



POLITECNICO DI MILANO
DIPARTIMENTO DI ENERGIA,
INFORMAZIONE E BIOINGEGNERIA
Computer science and engineering
Software engineering 2

SafeStreets - DD

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Contents

1	Introduction	3
1.1	Purpose	3
1.2	Scope	3
1.3	Definitions, acronyms and abbreviations	3
1.3.1	Definitions	3
1.3.2	Acronyms	3
1.3.3	Abbreviations	4
1.4	Revision History	4
1.5	Reference Documents	4
1.6	Document Structure	5
2	Architectural Design	6
2.1	Overview: High-level components and their interaction	6
2.2	Component view	6
2.3	Deployment view	6
2.4	Runtime view	7
2.5	Component interfaces	7
2.6	Selected architectural styles and patterns	7
2.7	Other design decisions	7
3	User interface design	8
4	Requirements traceability	9
5	Implementation, integration and test plan	10
6	Effort Spent	11
6.1	Luca Loria	11
6.2	Nicolò Albergoni	12

Introduction

1.1 Purpose

The purpose of this Design Document (DD) is to give a rather technical and implementation oriented perspective for the SafeStreets software that is going to be build. While the Requirement Analysis and Specification Document (RASD) gives a more conceptual description of the software and a view of the system that is not strictly related to the actual implementation, the DD provides a three hundred and sixty degree guide for the developers that will implement the software in the real world. In fact the DD document contains a practical and detailed description of the architecture that will have to be built; it covers all the aspects of the system that are relevant for the developers. For example the second section is entirely dedicated to the description of the system architecture in all the useful ways (i.e. component, deployment and runtime view), there is also a section for the design of user interface to be realized as well as a part related to the implementation and testing plan.

1.2 Scope

1.3 Definitions, acronyms and abbreviations

1.3.1 Definitions

- *Most Dangerous Streets*: Streets with the highest frequency of violation reports.

1.3.2 Acronyms

- EU: European Union;

- CET: Central European Timezone;
- API: Application Programming Interface;
- HTTP: Hyper Text Transfer Protocol;
- GPS: Global Positioning System;
- GDPR: General Data Protection Regulation.

1.3.3 Abbreviations

- [Gn]: n-th goal;
- [Dn]: n-th domain assumption;
- [Rn]: n-th functional requirements;
- MDS: Most Dangerous Street;
- LSA: Local System Administrator;
- PT: Police Technician.

1.4 Revision History

- Version 1.0:
 - First release.

1.5 Reference Documents

- SafeStreets assignment document;
- Previous years RASDs of the Software engineering 2 project;
- IEEE Std 830--1998 IEEE Recommended Practice for Software Requirements Specifications;
- Slides from the course "Software engineering 2".

1.6 Document Structure

1. In the first part a general introduction of the Design Document is given. The purpose part exposes the substantial differences with the RASD document;
2. The second section it's the core of the DD, it firstly provides a high level overview of the system followed by a description of various aspects of the architecture from different points of view such as: component, deployment and runtime view. It is also present a general explanation of the architectural patterns and styles adopted in the development process. Most of the parts of this section are enriched with UML diagrams to ensure a better understanding of the concepts;
3. This part specifies the user interface design of the mobile application and the web interface. Since the mockups of both applications were already inserted in the RASD document here are proposed some UX diagrams to better describe the navigation and functioning of the applications;
4. Part four exposes the requirements traceability matrix which maps the requirements stated in the RASD document with the corresponding design element;
5. Chapter five provides the proposals for the implementation, integration and testing plans. This plans are created by taking into account, for each functionality, the importance for the customer and the difficulty of implementation/testing;
6. The last part states the hours of work division and the tools used to create all the part of this DD document.

Architectural Design

2.1 Overview: High-level components and their interaction

2.2 Component view

2.3 Deployment view

The following image represents the deployment diagram of the SafeStreets architecture. It shows the logical division of the software architecture as well as the distribution of the software components to their target nodes, on which they will be deployed.

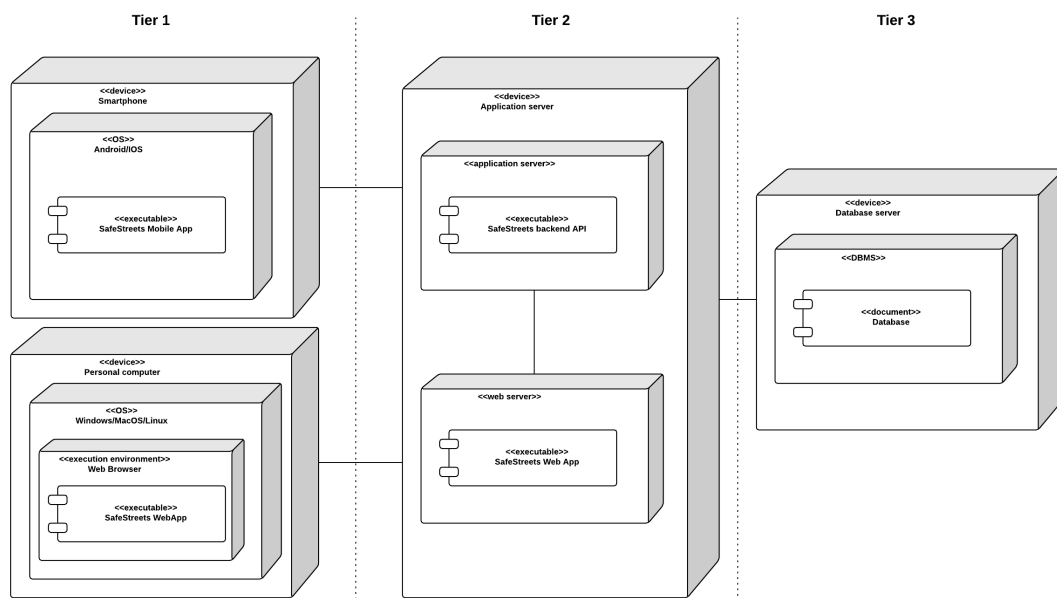


Figure 2.1: Deployment diagram

2.4 Runtime view

2.5 Component interfaces

2.6 Selected architectural styles and patterns

2.7 Other design decisions

User interface design

Requirements traceability

Implementation, integration and test plan

Effort Spent

6.1 Luca Loria

Day	Hours	Topic
20/10/2019	1.5	Text assumptions
22/10/2019	1	Domain assumptions
23/10/2019	2	Design constraints
24/10/2019	2	Revision ch 1 and 2
26/10/2019	3	Software system attributes
28/10/2019	0.5	Performance requirements
29/10/2019	2	External interface req
30/10/2019	5	Mockups creation
31/10/2019	1.5	Revision ch 3
01/11/2019	1	Alloy signatures
04/11/2019	1.5	Alloy facts part 1
06/11/2019	3	Alloy facts part 2 and world predicates
07/11/2019	4	Finish alloy, fix class diagram and start impaginating
08/11/2019	3.5	Reviewing requirements and sequence diagrams. Create references and Revision. Create alloy world section in RASD. Start impaginating correctly
09/11/2019	2	Shared phenomena matrix, frontpage and pagination fixes
10/11/2019	2	Final Revision

6.2 Nicolò Albergoni

Day	Hours	Topic
22/10/2019	2.5	Purpose
23/10/2019	3	Scope, Current system
24/10/2019	1.75	Goals, Overview
26/10/2019	3	Product perspective, Product function
27/10/2019	3	Product function, Revision ch 1 and 2
29/10/2019	2.5	Scenarios
30/10/2019	4	Use cases
31/10/2019	3	Use cases, Revision ch 3
01/11/2019	1	Finish use cases
02/11/2019	2.75	Requirements
05/11/2019	2.25	Finish requirements
06/11/2019	2.5	Sequence diagrams
07/11/2019	3.25	Sequence diagrams
08/11/2019	1.75	Finish and reviewing of sequence diagrams
09/11/2019	2	Use case diagrams, pagination fixes
10/11/2019	2	Traceability matrix, final revision

References

- LaTeX Workshop extension for Visual Studio Code:
<https://github.com/James-Yu/LaTeX-Workshop/>
- LaTeX compiler:
<https://www.latex-project.org/>
- StarUML for UML diagrams:
<http://staruml.io/>
- Moqups for creating Mockups:
<https://app.moqups.com/>
- Alloy extension for Visual Studio Code:
<https://github.com/s-arash/org.alloytools.alloy/tree/ls>
- Alloy compiler and visualizer:
<http://alloy.lcs.mit.edu/alloy/>