LifeFlow

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**Software Requirements Specification**

**Document**

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1. Introduction

This section provides an overview of the software requirements specification (SRS) for the Blood Donation Management Platform (BDMP), a web-based system designed to facilitate the discovery of compatible blood donors. The platform allows users — donors, recipients, and medical professionals — to create profiles, search for donors based on medical compatibility, and arrange communication through chat and Zoom video conferences. The purpose of this document is to outline the main features, functionalities, and limitations of the system to guide its development and implementation.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to define the functional and non-functional requirements for the Blood Donation Management Platform (BDMP). This document will serve as a comprehensive guide for developers, testers, and stakeholders, ensuring the platform meets the needs of its users and is developed with a clear understanding of the project's goals.

1.2 Scope

The Blood Donation Management Platform (BDMP) is a web application designed to enhance the process of finding compatible blood donors. The platform aims to streamline user interaction, improve the efficiency of donor-recipient matching, and ensure a secure communication environment between users and medical professionals.

The system will include features for creating detailed user profiles, searching for donors based on blood group and medical compatibility, and facilitating real-time communication through chat and Zoom video conferencing.

The product objectives include:

* Providing a streamlined experience for blood donation management.
* Facilitating the search for compatible donors based on blood type, Rh factor, and health status.
* Enabling secure real-time communication between donors, recipients, and doctors.
* Allowing healthcare professionals to verify the medical suitability of donors.
* Ensuring the security and confidentiality of sensitive medical and personal information in compliance with GDPR.

This SRS defines the requirements for the first version (MVP) of the Blood Donation Management Platform.

1.3 Definitions, Acronyms, and Abbreviations

|  |  |
| --- | --- |
| **Term** | **Definition** |
| API | Application Programming Interface |
| GDPR | General Data Protection Regulation |
| MVP | Minimum Viable Product |
| SRS | Software Requirements Specification |
| UI | User Interface |
| UX | User Experience |
| JWT | JSON Web Token |
| Zoom API | Video conferencing service API |

1.4 References

* IEEE Guide to Software Requirements Specifications (IEEE Std 830-1998)
* Zoom API Developer Documentation
* GDPR Regulation (EU) 2016/679
* OWASP Security Guidelines
* MongoDB Documentation
* WebAuthn API Specification

1.5 Overview

This SRS document is organized to provide a comprehensive understanding of the Blood Donation Management Platform. Section 1 introduces the purpose, scope, definitions, and references. Section 2 presents the general description, covering product perspective, main functions, user characteristics, constraints, and assumptions.

Section 3 outlines the specific requirements of the platform, including external interface requirements, functional requirements, performance requirements, and other system attributes. Section 4 provides supporting information, including use case diagrams.

2. The Overall Description

2.1 Product Perspective

The Blood Donation Management Platform (BDMP) is a new, self-contained web-based application designed to address the needs of modern blood donation services. It integrates with external systems such as Zoom for secure video conferencing, email services for notifications, and biometric authentication systems for secure user login.

The platform’s main innovation lies in its ability to streamline donor-recipient matching and communication. While there are existing blood donor databases, BDMP differentiates itself through real-time communication capabilities, medical profile verification by healthcare professionals, and secure handling of sensitive data compliant with GDPR.

2.1.1 System Interfaces

BDMP will interface with the following external systems:

* Zoom API for scheduling and conducting video conferencing sessions between donors, recipients, and doctors.
* Email services (SMTP) for sending notifications and verification emails.
* WebAuthn API for biometric authentication of users.
* External geolocation services for optional donor location matching.

2.1.2 Interfaces

The platform will feature a modern, intuitive web-based interface. Key interface components include:

* User registration and login screens with biometric authentication support.
* Profile creation and management for donors, recipients, and healthcare professionals.
* Donor search interface with filtering based on blood group, Rh factor, and availability.
* Chat interface for secure messaging between verified users.
* Video conferencing scheduling and launching interface integrated via Zoom.
* Settings and preference management screens.

The UI will follow modern design principles to ensure accessibility and ease of use across a wide range of user technical skills.

2.1.3 Hardware Interfaces

BDMP will utilize the following hardware features on users' devices:

* Biometric devices (e.g., fingerprint scanners, Face ID) for secure login.
* Camera and microphone for video conferencing sessions via Zoom.
* Standard storage for caching session data and local settings.

The platform will be optimized for various screen sizes and resolutions, ensuring a consistent experience across desktops, tablets, and smartphones.

2.1.4 Software Interfaces

The platform will interface with the following software systems:

* MongoDB for storing user profiles, medical data, and communication history.
* SMTP servers for email verification and notifications.
* Zoom API for video conferencing features.
* WebAuthn API for biometric login integration.
* REST APIs for structured client-server communication.

2.1.5 Communications Interfaces

BDMP will utilize the following communication protocols:

* HTTPS for secure communication with backend services.
* REST APIs for communication with external and internal systems.
* Zoom API over HTTPS for video conference sessions.

2.1.6 Memory Constraints

The platform should:

* Operate efficiently on systems with limited memory (minimum 2GB RAM for clients)
* Limit local storage usage for cached data to a maximum of 400MB.
* Implement efficient caching mechanisms to optimize performance.
* Support offline viewing of user profiles and chat history (where possible).

2.1.7 Operations

The BDMP platform will support the following operational scenarios:

* Normal operation with internet connectivity
* Automatic synchronization when connectivity is restored after interruptions.
* Background operation for notification handling and session updates.
* Regular updates for functionality improvements and security patches.

2.1.8 Site Adaptation Requirements

BDMP will adapt to various environments through:

* Compliance with local healthcare data regulations.
* Scalability to adapt to growing user bases without significant performance degradation.

2.2 Product Functions

BDMP will provide the following key functions:

* User Profile Management
* Create and manage personal profiles for donors, recipients, and doctors.
* Input and update medical information (e.g., blood type, Rh factor, health status).
* Biometric authentication for secure account access

Donor Search

* Search for potential donors based on blood group, Rh factor, location, and availability.
* View detailed medical and personal profiles of matching donors.

Medical Verification:

* Healthcare professionals can review and verify donor profiles based on submitted medical data.

Communication

* Secure chat with verified users (donor-recipient-doctor).
* Schedule and conduct video conferencing via Zoom for verification and discussion purposes.

Notifications

* Receive email notifications regarding profile updates, chat messages, and meeting schedules.

Security Features

* Biometric login support (optional).
* Multi-factor authentication and role-based access control.

2.3 User Characteristics

BDMP targets diverse user groups with varying technical capabilities:

Blood Donors

* Individuals aged 18+ willing to donate blood.
* Basic internet skills and familiarity with web applications.

Recipients

* Patients or their representatives seeking compatible blood donors.
* Need easy access to donor search and communication tools.

Healthcare Professionals

* Certified doctors and medical staff responsible for verifying donor profiles.
* Require access to detailed medical information and secure communication.

The application will accommodate varying levels of digital literacy, offering an intuitive design for less tech-savvy users and secure, advanced features for professional users.

2.4 Constraints

The development of BDMP is subject to the following constraints:

Technical Constraints

* Must function smoothly on modern web browsers (Chrome, Firefox, Safari, Edge).
* Backend must be scalable to support a growing number of users.
* Real-time video conferencing relies on the availability of the Zoom API.

Regulatory Constraits

* Must comply with GDPR and local healthcare data regulations.
* Must implement secure storage and encryption for sensitive medical data.
* Must enforce age verification (minimum donor age 18 years).

Business Constraints

* Initial development must fit within a limited project budget.
* The MVP must be ready within 6 months.
* Cost-effective hosting and third-party service integration are required.

User Experience Constraints

* The platform must be easy to use without extensive training.
* Critical functions should be accessible within 3 clicks/taps.
* The platform must consider varying internet connectivity conditions in different regions.

2.5 Assumptions and Dependencies

The following assumptions and dependencies may affect requirements.

Assumptions

* Users will have access to the internet and compatible devices
* Users will be willing to provide necessary personal and medical information.
* The need for efficient donor-recipient matching will continue to grow.

Dependencies

* Stability and availability of third-party services (Zoom, SMTP servers).
* Continued access to cloud infrastructure at projected costs.
* Compliance with evolving healthcare data privacy regulations.

2.6 Apportioning of Requirements

Requirements will be implemented across several releases:

MVP (Version 1.0)

* Basic user profiles and authentication (email, biometric login).
* Basic donor search functionality.
* Core chat and Zoom integration for communication.
* Profile verification by healthcare professionals.

Version 1.1 (3 months after MVP)

* Advanced search filters (location, blood type compatibility).
* Integration with national donor registries (optional).
* Notification system enhancement.

Version 1.2 (6 months after MVP)

* Group video conferences for multiple stakeholders.
* Activity and donation history tracking for donors.
* Advanced privacy and consent management.

Future Versions

* AI-powered donor-recipient matching optimization.
* Predictive analytics for donation need.
* Expanded language localization.
* Mobile application version for iOS and Android.

3. Specific Requirements

3.1 External Interfaces

3.1.1 User Interfaces

The platform will provide a web-based, responsive user interface. Major components will include:

* Registration and Login Interface
  + Email-based and biometric (WebAuthn) login support.
  + Email verification via one-time confirmation links.
  + Password recovery and reset functionality.
* Profile Management Interface
  + Profile creation and editing for donors, recipients, and doctors.
  + Medical information input fields: blood type, Rh factor, chronic conditions.
  + Consent management for sharing medical information.
* Donor Search Interface
  + Search by blood group, Rh factor, location, and availability.
  + Filters for specific medical eligibility criteria.
  + Detailed view of donor profiles including medical verification status.
* Communication Interface
  + Secure chat with history tracking and encrypted messaging.
  + Zoom meeting scheduling and joining capabilities.
* Notification System
  + Alerts for profile updates, message receipts, and meeting schedules.
  + Email and in-app notification settings customization.
* Settings Interface
  + Privacy and data-sharing preferences.
  + Biometric login management.
  + Language and localization options.

3.1.2 Hardware Interfaces

* Biometric sensors (fingerprint readers, facial recognition) for WebAuthn-based authentication.
* Camera and microphone access for Zoom video meetings.
* Local storage access for caching session and notification data.

3.1.3 Software Interfaces

* Zoom API: Video conferencing for direct communication between users.
* SMTP Email Services: For notification and verification messages.
* MongoDB: Cloud-based database for storing user profiles, medical records, chat history.
* WebAuthn API: Secure biometric authentication.
* REST API: Client-server communication over HTTPS using JSON format.

3.1.4 Communications Interfaces

* HTTPS for all data transmission.
* WebSocket (future release) for real-time chat communication.
* Zoom’s secure communication protocols for video conferencing.
* OAuth 2.0 where necessary for third-party service integrations.

3.2 Functions

3.2.1 User Account Management

User Registration

* Email and biometric options for user registration.
* Email verification mandatory before profile activation.

Authentication

* Secure JWT-based session management.
* Support for biometric reauthentication.

Profile Management

* Donors provide medical details: blood group, Rh factor, health conditions.
* Recipients specify search criteria and blood needs.
* Doctors verify donor profiles through secure admin interfaces.

3.2.2 Donor Search and Matching

Search Functionality

* Recipients can search for donors by blood type, Rh factor, and availability.
* Advanced filters: location radius, verified status, medical history compliance.

Profile Viewing

* Recipients can view donor profiles with anonymized personal information unless consent is given.
* Doctors have extended access to full medical history upon verification.

3.2.3 Communication and Meeting Scheduling

Chat Functionality

* Text-based chat between donors and recipients.
* Full encryption of chat messages.

Zoom Meeting Integration

* Schedule and join video meetings directly from the platform.
* Send and receive meeting invites via integrated calendar system.

3.2.4 Notifications and Alerts

Notification System

* In-app notifications and email alerts for key actions (e.g., new message, meeting scheduled).
* Notification preferences manageable by the user.

Email Notifications

* Verification emails, appointment reminders, critical updates.

3.2.5 Security and Privacy

* Role-based access control (RBAC) to protect sensitive data.
* Session timeouts and auto-logout for inactive users.

3.3 Performance Requirements

* System shall support up to 5,000 concurrent users at MVP launch.
* Search queries shall return results within 2 seconds under normal load.
* Chat message delivery must occur within 1 second.
* Zoom meetings must integrate with less than 3 seconds delay when joining.
* 99.9% uptime excluding scheduled maintenance.

3.4 Logical Database Requirements

*User*

*Fields: userID, firstName, surName, middleName, email, password, role, createdAt, updatedAt*

*DoctorProfile*

*Fields: doctorProfileID, userId*

*DonorProfile*

*Fields: donorProfileID, userId, gender, birthDay, weight, bloodType, bloodResus, available, hasChronicDiseases, verificationStatus, consentToDataProcessing, allowProfileVisibility, createdAt, updatedAt*

*SeekerProfile*

*Fields: seekerProfileID, userId, createdAt, updatedAt*

*MedicalInfo*

*Fields: medicalInfoID, donorId, HIV\_AIDS, hepatitisBorC, syphilis, tuberculosisActiveOrPast, oncologicalDiseases, diabetesMellitus, heartAndVascularDiseases, centralNervousSystemDiseases, autoimmuneDiseases, bloodDiseases, hasRecentUpgade, upgadeDate, acuteRespiratoryInfections, respiratoryInfectionsDate, antibioticTherapy, antibioticTherapyDate, vaccination, vaccinationDate, surgeriesInjuriesStitches, surgeriesInjuriesStitchesDate, pregnancy, pregnancyDate, dentalPocedures, dentalPoceduresDate, herpesSimplex, herpesSimplexDate, lastDonationDate, donationTypeOffered, yearlyDonationsCount*

*DonationRecord*

*Fields: donationRecordID, donorId, donationType, date, numberOfDonation*

*SearchRequest*

*Fields: searchRequestID, seekerId, donorId, bloodType, resusFactor, donationType, notes, status, meetingLink, createdAt*

*Message*

*Fields: messageID, senderId, receiverId, content, createdAt*

3.5 Design Constraints

3.5.1 Standards Compliance

* WebAuthn for secure biometric authentication.
* REST API and JSON standard communication protocols.

3.6 Software System Attributes

3.6.1 Reliability

* Failover clusters for database and server infrastructure.
* Recovery time objective (RTO) of 15 minutes for system recovery.

3.6.2 Availability

* 99.9% uptime target, with maintenance downtime scheduled during off-peak hours.

3.6.3 Security

* End-to-end encryption for sensitive data in transit and at rest.
* Biometric login to enhance account security.
* Enforced secure session management practices.
* Quarterly vulnerability assessments.

3.6.4 Maintainability

* Modular architecture to facilitate easy updates and bug fixes.
* Logging and monitoring systems for proactive issue detection.
* Automated CI/CD pipelines for faster deployments.

3.6.5 Portability

* Browser compatibility: Chrome, Firefox, Safari, Edge (latest two versions).
* Mobile responsiveness on tablets and smartphones.
* Server deployability on AWS, Azure, or similar cloud services.

4. Change Management Process

This section outlines the process for managing changes to the Software Requirements Specification (SRS) and the Blood Donation Management Platform during the project lifecycle.

* Submission of Change Requests

Any project stakeholder, including developers, testers, or product owners, may submit a formal change request (CR). The CR must include:

* + A clear description of the proposed change.
  + Justification for the change (business or technical reason).
  + Potential impact analysis (on timelines, budget, scope, and system performance).
* Evaluation and Approval Process
  + The change request will be reviewed by the Change Control Board (CCB) consisting of the Project Manager, Lead Developer, and QA Lead.
  + For minor changes (e.g., small interface improvements), the approval can be expedited by the Project Manager.
  + Major changes (affecting core system functionalities, architecture, or delivery timelines) must receive formal approval from the Product Owner and be re-baselined in the project plan.
* Impact Assessment
  + Each change will be evaluated for its impact on system design, security compliance (GDPR), data privacy, and integration with third-party services (Zoom, SMTP).
  + Risk assessments will be carried out for all changes that may introduce vulnerabilities or regressions.
* Documentation Update
  + Approved changes will be incorporated into the SRS.
  + Updated versions of the SRS will be documented with version control and distributed to all stakeholders.
* Communication
  + All approved changes and updates will be communicated to the team via regular project status meetings and project management tools (e.g., Jira, Trello).

5. Document Approvals

The following Software Requirements Specification (SRS) has been reviewed and approved by the listed project stakeholders:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Role** | **Signature** | **Date** |
| Kristina Kucheriavenko | Project Manager? |  | 10-06-2025 |