
# Software Engineering 2 Project

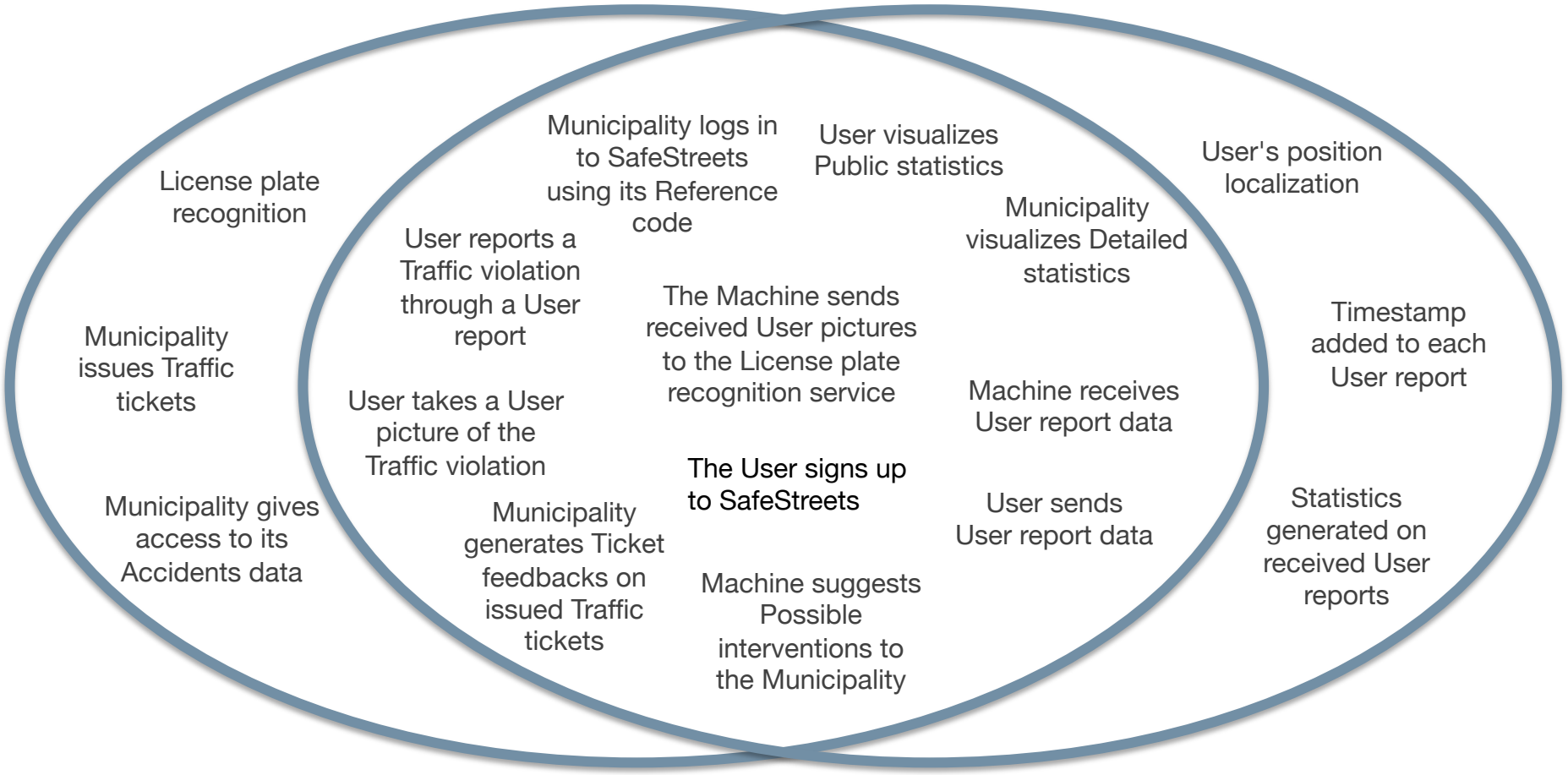
Fabiana Ferrara, Stefano Formicola, Leonardo Guerra

A.Y. 2019-2020

Prof. Di Nitto Elisabetta

SafeStreets

# World and Machine Phenomena



# World and Machine Phenomena

| Phenomena | Shared | Who controls it |
|---|---|---|
| The User signs up to SafeStreets | Yes | World |
| The Municipality logs in to SafeStreets using its Reference code | Yes | World |
| The User reports a Traffic violation through a User report | Yes | World |
| The User takes a User picture of the Traffic violation | Yes | World |
| The Machine sends received User pictures to the License plate recognition service | Yes | Machine |
| The License plate recognition service recognizes a license plate | No | World |
| The License plate recognition service can’t recognize a license plate | No | World |
| The Machine locates the User's position | No | Machine |
| The Machine adds a Timestamp to each User report | No | Machine |

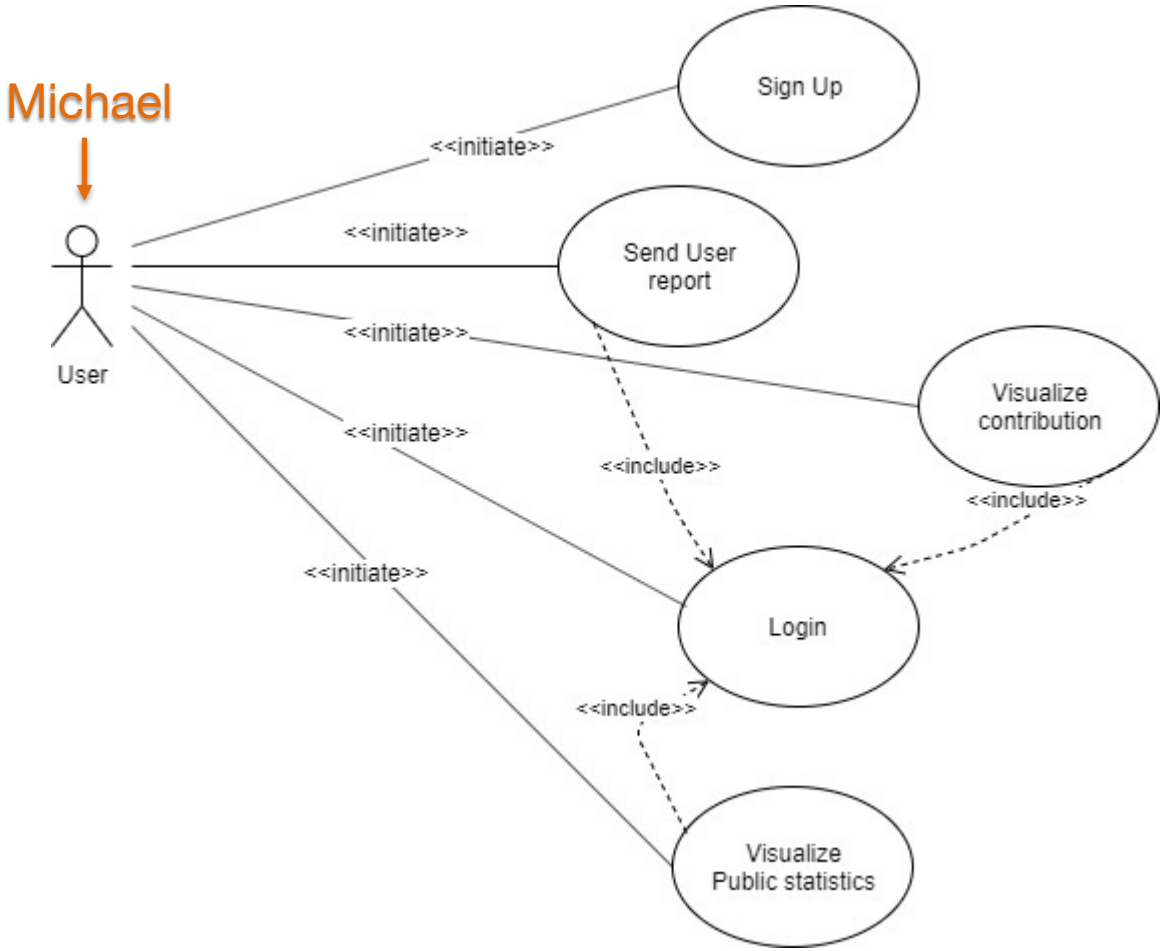
# World and Machine Phenomena

| Phenomena | Shared | Who controls it |
|---|---|---|
| **The User sends User report data** | Yes | World |
| The Machine receives User report data | Yes | Machine |
| **The Municipality issues Traffic tickets** | No | World |
| The Municipality generates Tickets feedbacks on issued Traffic tickets | Yes | World |
| The Machine generates statistics on received User reports | No | Machine |
| The User visualizes Public statistics | Yes | World |
| The Municipality visualizes Detailed statistics | Yes | World |
| The Municipality gives access to its Accidents data | No | World |
| **The Machine suggests Possible interventions to the Municipality** | Yes | Machine |

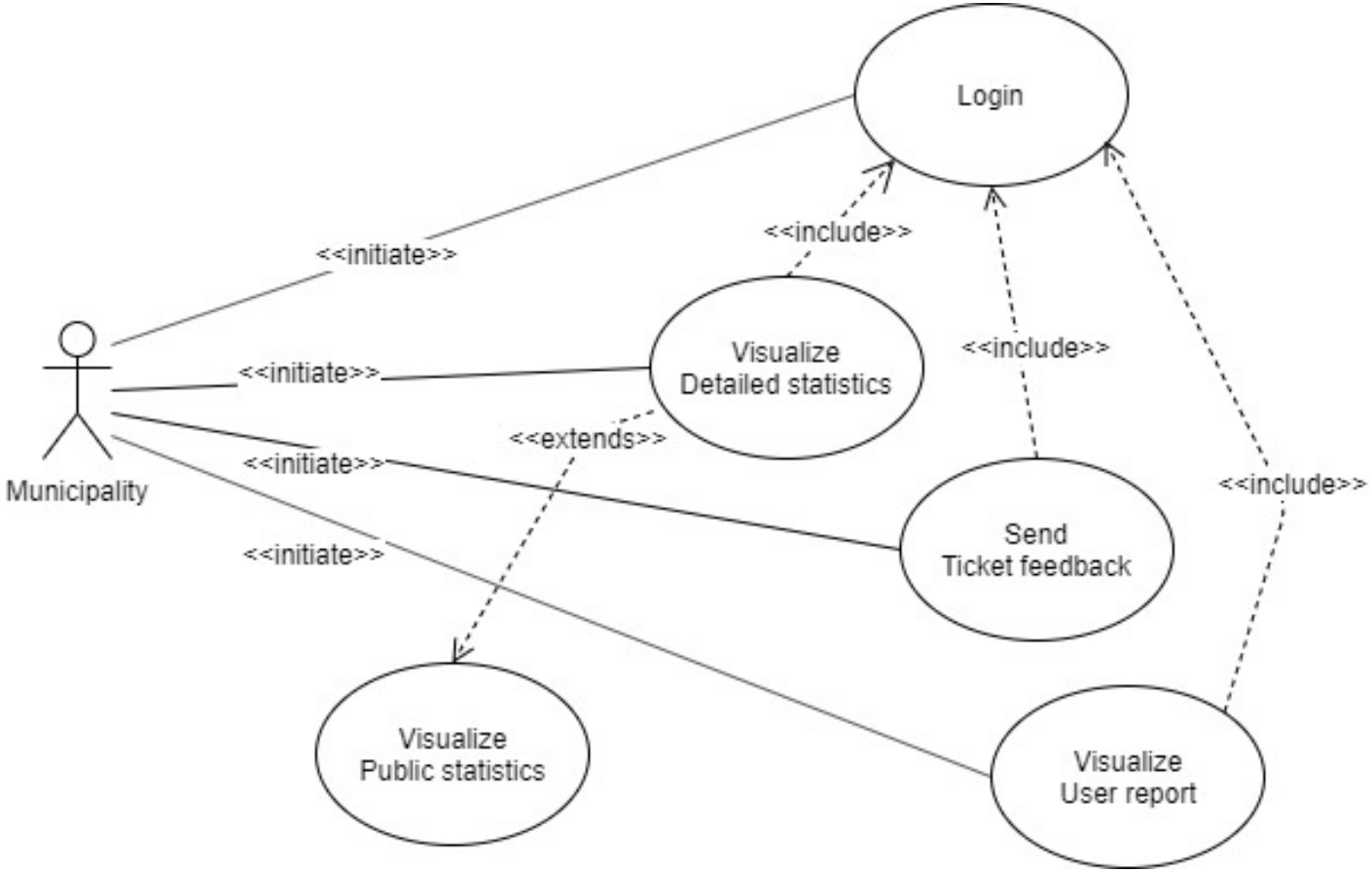
# Goals of the system

| | |
|---|---|
| $G_1$ | Collect User report in SafeStreets Database |
| $G_2$ | Send User report notification to Municipality as soon as it is generated |
| $G_3$ | Send User picture to the License plate recognition service as soon as it is received |
| $G_4$ | Allow Municipality to visualize Detailed statistics |
| $G_5$ | Allow Users to visualize Public statistics |
| $G_6$ | Suggest Possible interventions to Municipality |
| $G_7$ | Collect information about Ticket feedback |
| $G_8$ | Allow Users to visualize their contribution to SafeStreets |

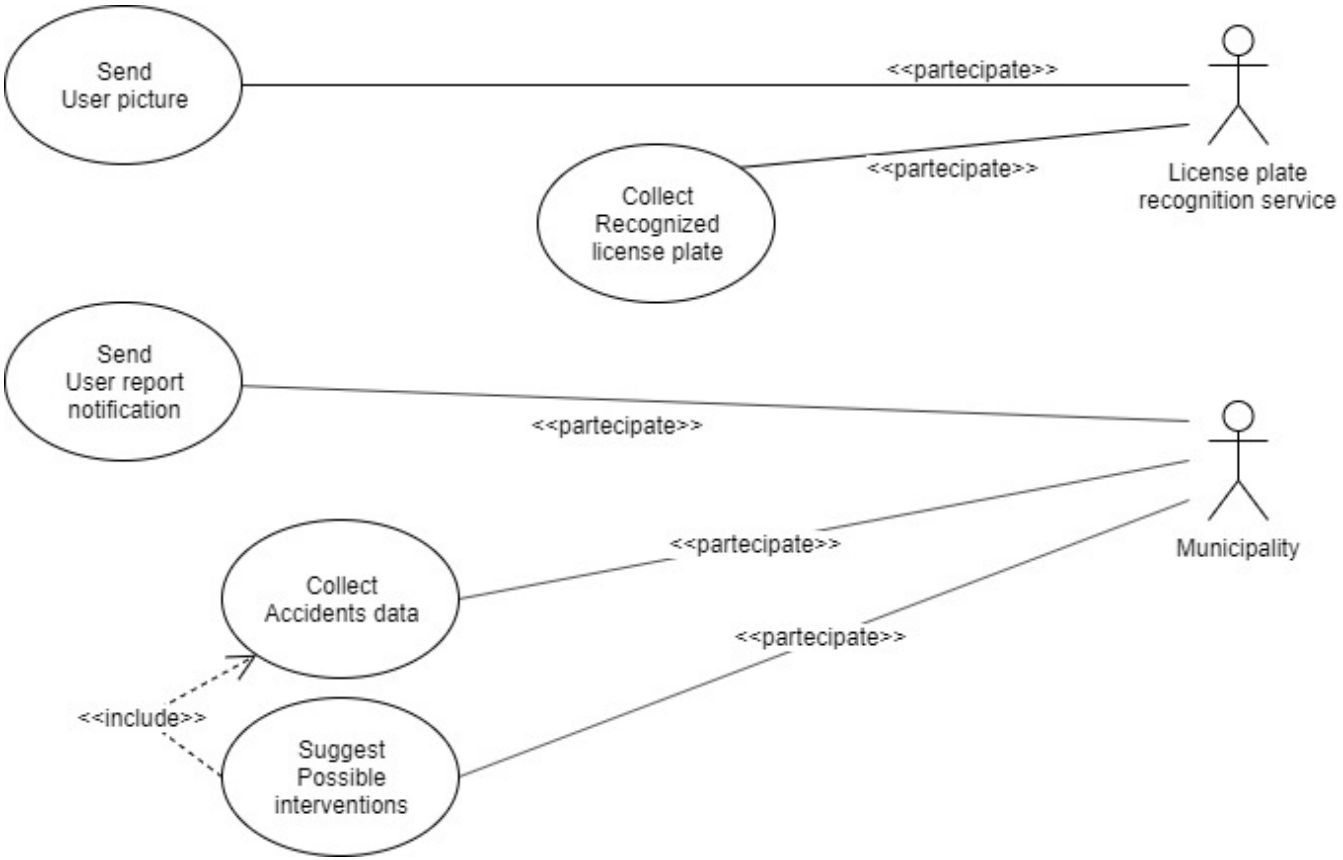
# Use Cases (1)


Michael
User
Sign Up
Send User report
Visualize contribution
Login
Visualize Public statistics
<<initiate>>
<<initiate>>
<<initiate>>
<<initiate>>
<<initiate>>
<<include>>
<<include>>
<<include>>

# Use Cases (2)


Login
<<initiate>>
<<include>>
Visualize
Detailed statistics
<<include>>
<<initiate>>
<<extends>>
<<initiate>>
Send
Ticket feedback
<<include>>
<<initiate>>
Municipality
Visualize
Public statistics
Visualize
User report

# Use Cases (3)


Send
User picture
<<partecipate>>
Collect
Recognized
license plate
<<partecipate>>
License plate
recognition service
Send
User report
notification
<<partecipate>>
Collect
Accidents data
<<partecipate>>
Municipality
<<partecipate>>
<<include>>
Suggest
Possible
interventions

# Most important Domain Assumptions

| | |
|---|---|
| $D_6$ | SafeStreets and License plate recognition service are always online |
| $D_7$ | Municipality has institutional credentials (Reference code and password) which uses to access the system |
| $D_8$ | Municipality grants access to its own Accidents Database |

# Most important Requirements

| | |
|---|---|
| $R_7$ | Send User picture to the License plate recognition service |
| $R_{16}$ | Generate Possible interventions crossing Municipality Accidents data with SafeStreets Database data |
| $R_{18}$ | Allow Municipality to set specific constraints to define Detailed statistics |
| $R_{23}$ | Allow User to choose among Filters which define Public statistics |

# Alloy Model: summary

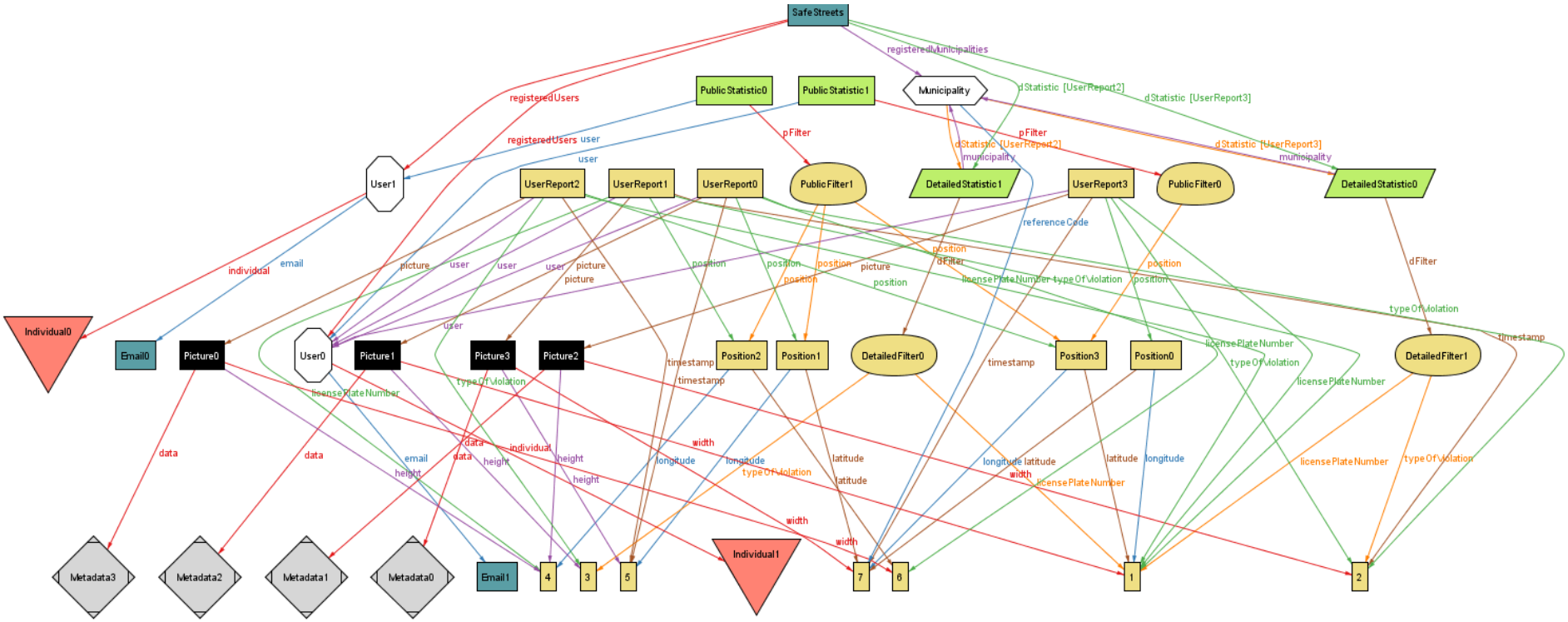
**Executing "Check sendDetailedStatisticOK for 10"**
Solver=sat4j Bitwidth=4 MaxSeq=7 SkolemDepth=1 Symmetry=20
82344 vars. 5241 primary vars. 235603 clauses. 802ms.
No counterexample found. Assertion may be valid. 161ms.

**Executing "Check sendPublicStatisticOK for 10"**
Solver=sat4j Bitwidth=4 MaxSeq=7 SkolemDepth=1 Symmetry=20
82444 vars. 5241 primary vars. 235951 clauses. 598ms.
No counterexample found. Assertion may be valid. 115ms.

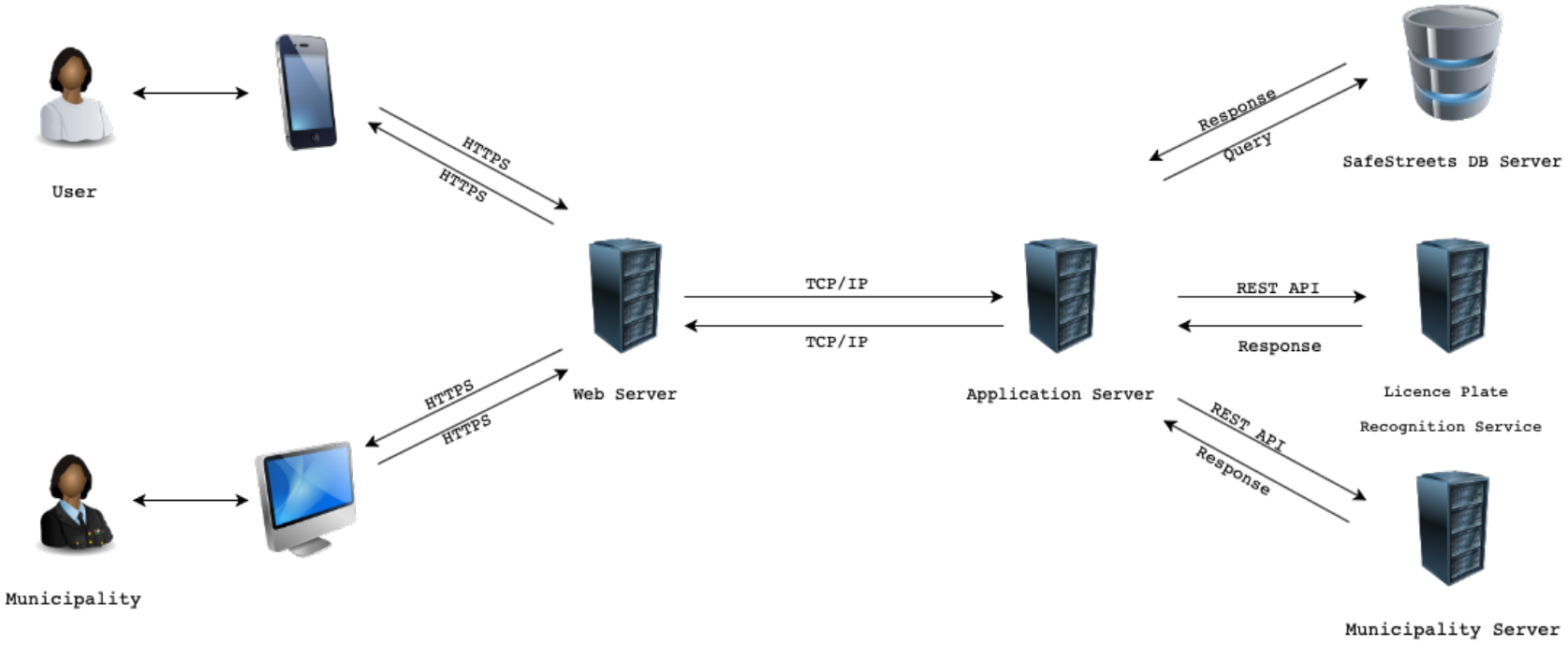
**Executing "Run show for 10 but exactly 2 User, exactly 1 Municipality, exactly 4 UserReport, exactly 2 DetailedStatistic, exactly 2 PublicStatistic"**
Solver=sat4j Bitwidth=4 MaxSeq=7 SkolemDepth=1 Symmetry=20
25789 vars. 1815 primary vars. 77108 clauses. 125ms.
Instance found. Predicate is consistent. 376ms.

**3 commands were executed. The results are:**
#1: No counterexample found. sendDetailedStatisticOK may be valid.
#2: No counterexample found. sendPublicStatisticOK may be valid.
#3: Instance found. show is consistent.

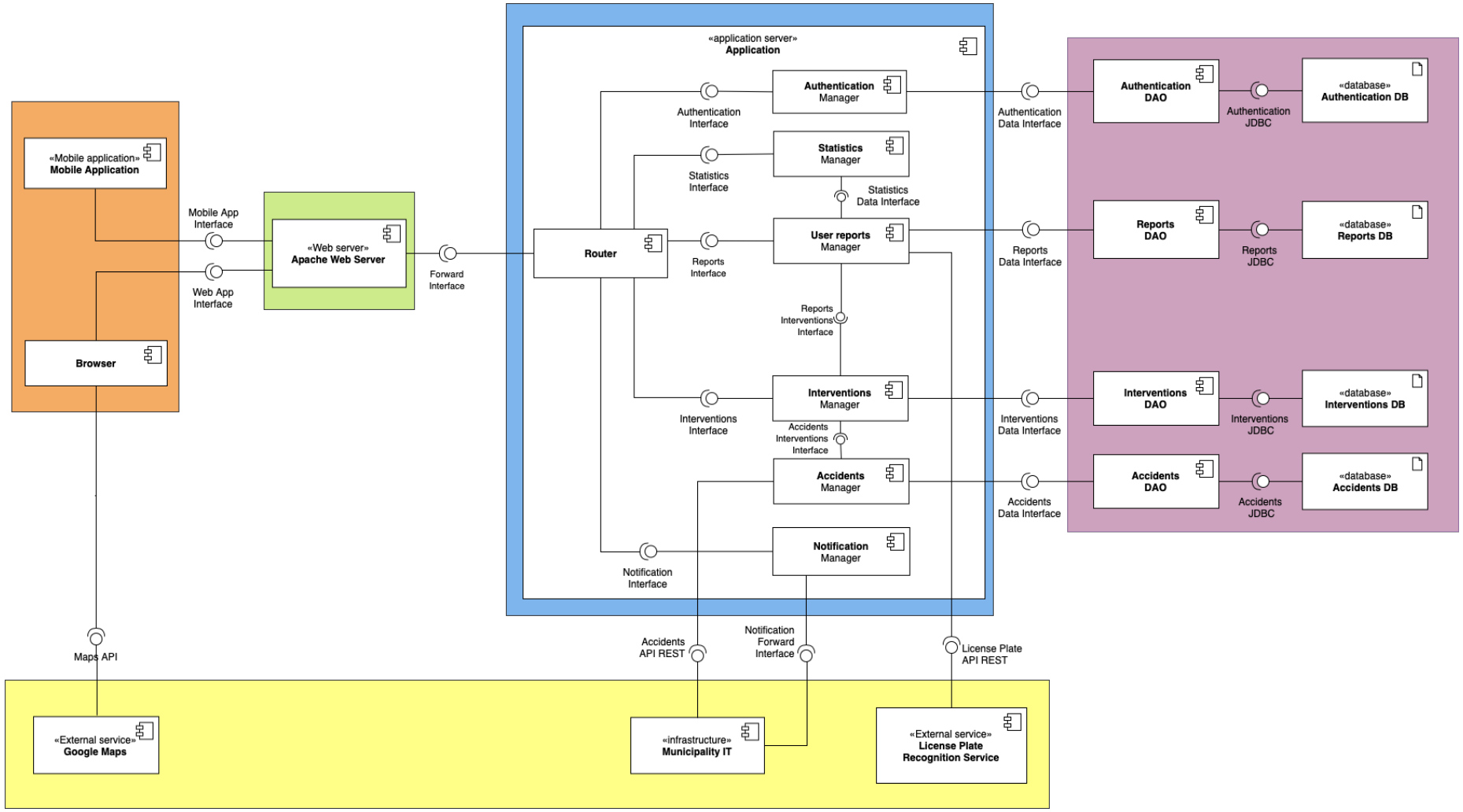
# Alloy Model: graph



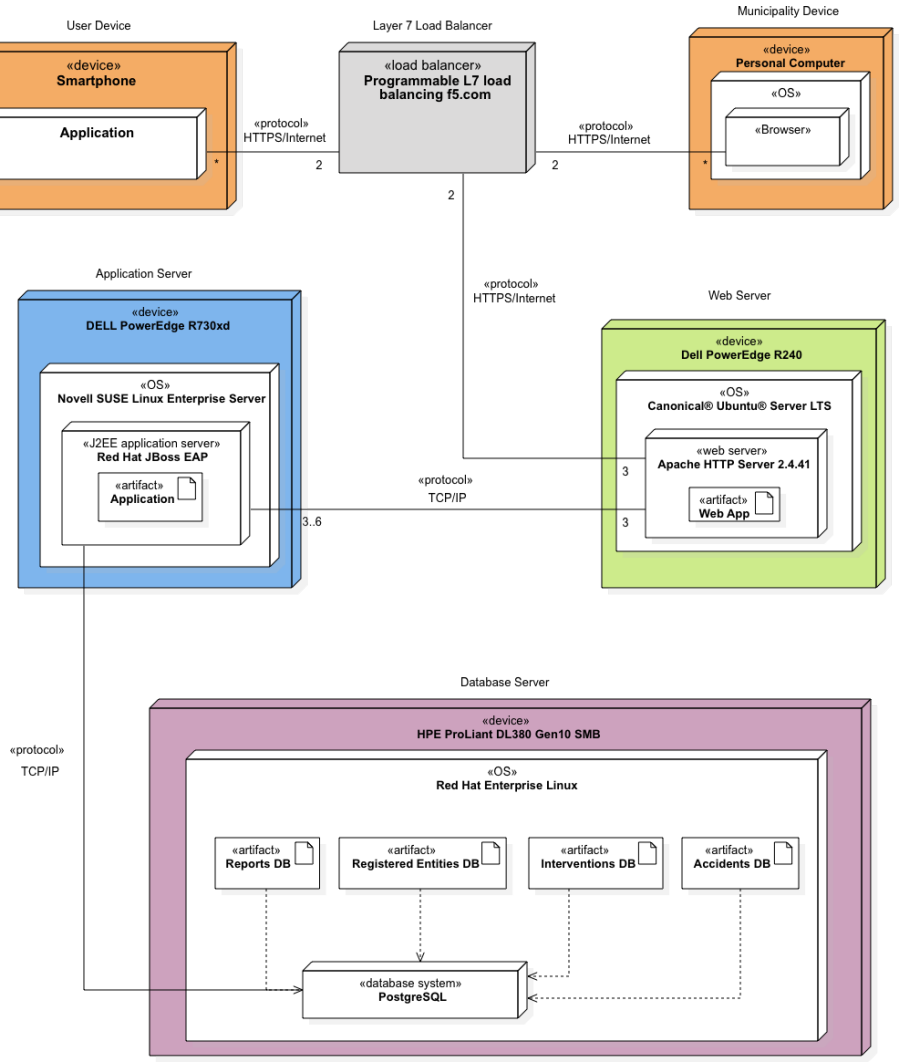
# High Level Description of the S2B



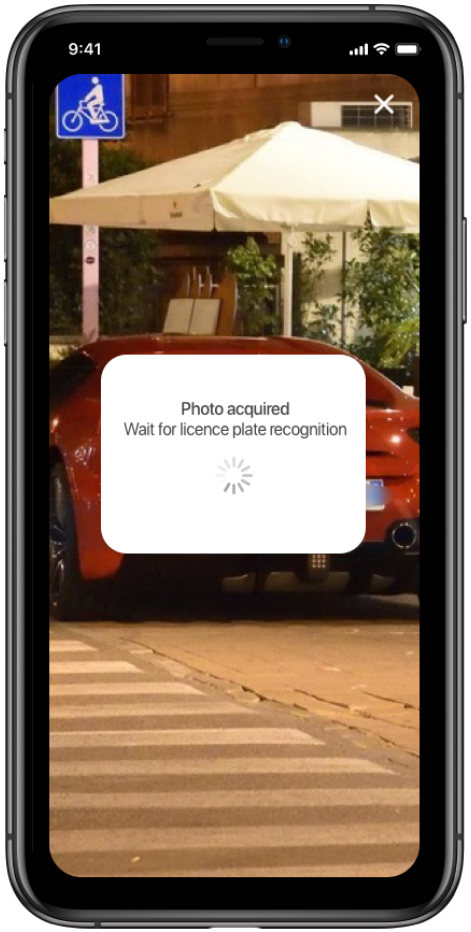
# Low Level Description of the S2B: Component Diagram

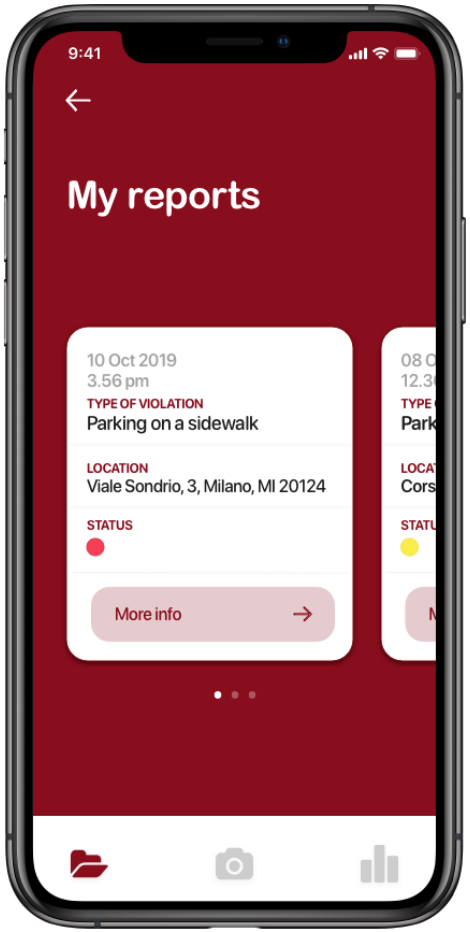


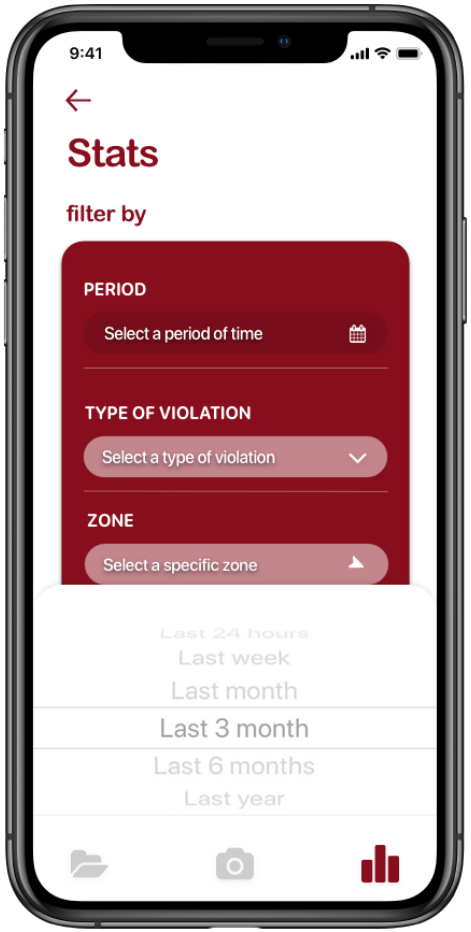
# Dynamic Description of the S2B: Deployment Diagram



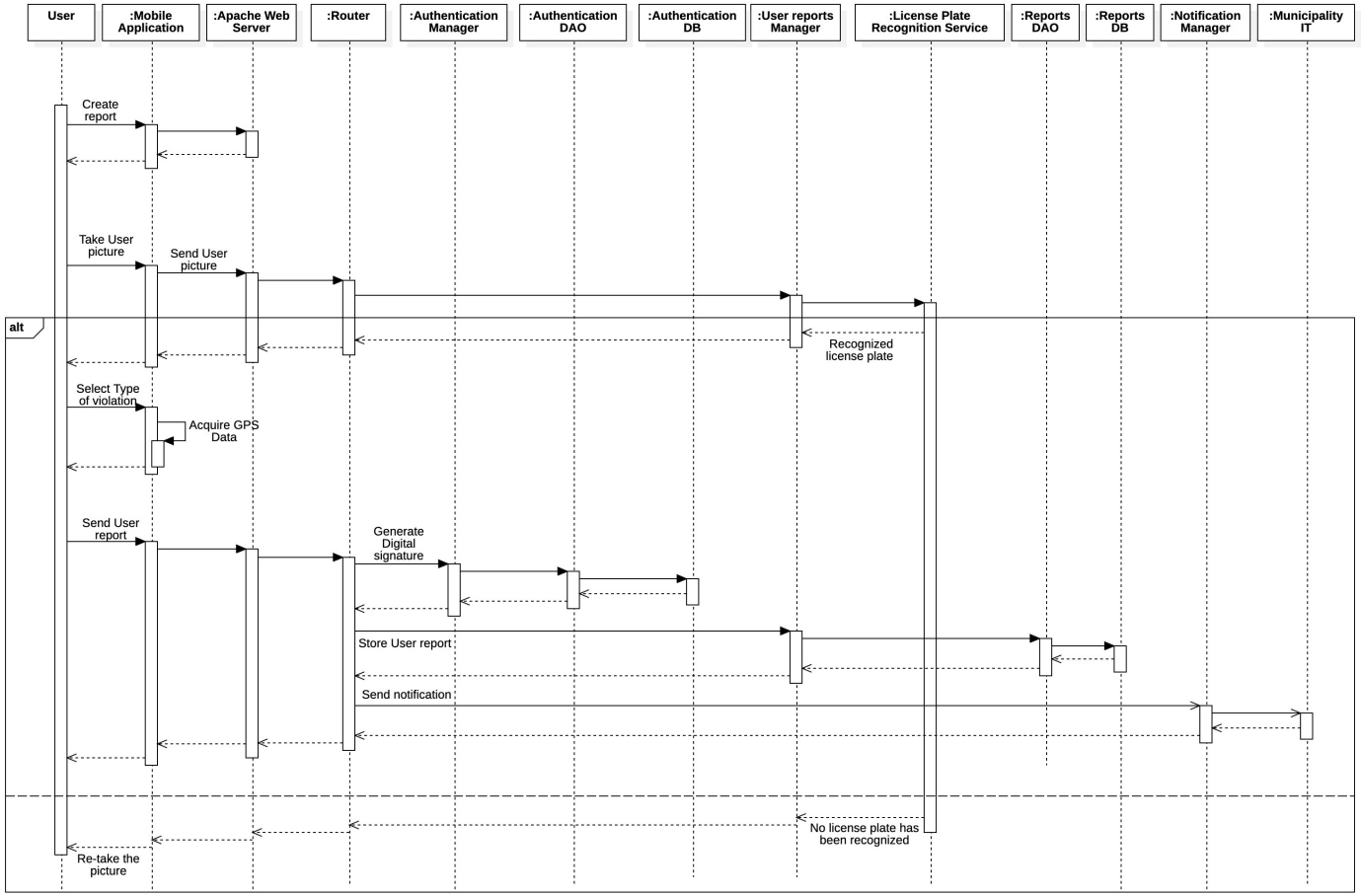
# A Meaningful Use Case

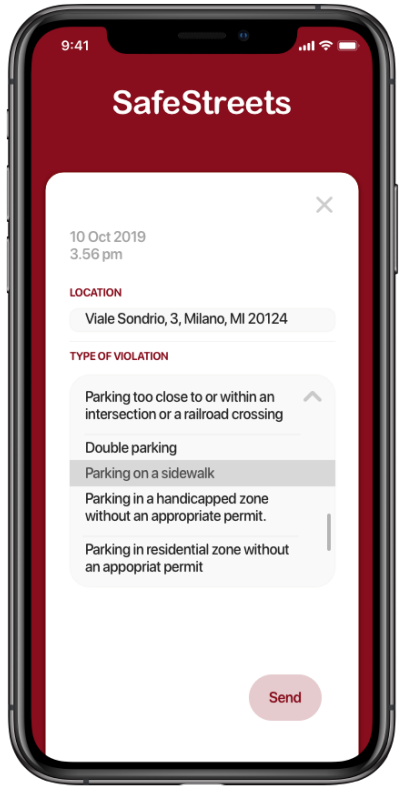


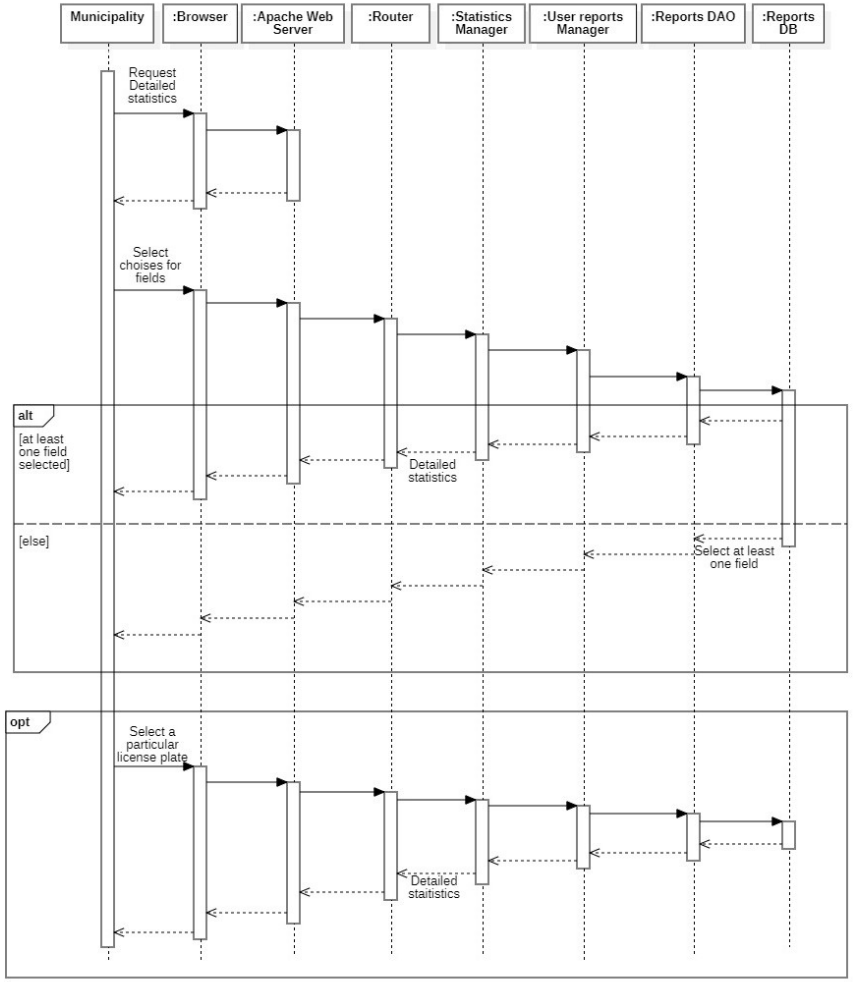



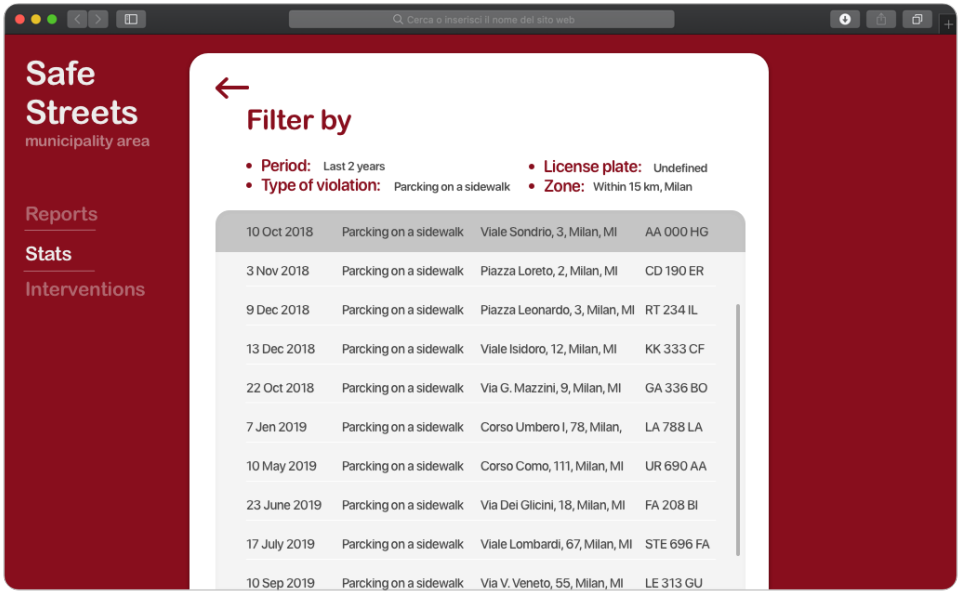
# Sequence Diagrams: User sends User report ($U_4$)



# Sequence Diagrams: Visualization of Detailed Statistics ($U_7$)



- ✓ 4-Tier Architecture
- ✓ Thin Client
- ✓ Model-View-Controller
- ✓ Data Access Object
- ✓ Application Logic

# Design decisions

- ✓ User Authentication and Password Storing
- ✓ Chain of Custody
- ✓ Relational Database

# Implementation, integration and testing strategy

| Feature | Importance for the customer | Difficulty of implementation |
|---|---|---|
| Sign up and login | Low | Low |
| User report generation | High | High |
| Own report visualization | Medium | Low |
| Public statistics visualization | Medium | Medium |
| Ticket feedback generation | High | Low |
| Detailed statistics visualization | Medium | Medium |
| Possible interventions visualization | Medium | High |

POLITECNICO
MILANO 1863

SafeStreets

Fabiana Ferrara
Stefano Formicola
Leonardo Guerra