Software Requirements Specification

for

Railway Reservation System

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version
A. Chandra, Aman Rao, Aman Singh, Anand Maharia	20-11-23	Initial Version	1.0

1. Introduction

1.1 Purpose

The purpose of this document is to specify the software requirements for the Railway Reservation System, including user registration, login, profile management, train information, ticket booking and cancellation, ticket viewing and printing, and user dashboard features.

1.2 Document Conventions

This document follows standard conventions for formatting and organizing software requirements.

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers, testers, and documentation writers. Readers are suggested to begin with the overview sections and proceed through the sections relevant to their roles.

1.4 Product Scope

The Railway Reservation System is a web-based application developed in PHP and MySQL, hosted on an Apache Service on Google VM Compute Engine, and using Google Cloud MySQL Instance as Database Server. The system includes features for user management, train information, ticket booking, cancellation, and viewing.

1.5 References

No external references are currently applicable.

2. Overall Description

2.1 Product Perspective

The Railway Reservation System is a self-contained product providing online reservation and management of train tickets. It interacts with the users through a web-based interface.

2.2 Product Functions

- User registration and login
- Profile management
- Train information display
- Ticket booking and cancellation

- Ticket viewing and printing
- User dashboard

2.3 User Classes and Characteristics

The system caters to regular users seeking to book and manage train tickets. Users may have distinct preferences and security levels.

2.4 Operating Environment

The system operates within a web-based environment using PHP and MySQL. It is hosted on an Apache Google VM Compute Engine, with the database managed by Google Cloud SQL.

2.5 Design and Implementation Constraints

The system must adhere to PHP and MySQL for implementation, ensuring compatibility with the specified hosting environment and database management system.

2.6 User Documentation

User documentation comprises manuals, online help, and tutorials delivered with the software.

2.7 Assumptions and Dependencies

Assumptions include the availability of the specified hosting environment, proper functioning of PHP and MySQL, and reliable internet connectivity. Dependencies include compatibility with Google Cloud SQL.

3. External Interface Requirements

3.1 User Interfaces

The system will feature a user-friendly web-based interface, allowing users to register, log in, manage profiles, and interact with various functionalities.

3.2 Hardware Interfaces

The system interfaces with the hosting environment, Apache Google VM Compute Engine, and Google Cloud SQL Instance.

3.3 Software Interfaces

The system interfaces with PHP, MySQL, and the Apache web server. It also interacts with the Google Cloud SQL database.

3.4 Communications Interfaces

The system requires internet connectivity for users to access the web-based interface and perform various actions.

4. System Features

4.1 User Registration and Login

4.1.1 Description and Priority

This feature allows users to register with the system and log in using their credentials. It is of high priority as it forms the foundation for user interaction with the system.

4.1.2 Stimulus/Response Sequences

* User accesses the registration page and provides necessary information.
* System validates the information and creates a new user account.
* User logs in with their registered username and password.
* System validates the login credentials and grants access.

4.1.3 Functional Requirements

REQ-1: The system shall allow users to register with a valid username, name, age, gender, and password.
REQ-2: Users shall be able to log in using their registered credentials.
REQ-3: Invalid login attempts shall be limited to enhance security.
REQ-4: Passwords must meet security standards, including a minimum length and complexity requirements.
REQ-5: The system shall provide error messages for failed login attempts.:

4.2 Profile Management

4.2.1 Description and Priority

This feature enables users to view and update their profiles. It is of medium priority, enhancing user customization and personalization.

4.2.2 Stimulus/Response Sequences

* User accesses the profile page and views existing information.
* User updates profile details and saves changes.

4.2.3 Functional Requirements

REQ-6: Users should be able to view and update their profiles.
REQ-7: The system shall validate and store updated profile information.
REQ-8: Users shall have the option to reset their passwords.

4.3 User Dashboard

4.3.1 Description and Priority

This feature provides users with a dashboard listing all upcoming and past journeys. It is of medium priority, enhancing the user experience by offering a quick overview of their travel history.

4.3.2 Stimulus/Response Sequences

* User logs in and accesses the dashboard.
* System retrieves and displays a list of upcoming and past journeys.

4.3.3 Functional Requirements

REQ-9: The system shall display a dashboard listing all upcoming and past journeys.
REQ-10: Users can click on a journey to view detailed information.

4.4 Train Information

4.4.1 Description and Priority

This feature allows users to view information about all available running trains and the schedule for a specific train. It is of high priority to facilitate informed decision-making for users.

4.4.2 Stimulus/Response Sequences

* User selects the "Train Information" option.
* System retrieves and displays a list of all running trains.
* User selects a specific train to view its schedule.

4.4.3 Functional Requirements

REQ-11: Users can view a list of all available running trains.
REQ-12: Users can select a train to view its schedule.
REQ-13: The system shall display relevant details such as train number, name, distance, travel time, and base fare.

4.5 Ticket Booking and Cancellation

4.5.1 Description and Priority

This feature enables users to reserve train seats from one station to another on a specified date and cancel previously booked tickets. It is of the highest priority as it represents the core functionality of the system.

4.5.2 Stimulus/Response Sequences

* User selects the "Book" option and enters journey details.
* System checks seat availability and confirms the booking.
* User selects the "Cancel" option and provides necessary details.

4.5.3 Functional Requirements

REQ-14: Users can reserve train seats by providing journey details.
REQ-15: The system shall check seat availability and confirm the booking.
REQ-16: Users can cancel previously booked train tickets.

4.6 Ticket Viewing and Printing

4.6.1 Description and Priority

This feature allows users to view and print their train tickets, categorized as upcoming, past, or canceled. It is of medium priority, providing users with a record of their journeys.

4.6.2 Stimulus/Response Sequences

* User selects the "Ticket" option.
* System displays a list of upcoming, past, or cancelled tickets.
* User selects a ticket to view or print.

4.6.3 Functional Requirements

REQ-15: Users can view a list of upcoming, past, or cancelled tickets.
REQ-16: Users can select a ticket to view or print.
REQ-17: The system shall categorize tickets based on their status.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

5.1.1 Response Time

The system shall respond to user interactions (e.g., booking, cancellation) within 3 seconds under normal load conditions. - The maximum response time for critical functions (e.g., fare calculation) shall not exceed 5 seconds.

5.1.2 Scalability

The system must be able to handle a minimum of 500 simultaneous users without significant degradation in performance. - The system should scale horizontally to accommodate increased user traffic during peak hours.

5.2 Safety Requirements

5.2.1 Transaction Rollback

In the event of a system failure during a ticket booking transaction, the system shall ensure that the transaction is rolled back to maintain data consistency.

5.2.2 Data Integrity

The system must employ measures to ensure data integrity and prevent data corruption.

5.3 Security Requirements

5.3.1 User Authentication

* User passwords shall be securely stored using strong encryption algorithms.

* The system shall implement user authentication to ensure secure access to user accounts.

5.3.2 Authorization

Access to sensitive functionalities (e.g., admin management) shall be restricted to authorized users.

5.3.3 Secure Communication

Communication between the system components shall be encrypted using secure protocols (e.g., HTTPS).

5.4 Software Quality Attributes

5.4.1 Maintainability

* The system shall be designed for high maintainability to facilitate easy updates and enhancements.

* Code changes and updates

5.4.2 Reliability

* The system shall be designed for high reliability, minimizing system downtime and ensuring continuous availability.

* Backup and recovery mechanisms shall be in place to protect against data loss.

5.4.3 Performance Monitoring

The system shall include performance monitoring tools to track response times, resource usage, and identify performance bottlenecks.

5.5 Business Rules

5.5.1 User Roles and Permissions

The system shall enforce business rules related to user roles, ensuring that users can only perform actions appropriate to their roles (e.g., regular users cannot access admin functionalities).

5.5.2 Payment Processing

Business rules related to payment processing, including handling refunds and cancellations, shall be implemented securely and in compliance with relevant regulations.

6. Other Requirements

6.1 Multilingual Support

The system shall support multiple languages for user interfaces to accommodate users with diverse language preferences.

6.2 Accessibility

The system shall be designed to be accessible to users with disabilities, in compliance with accessibility standards (e.g., WCAG).

Appendix A: Glossary

- User

  An individual who interacts with the Railway Reservation System.

- Admin

  An authorized user with administrative privileges in the Railway Reservation System.

- Transaction Rollback

  A safety measure ensuring that in the event of a system failure during a ticket booking transaction, the transaction is rolled back to maintain data consistency.

- Data Integrity

  Ensuring the accuracy and consistency of data within the system.

- User Authentication

  The process of verifying the identity of users before granting them access to the system.

- Authorization

  Granting users, the appropriate permissions to access specific functionalities based on their roles.

- Secure Communication

  Ensuring that communication between system components is encrypted using secure protocols (e.g., HTTPS).

- Maintainability

  The ease with which the system can be updated and enhanced to meet changing requirements.

- Usability

  The user-friendliness and intuitiveness of the system interfaces.

- Reliability

  The ability of the system to operate continuously with minimal downtime and ensure data availability.

- Performance Monitoring

  The process of tracking system performance metrics to identify and address performance issues.

Appendix B: Analysis Models

- Data Flow Diagrams (DFD)

  Illustrations of the flow of information within the system, showing how data moves through different processes and entities.

- Entity-Relationship Diagrams (ERD)

  Visual representations of the relationships between different entities in the system, including users, trains, tickets, and stations.

Appendix C: To Be Determined List

1. *TBD: Define specific error messages and codes for various system functionalities.*
2. *TBD: Finalize the mechanism for user notification preferences (e.g., email, in-app alerts).*
3. *TBD: Specify the backup and recovery mechanisms to be implemented for data protection.*
4. *TBD: Determine the specific accessibility standards (e.g., WCAG level) to be followed.*