CLup project by Neroni, Pozzi, Vetere

POLITECNICO
MILANO 1863

Requirement Analysis and Specification Document

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Authors:	Cristiano Neroni, Davide Pozzi, Maurizio Vetere
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1   Introduction

This document has been prepared to help you approaching Latex as a formatting tool for your Travlendar+ deliverables. This document suggests you a possible style and format for your deliverables and contains information about basic formatting commands in Latex. A good guide to Latex is available here https://tobi.oetiker.ch/lshort/lshort.pdf, but you can find many other good references on the web.

Writing in Latex means writing textual files having a `.tex` extension and exploiting the Latex markup commands for formatting purposes. Your files then need to be compiled using the Latex compiler. Similarly to programming languages, you can find many editors that help you writing and compiling your latex code. Here https://beebom.com/best-latex-editors/ you have a short oviewvview of some of them. Feel free to choose the one you like.

Include a subsection for each of the following items[1]:

- Purpose: here we include the goals of the project

- Scope: here we include an analysis of the world and of the shared phenomena

- Definitions, Acronyms, Abbreviations

- Revision history

- Reference Documents

- Document Structure

Below you see how to define the header for a subsection.

1.1   Purpose

This document has the purpose to guide the developer in the realization of the software called Clup, an application that aims to manage queues digitally.
Due to the Coronavirus emergency grocery shopping needs to follow strict rules: supermarkets need to restrict access to their stores which typically results in long lines forming outside.The goal of this project is to develop an easy-to-use application that allows store managers to regulate the influx of people and that saves people from having to crowd outside of stores.
The application releases a number that gives the position in the queue and gives information about the time when that number is called, in this way the user is able to arrive to the supermarket and enter immediately.
Clup allows also the user to book a slot to enter the supermarket indicating the expected time to shop, or alternatively the application itself can infer it.
Finally the application can suggest different slots to visit the store, based on the influx of people, and slots in alternative stores, based on the day/hour preferences of the user.

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[1]By the way, what follows is the structure of an itemized list in Latex.

1.1.1 Goals

G1	Allow users to take a number of the line
G3	Users know the least crowded time slots
G4	Users can make a reservation to enter in a supermarket
G6	Stores can easily monitor fluxes
G7	Users can see alternative stores
G8	Only authorized users can access
G9	Anybody is guaranteed possibility to make shopping at the supermarket
G10	CLup should avoid crowd outside supermarket stores
G11	CLup should guarantee everyone access to the supermarket in a finite (reasonable) time
G12	CLup should not decrease customer affluence beyond a reasonable level ($\rightarrow$ define reasonable)
G13	CLup should prevent department overcrowding
G14	CLup should raise max number of concurrent customers by managing shopping sessions by category
G15	CLup should not inhibit purchase/access to any product category
G16	CLup should guarantee same possibilities to offline users
G17	CLup should guarantee finding the best (less crowded, soonest available) alternative among local supermarket stores (of same franchise only?)

1.2 Scope

1.2.1 World Phenomena

WP1	User leaves home to go to the supermarket
WP2	Users crowd outside the store
WP3	User arrives at the supermarket
WP4	User enters the supermarket
WP5	User does the grocery shopping
WP6	User exits the supermarket
WP7	Supermarkets restrict accesses in stores
WP8	User buys products of a non booked category

1.2.2 Shared Phenomena

SP1	User lines up using the application
SP2	User makes a reservation
SP3	User keeps track of how line evolves
SP4	User validates the entrance with a QR code
SP5	User receives suggestion for less crowded time slots
SP6	User receives suggestion for less crowded stores
SP7	CLup assigns a time slot
SP8	CLup signals max number of customers inside the store has been reached
SP9	CLup signals customer for improper behavior
SP10	Offline customer interacts with physical totem
SP11	User confirms booking
SP12	User confirms ticket reservation

1.3 Definitions, Acronyms, Abbreviations

1.3.1 Definitions

1.3.2 Acronyms

1.3.3 Abbreviations

1.4 Revision History

- **v1.0**: First version of the document

1.5 Reference Documents

1.6 Document Structure

2   Overall Description

Here you can see how to include an image in your document.

Here is the command to refer to another element (section, figure, table, ...) in the document: *As discussed in Section 1.6 and as shown in Figure 1, ...* Here is how to introduce a bibliographic citation [1]. Bibliographic references should be included in a `.bib` file.

Table generation is a bit complicated in Latex. You will soon become proficient, but to start you can rely on tools or external services. See for instance this https://www.tablesgenerator.com.

2.1   Product Perspective

2.1.1   Scenarios

Scenario 1   Single user of the CLup platform, Bob, decides it's time to go shopping. Bob lives in Milan and this means he's currently in reach of 5 different supermarkets belonging to the CLup network.

Bob then opens the app, checks the status of the current queue and notices the nearest supermarket has free room, 13 entrances left out of 55 total. It's fine for Bob, he starts walking towards it.

As soon as he approaches the supermarket (Bob's on foot), he checks the app and start the check-in procedure. It's not rush hours and 8 entrance are still left, so everything goes ok and Bob gets a QR ticket. He approaches the entrance, has is code scanned by an automatic turnstile and gets inside the supermarket.

In 36' time, Bob completes his shopping. He proceeds towards the exit, where another turnstile scans his QR code once again to confirm exit. He's now free to get home.

2.2   Product Functions

2.3   User Characteristics

2.4   Assumptions, Dependencies and Constraints

2.4.1   Domain Assumptions

Follows a list of assumptions made about the domain CLup focuses on.

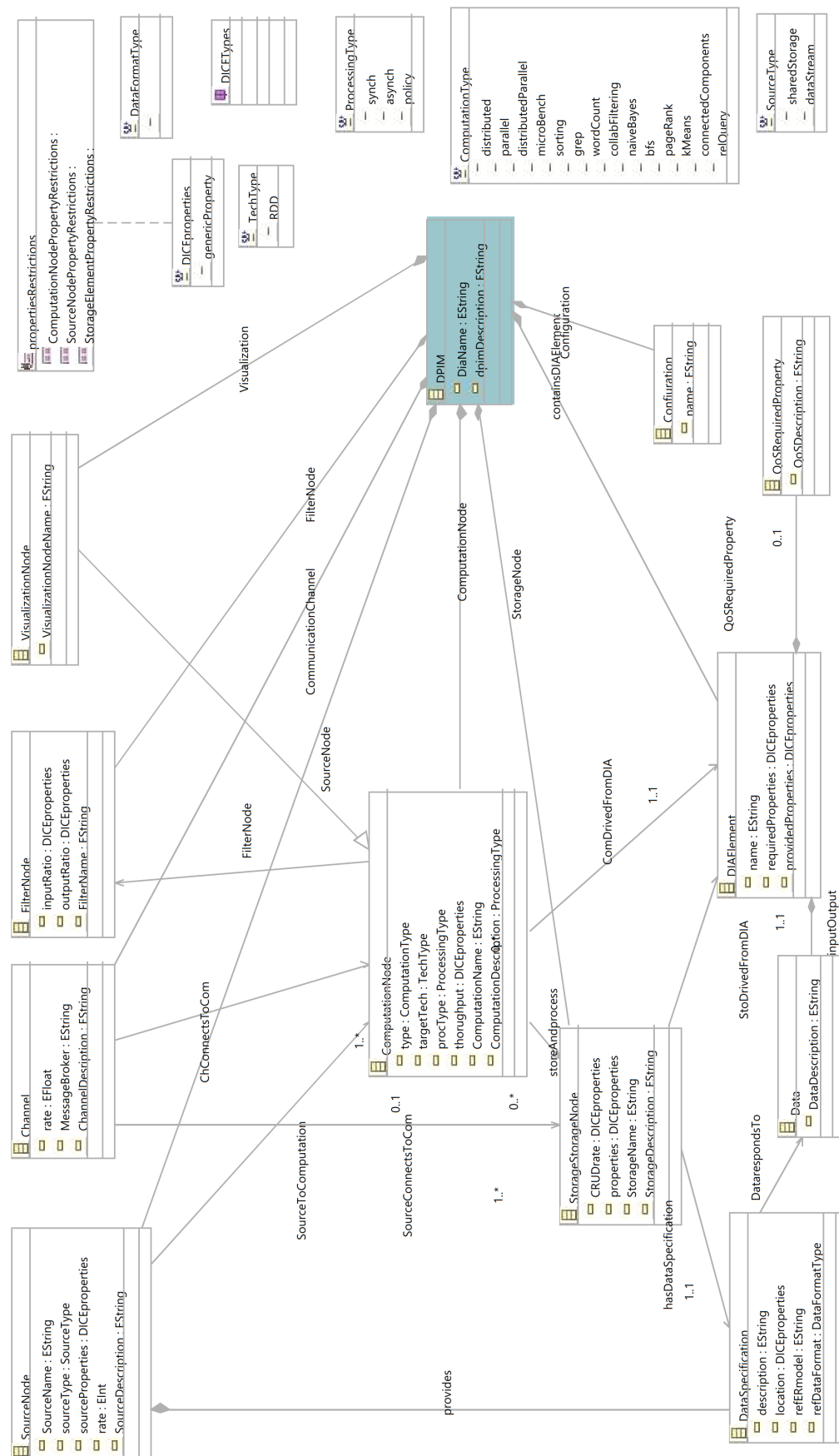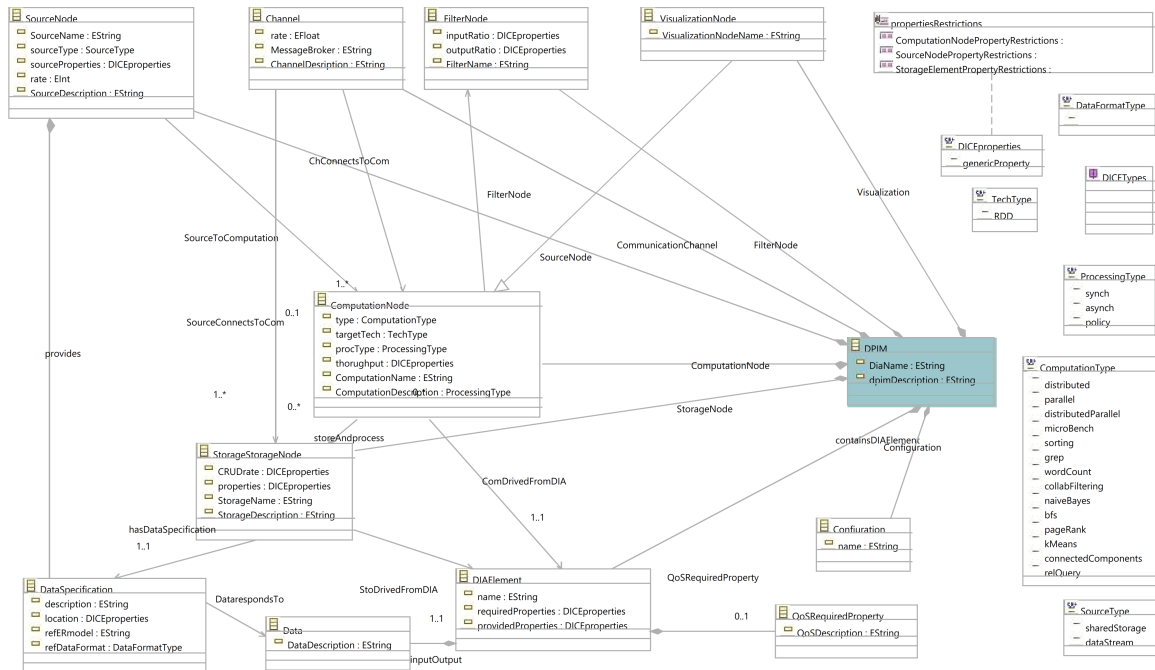|	
D1	Entrance checking is possible and guaranteed by the Staff
D2	Exit checking is possible and guaranteed by the Staff
D3	One customer per authorization given is allowed in by the Staff

Figure 1: DICE DPIM metamodel.

Figure 2: DICE DPIM metamodel in portrait form.

3 Specific Requirements

Organize this section according to the rules defined in the project description.

3.1 External Interface Requirements

3.2 Functional Requirements

3.3 Performance Requirements

3.4 Design Constraints

3.5 Software System Attributes

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4   Formal Analysis Using Alloy

Organize this section according to the rules defined in the project description.

5   Effort Spent

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

References

[1] S. Bernardi, J. Merseguer, and D. C. Petriu. A dependability profile within MARTE. *Software and Systems Modeling*, 10(3):313–336, 2011.

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