A PROJECT FOR THE METRO TRANS EAST AFRICA LIMITED

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Software Requirements Specification (SRS) for Public Transport Fare Collection and Management System

1. Introduction

1.1 Purpose

This document defines the functional and non-functional requirements for Metro Trans East Africa's public transport fare collection and management system. The system aims to enhance financial transparency, minimize revenue losses, and improve operational efficiency through secure digital payments and real-time monitoring.

1.2 Scope

The system will facilitate automated, cashless fare collection using mobile payments, QR codes, and NFC-enabled smart cards. It will provide a real-time transaction monitoring dashboard, fraud detection mechanisms, and transaction logging. The system will be available as a web and mobile-based application for passengers, touts, and administrators.

1.3 Definitions, Acronyms, and Abbreviations

- NFC Near Field Communication
- **QR** Quick Response Code
- **MPesa** Mobile money transfer service
- API Application Programming Interface
- **DBMS** Database Management System

• SRS - Software Requirements Specification

1.4 References

- IEEE 830-1998 Software Requirements Specification Standard
- World Bank (2020) Digital Fare Collection in Urban Transit Systems
- Komba & Kayuni (2021) The Impact of Real-Time Monitoring on Public Transport Revenue Collection

2. Overall Description

2.1 Product Perspective

The system is a digital fare collection platform that integrates cashless payment solutions, real-time monitoring, and fraud prevention to replace the manual fare collection system used by Metro Trans East Africa.

2.2 Product Functions

- Secure digital fare collection via MPesa, QR codes, and NFC payments.
- Real-time transaction monitoring and fraud detection.
- Automated passenger validation using QR/NFC-based scanning.
- Role-based access control for passengers, touts, and administrators.
- Secure transaction logging and reporting.

2.3 User Characteristics

- Passengers: Use digital payment options for fare transactions.
- Touts (Conductors): Verify fare payments and generate reports.

• Administrators: Monitor transactions, detect fraud, and manage users.

2.4 Constraints

- The system must process transactions in real-time.
- Compliance with transport regulations.
- Web and mobile apps must support both Android and iOS.

3. Specific Requirements

3.1 Functional Requirements

1. User Authentication

- Secure registration and login functionality.
- Role-based authentication for passengers, touts, and administrators.

2. Fare Payment System

- Support for digital payments (MPesa, QR codes, NFC-enabled smart cards).
- Real-time validation of payment before passenger boarding.

3. Transaction Monitoring

- Provide real-time dashboards for tracking fare collections.
- Generate financial and operational reports.

4. Fraud Detection and Prevention

 Detect anomalies in transactions such as duplicate payments and fare reversals. Automated alerts for suspicious activities.

5. **User Management**

- Admin control to manage user accounts.
- Passengers can access their transaction history.

3.2 Non-Functional Requirements

1. Security

- o AES encryption for securing transaction data.
- o Multi-factor authentication (MFA) for administrator access.

2. Performance

- o The system shall process transactions within 2 seconds.
- o It shall support up to 10,000 concurrent users.

3. **Usability**

- The UI shall be responsive and user-friendly.
- Support for multiple languages (English and Swahili).

4. Reliability

- o System uptime of 99.9% with failover mechanisms.
- o Daily automatic backups.

4. Appendices

• System architecture diagrams (to be developed in later phases)

- Database schema design
- API documentation for payment integration