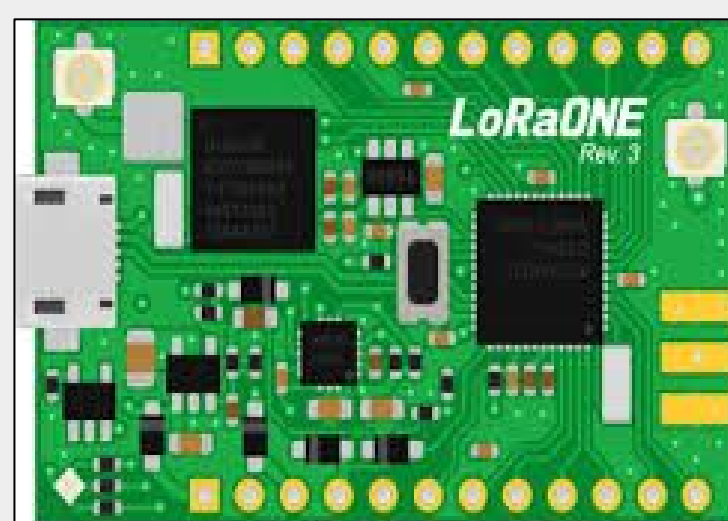


A boat regatta on Lake Lérans

We will equip each boat with a device that can collect its GPS coordinates and communicate them to the main server.



Devices



LoRaOne

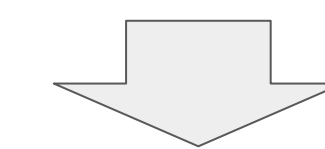


GPS-module

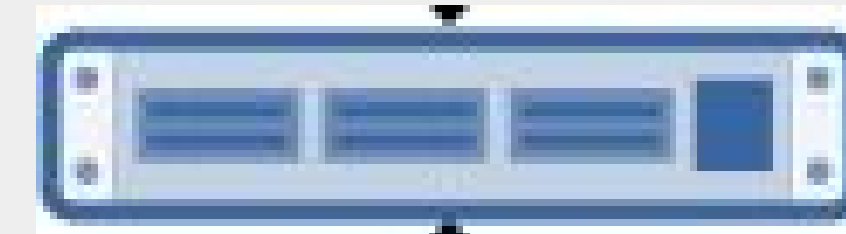


LoRaGateways

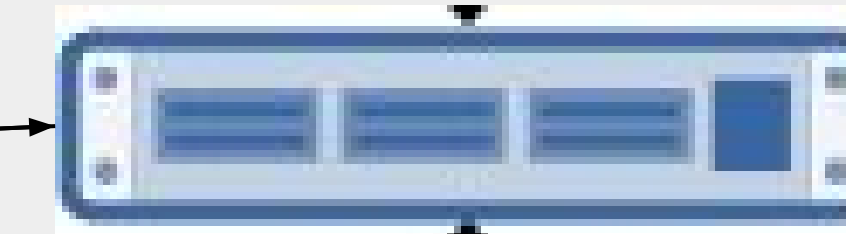
We will implement a private LoRa network that will cover the entire lake



Network Server

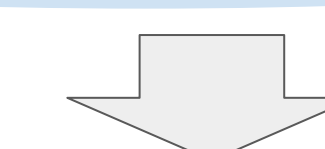


Gateway-Bridge

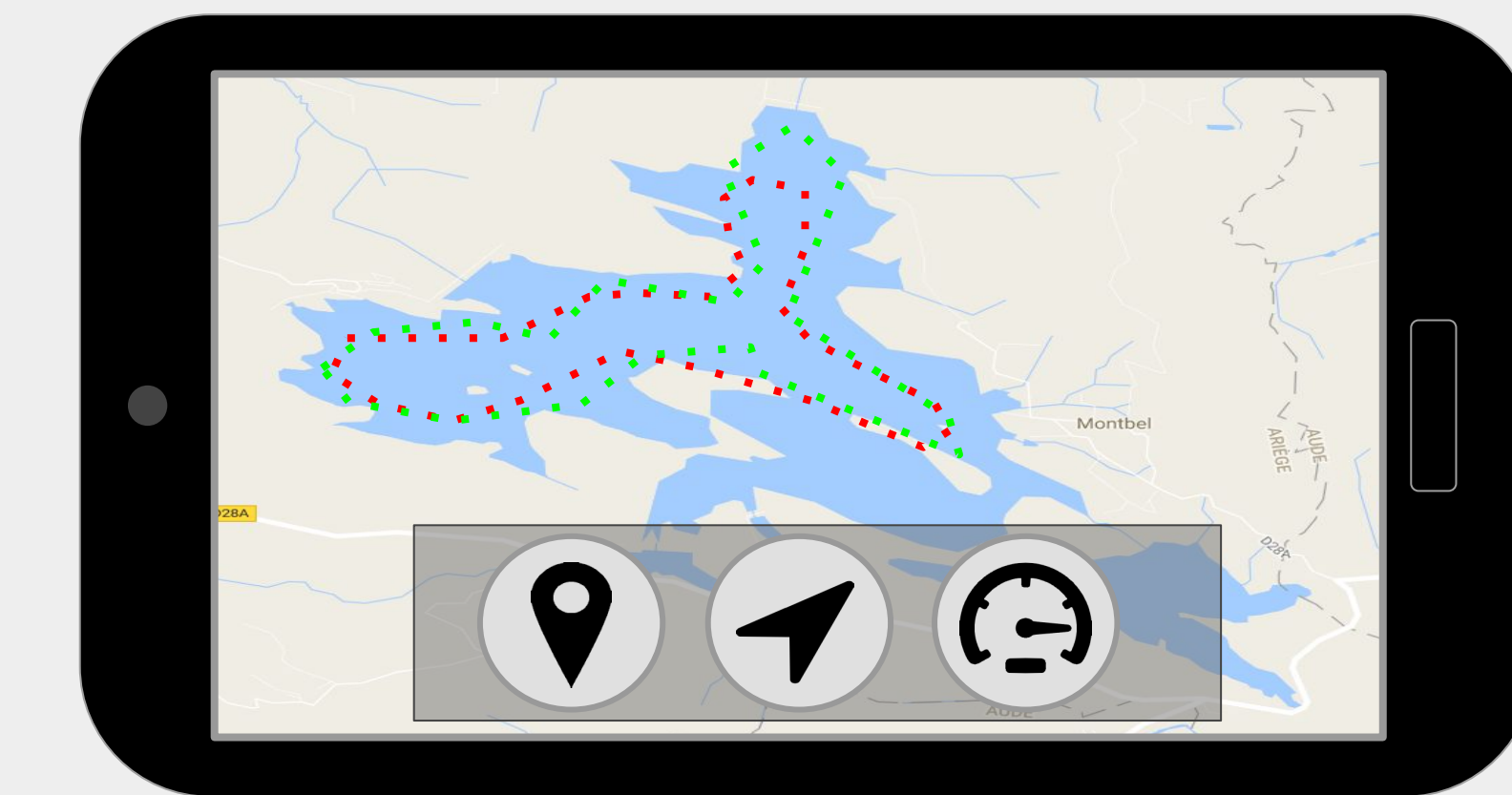


LoRaWAN-App-Server

We will create a web application to visualise the location of the sailboats in real time.



Web Application



For the device, we have chosen to use the LoRaOne card from Sodaq. This card contains several components that we will need to ensure the functions of our product.

- A GPS module to locate the sail boats during the race.
- A LoRa module to communicate with the server.
- An accelerometer to enable sleep activation, so that we will not need an on/off switch.

The LoRa network is composed of three elements:

- The Lora-Gateway-Bridge that converts the packet-forwarder protocol to MQTT
- The Loraserver, a LoRaWAN network server
- The LoRaWAN-app-server that is responsible for the node inventory part of a LoRa WAN infrastructure. It handles received application payloads and a downlink application payload queue.

- Web application compatible with Safari, Google Chrome, and Firefox and mobile devices browsers.
- Server side TypeScript/NodeJS/Express/MongoDB, client side Typescript/Angular2.
- Service oriented architecture for more flexibility.
- Import data from their existing tools (Freg software).

For the gateways, we have decided to use a Christera Pi, a LoRa shield for Raspberry Pi, from Snootlab. This is a low-cost solution for a LoRa gateway.

To ensure the communication between the LoRa Server and the Server/Web application, we will implement a WiFi network.