Software Requirements Analysis

TRANSPORT
SERVICE MATCH PLATFORM

Version	Description of Change	Author	Date
1.0	First Draft	Ahmed Berdai / Aadel Bouzambou / Maria Deffense / Moustapha El Zeir / Ophelia Karapetyan /	03/02/2025
2.0	Second Draft	Ahmed Berdai / Aadel Bouzambou / Maria Deffense / Moustapha El Zeir / Ophelia Karapetyan /	27/02/2025

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1. Introduction

Thousands of trucks move cargo between cities and countries worldwide every day, ensuring the global supply chain operates smoothly. However, there is a significant issue behind this process: empty return trips. These trips result in a series of problems, such as increased carbon emissions, higher costs, fuel waste, and revenue loss.

Nearly 35% of the trucks return empty after delivering goods, resulting in billions of dollars of loss and releasing 87 million metric tons of carbon emissions annually. As Dorothi Li (CTO at Convoy) explained: “Inefficiency is one of the world’s biggest polluters. And there’s a big opportunity to create more efficiency in trucking or any other freight or transportation network.”

The ineffective optimization in return trips results in:

- Higher costs - both for large companies and individual drivers
- Lost revenues - due to driving empty trucks
- Environmental issues - more fuel consumption and carbon emissions

To tackle this challenge, we propose a digital freight marketplace. This solution aims to reduce empty miles, cut costs, and minimize environmental impact while creating value for everyone involved, from truck drivers to global businesses.

1.1 Purpose

The purpose of this document is to outline the functional and non-functional requirements for the Transport Service Match system. This system facilitates the matching of logistic providers (LP) and logistic requesters (LR) for efficient transportation services.

1.2 References

- Transport Service Match Workflow Document
- Meeting with Stakeholders
- Entity Relation Analysis
- Process Model Analysis
- UX/ UI Analysis

1.3 Assumptions and Constraints

- Users must have internet access to use the system.
- The system will support real-time communication and tracking.
- The system must comply with data privacy regulations.

2. Functional Requirements

2.1 Context

The Transport Service Match system is designed to streamline the process of matching logistic providers with logistic requesters. The system supports registration, role selection, request creation, acceptance, coordination, and completion of logistic tasks.

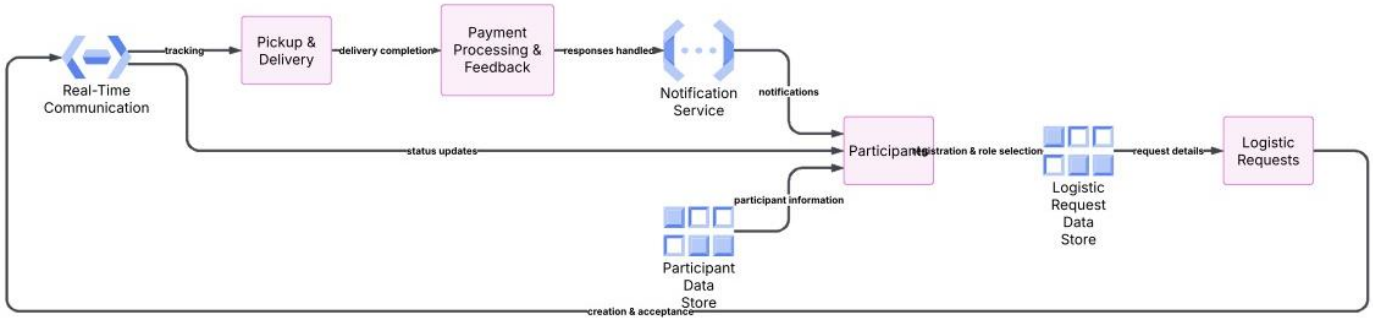
2.2 User Requirements

U1.0: Users need a way to register as Participant.	**U1.1:** Users must provide details like first name, last name, phone, email, location, password. **U1.2:** Users must select a role (LR or LP) after registration process and after each new log in.
U2.0: Users (Logistic Requesters - LRs) need a way to create logistic requests efficiently.	**U2.1:** Users (LR) must provide details like pick-up / drop-off locations, package size / weight, delivery dates. **U2.2:** Users (LR) need visibility into available logistic providers based on location and availability.
U3.0: Users (Logistic Providers - LPs) need a way to accept logistic requests seamlessly.	**U3.1:** Users (LP) must share details like pick-up and drop-off locations, package size, package weight, and delivery dates. **U3.2:** Users (LP) need notifications for new logistic requests.
U4.0: Both users (LR and LP) need real-time tracking for logistic requests.	**U4.1:** Live updates on the location of the package are essential for coordination.
U5.0: Both users (LR and LP) need a way to communicate directly.	**U5.1:** Messaging is required to coordinate pick-up, delivery, and other details.
U6.0: Both users (LR and LP) need a way to complete and confirm logistic requests.	**U6.1:** Users (LR) must be able to mark the delivery as complete. **U6.2:** Users (LP) must receive confirmation of delivery completion.
U7.0: Both users (LR and LP) need a way to handle payments efficiently.	**U7.1:** Payment details must be processed based on agreed terms. **U7.2:** Both users (LR and LP) need visibility into payment status.
U8.0: Both users (LR and LP) need a way to provide feedback and ratings.	**U8.1:** Both users (LR and LP) must be able to rate each other based on the delivery experience. **U8.2:** Feedback must be stored for future reference.
U9.0: The system must maintain logs and generate reports for audit purposes.	**U9.1:** All actions must be logged for compliance and performance analysis. **U9.2:** Reports must be generated periodically for review.

2.3 Diagrams

2.3.1 Level 0 / Context Diagram

The diagram provides a comprehensive overview of the interactions and data flows within the Transport Service Match Application.



Graphique 1: *Context Diagram representing Core System (Transport Service Match Platform) and interaction with external services and entities. Realized using lucid.app*

Main Components:

1. Participant Data Store: Stores participant information.
2. Logistic Request Data Store: Stores logistic request details.
3. Real-Time Communication: Facilitates coordination between participants.
4. Notification Service: Sends notifications about request status and updates.

Data Flows :

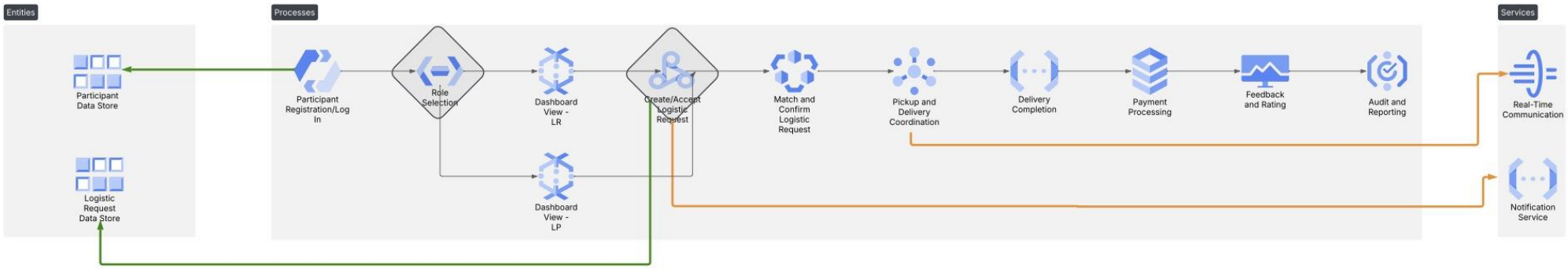
- Participant Information: Flows between Participants and Participant Data Store.
- Request Details: Flows between Logistic Requests and Logistic Request Data Store.
- Status Updates: Communicated through Real-Time Communication.
- Notifications: Sent via Notification Service.

Processes:

- Registration & Role Selection: Participants register and select their role.
- Creation & Acceptance: Logistic Providers create requests; Logistic Requesters accept them.
- Tracking: Real-time tracking of requests.
- Pickup & Delivery: Coordination of package pickup and delivery.
- Delivery Completion: Marking deliveries as complete.
- Payment Processing & Feedback: Handling payments and collecting feedback.

2.3.2 Level 1 / Data Flow Diagram

This diagram outlines the key processes and data flows in the Transport Service Match system, including Participant Registration/Log In, Role Selection, Dashboard Views, Logistic Request handling, Coordination, Completion, Payment, Feedback, and Reporting. It also highlights Real-Time Communication, Notification Service, and the main entities: Participant Data Store and Logistic Request Data Store.



Graphique 2: *Data Flow Diagram representing how data moves through the system. Realized using lucid.app*

Entities:

1. Participant Data Store: Stores participant information, role selection, feedback, and ratings.
2. Logistic Request Data Store: Stores logistic request details, status updates, and payment information.

Services:

1. Real-Time Communication: Service that facilitates real-time communication between LPs and LRs during pickup and delivery.
2. Notification Service: Service that sends notifications to participants about request status, confirmations, and updates

Processes:

1. Participant Registration/Log In: Process where participants register or log in to the application.
2. Role Selection: Decision process where participants select their role as Logistic Provider (LP) or Logistic Requester (LR).
3. Dashboard View - LP: Process where LPs access their dashboard to manage logistic requests.
4. Dashboard View - LR: Process where LRs access their dashboard to view and accept logistic requests.
5. Create/Accept Logistic Request: Process where LPs create logistic requests and LRs accept them.
6. Match and Confirm Logistic Request: Process where the system matches logistic requests with acceptances and confirms them.

7. Pickup and Delivery Coordination: Process where LPs and LRs coordinate the pickup and delivery of packages.
8. Delivery Completion: Process where LRs mark the delivery as complete.
9. Payment Processing: Process where payment details are processed based on agreed terms.
10. Feedback and Rating: Process where LPs and LRs provide feedback and rate each other.
11. Audit and Reporting: Process where the system maintains logs and generates reports for audit purposes.

2.4 Logical Data Model/Data Dictionary

The Logical Data Model/Data Dictionary defines the system's key data stores, including participant details, logistics requests, real-time communication, and notifications, ensuring smooth coordination and operational efficiency.

- **Participant Data Store:** Stores participant information, role selection, feedback, and ratings.
- **Logistic Request Data Store:** Stores logistic request details, status updates, and payment information.
- **Real-Time Communication:** Facilitates coordination between LP and LR during pickup and delivery.
- **Notification Service:** Sends notifications to participants about request status, confirmations, and updates.

3. Other Requirements

3.1 Interface Requirements

3.1.1 Hardware Interfaces

The system must be compatible with standard computing devices (PCs, laptops, tablets, smartphones).

3.1.2 Software Interfaces

The system must integrate with web browsers and mobile operating systems (iOS, Android).

3.1.3 Communications Interfaces

The system must support real-time communication protocols for coordination and tracking.

3.2 Data Conversion Requirements

The system must ensure accurate data conversion during registration, request creation, and status updates.

3.3 Hardware/Software Requirements

3.3.1 Security and Privacy

The system must implement robust security measures to protect user data and ensure privacy.

3.3.2 Audit Trail

The system must maintain an audit trail of all actions for compliance and performance analysis.

3.3.3 Reliability

The system must ensure high reliability to support continuous operation.

3.3.4 Recoverability

The system must have mechanisms in place for data recovery in case of failures.

3.3.5 System Availability

The system must ensure high availability to support user access at all times.

3.3.6 General Performance

The system must provide fast and responsive performance for all user interactions.

3.3.7 Capacity

The system must be scalable to handle a large number of users and requests.

3.3.8 Data Retention

The system must define data retention policies to manage storage and compliance.

3.3.9 Error Handling

The system must implement robust error handling to manage and log errors effectively.

Appendix A – Glossary

- **LR:** Logistic Requester (someone who needs transportation).
- **LP:** Logistic Provider (someone who offers transportation).
- **GDPR:** General Data Protection Regulation (rules for protecting user data)..[1]

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[1]Methodology Note:

This document was developed through a structured and iterative approach to ensure comprehensive and accurate requirements analysis for the Transport Service Match Platform. The methodology included the following key steps:

1. **Initial Draft (Version 1.0)**: The first draft was created collaboratively by the team, outlining the core functional and non-functional requirements based on initial stakeholder input and project objectives.
2. **Stakeholder Review and Refinement**: Following a meeting with Mr. Cuvellier, the scope was refined, and a Level 1 workflow process was established. This workflow served as the foundation for revisiting and updating the requirements analysis.
3. **Second Draft (Version 2.0)**: The document was revised to align with the updated workflow, ensuring all functional requirements, diagrams, and other specifications reflected the agreed-upon process. Diagrams, including the Level 0 Context Diagram and Level 1 Data Flow Diagram, were created using Lucid.app to visualize system interactions and data flows.
4. **Validation and Finalization**: The updated document was reviewed for consistency, accuracy, and alignment with stakeholder expectations. Feedback was incorporated, and the final version was prepared for implementation.

This iterative process ensured that the document accurately captures the system requirements, supports stakeholder needs, and provides a clear roadmap for development.