Implementation of the Service Platform

Thiago Nepomuceno, 16.12.2020

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Summary

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Scenario

We were part of the Work Package 4 (WP4), this WP is responsible for functional development. Its main task is to produce a prototype of the scenario designed by Work Package 3 (WP3).

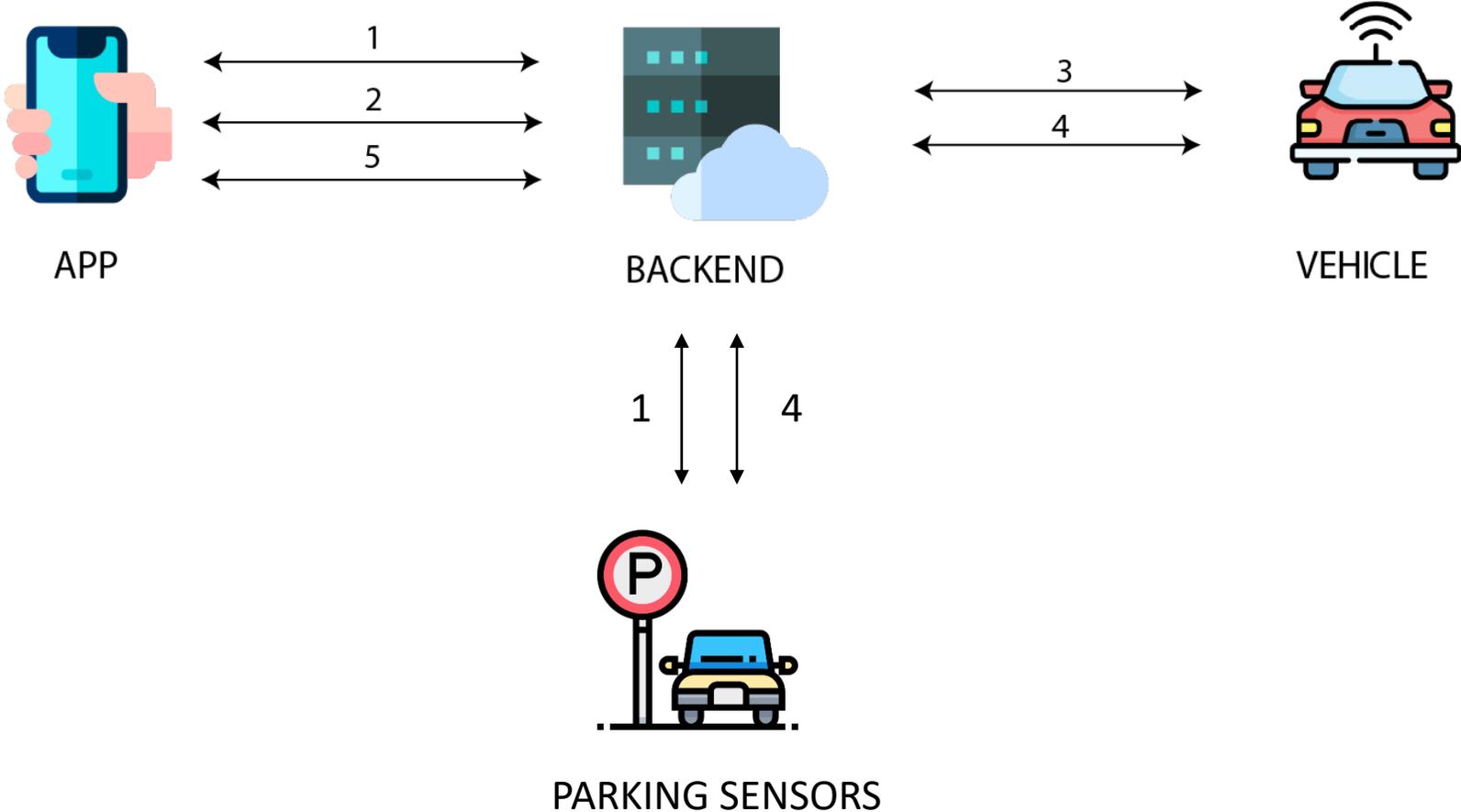We can summarize the chosen scenario as follows:

"The customer opens an **app**, choose and reserve a parking spot. Then, it travels to the parking area, when it gets close to the selected spot, the **app** will ask if the customer wants to do *automated* or *manual* parking. When automated parking is selected, the car will use its **sensors and algorithms** to park the car in the selected spot. When the parking is done, the **app** will inform the customer and generate a parking ticket."

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Scenario

The prototype system for the described scenario has the following components:

- Mobile App
- Backend System
- Smart car (Vehicle)
- IoT devices (Parking Spots)

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Communication Between the Components

APP

BACKEND

VEHICLE

PARKING SENSORS

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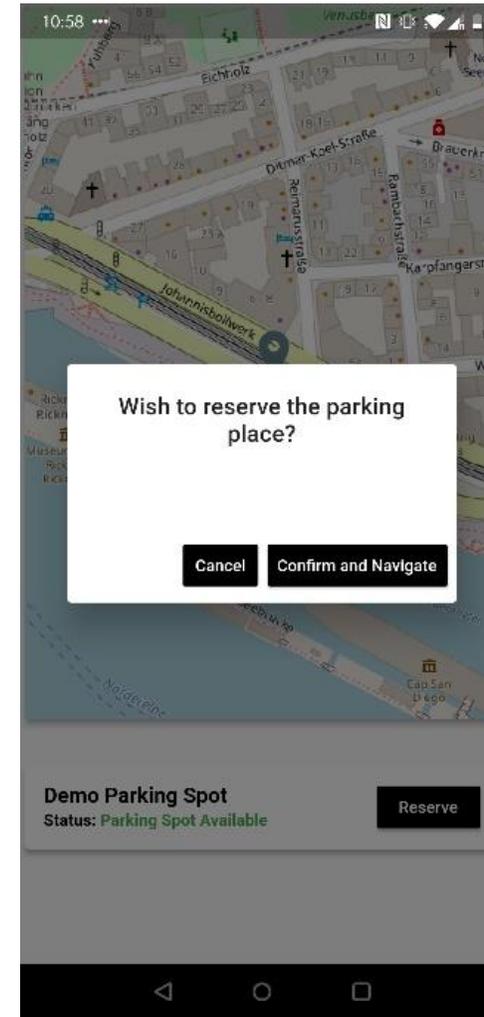a body of the European Union

Parking Spots
in the Area

1. The APP gets currently available PARKING SPOTS from the BACKEND and displays them to the customer. The customer chooses a PARKING SPOT to navigate. A map with the navigation route for the selected PARKING SPOT is displayed in the VEHICLE.

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Reserve
Parking Spot

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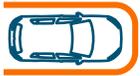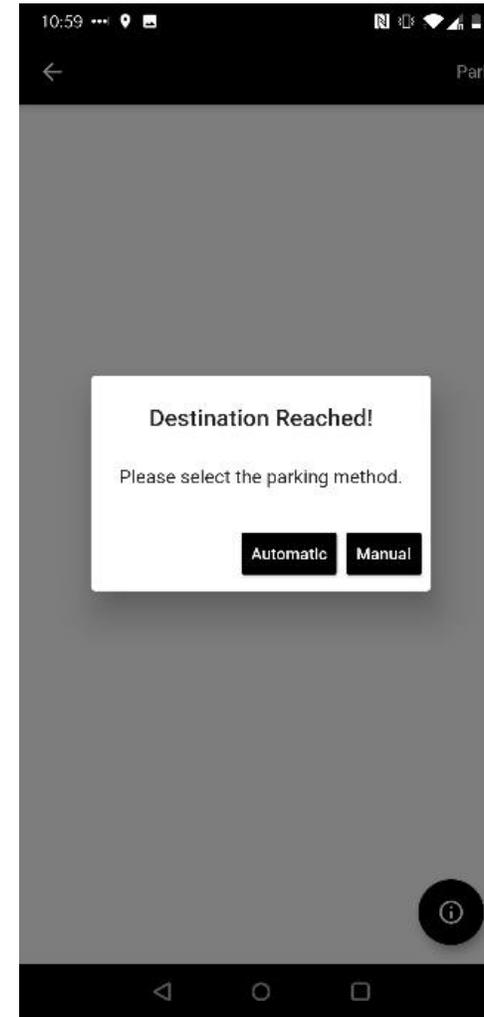a body of the European Union
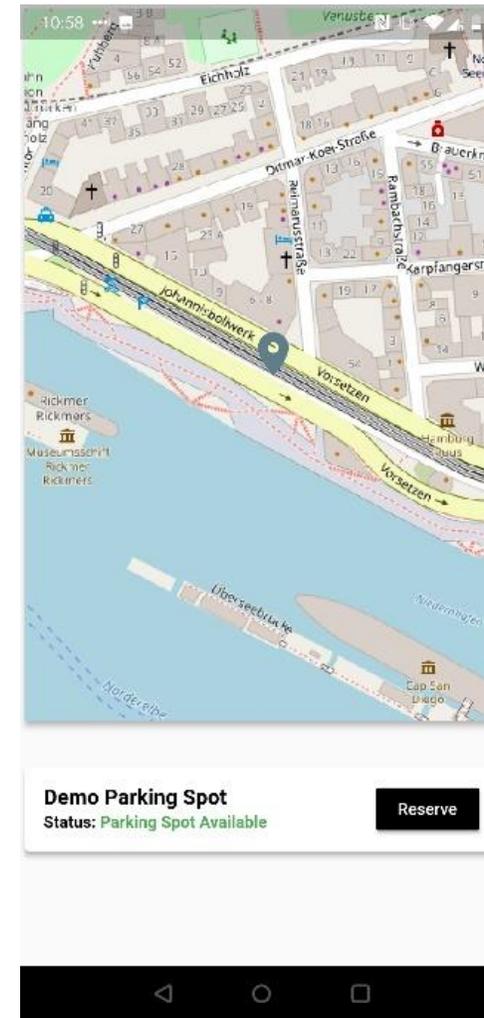
Select Parking Method

2. When the VEHICLE reaches the designated area, the APP asks if the customer wants the manual or automated parking method. If automated parking is selected:
    * The APP sends the choice to the backend that then saves it in the database.
    * The APP gives instructions to the customer about the progress of the parking manoeuvre.

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Parking in Progress

3. The VEHICLE continuously checks with the BACKEND if there are any PARKING SPOT assigned to do automated parking. If the BACKEND returns a PARKING SPOT, the VEHICLE starts the parking manoeuvre.

4. When the manoeuvre completes, the VEHICLE sends this information to the BACKEND.

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Parking Ticket

5. When the BACKEND gets information about a completed manoeuvre, it forwards it to the APP that will display the appropriate information to the customer as well as the parking ticket, completing the parking process.

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Screenshots of the Web GUI

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Screenshots of the Web GUI

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Challenges

During the development of the project we faced some challenges that had to be overcome. Most of them related directly to a shorter project duration after the project was not extended to a second year.

While the theoretical tasks like research, initial studies and evaluation of the ideas could be completed in the new timeframe, the practical implementation for the final demonstration in Hamburg was severally impacted by this change.
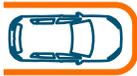
Some of the challenges were:

- A smartphone app by itself usually takes a considerable amount of time to be created and polished. It was specially hard to do it in time with the limited development resources available in a research institute.

- The backend system is a complex piece of software that involves multiple micro services (each one with their own database) communicating between them to provide the features previously listed. Such complex system would usually take from several months to more them one year just by itself, but thanks to the AutoIoT platform previously developed by Fraunhofer it could be delivered in the new timeframe of the project.

- Integration and testing of the system was the most impacted aspect. The whole system only came to life in the last week before the final presentation.

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Challenges

- Even with so many challenges we could delivered all planned aspects of the system.

- The final presentation in Hamburg was successful.

- No internal difficulties faced by the development teams seems to became apparent during the demo.

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Thanks!

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