I.S.P. - Team 3 - Final review

The GPS-Tracer

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Plan

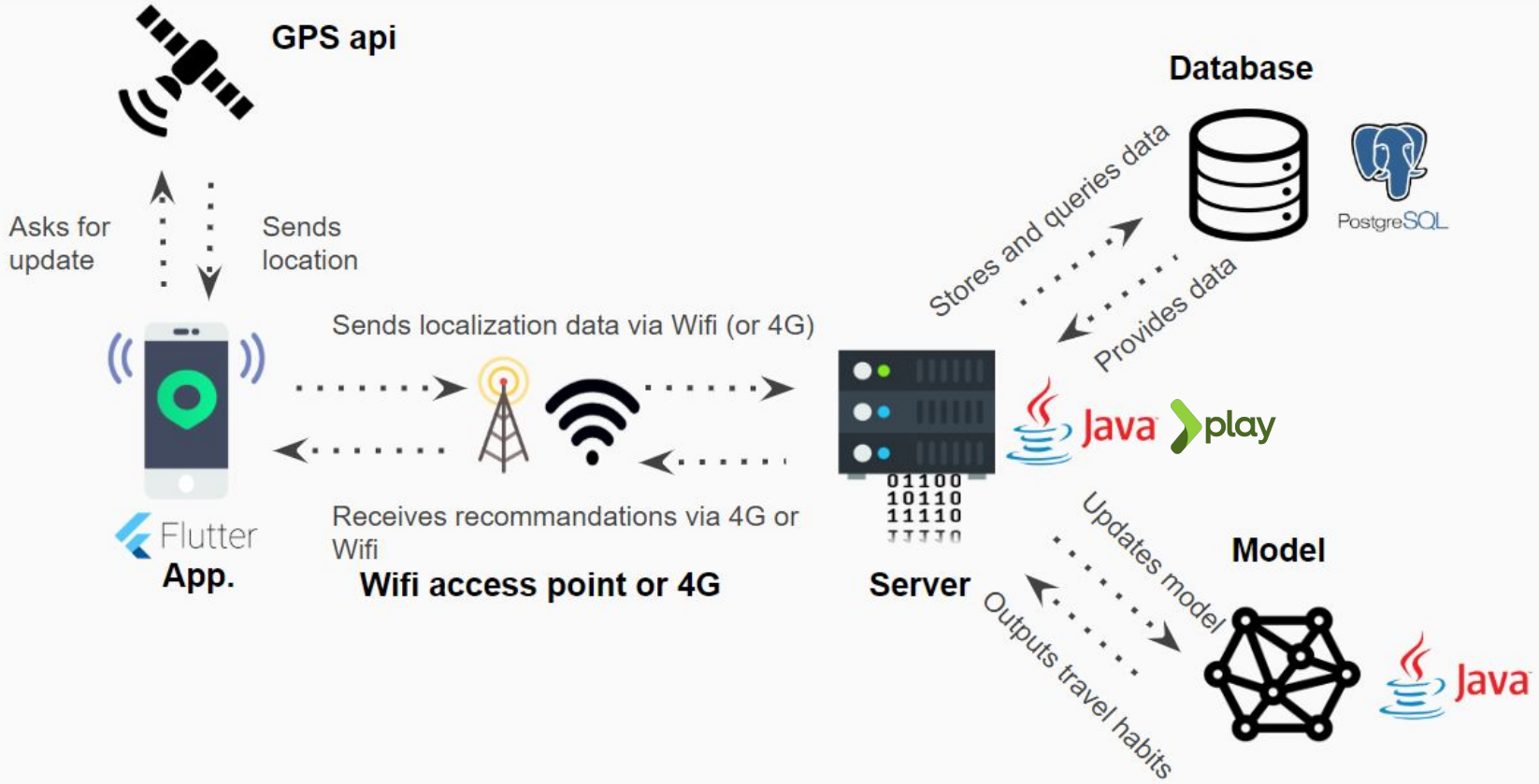
- Project overview
- Delivered content
  - General architecture
  - Learning algorithm
  - Server
  - Application
  - Tests
- Project management
  - Budget
- Demonstration

Project Overview

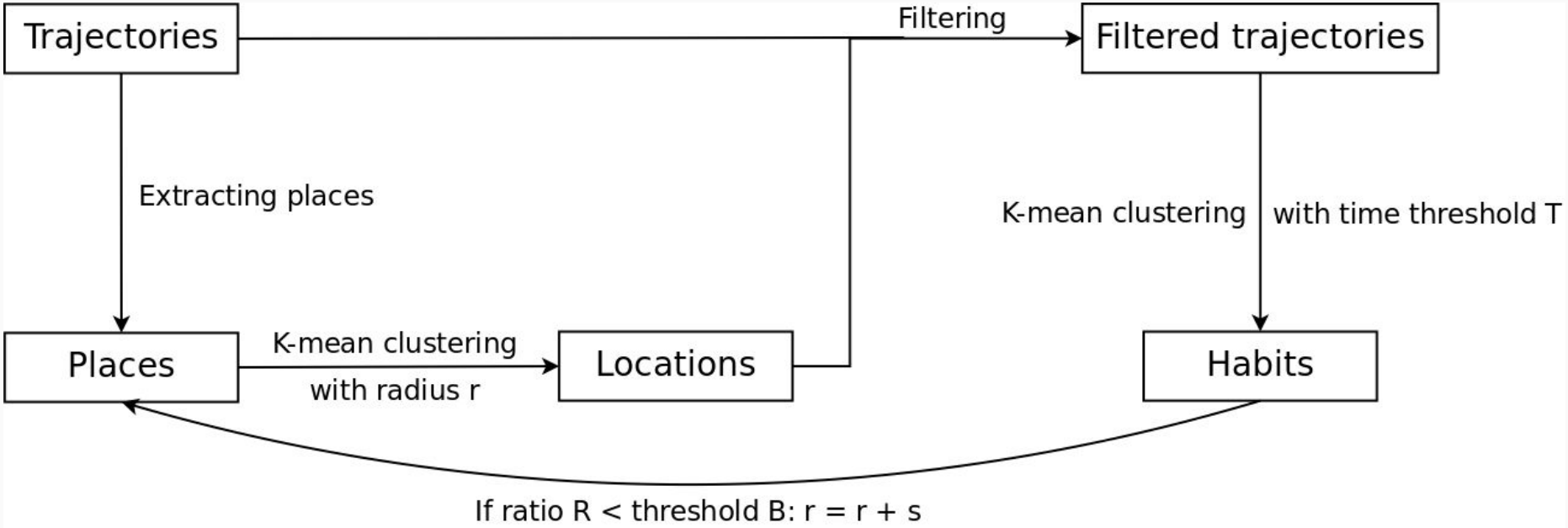
Product vision

- **For:** CovoitULiège
- **Who:** needs to provide an intelligent and automatic detection of user's habits.
- **The:** Covoit ULiège dev. app is an application
- **That:** allows their users to have their displacement model automatically registered in a transparent manner so that they don't need to enter manually their travels.
- **Unlike:** BlaBlaCar or the current state of CovoitULiège
- **Our product:** is free, efficient and makes the ridesharing service easier to use for a better experience.

Architecture of the delivered solution



Overview of the algorithms



- r = 200m to 1000m
- T = 120 minutes
- R = (number of trajectories that contributed to a habit) / (number of filtered trajectories)
- B = 0.2
- Step s = 50m

- 5 places in a cluster to detect a location.
- 4 trajectories in a cluster to detect a habit.

Functionalities of the algorithms

The habit detection process is able to:

- Extract habits from a sufficient number of trajectories that link the same locations and are done at the same time of the week.
- Differentiate two habits that are almost identical (in start and end time or in the locations they link).
- Discard single trajectories or identical trajectories that are not in a sufficient number to be considered as an habit.

Server methods

Currently implemented methods :

- Register a new user
- Post Trajectories
- Get the habits of the user
- Get configuration file for the application

Server GDPR methods

Currently implemented methods :

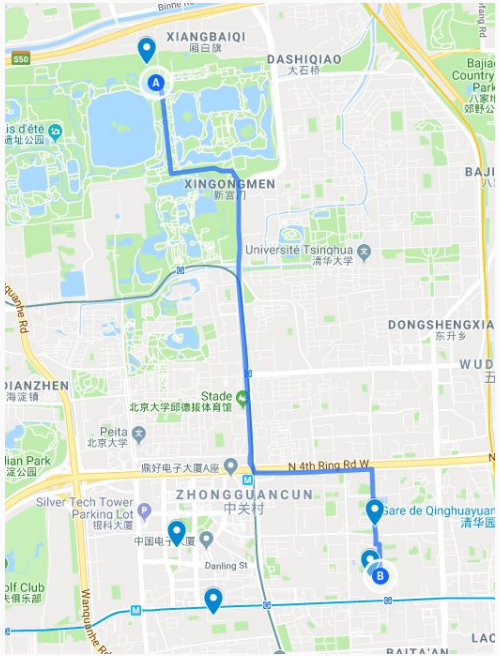
- Download all the data of a user
- Delete the trajectories of a user
- Delete an account

App - features

- Background acquisition
- Very small battery overhead
  - Double geofencing
    - 1 for battery saving (accelerometer)
    - 1 for stay point detection (trajectories making)
- Limited data sent to server
- Appealing design
- Secured data transfer
- Hashed passwords and crypted session

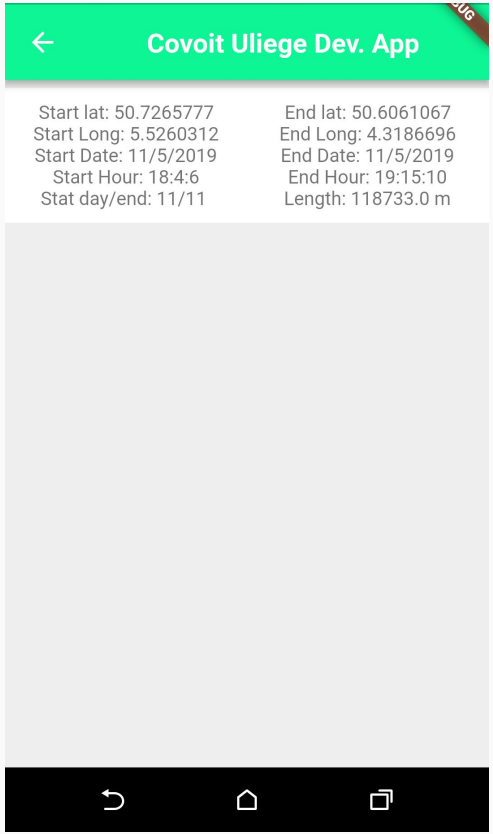
- Dev. tool page
- Bug reporting feature
- GDPR compliant
- Very modular
  - Remote config
  - Server changes
  - Storage changes
- Cross platform

Solution testing



- **Server**
  - Unit testing
  - Methods verification using the app
  - Concurrent connections
  - Geolife validation
- **App**
  - Many unit tests of API’s
  - Widget unit testing
  - Test IRL of background data acquisition
  - + Dev. tool page to monitor activity

Solution testing (II)



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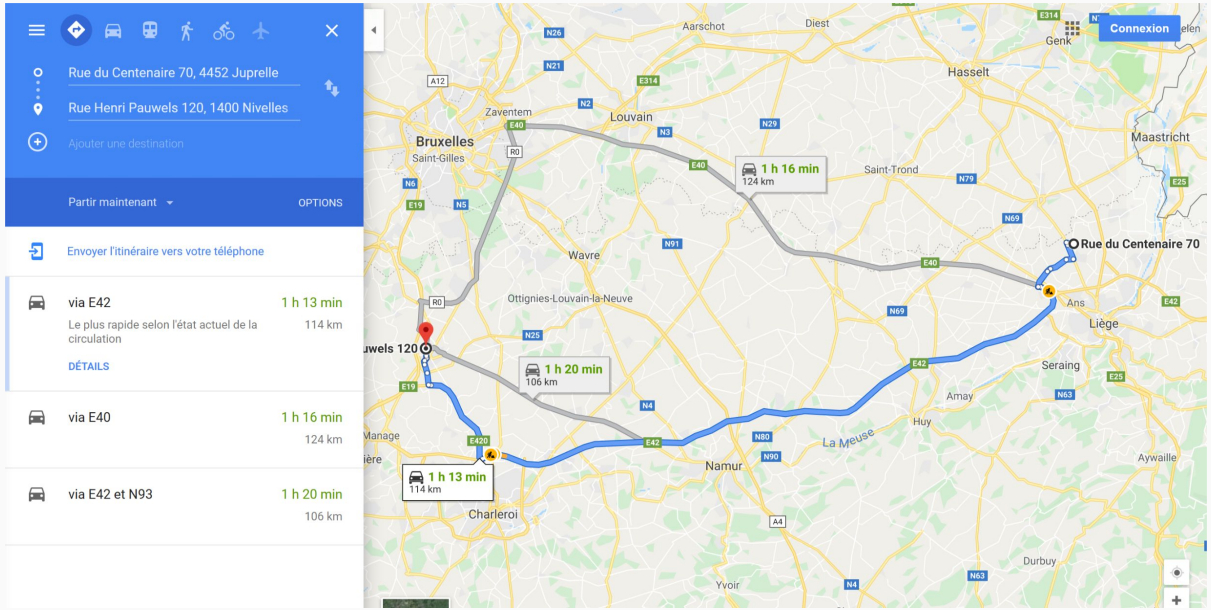
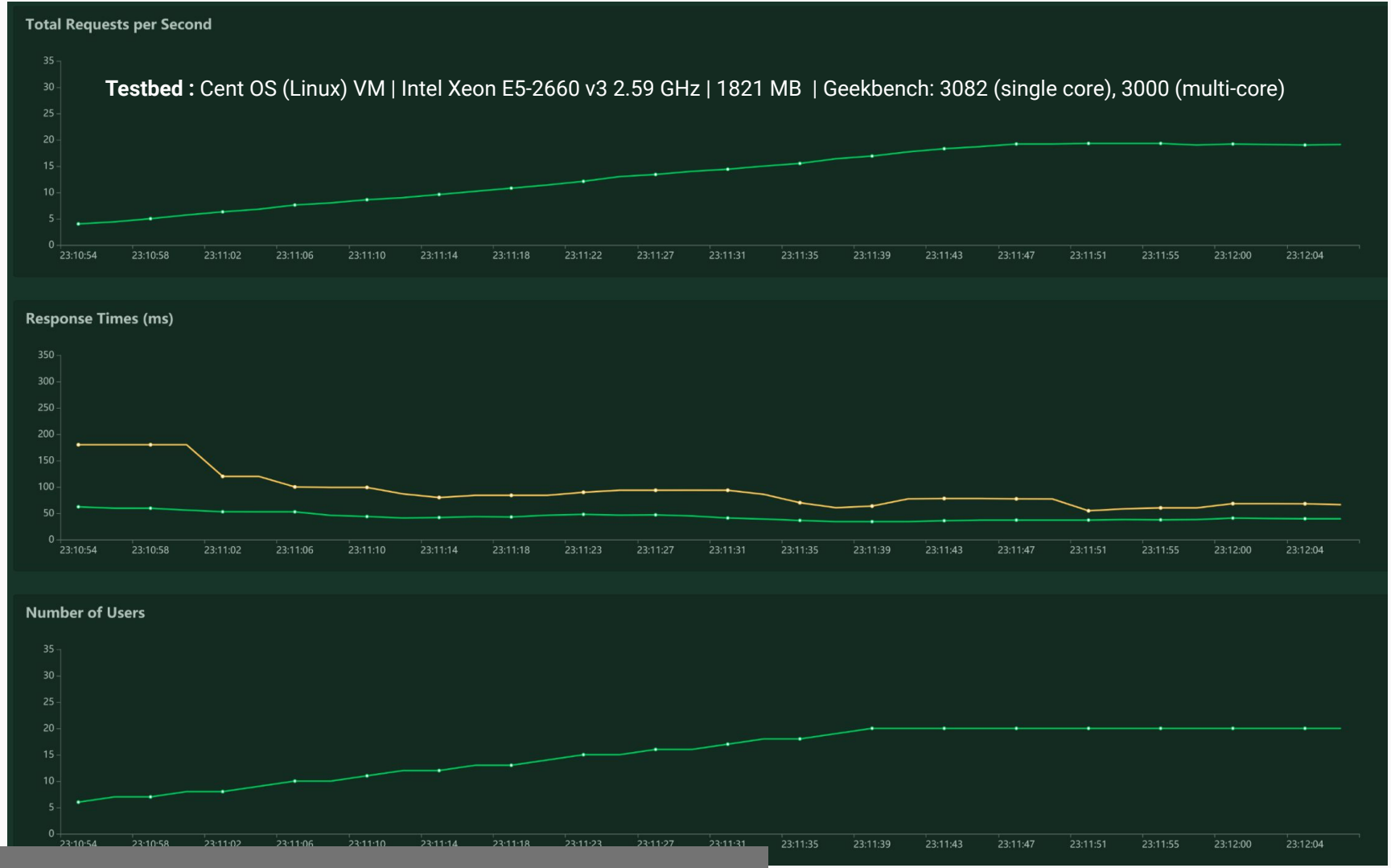



Total Requests per Second
Testbed : Cent OS (Linux) VM | Intel Xeon E5-2660 v3 2.59 GHz | 1821 MB | Geekbench: 3082 (single core), 3000 (multi-core)
35
30
25
20
15
10
5
0
23:10:54
23:10:58
23:11:02
23:11:06
23:11:10
23:11:14
23:11:18
23:11:22
23:11:27
23:11:31
23:11:35
23:11:39
23:11:43
23:11:47
23:11:51
23:11:55
23:12:00
23:12:04
Response Times (ms)
350
300
250
200
150
100
50
0
23:10:54
23:10:58
23:11:02
23:11:06
23:11:10
23:11:14
23:11:18
23:11:23
23:11:27
23:11:31
23:11:35
23:11:39
23:11:43
23:11:47
23:11:51
23:11:55
23:12:00
23:12:04
Number of Users
35
30
25
20
15
10
5
0
23:10:54
23:10:58
23:11:02
23:11:06
23:11:10
23:11:14
23:11:18
23:11:23
23:11:27
23:11:31
23:11:35
23:11:39
23:11:43
23:11:47
23:11:51
23:11:55
23:12:00
23:12:04

Load test (II)

# fails	Method	Name	Type
53	POST	/DownloadUserData	HTTPError('500 Server Error: Internal Server Error for url: https://spem3.montefiore.ulg.ac.be:443/DownloadUserData',)
102	POST	/GetHabits	HTTPError('500 Server Error: Internal Server Error for url: https://spem3.montefiore.ulg.ac.be:443/GetHabits',)
~~212~~ 0	POST	/Login	HTTPError('400 Client Error: Bad Request for url: https://spem3.montefiore.ulg.ac.be:443/Login',)
225	POST	/Login	HTTPError('500 Server Error: Internal Server Error for url: https://spem3.montefiore.ulg.ac.be:443/Login',)

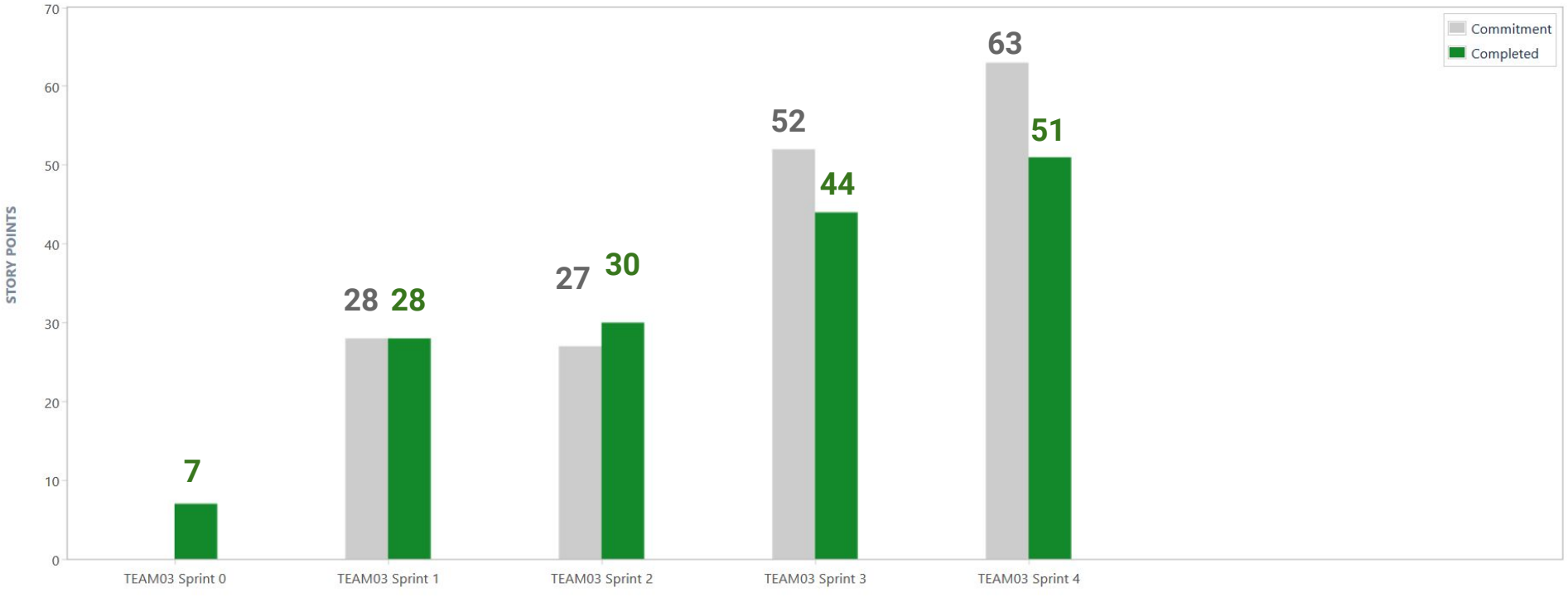
Type	Name	# Requests	# Fails	Median (ms)	Average (ms)	Min (ms)	Max (ms)	Average size (bytes)	Current RPS
POST	/DownloadUserData	95	53	44	51	24.359464645385742	110.05783081054688	146	1.6
POST	/GetConfig	440	0	38	43	24.04952049255371	321.9614028930664	565	7.9
POST	/GetHabits	192	102	45	50	25.138139724731445	162.2335910797119	6	3.1
POST	/Login	437	~~437~~ 0	42	52	24.895191192626953	608.4818840026855	0	6.7
	Total	**1164**	~~532~~ 185	**41**	**48**	**24.04952049255371**	**608.4818840026855**	**226**	**19.3**

20% of failed request:

Reason: org.postgresql.util.PSQLException: FATAL: remaining connection slots are reserved for non-replication superuser connections

Project Management

Velocity chart



Product backlog remaining stories

TEAM03-28	Language Compatibility	Learning algorithms f...	3
TEAM03-16	Handle routing server	Data acquisition	5
TEAM03-55	Forgot password log in on app	Accounts manageme...	2

Tot: 10

Product budget

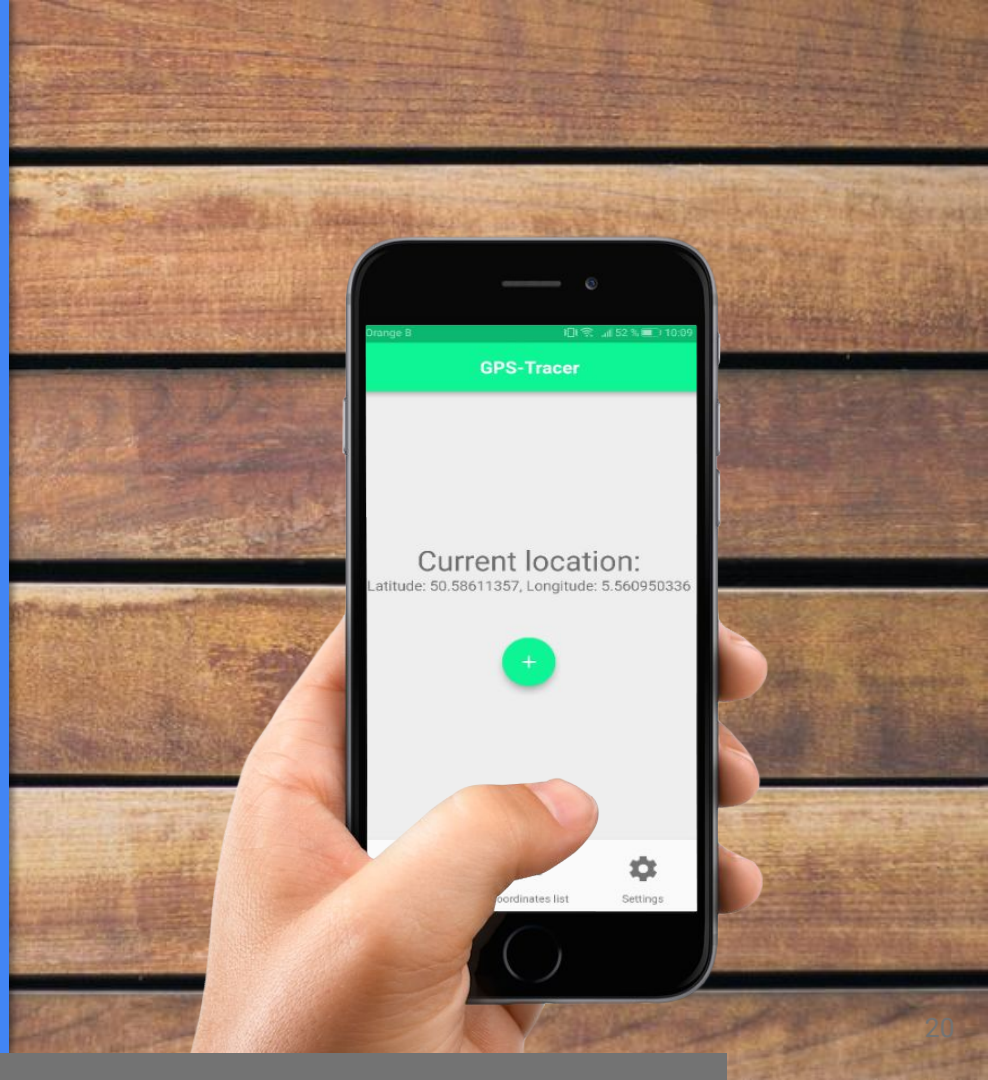
Product Budget					
	Budget (h)	**Actuals (h)**	**To complete (h)**	**At completion (h)**	**Budget variance (h)**
Sprint 0	119	71	0	71	-48
Sprint 1	268	190,75	0	190,75	-77,25
Sprint 2	201	213,5	0	213,5	12,5
Sprint 3	335	381	0	381	46
Sprint 4	335	351,5	0	351,5	16,5
Final defense preparation	142	127	0	127	-15
Total	1400	1334,75	0	1334,75	-65,25

Timesheet (per person)

Nom	P	%	Σ	29 L	30 M	01 M	02 J	03 V	04 S	05 D	06 L	07 M	08 M	09 J
Cyril Geortay		100%	22					8					6	8
Damien Seron		100%	28			5	5				7		4	7
Julien De Cooman		100%	15								5		2	8
Olivier Moitroux		100%	29			5		4	6	2			3	9
Robin Houart		100%	33	7	6	5	2	2		2	2		7	
Total des heures de la journée :				7	6	15	7	14	6	4	14		22	32
Total des heures de la semaine :									55					72
Total des heures planifiées:														

Total	À ce jour	Période
Travaillé	127	127
Planifié	0	0

Demonstration



Improvements ?

Improvements

Application :

- Home proposes next travel in app
- Tokens
- Crypted coordinates
- Infer mean of travel

: Idea for improvement

: Missing feature

: Remaining error

Server :

- Change time in mapper
- Automatic deletion of data
- Change where to generate habits
- Queues for db access
- Make algorithm run online

Thank you