Project Report

UltraTeam 7.1

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RICM4 - Polytech Grenoble

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Introduction

UltraTeam is a big project which consists in developing a mobile Web application allowing members of a team or a group of hikers (walking, ski touring, ski touring, cross-country skiing...) to position each other (running time, walking time, distance) in real time and to monitor / manage the effort of team members. Last year (in 2016-2017), two teams has started to develop an application.

This year, two teams have decided to continue this project. However, we made the decision to start from scratch. UltraTeam was divided in two development teams UltraTeam_MV (made up of MOLION Enzo and VALETTE Léo) and UltraTeam 7.1 (us). UltraTeam_MV had to create a BLE / LoRa decentralized protocol conception (and implementation) and they have also created a web application. We (UltraTeam 7.1) were focused on creating a web service. The application, if it is connected to the 3G/4G network, will send through a REST API all the information accumulated during the hike to our server. Then we will sort and display the information for the hikers. Hikers will be able to see their itinerary on a map (in real time or just after their hike). This could be particularly helpful for rescuers to localize the person (SOS distress signal will be display on the map too).

Jhipster Generator

What is JHipster ?

JHipster is a development platform to generate, develop and deploy Spring Boot + Angular Web applications and Spring microservices. We used this platform to generate our application. To facilitate the development, JHipster community propose some modules. For instance their are some modules to generate new pages or insert leaflet maps. If you want to create your first JHipster application, you can follow the explanation on the official JHipster website. We advise you to use the online JHipster application (it's very useful to generate your first application because the user interface is useful).

Generator JHipster Leaflet map

In our project we had to visualize data in a map. So we had to add a leaflet map in our JHipster application. Mr. Frederik Hahne has uploaded a module in the JHipster marketplace. Unfortunately, his module didn't work with an Angular application (it only works with AngularJS). That's why we have decided to create our own JHipster module (to operate with Angular) to generate a leaflet map in another page. It took two weeks to make this generator but it was a great experience and it will be useful for the JHipster community. Our module is now in the official JHipster's Marketplace and you can also find it as an external module while creating a new JHipster application (in your terminal).

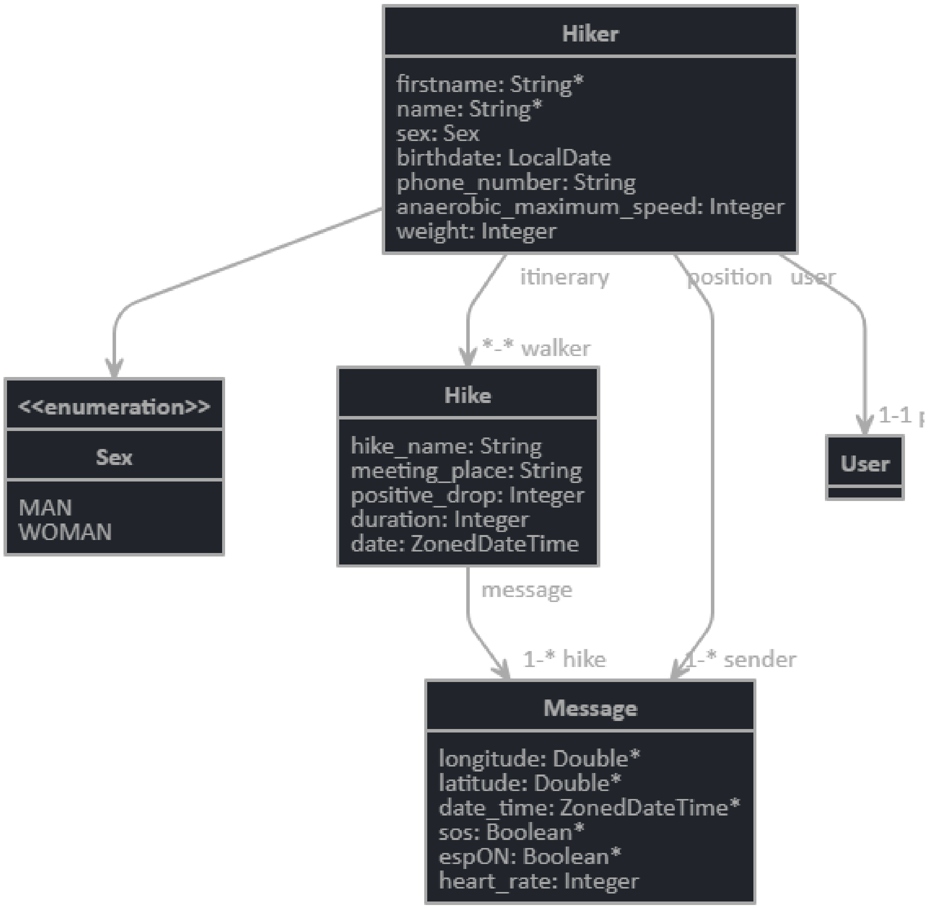
Our module is available on npm and on the JHipster's Marketplace with the following name : *generator-jhipster-leafletmap*. It has been downloaded approximately 200 times 2 weeks after it's creation.

Npm's page : https://www.npmjs.com/package/generator-jhipster-leafletmap

GitHub : https://github.com/ultratrail/generator-jhipster-leafletmap

Data Base

Uml diagram



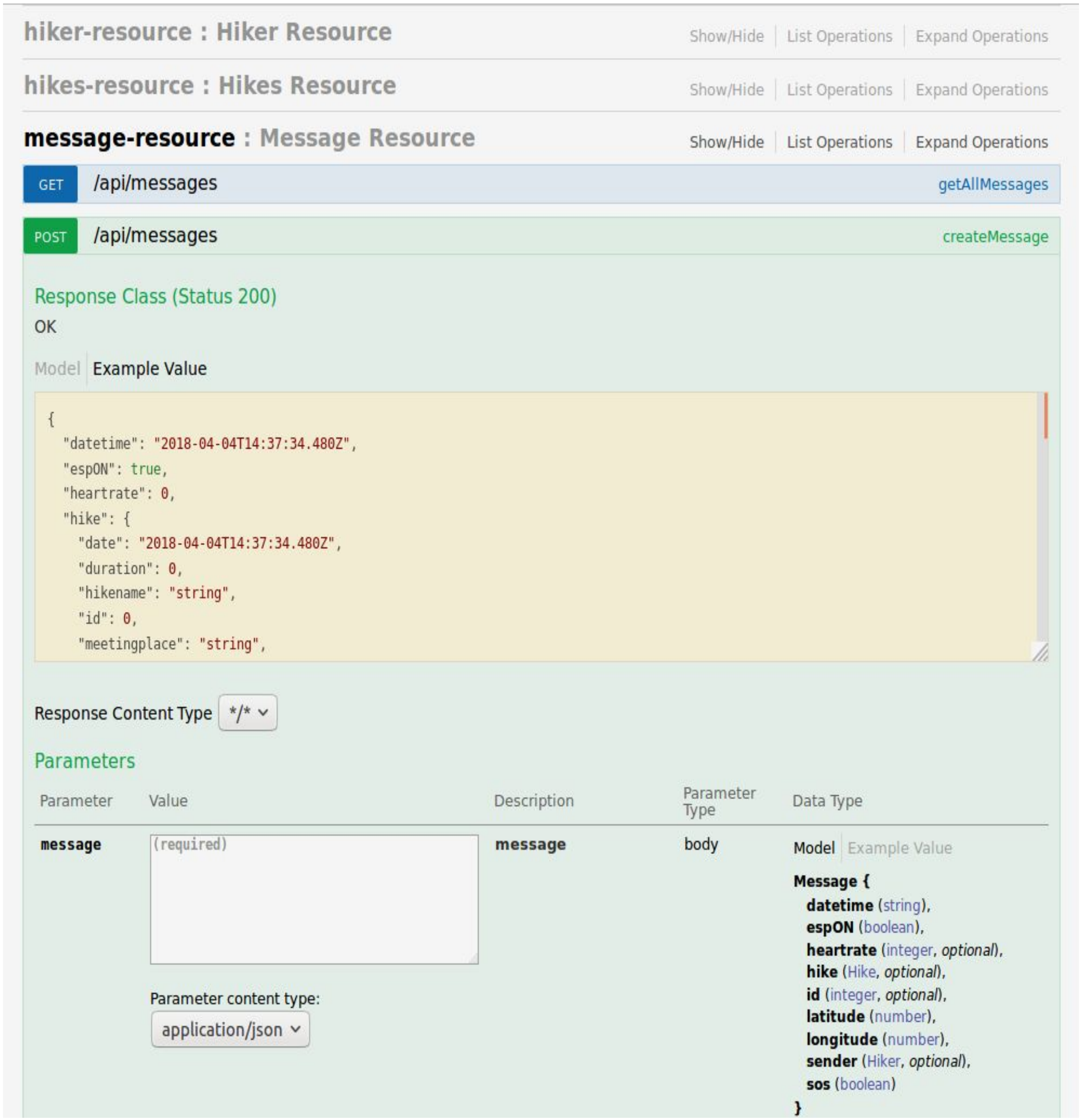
Entities

Jhipster works with entities. We had to define some entities to store all the information about hikes and hikers. To create entities you can use JDL studio. This domain language generates a data base and an UML diagram. You can find some JDL examples on JHipster to help you.

Rest API and Swagger

To see all the available functions with the REST API of our server, you can log in as administrator (username : admin / password : admin) and go to “Administration” and then “API” (or simply go to http://localhost:8080/#/docs).

The Swagger document is also available on http://localhost:8080/v2/api-docs.


hiker-resource : Hiker Resource
Show/Hide | List Operations | Expand Operations
hikes-resource : Hikes Resource
Show/Hide | List Operations | Expand Operations
message-resource : Message Resource
Show/Hide | List Operations | Expand Operations
GET
/api/messages
getAllMessages
POST
/api/messages
createMessage

Response Class (Status 200)

OK

```
{
  "datetime": "2018-04-04T14:37:34.480Z",
  "espON": true,
  "heartrate": 0,
  "hike": {
    "date": "2018-04-04T14:37:34.480Z",
    "duration": 0,
    "hikename": "string",
    "id": 0,
    "meetingplace": "string",
```

Response Content Type: */*

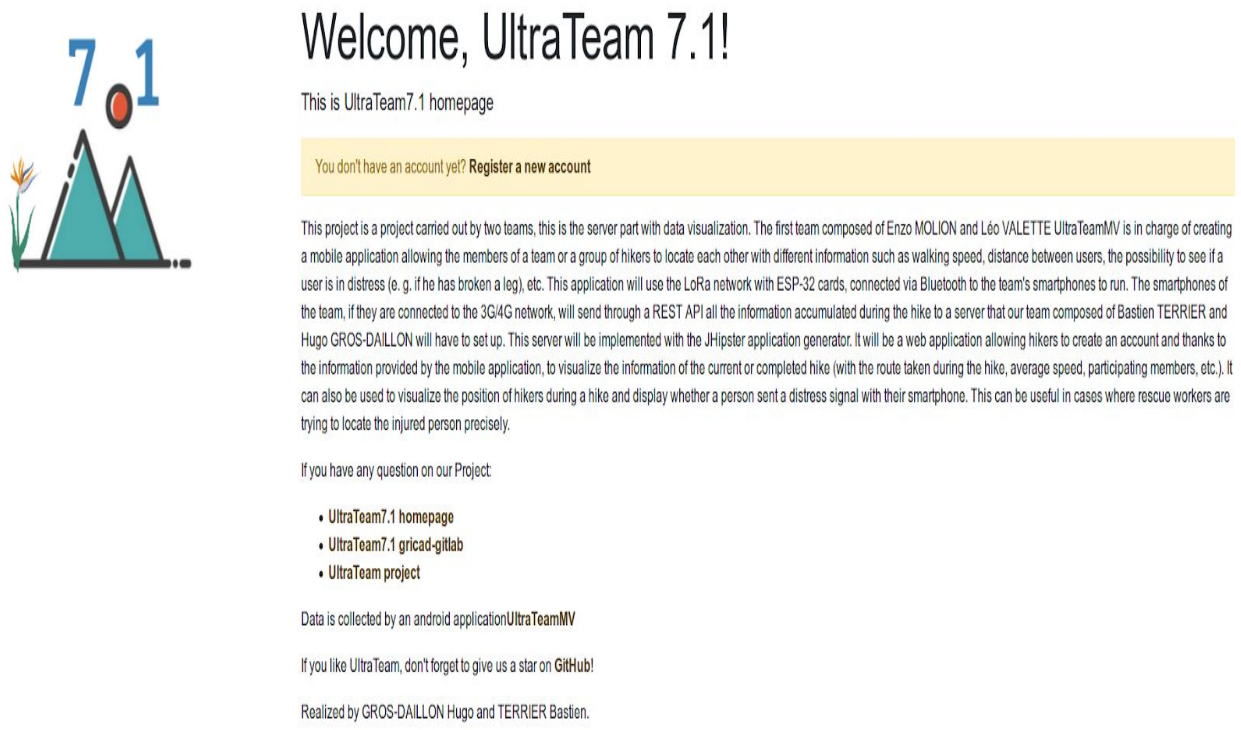
Parameters

Parameter	Value	Description	Parameter Type	Data Type
message	(required) Parameter content type: application/json	**message**	body	Model | Example Value

```
Message {
  datetime (string),
  espON (boolean),
  heartrate (integer, optional),
  hike (Hike, optional),
  id (integer, optional),
  latitude (number),
  longitude (number),
  sender (Hiker, optional),
  sos (boolean)
}
```

UltraTeam 7.1 Application

Our web application is a data visualization project. Hikers will be able to see their itinerary on a map (in real time or just after their hike) thanks to the messages they transmitted with their smartphone, LoRa and the REST API of our application. Hikers can also see SOS messages with their positions when they have a problem and then, emergency users can see all the Hikes with the position of the hikers which send SOS messages on the map.



Welcome, UltraTeam 7.1!

This is UltraTeam7.1 homepage

You don't have an account yet? **Register a new account**

This project is a project carried out by two teams, this is the server part with data visualization. The first team composed of Enzo MOLION and Léo VALETTE UltraTeamMV is in charge of creating a mobile application allowing the members of a team or a group of hikers to locate each other with different information such as walking speed, distance between users, the possibility to see if a user is in distress (e. g. if he has broken a leg), etc. This application will use the LoRa network with ESP-32 cards, connected via Bluetooth to the team's smartphones to run. The smartphones of the team, if they are connected to the 3G/4G network, will send through a REST API all the information accumulated during the hike to a server that our team composed of Bastien TERRIER and Hugo GROS-DAILLON will have to set up. This server will be implemented with the JHipster application generator. It will be a web application allowing hikers to create an account and thanks to the information provided by the mobile application, to visualize the information of the current or completed hike (with the route taken during the hike, average speed, participating members, etc.). It can also be used to visualize the position of hikers during a hike and display whether a person sent a distress signal with their smartphone. This can be useful in cases where rescue workers are trying to locate the injured person precisely.

If you have any question on our Project:

- **UltraTeam7.1 homepage**
- **UltraTeam7.1 gricad-gitlab**
- **UltraTeam project**

Data is collected by an android application**UltraTeamMV**

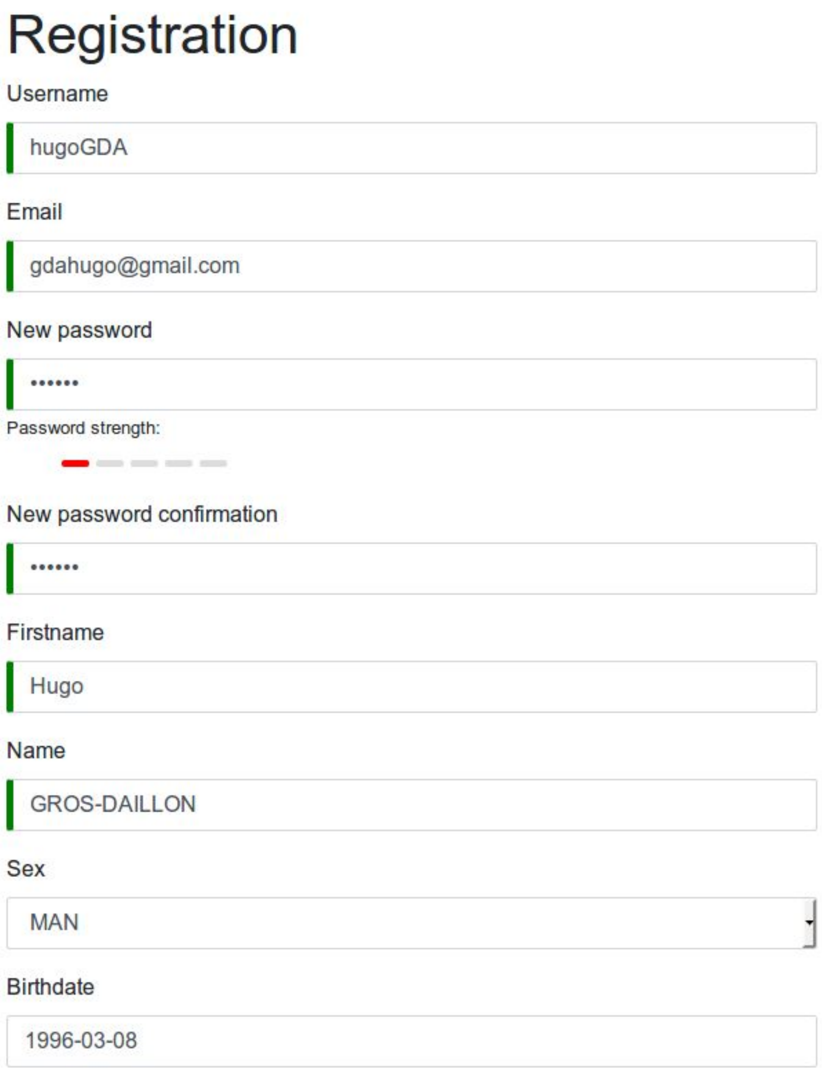
If you like UltraTeam, don't forget to give us a star on **GitHub**!

Realized by GROS-DAILLON Hugo and TERRIER Bastien.

User registration

When a user want to register on our web application, he has to click on "register" and fill the register form. On this form we can see many fields, the first 4 fields are the basic ones in the application (Username, Email, New Password and New Password Confirmation).

All other fields have been added by us (First Name, Name, Sex, Birthdate, Phonenumber, Anaerobic maximum speed and weight) to add information about a hiker.



Registration

Username

hugoGDA

Email

gdahugo@gmail.com

New password

••••••

Password strength:

New password confirmation

••••••

Firstname

Hugo

Name

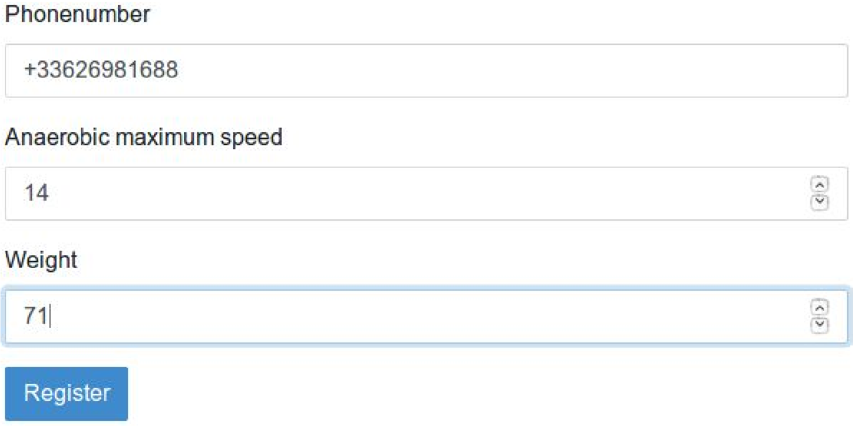
GROS-DAILLON

Sex

MAN

Birthdate

1996-03-08



Phonenumber

+33626981688

Anaerobic maximum speed

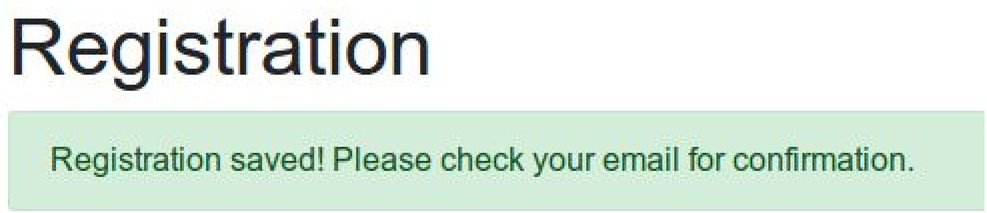
14

Weight

71

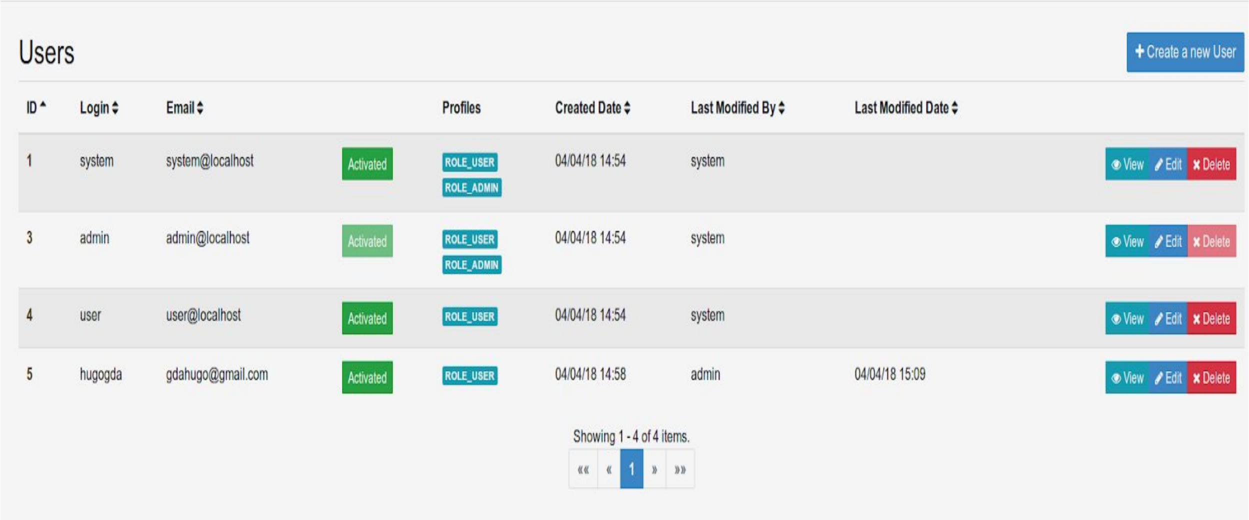
When you click on the register button, two entities are created. First, the user is created with an "ID", an "username" a "password" and an "email". After that, our own entity (a Hiker) is also created with the values of the fields completed by the person registering.

The two entities Hiker and User are linked by the User's ID.



Registration

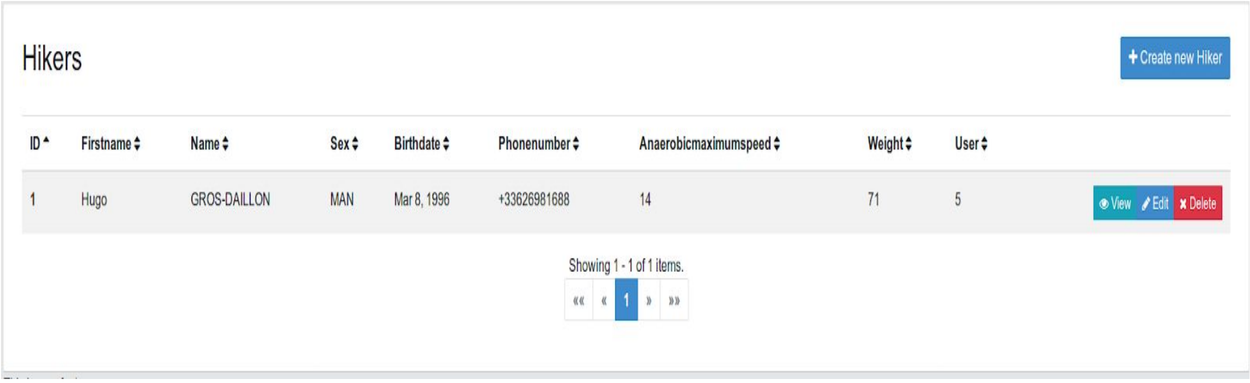
Registration saved! Please check your email for confirmation.



Users

ID	Login	Email		Profiles	Created Date	Last Modified By	Last Modified Date	
1	system	system@localhost	Activated	ROLE_USER ROLE_ADMIN	04/04/18 14:54	system		View Edit Delete
3	admin	admin@localhost	Activated	ROLE_USER ROLE_ADMIN	04/04/18 14:54	system		View Edit Delete
4	user	user@localhost	Activated	ROLE_USER	04/04/18 14:54	system		View Edit Delete
5	hugogda	gdahugo@gmail.com	Activated	ROLE_USER	04/04/18 14:58	admin	04/04/18 15:09	View Edit Delete

Showing 1 - 4 of 4 items.



Hikers

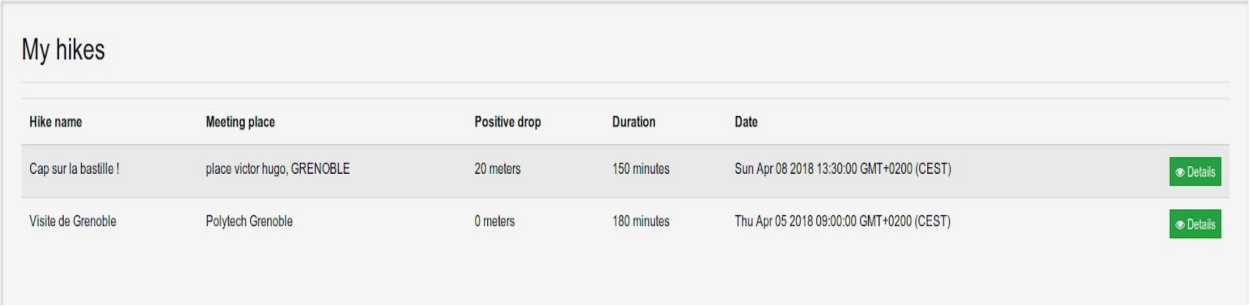
ID	Firstname	Name	Sex	Birthdate	Phonenumber	Anaerobicmaximumspeed	Weight	User	
1	Hugo	GROS-DAILLON	MAN	Mar 8, 1996	+33626981688	14	71	5	View Edit Delete

Showing 1 - 1 of 1 items.

Hikes

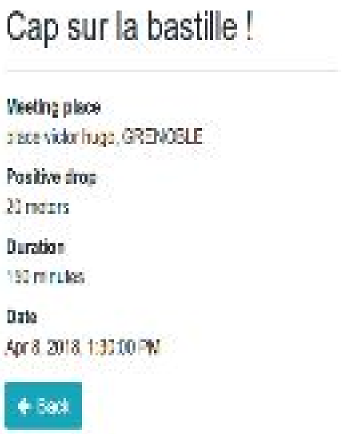
When the user is registered, he can go hiking ! With his smartphone and his LoRa, he will send to the web application messages with the REST API. All the messages sent during the hike correspond to the message entity of our database. The messages contain the position of the hiker (latitude and longitude), a date, a "SOS" boolean, a "ESP ON" boolean and possibly a heart rate.

After the hike, whenever he wants, he can connect himself to our web application to watch his route.



My hikes

Hike name	Meeting place	Positive drop	Duration	Date	
Cap sur la bastille !	place victor hugo, GRENOBLE	20 meters	150 minutes	Sun Apr 08 2018 13:30:00 GMT+0200 (CEST)	Details
Visite de Grenoble	Polytech Grenoble	0 meters	180 minutes	Thu Apr 05 2018 09:00:00 GMT+0200 (CEST)	Details



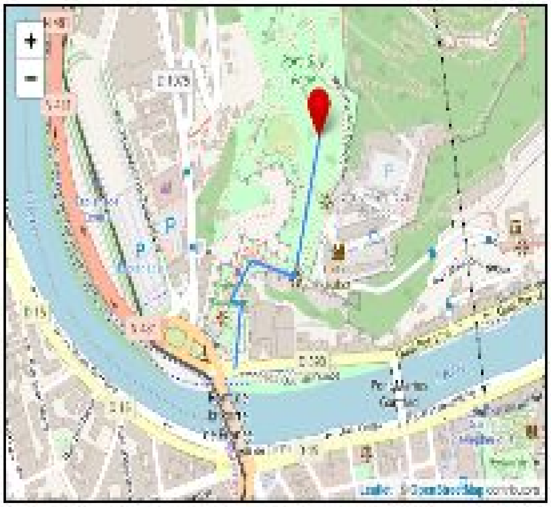
Cap sur la bastille !

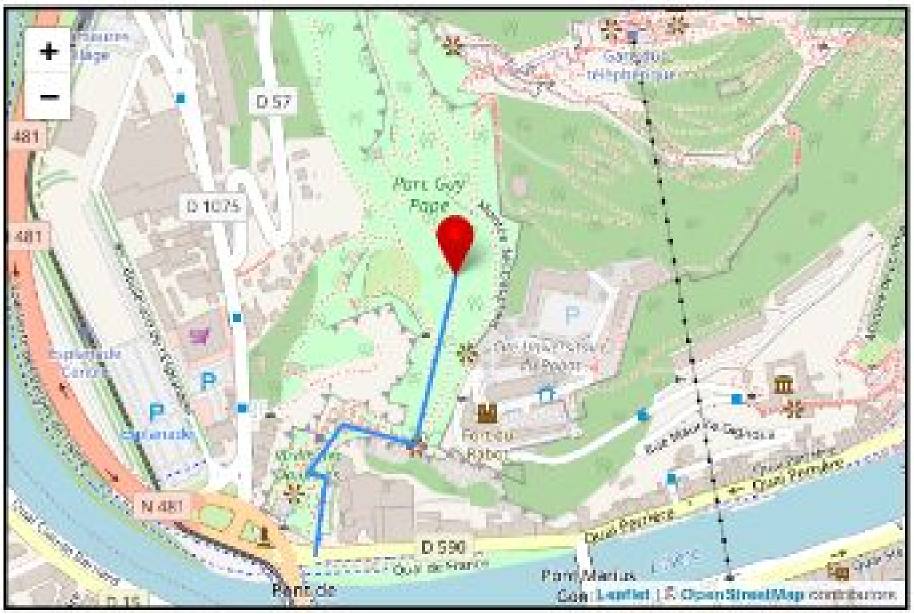
Meeting place
place victor hugo, GRENOBLE

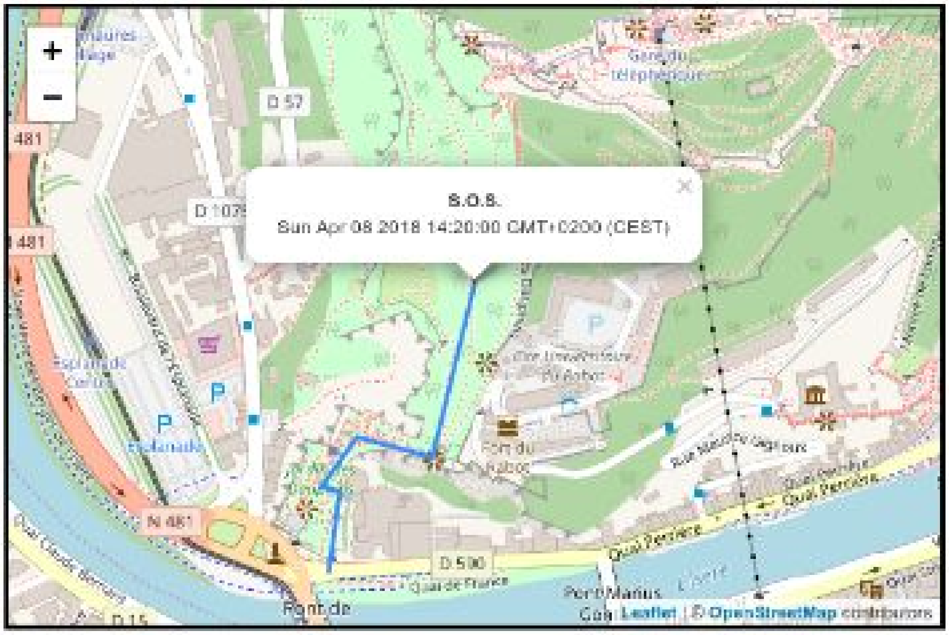
Positive drop
20 meters

Duration
150 minutes

Date
Apr 8, 2018 1:30:00 PM







S.O.S.

Sun Apr 08 2018 14:20:00 GMT+0200 (CEST)

The red marker on the leaflet map is placed if the hiker send a “SOS” message. This feature has been implemented in case emergency users would like to know the position of someone who has hurt himself to intervene quickly. If we click on the red marker we can see “S.O.S” and the date with the hours.

Conclusion

Thanks to this project, we were able to fully learn the use of a new technology: JHipster. As described in this report, this web applications generator has made our job a lot easier. We had the most difficulties in understanding the hierarchy of an application generated with JHipster but also how it works.

What we also found difficult was to integrate a leaflet map into our project and to manipulate it.

The project specifications have almost all been completed. The only thing we haven't had time to deal with is the implementation of emergency users which can see all the hikes (not only his own as users are currently doing) in order to see the hikers in SOS position to intervene quickly. This could be done by adding a new user with specific permissions.

In the future, if other student are brought to take over this project, What will be interesting to do will be to make the link between the mobile application, realized by the group ultrateam 7.2 and our web application by implementing the mobile application features described by the other group, allowing to create hikes on our server as well as sending messages through the REST API.