Final Project Design Document – Part 1

# **High-Level Design Document**

## The Public Transit Fleet Management System (PTFMS)

<https://github.com/r3ssler/25S_CST8288_FinalProject>

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**1.Version History**

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| --- | --- | --- | --- |
| **Version** | **Author** | **Date** | **Description of changes** |
| 1.0 | Viet-Quynh Nguyen | 19/07/2025 | Document Created |
| 1.1 | Viet-Quynh Nguyen | 19/07/2025 | Added introduction |
| 1.2 | Ramandeep Kaur | 20/07/2025 | Updated Targeted audience, Scope |
| 2.0 |  |  | Added Introduction of Architecture |
| 2.1 |  |  | Application Architecture |
| 2.2 |  |  | Business architecture |
| 2.4 |  |  | Updated the Security Architecture, Deployment Architecture, and Testing Model content. |
|  |  |  |  |

**2.Introduction**

The **PTFMS** is an online system that improves the services, management, and operations of public transit agencies by providing centralized control and visibility over fleet performance. It allows buses, electric light rail vehicles, and diesel-electric trains to be monitored, tracked, and optimized by transit departments through a web-based platform.

For better efficiency, this system enhances transit operations by incorporating real-time GPS tracking, onboard performance and energy/fuel consumption monitoring, automated predictive maintenance alerts, and dynamic route adjustments. The system supports transit managers by analyzing operational data, issuing intelligent alerts, and delivering insights to control costs, minimize downtime, and improve transportation reliability.

This document outlines the **PTFMS design at its highest level of abstraction**. It provides a comprehensive and informative reference for the system's overall architecture, foundational design principles, and essential technical specifications. It serves as a guiding document for system architects, developers, and project stakeholders to effectively understand and implement the solution.

**3. Targeted Audience**

This document is intended for multiple stakeholders involved in the design, development, and deployment of the system, including the following:

* **Software Developers:** To implement system components based on design.
* **Software Architects:** To review and refine the system’s structure and design patterns.
* **Project Managers:** To oversee development progress and ensure alignment with project objectives.
* **Quality Assurance (QA) Engineers:** To develop and execute test plans based on functional and architectural requirements.
* **System Administrators:** To configure, deploy, and maintain the application in a production environment.

**4. Scope**

The scope of the project is defined as follows:

**Within Scope:**

* User registration and role-based login
* Vehicle management and fuel monitoring
* GPS tracking and manual log updates
* Predictive maintenance alerting
* Reporting dashboards and energy analytics

**Out of Scope:**

* Mobile app version
* Real-time IoT sensor hardware integrations
* Third-party APIs (e.g., Google Maps)

**5. Application Architecture**

The Public Transit Fleet Management System (PTFMS) follows a 3-tier architecture:

* **Presentation Layer**: JSP pages for input and display (login, dashboard, vehicle registration)
* **Business Layer**: Java Servlets and services managing operations, alerts, and route logic
* **Data Layer**: MySQL with DAO access via JDBC

**1. Presentation Layer**

* User Interface: xx
* Components: xx
* Interaction: xx

**2. Business Logic Layer**

* **Core Functionalities:**
* xx
* xx
* xx
* xx
* Interaction: xx

#### **3. Database Layer**

* **Database:** MySQL 8.0.40 (JDBC for interaction).
* **Key Tables:** 
  + **xx**
  + xx
* **Interaction:** xx

**6. Business Architecture:**

**7.Detailed Design:**

**8.Data Architecture:**

**9.Security Architecture:**

**10.Deployment Architecture:**

**11.Testing Model**

**12. References**

**13.Acronyms/Abbreviation**