POLITECNICO
MILANO 1863

CLup

Design Document

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1 Introduction

1.1 Purpose

The purpose of this document is to provide more technical and detailed information about the software discussed in the RASD document. The Design Document is a guide for the programmer that will develop the application in all its functions. The document will explain and motivate all the architectural choices by providing a description of the components and their interaction. We will also enforce the quality of the product through a set of design characteristics. Finally we describe the implementation, integration and test planning.
The topics touched by this document are:

- high level architecture

- main components, their interfaces and deployment

- runtime behavior

- design patterns

- more details on user interface

- mapping of the requirements on the components of the architecture

- implementation, integration and test planning

1.2 Scope

CLup is a system that allows customers to line up in a virtual first in first out queue, in order to avoid overcrowding outside of stores. Customers can queue up remotely or on premise (by using a device installed outside the store). When a customer queues up remotely he/she can choose to line up immediately or to book a future visit. The system alerts customers when it is time for them to depart to reach the store. The system builds statistics on customer entry and exit in order to provide a better estimation of waiting times. The system allows the store owners to control the occupation of each of their stores. This is just a summary of all the features of the system, for a more detailed description of the software functionalities read the RASD.

1.3 Definitions, Acronyms, Abbreviations

1.3.1 Definitions

Reservation	Virtual or physical artifact used to identify the position of a customer in a queue
Queue up	Customers are lined up in a FIFO queue
Enqueued	A customer is enqueued when he has provided the system with a means of identification and requested a reservation
Authorized	A customer is authorized when he has been enqueued and is allowed temporary access to the store.
Occupation	Number of customers currently present in the store
Printer	Device that can read a social security card and print tickets that contains a progressive number and an estimate of the waiting time.
User	Either a customer or a store owner.

1.3.2 Acronyms

RASD	Requirement Analysis and Specification Document
GPS	Global Positioning System
S2B	Software to be
UI	User Interface
FIFO	First in first out

1.3.3 Abbreviations

Gn	Goal number n
Rn	Requirement number n

1.4 Revision history

Not yet defined.

1.5 Reference Documents

1. IEEE Std 830-1998 Recommended Practice for Software Requirements Specifications

2. Specification Document: R&DD Assignment A.Y. 2020/2021

3. uml-diagrams.org

1.6 Document Structure

- Chapter 1: gives an introduction about the Design Document, enumerating all the topics that will be covered. Moreover this section contains specifications such as the definitions, acronyms, abbreviation, revision history of the document and the references.

- Chapter 2: contains the architectural design choices, with an in-depth look at the high level components and their interactions. It include several views: the component view, the deployment view and the runtime view. Here are described the interfaces (both hardware and software) used for the development of the application, their functions and the processes in which they are utilized. Finally, there is the explanation of the architectural patterns chosen with the other design decisions.

- Chapter 3: this section provide an overview of how the user interfaces of the system will look like.

- Chapter 4: This chapter maps the requirements defined in the RASD to the design elements defined in this document.

- Chapter 5: here we define the plan for the implementation of the subcomponents of the system and the order in which the integration operations and their testing will be performed.

- Chapter 6: shows the effort which each member of the group spent working on the project.

- Chapter 7: includes the reference documents.

2 Architectural Design

2.1 Overview

The architecture of the S2B is a distributed client-server architectural design, structured according to three logic layers:

- **Presentation level P**: manages the user interaction with the system. This layer contains the interfaces able to provide the functions of the application to the users.
  To the presentation layer belong the web app, the phone application and the software on the ticket printer and on the QR reader.

- **Business logic or Application layer (A)**: handles the business logic of the application and its functionalities. This layer represent the core of the application logic.

- **Data access layer (D)**: manages information and data, by accessing the database.

Every logic layer can be mapped in an hardware layer.
The presentation layer is composed by the smartphone or the computer of the user, the ticket printer outside the stores, the QR reader and the turnstiles.
The application layer is composed by the application server. The data layer is composed by the database server.
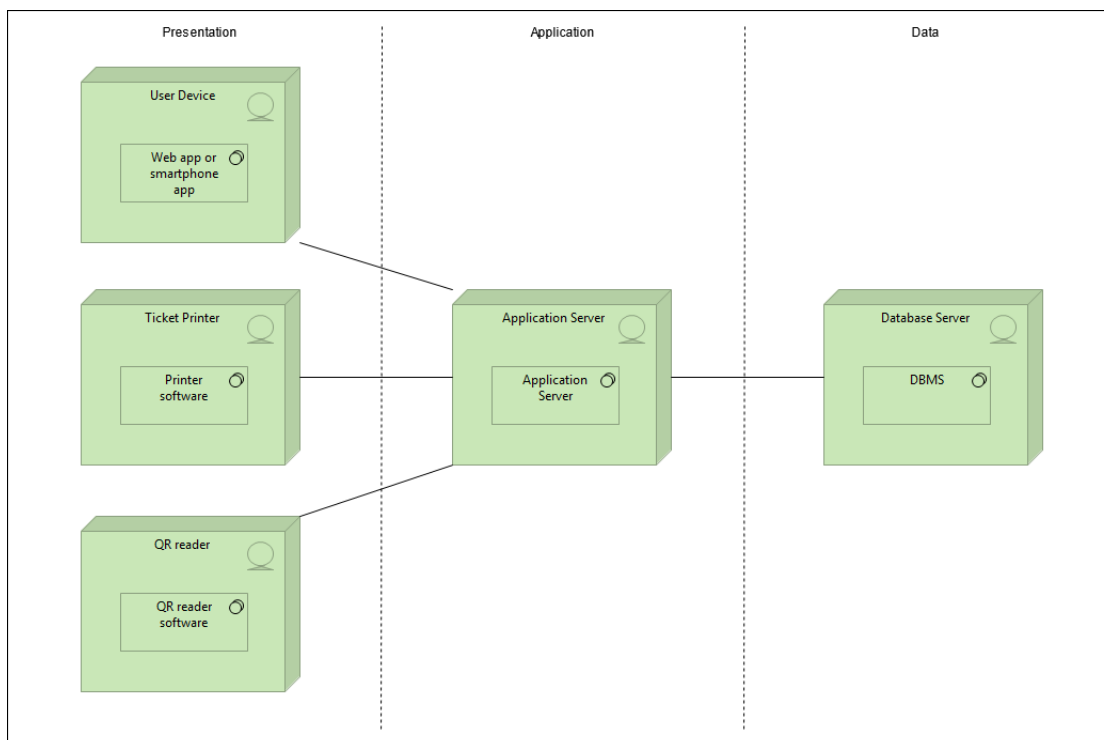
Customers line up at a store trough the web app or the smartphone application and their requests are sent to the
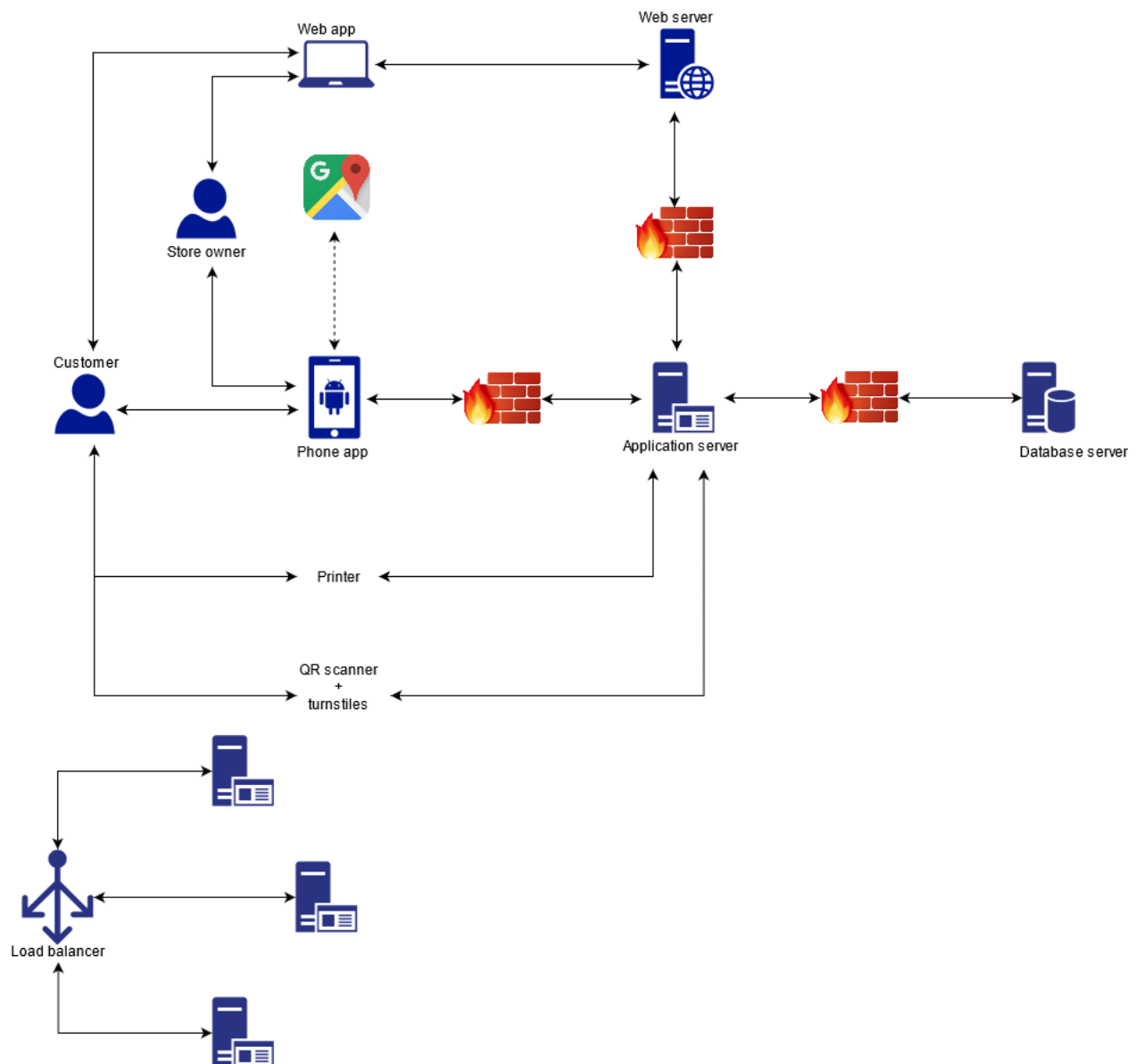
3   User Interface Design

4   Requirements Traceability

5 Implementation, Integration and Test Plan

6   Effort Spent

Provide here information about how much effort each group member spent in working at this document. We would appreciate details here.

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References

- **drawio.org** was used to draw diagrams

- **alloy.mit.edu** was the reference for alloy model

- **uml-diagrams.org** was the reference for uml diagrams