

Software Requirements Specification (SRS) for Bus Navigation App using LoRaWAN Technology

1. Introduction

1.1 Purpose of this Document

This Software Requirements Specification (SRS) outlines the functional and non-functional requirements for the development of a Bus Navigation App that utilizes LoRaWAN (Long Range Wide Area Network) technology to track the vehicle's location in real-time. It serves as a comprehensive guide for the development team and stakeholders to understand the system's functionalities, user needs, and operational constraints.

1.2 Scope of this Document

This document focuses on the core functionalities of the Bus Navigation App, including real-time vehicle tracking, route planning, and user interface design. It excludes specific hardware specifications, network infrastructure details, and LoRaWAN technology implementation details, which will be documented separately.

1.3 Overview

The Bus Navigation App aims to provide users with real-time information about bus locations, routes, and schedules. By leveraging LoRaWAN technology, the app offers accurate and reliable tracking of buses, ensuring efficient navigation for passengers.

1.4 Business Context

The Bus Navigation App will cater to commuters using public transportation, offering them a convenient way to track buses and plan their journeys. It will be implemented by transportation authorities and service providers seeking to enhance the overall passenger experience.

2. General Description

2.1 Product Functions

- Real-time bus tracking using LoRaWAN technology
- Route planning and optimization

- Bus stop information display
- Schedule updates and notifications
- User-friendly interface for easy navigation

2.2 Similar System Information

Existing navigation apps and public transportation tracking systems can be referenced for understanding functionalities and user experience best practices.

2.3 User Characteristics

The Bus Navigation App is intended for commuters using public transportation, including regular passengers and occasional travelers.

2.4 User Problem Statement

Commuters face challenges in tracking bus locations and planning their journeys efficiently due to limited real-time information and unpredictable schedules.

2.5 User Objectives

Users expect the Bus Navigation App to provide:

- Accurate real-time bus tracking information
- Easy-to-use interface for route planning and navigation
- Timely updates and notifications about bus schedules and delays

2.6 General Constraints

- Compliance with data privacy regulations and standards
- Integration with existing transportation systems and databases
- Scalability to accommodate increasing user and bus volumes

3. Functional Requirements

3.1 Real-time Bus Tracking:

- Integration with LoRaWAN technology for accurate bus location tracking
- Display of real-time bus locations on the app's map interface
- Refresh mechanism to update bus locations at regular intervals

3.2 Route Planning:

- Input mechanism for users to enter their origin and destination
- Calculation of optimal routes based on bus schedules and current traffic conditions
- Display of route options with estimated travel times

3.3 Bus Stop Information:

- Display of nearby bus stops based on user's current location
- Information about bus routes serving each bus stop
- Real-time bus arrival predictions for each stop

3.4 Schedule Updates and Notifications:

- Notification system for users about bus schedule changes and delays
- Option for users to subscribe to specific bus routes or stops for updates

4. Interface Requirements

4.1 User Interfaces

- Mobile application interface accessible on smartphones and tablets
- Intuitive and user-friendly design with map-based navigation and search functionality

4.2 Software Interfaces

- Integration with LoRaWAN network servers for receiving real-time bus location data
- Integration with transportation authority databases for bus route and schedule information

5. Performance Requirements

- Fast response times for loading bus tracking information and route calculations
- Reliability of real-time bus tracking data with minimal latency
- Scalability to handle concurrent user requests during peak hours

6. Other Non-Functional Attributes

6.1 Security

- Secure authentication and authorization mechanisms for user accounts
- Encryption of user data and communication channels to protect privacy

6.2 Reliability

- High system availability with minimal downtime for uninterrupted service
- Regular monitoring and maintenance to ensure system reliability

6.3 Maintainability

- Modular code architecture for easy maintenance and updates
- Version control and documentation practices for efficient code management

6.4 Usability

- Accessibility features for users with disabilities
- Multilingual support and clear instructions for users of diverse backgrounds