

# Software Requirements Specification (SRS) for "Zambian AirDirect" System

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## 1. Introduction to the Project

This document outlines the detailed requirements for our new Online Flight Management System, which we're provisionally calling "Zambian AirDirect" (ZAD). The main goal is to create a robust web application that enables users to effortlessly search for, book, and securely pay for airline flights. Additionally, it will provide airline administrative staff with comprehensive tools for managing flight schedules and passenger bookings. This initiative aims to significantly improve the efficiency and user experience of air travel booking within Zambia.

## 2. General System Description

### 2.1 Overview of the System

The ZAD system is conceived as a standalone web-based platform. While its initial deployment will be independent, its architecture is designed to accommodate future integration with existing airline operational databases for real-time data synchronization. The core objective is to transition from traditional, often manual, booking processes to a streamlined, accurate, and readily accessible digital solution.

### 2.2 Intended Users

The system is tailored for two primary user groups:

- **Passengers:** These are the general public who will interact with the customer-facing functionalities. They are expected to have fundamental internet proficiency and will utilize the system for flight inquiries, reservations, and managing their travel details.
- **Airline Staff:** This category includes various airline personnel responsible for flight operations, customer support, and ticketing. They will access a secure, restricted administrative interface, with specific permissions granted based on their job roles.

### 2.3 Operational Environment

The ZAD system will operate within standard modern web browsers (e.g., Google Chrome, Mozilla Firefox, Microsoft Edge, Apple Safari). A crucial requirement is its

responsiveness, ensuring optimal display and usability across a wide range of devices, including desktop computers, laptops, tablets, and mobile smartphones. The system will be hosted on a highly available, scalable cloud infrastructure to ensure continuous access and performance.

## 2.4 Key Constraints

- **Data Security:** Paramount importance is placed on the security of sensitive personal and financial data. All data transmission and storage *must* incorporate robust encryption techniques, and the system must be resilient against common cyber threats.
- **Regulatory Compliance:** Strict adherence to all applicable Zambian civil aviation regulations and international data privacy laws (e.g., principles similar to GDPR for personal data protection) is mandatory.
- **Payment Integration Standards:** The system's payment gateway integrations are limited to providers that are fully PCI DSS compliant to ensure secure transaction processing.

## 2.5 Assumptions and Dependencies

- **Assumptions:** It is assumed that end-users will have reliable internet connectivity to access and utilize the platform effectively. Additionally, the availability and reliability of APIs from chosen third-party payment processors are fundamental assumptions.
- **Dependencies:** The successful functioning of the ZAD system relies critically on a robust, scalable backend database management system and the consistent performance of all integrated external services.

# 3. Specific Functional Requirements

## 3.1 User Account and Authentication

- **F.1:** New users (passengers) shall be able to register for an account by providing a unique email address, a password that meets defined complexity requirements, and essential contact details (e.g., name, phone number).
- **F.2:** Registered users shall be able to securely log in to their accounts using their credentials.
- **F.3:** Once authenticated, users shall have the capability to view and update their personal profile information.
- **F.4:** A secure password recovery mechanism shall be provided for users who forget their passwords, utilizing their registered email address for verification.

## 3.2 Flight Search and Display

- **F.5:** The system shall enable users to conduct comprehensive flight searches based on the following criteria: departure airport, destination airport, desired travel dates (supporting both one-way and round-trip options), and the number of passengers (categorized, e.g., adult, child, infant).
- **F.6:** Search results shall clearly present all pertinent flight information, including: the airline's name, specific flight number, precise departure and arrival times, total flight duration, detailed information regarding any layovers, and the corresponding ticket price.
- **F.7:** Users shall be provided with intuitive filtering options for search results, allowing them to refine choices based on criteria such as price range, specific airlines, number of stops, and preferred time slots for departure or arrival.

### **3.3 Booking and Reservation Process**

- **F.8:** Users shall be able to select their preferred flight(s) from the displayed search results to initiate the booking procedure.
- **F.9:** The system shall guide the user through accurately entering all necessary passenger details for each traveler included in the booking (e.g., full legal name, date of birth, and passport information for international travel, if applicable).
- **F.10:** Prior to final payment, a comprehensive summary of the selected flights, entered passenger details, and the total cost shall be presented to the user for final review and explicit confirmation.
- **F.11:** Upon successful reservation, the system shall automatically generate and prominently display a unique booking reference number.

### **3.4 Payment Processing and Confirmation**

- **F.12:** The system shall securely integrate with at least one major online payment gateway for processing credit/debit card transactions (e.g., Visa/MasterCard). The feasibility and integration of popular local Zambian mobile money options will also be a key consideration.
- **F.13:** The booking status shall automatically transition to "Confirmed" immediately following successful payment processing.
- **F.14:** An electronic ticket (e-ticket) and a detailed booking confirmation email shall be automatically dispatched to the user's registered email address upon successful payment.

### **3.5 Administrative Functions for Airline Staff**

- **F.15:** Authorized administrative staff shall possess the capability to manage flight schedules, which includes adding new flights, modifying details of existing flights (e.g., timings, aircraft assignments, seat capacities), and cancelling flights.
- **F.16:** Administrators shall also have the ability to search for, view detailed

information about, modify, or cancel passenger bookings as required.

- **F.17:** The system shall generate various essential reports for administrative analysis, including flight occupancy reports, revenue summaries, and passenger manifests for specific flights.

## 4. External Interface Requirements

### 4.1 User Interface

The ZAD system will feature an intuitive, web-based graphical user interface (GUI). Its design will be fully responsive, ensuring an optimal and consistent user experience across desktops, tablets, and mobile phones, with clear navigation and visual cues that adapt to different screen sizes.

### 4.2 Software Interfaces

- **Payment Gateway APIs:** These interfaces are critical for handling all secure financial transactions with external payment processors.
- **Email Service API:** Utilized for automated dispatch of transactional emails such as booking confirmations, e-tickets, and password reset links.
- **Airline Core Systems API (Future Consideration):** Potential future integration with the airline's internal operational databases for real-time inventory and flight data synchronization.

### 4.3 Communication Interfaces

All data communication between the client (user's web browser) and the ZAD servers, especially sensitive personal or payment information, *must* be secured using industry-standard HTTPS protocols (TLS 1.2 or higher).

## 5. Non-Functional Requirements (Performance, Security, etc.)

### 5.1 Performance

- **NFR.P1 (Search Response Time):** Flight search results should consistently display within 2.5 seconds for 95% of requests, even during periods of high system load.
- **NFR.P2 (User Concurrency):** The system shall be capable of supporting up to 80 concurrent users actively performing searches and booking transactions without experiencing any significant performance degradation.

### 5.2 Security

- **NFR.S1 (Data Encryption):** All sensitive data, including personally identifiable information (PII) and payment details, must be encrypted both during

transmission (using robust TLS encryption) and when stored within the database.

- **NFR.S2 (Access Control):** A strict role-based access control (RBAC) system shall be implemented, ensuring that administrative staff can only access functionalities commensurate with their assigned roles and permissions.
- **NFR.S3 (Authentication Strength):** User authentication mechanisms will enforce strong password policies, implement account lockout after multiple failed attempts, and include robust measures against brute-force attacks and credential stuffing.
- **NFR.S4 (Session Management):** Robust session management techniques shall be employed to prevent session hijacking, session fixation, and unauthorized access to user accounts.

### 5.3 Reliability

- **NFR.R1 (System Availability):** The ZAD system shall maintain an operational uptime of 99.8%, excluding pre-scheduled maintenance windows, ensuring very high availability of service to users.
- **NFR.R2 (Data Integrity & Recovery):** Comprehensive mechanisms for data integrity (e.g., transactional consistency, validation rules) and a robust backup and disaster recovery plan shall be in place to prevent data loss for all booking and payment records.

### 5.4 Usability

- **NFR.U1 (Learning Curve):** A new user, even with only basic web navigation skills, should be able to successfully complete a flight booking (from initial search to final confirmation) within a maximum of 5 intuitive steps.
- **NFR.U2 (Error Feedback):** The system shall provide clear, concise, and context-sensitive error messages for any invalid inputs or system issues, guiding the user toward a quick and effective resolution.

### 5.5 Scalability

The architectural design of the ZAD system shall explicitly support horizontal scaling, enabling it to accommodate substantial future growth in user base, flight inventory, and transaction volume without necessitating a major re-architecture or significant performance impact.

### 5.6 Maintainability

- **NFR.M1 (Code Quality & Documentation):** The codebase shall adhere to high coding standards, be extensively commented, and follow a modular design pattern to facilitate ease of understanding, debugging, and future modifications by development teams, reducing technical debt.

- **NFR.M2 (Deployment Efficiency):** Updates, bug fixes, and new feature deployments shall be achievable with minimal system downtime, ideally leveraging automated Continuous Integration/Continuous Deployment (CI/CD) pipelines to ensure rapid and reliable releases.