POLITECNICO
MILANO 1863

SafeStreets

Software Engineering 2 Project

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RASD

Requirements Analysis and Specification Document

Goals of the system

1) The system must allow users to send a report of traffic violations

2) The system must allow all users to mine the information that has been received by highlighting the streets (or the areas) with the highest frequency of violations

3) The system must allow authorities to mine the information that has been received to see the ranking of vehicles that commit more violations

4) The system must cross the information provided by the municipality about the accidents with its own data to identify potentially unsafe areas and suggest possible interventions.

- "STANDARD" USER: Common citizen who signs up to use the SafeStreet service. He uses the app to report a traffic violation or to visualize public available data on the map

- TRAFFIC WARDEN: The sign up process is made in collaboration with the authorities to guarantee their identity. He has to take on and verify the violations. Also he can access the ranking of vehicles that commited violations.

- MUNICIPALITY'S CLERK: Certified municipality's clerk who can access the suggestions for possible interventions.
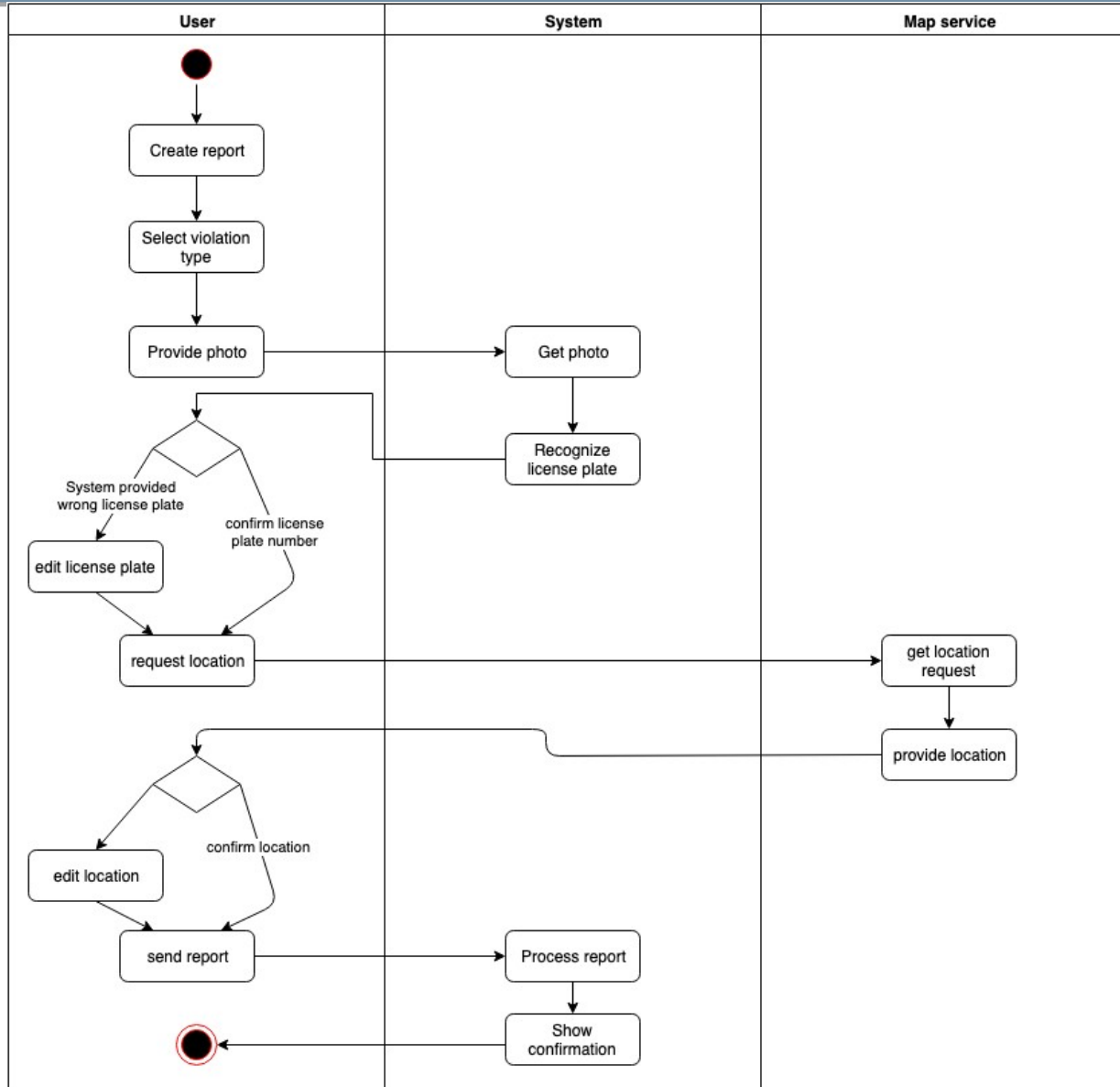
Boundaries between world and machine

- The system doesn't verify the reports automatically

- The sytems handles a request only if it comes from a user that has the required authorization:
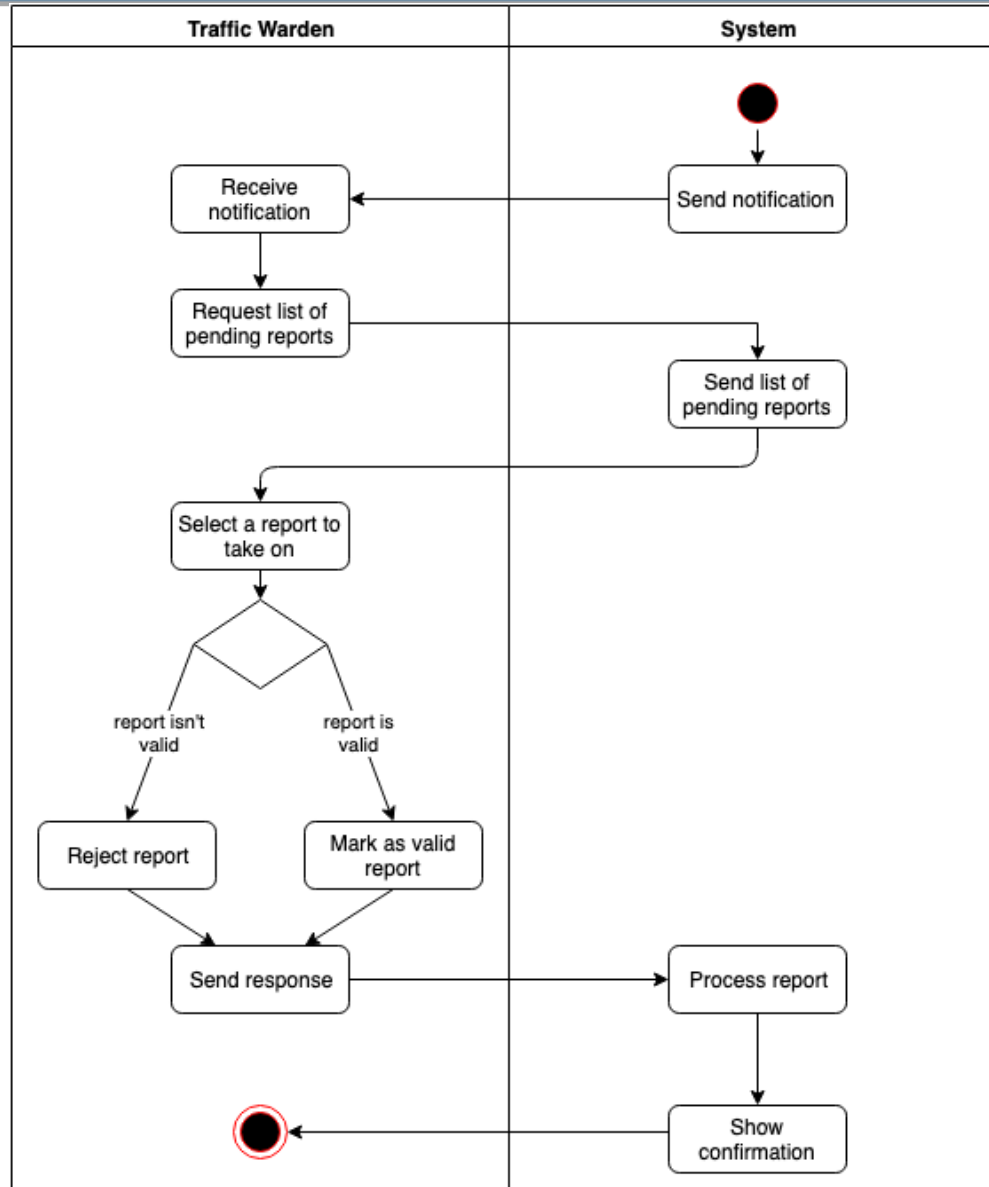
    Only police officers can access information about a vehicle

    Only municipality's clerks can see suggestions for possible interventions
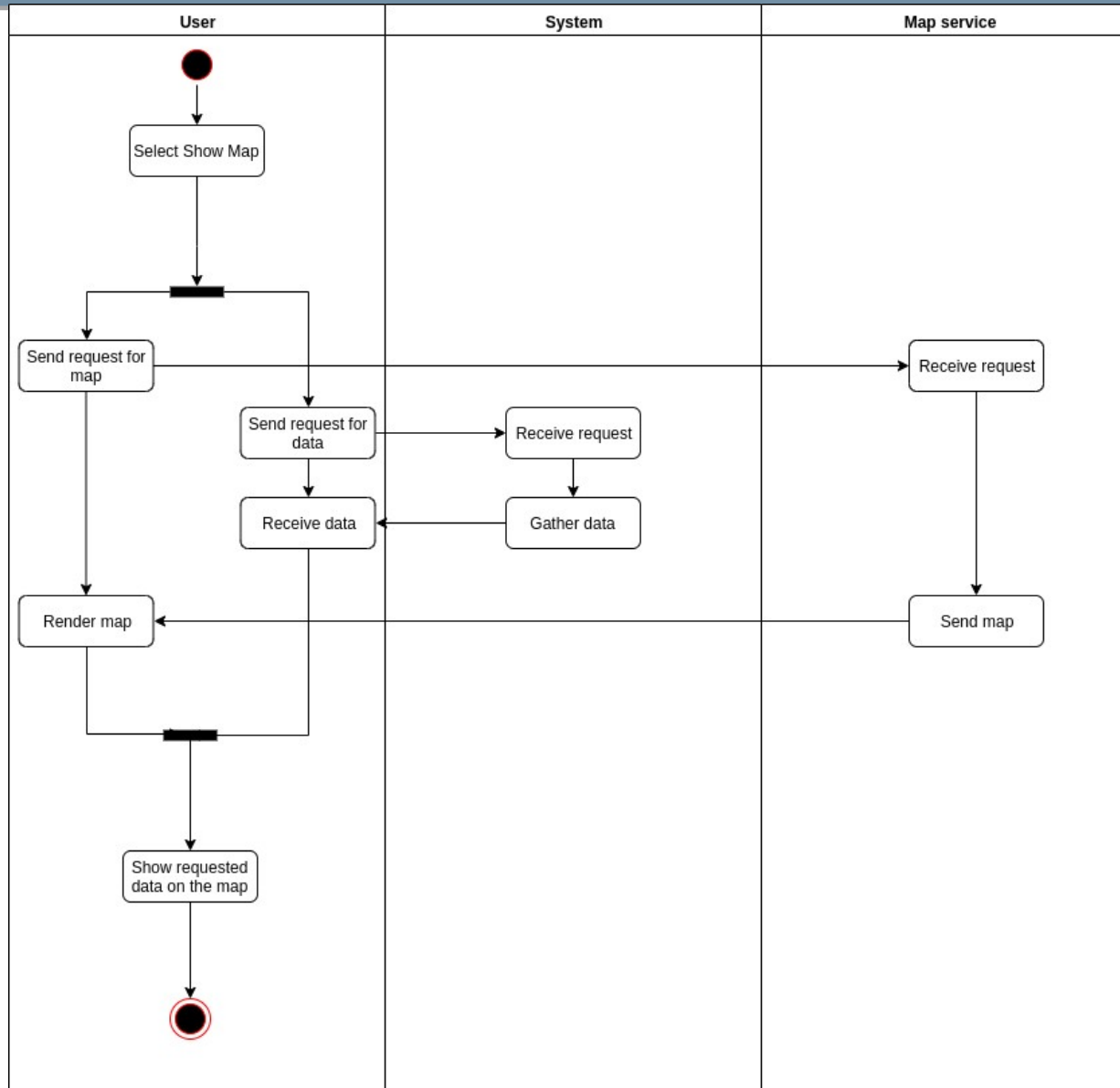
Meaningful use cases - Visualize public available data on map

The most important requirements

- **R3** The system must allow users to send pictures of violations, including their date, time, and position to authorities.

- **R5-R6** The system must allow the user to fix the license plate ,if the algorithm read it wrong, and the location if the GPS acquired the wrong location.

- **R10** The system has to allow the traffic warden to validate or to invalidate the report.

- **R16** The system must cross the information provided by the municipality about the accidents with its own data to identify potentially unsafe areas.
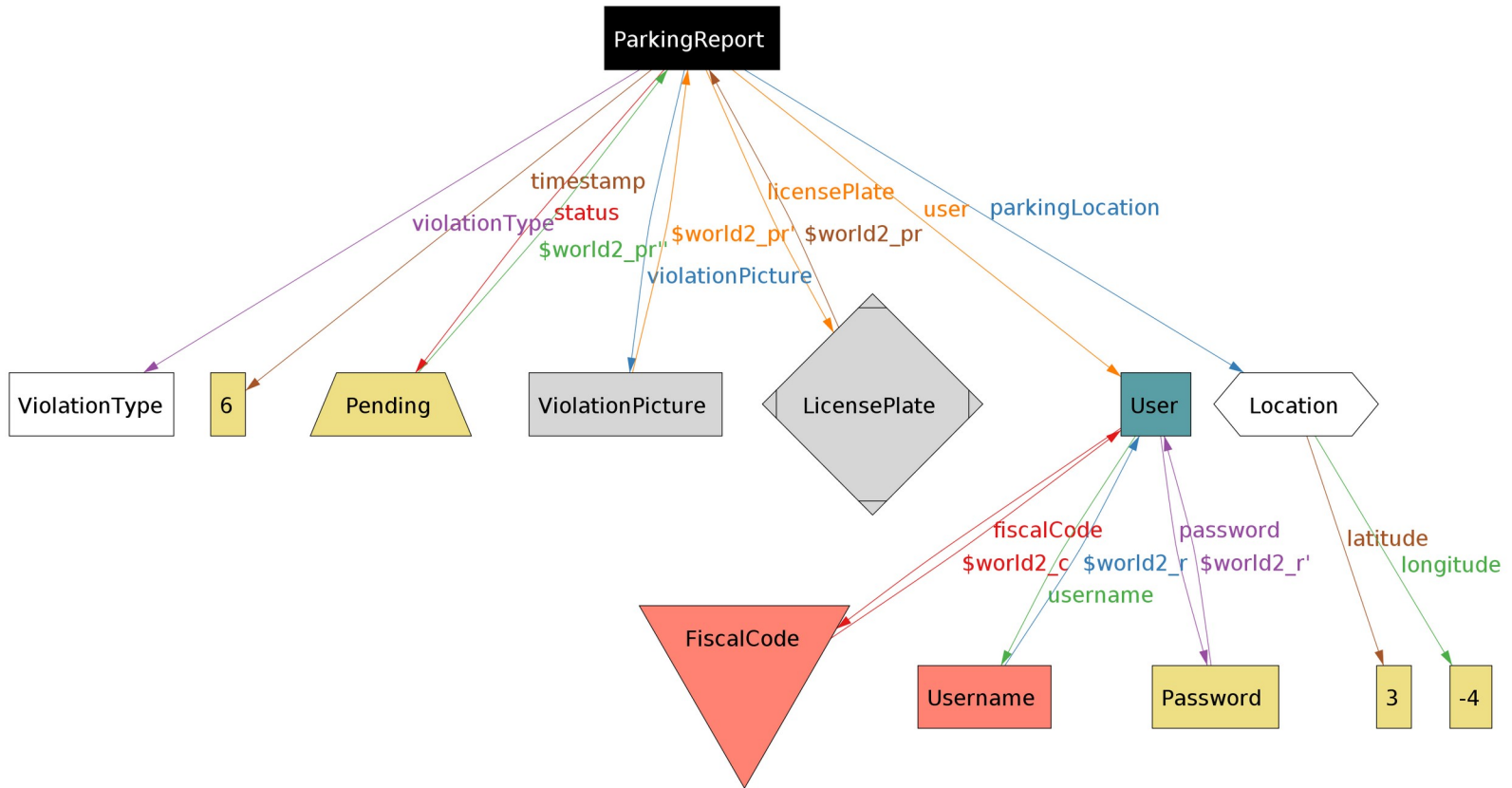
The most important assumptions

- **D1**: All traffic wardens have a smartphone.

- **D4**: The map provider will provide only well formatted data.

- **D3**: The municipality will provide only well formatted report of accidents.

Alloy model

- **Signatures** define how the data is structured and the relationships between entities.

- **Facts** statements model the domain assumptions which are necessary to make the system work

- **Assert** statements model the requirements which must be guaranteed by the system

- **Pred** statements show how the system should function through generated worlds

Alloy model

In this world without traffic wardens, parking report status can only be pending. None can take on the requests.
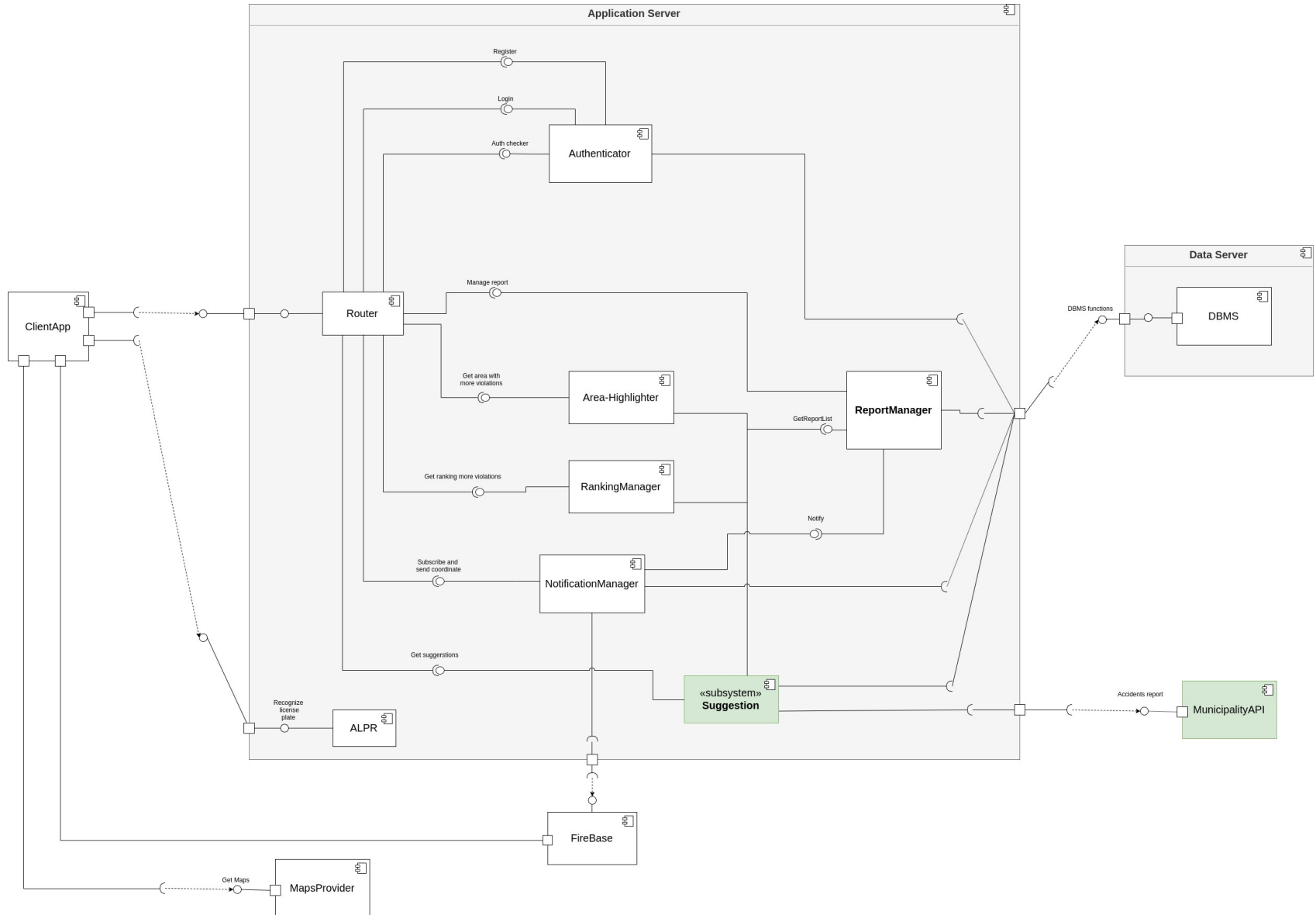

$world2_c: 1
$world2_pr: 1
$world2_pr': 1
$world2_pr'': 1
$world2_r: 1
$world2_r': 1
fiscalCode: 1
latitude: 1
licensePlate: 1
longitude: 1
parkingLocation: 1
password: 1
status: 1
timestamp: 1
user: 1
username: 1
violationPicture: 1
violationType: 1

DD - Design Document

Meaningful interactions

- The component structure is made so that every incoming request from clients is caught by the **Router**, which, if needed, checks if the clients has the permission to execute the request, exploting the **Authenticator** interface, and then forwards the request to the right component

- The only type of request from the client that is not handled by the router is the request to analyze a photo of a license plate. This request is directly handled by the **ALPR.** (For scalability reasons it may be deployed on a different server) (Also it could be provided as an external service for the community)

- The **ReportManager** is the only component to query the database in order to get the reports list (maintainability)

- RESTful architecture

- Three-tier architecture: Presentation – Logic – Data

- Relational Database: The advantages of relational databases (Expressive query language, secondary indexes, strong consistency, etc.) make them a preferred choice for this application as it will handle well-structured data

- Safestreets will be available as a web application and as a native app for Android and iOS. The user interface and the UX should be the same on every device

Integration strategy