Software Requirements Specification

For

Transport Company Computerisation (TCC) Software

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1. Introduction

1.1 Purpose

This SRS (Software Requirements Specification) document is prepared to provide the client with a detailed description of the system and software requirements, specifications and features of the Transport Company Computerisation (TCC) Software. This document contains various information regarding all the functional and non-functional requirements of the client.

The intention behind the document is to get approval from the client to enable developers to get references for the development of version 1.0 of the TCC Software.

1.2 Intended Audience and Reading Suggestions

The following document is intended for the client, developers and testers.

1.3 Product Scope

The Software would aid in administrative and functional working of a Transport Company. This will ease and facilitate the company's working. For the complete working of the software, all branch offices of the company along with the HQ office are supposed to have it installed. It facilitates the database for the logistics of the company, i.e. truck and consignment database, calculation of waiting time for consignments.

The product will be an application written in python. The reason for the choice is maintainability, portability, reusability of the code written in the mentioned language.

1.4 References

[1] IEEE Software Engineering Standards Committee "IEEE Recommended Practice For Software Requirements Specifications"
[2] http://www.wikipedia.org/wiki/SRS
[3] MongoDB Atlas Operational Efficiency | MongoDB
[4] **PyMongo 4.0.2 Documentation — PyMongo 4.0.2 documentation**

2. Overall Description

2.1 Product Perspective

The product is a computerized replacement of some of the traditional bookkeeping activities of a transport company. Specifically, it computerized the data on consignments the company receives and automates the task of dispatching trucks. From the perspective of a company, this product represents a component of a larger system and only deals with processing consignments after they have been received. If the process of receiving consignments is also computerized, we would need an interface between that software and the product specified in this SRS.

2.2 Product Functions

The product will perform the following functions:

- Allow for the entry of various consignments the company receives by branch employees
- Automate the allocation of trucks based on the consignments
- Provide an interface for the manager to monitor activities
- Allow the manager to add or remove trucks/employees to the system
- Store all the relevant details in a database

2.3 User Classes and Characteristics

- The head Office manager- this is the most important user class. Will be given full administrator privileges over the features offered by the app. Will be allowed to change passwords, and add or remove employees/ trucks to the system. Will also be provided with an interface to monitor all activities of the company at all its branches(eg. Can query any consignment, receive data on destinations and revenue etc)
- Branch office employees- These are the class of users that will be tasked with receiving individual consignments and entering them into the system. Will be provided with a userID and password by the Head Office manager. Won't have access to big picture data on consignments, revenue and truck statistics.

2.4 Operating Environment

The software will be designed to function on systems with **python 3** or higher. It will work on **windows**(windows 7 and newer) and **Linux** machines. In case of cross-platform compatibility issues during development, functionality on a Windows 10 environment will be given the highest preference.

2.5 Design and Implementation Constraints

Constraints:

- Memory management while loading data from the database under the ‘Manager’ user class- Since the manager will be provided with a large number of statistics to query from, we should ensure

this doesn't lead to performance issues. Moreover, automated Dispatching of trucks in real-time will require real-time calculations with a large amount of data.

- **External dependencies** - We are using mongoDB atlas services for our Software. This may cause backward compatibility issues in the future.
- **Security Considerations** - Since we are hosting the database online, we also need to ensure data security for the company's sensitive data. Also, all automation of dispatch systems must occur centrally.
- **Future expandability** - Currently, consignments are manually entered by employees in our system. The software will need to be written in such a way that it can be easily integrated with an automatic consignment system in the future.

2.6 User Documentation

Contact the development team in case you face any issues related to the setting up of the applications.

2.7 Assumptions and Dependencies

- **External dependencies** - IP registered in MongoDB atlas for access to online Database.
- **Operating system requirements** - the software will be kept cross-platform as far as possible, but in case of issues during the development cycle, Windows 10 will be given the highest priority based on use case assumptions
- There will only be a single manager/Administrator. All security features will be designed around this assumption
- All branch offices have the software installed.

3. External Interface Requirements

3.1 User Interfaces

The user interface of the software will be easy to use and interactive. Each person will have to log in using his login id and password. Only after that, he will be able to make any changes to the database or have his/her queries answered.

1. Employees: They will be given the access to do the following jobs:

a) Enter details of a consignment like a type, volume, details of sender and receiver, like name, address and a Government ID.

b) They will be able to see the truck details present at their center.

c) They would be able to view the allotment of the truck and take a printout of the details of consignment number, volume, sender's name and address and receiver's name and address to be forwarded along with the truck.

2. Manager: The manager will be given admin rights. He:

- Can do all the tasks that an employee can do
- Can view the status of all consignments and truck status at a given time.
- Can view the corresponding revenue generated in a particular center as well as overall centers.
- Can see the waiting time of a consignment.
- Can appoint new employees and add them to the employee's database or remove an employee from the company as well as from the database.
- He will give an employee a username and a password and he can also reset the password of an employee.

3.2 Hardware Interfaces

- The storage of the data on the physical drive will depend on the tools used for the development of software.
- The computer should have a minimum of 2GB RAM (preferably 4GB or more) and 100 MB, (approximately, at most), and at least a dual core processor.
- At the manager's side, the RAM requirements could range upto 16 GB depending upon the size of the database we are dealing with.
- More memory may be required if the database is too large.

3.3 Software Interfaces

- We would be writing the whole solution in **python** using VS code
- A database will also be required to store the employee information, consignment details and truck information in a logical manner for which we are currently fixated on **MongoDB Atlas**.
- Python applications must be able to communicate with the database properly.
- Internet connection is required for the communication of computers at different branches.

3.4 Communications Interfaces

Communication plays a major role in software performance. All information regarding the trucks and consignments are sent through networks. So the computers are different and the central machine must be able to communicate securely and quickly over the network. The software must take care of the communication protocol to be used or the encryption to be followed to ensure secure communication among different branches.

4. System Features

4.1 Administrator interface

Critical priority- This feature will be essential to start the system since it is needed to add employees, trucks and manage login credentials. This interface further includes subfeatures of various priorities listed below (under response sequences)

4.1.1 Stimulus/Response Sequences

Options will be provided to :

- Add or remove employees, and manage login credentials(high priority)
- Add or removes trucks from the system(priority)
- Accept queries on various statistics on the company (low priority)
- Perform non-admin tasks (like entering consignments manually) (low priority)

On Choosing an option, the administrator will be taken to an interface that performs the relevant task.

For example, ongoing to the remove employee interface, the administrator will be provided with a searchable list of employees that can be removed

Ongoing to the queries interface, the administrator will be given options to query details on trucks, employees or destinations

4.1.2 Functional Requirements :

REQ-1: **IP Address Registration** for all the systems in database service which would be used in the company.
REQ-2: **Login credentials** - In case of lost login credentials, there will be no higher authority to reset the system for security reasons. The manager will have to contact the development team

4.2 Consignment Entry (employee interface)

High priority- This feature is essential to achieve the main purpose of the software- computerisation of bookkeeping activities at the company. This feature will be given to all branch employees with the relevant login credentials.

4.2.1 Stimulus/Response Sequences

Branch Employees will be presented with a login portal. Upon entering the correct credentials, they will be taken to a window that allows them to enter the details of a consignment

These details include:

- Time of receiving the consignment
- Volume

- Destination Address
- Sender Address

4.2.2 Functional Requirements

REQ-1: Employee's IP address
REQ-2: Login credentials- In case of lost login credentials, there will be no higher authority to reset the system for security reasons. The manager will have to contact the development team

4.3 Automated dispatch and cost calculation

Medium priority- This feature isn't essential to the functioning of the app, however, it is a core feature we wish to implement. The idea is to automatically process consignments in real-time, and dispatch trucks based on availability and total volume of the consignment. Cost calculations will be automated as well.

4.3.2 Stimulus/Response Sequences

This feature does not rely on a user interface, since it is completely automated. After dispatch, the details will be stored in the database along with the time of dispatch. All computations will occur on the admin's machine since only that machine will be given access to the data in our database

4.3.3 Functional Requirements

REQ-1: **PyQt5** framework should be installed on the Admin's machine, required to interact with the database to upload information

REQ-2: The Admin's machine should have sufficient hardware capabilities and enough memory to handle data in real-time. All processing will occur centrally.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Branch employee's systems will have minimal requirements, with an approximate minimum recommended of 2GB ram and 20 GB free space.

The admin's systems will need more memory to handle the data required to automatically dispatch trucks in real-time. Exact specifications TBD

5.2 Safety and Security Requirements

- Invalid credentials among employees may be handled internally by the manager.
- Invalid admin Credentials falls outside the system boundaries for security reasons, and the relevant authorities will need to contact the development team. It might lead to a complete reset of the system.
- All data can only be accessed from the Admin's machine. The database management service used is external to the system. Moreover, it is a free service that will be changed before deployment of software for industry
- The developer will not be responsible for any losses incurred due to mismanagement on the organization's side.

5.4 Software Quality Attributes

The software will be robust, reliable, secure, and user friendly. Cross-platform support will not be a high priority during development. More emphasis will be placed on the correctness of functioning than on the UI design.

5.5 Business Rules

The security features are designed considering the existence of only 1 admin. Admin privileges must not be shared across multiple entities, and security lapses caused due to the same will not be accounted for.

Note: the project specified in this SRS is merely a simulation of industry-ready software. Any entity using this software is doing so of their own volition, and the development team will not be responsible for the same.

6. Other Requirements

The project has no legal requirements. For future expansion, attempts will be made to automate the work of consignment entry as well.

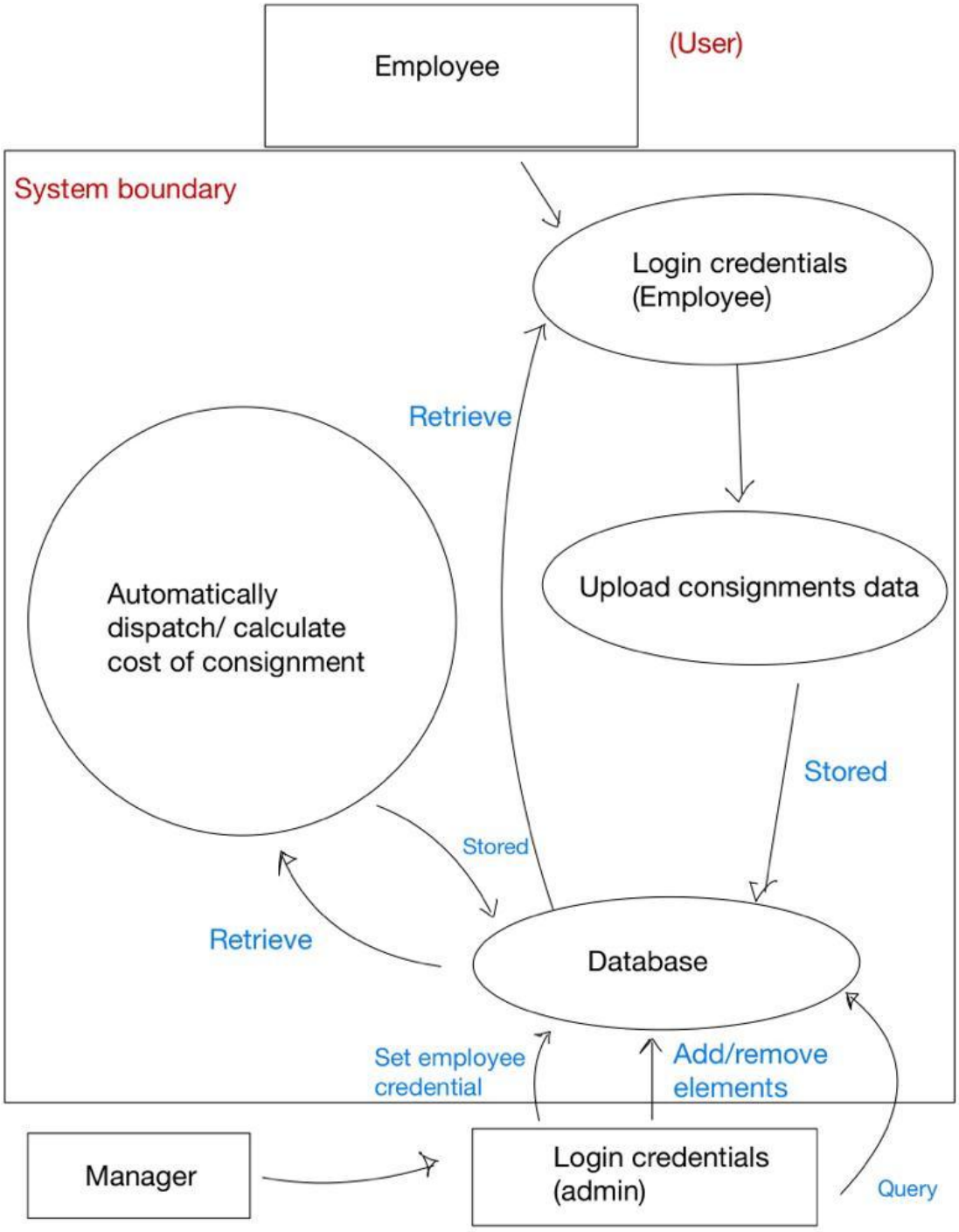
Further, the database being used is a free service meant for developers, and not ready for deployment in the industry. Future expansion would require integration with a professional database management service.

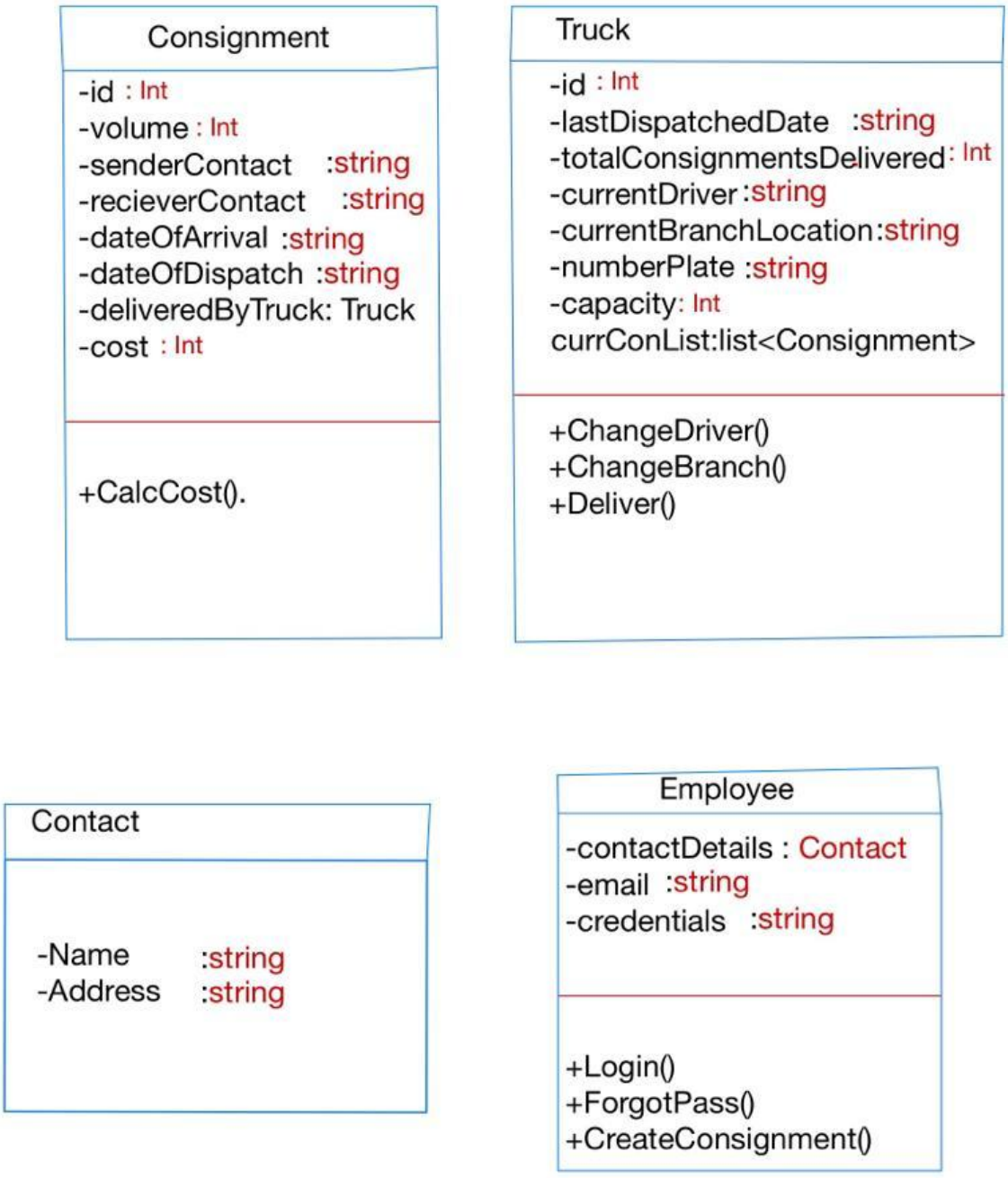
Appendix A: Glossary

RAM: Random Access Memory

GB: Gigabytes (= 1024 Megabytes)

Appendix B: Analysis Models





Appendix C: To Be Determined List

- *Performance requirements of the administrator's machine*
- *Cross-platform compatibility*
- *The most appropriate tool for developing Frontend*