

|  |  |
| --- | --- |
| BLOOD & DONOR MANAGEMENT SYSTEM - BDMS |  |
| SOFTWARE REQUIREMENTS SPECIFICATION  By Foyaj Ahmmad ID: 12-212-0017  Nazim Uddin Khan ID: 12-212-0018 |  |

BDMS

Version 4.0

May 18, 2025

**BLOOD & DONOR MANAGEMENT SYSTEM - BDMS**

Table of Contents

[Software Requirements Specification (SRS) 4](#_Toc197643118)

[1. Introduction 4](#_Toc197643119)

[1.1 Purpose 4](#_Toc197643120)

[1.2 Scope 4](#_Toc197643121)

[1.3 Definitions, Acronyms, and Abbreviations 4](#_Toc197643122)

[1.4 References 4](#_Toc197643123)

[1.5 Overview 4](#_Toc197643124)

[2. Overall Description 4](#_Toc197643125)

[2.1 Product Perspective 4](#_Toc197643126)

[2.2 Product Functions 5](#_Toc197643127)

[2.3 User Characteristics 5](#_Toc197643128)

[2.4 Constraints 5](#_Toc197643129)

[2.5 Assumptions and Dependencies 5](#_Toc197643130)

[3. External Interface Requirements 6](#_Toc197643158)

[3.1 User Interfaces 6](#_Toc197643159)

[3.2 Hardware Interfaces 6](#_Toc197643160)

[3.3 Software Interfaces 6](#_Toc197643161)

[3.4 Communication Interfaces 6](#_Toc197643162)

[4. System Features 7](#_Toc197643163)

[4.1 Donor Registration and Management 7](#_Toc197643164)

[4.2 Blood Request and Allocation 7](#_Toc197643165)

[4.3 Inventory and Stock Tracking 7](#_Toc197643166)

[4.4 Notifications and Alerts 7](#_Toc197643167)

[5. Other Non-Functional Requirements 7](#_Toc197643168)

[5.1 Performance Requirements 7](#_Toc197643169)

[5.2 Software System Attributes 7](#_Toc197643170)

[5.3 Business Rules 8](#_Toc197643171)

[6. Other Requirements 8](#_Toc197643172)

[7. Appendices 8](#_Toc197643173)

[Appendix A : Glossary 8](#_Toc197643174)

[Appendix B : Analysis Models 8](#_Toc197643175)

[Appendix C : Regulatory Compliance Mapping 8](#_Toc197643175)

Appendix D: Detail System Requirements & Functionality **………………………………………………………………………..**8

**Software Requirements Specification (SRS)**

**1. Introduction**

**1.1 Purpose**

The purpose of the Blood and Donor Management System (BDMS) is to efficiently bridge the gap between blood donors and seekers in Bangladesh. This system aims to solve major challenges including outdated donor information, lack of automated reminders, Limited Usability of Stored Blood and over-dependence on informal communication networks. BDMS provides a platform that facilitates emergency blood requests, maintains updated donor data, and ensures systematic, trackable communication between all parties involved.

**1.2 Scope**

BDMS is a web and mobile-based application (will launch in feature) designed for individuals in need of blood, voluntary donors. Key functionalities include donor and seeker registration, real-time donor matching, emergency alerts, profile management, donor verification, emergency blood request verification and detailed reporting. The system is built with scalability in mind and will potentially integrate with hospital systems and blood banks in the future.

**1.3 Definitions, Acronyms, and Abbreviations**

* **BDMS**: Blood and Donor Management System
* **API:** Application Programming Interface
* **UI**: User Interface
* **REST:** Representational State Transfer
* **GPS:** Global Positioning System
* **WCAG:** Web Content Accessibility Guidelines

**1.4 References**

* Client Requirements Document
* Problem Statement: Blood Donation System Bangladesh
* Bangladesh National Blood Transfusion Services Guidelines
* Health Insurance Portability and Accountability Act (HIPAA), 1996 (USA)
* General Data Protection Regulation (GDPR), EU Regulation 2016/679
* World Health Organization (WHO) Guidelines on Digital Health Data Protection (2021)
* Digital Security Act, 2018 (Bangladesh)
* Bangladesh ICT Policy, 2015

**1.5 Overview**

This document is structured to align with the Waterfall methodology, providing full documentation of system requirements. It includes system descriptions, external interfaces, functional and non-functional requirements, and appendices.

**2. Overall Description**

**2.1 Product Perspective**

BDMS is an independent platform that fits within the broader healthcare ecosystem of Bangladesh. It serves as a mediator between voluntary blood donors and individuals or institutions seeking blood.

**2.2 Product Functions**

* Donor and seeker registration and authentication
* Donor search and automated matching
* Profile and donation history management
* Emergency blood request submission and alerts
* Verification and badge system
* In system chat system
* Feedback and rating features
* Admin dashboard with analytics and fraud control

**2.3 User Characteristics**

* **Donors**: Regular or first-time users, typically aged 18–60, with basic digital literacy.
* **Blood Seekers**: Patients or their representatives, potentially in distress, needing a quick and intuitive interface.
* **Administrators**: Manage content, users, verification (User and Emergency Blood request) and generate analytics.
* **System Managers**: Oversee integration, infrastructure, and system reliability and scalability.

**2.4 Constraints**

* No offline, USSD or SMS-based functionality
* No blood transport or storage features
* Minimum 3-month interval between donations enforced
* Bengali content support limited to feedback and blog

**2.5 Assumptions and Dependencies**

This section outlines key assumptions about user behavior, system usage, and external dependencies that may influence the effectiveness and functionality of the BDMS.

User Behavior and Engagement Assumptions:

* Users will enter accurate and truthful information during registration and updates.
* Donors are assumed to be willing and able to donate when contacted.
* Donors will regularly update their availability and last donation date.
* Users will receive, read, and act on system-generated notifications and reminders.
* Most users will have access to the internet and basic digital literacy to navigate the system effectively.

System Reliability and Effectiveness Hypotheses:

* If donor data is accurate and current, the system will significantly reduce the time required to find a suitable match.
* Timely reminders and alerts will increase donor engagement and activity levels.
* The use of a trusted platform will decrease dependency on informal networks like social media for donor searches.
* The effectiveness of the system depends on donor responsiveness; repeated non-responsiveness may limit emergency utility.
* Accurate location-based search functionality will enhance the speed and success rate of donor matching.
* Negative user experiences (e.g., delayed responses or failed matches) may diminish user trust and system adoption.

Data Quality Risks:

* Some users may not consistently update their profiles, leading to outdated data in the system.
* A high volume of outdated or incorrect donor information may hinder system reliability and matching accuracy.

Technical and Environmental Dependencies:

* Continuous access to the internet is assumed for end users to interact with the system.
* Integration with external ID verification and geolocation APIs (e.g., NID services, Share ID) is assumed to remain stable and available.
* Future collaboration with hospitals and healthcare institutions is anticipated for enhanced integration and data verification.

Regulatory and Legal Compliance:

The system is designed under the assumption that all user data processing will fully comply with relevant national and international standards, including:

* + **Digital Security Act (2018)** of Bangladesh
  + **World Health Organization (WHO) Guidelines** on Digital Health Data Protection (2021)
  + **General Data Protection Regulation (GDPR)** (EU)
  + **Health Insurance Portability and Accountability Act (HIPAA)** (USA), as applicable in principle for best practice

**3. External Interface Requirements**

**3.1 User Interfaces**

* Responsive design for web and mobile platforms (in feature)
* English UI with Bengali content for blog/testimonials
* Forms for registration, donor search, emergency requests
* Dashboard for User, admins and system managers

**3.2 Hardware Interfaces**

* Compatible with Android 9+, iOS 12+, and modern web browsers
* Supports GPS-enabled smartphones

**3.3 Software Interfaces**

* Google Maps API for location-based search
* Share ID API for user verification
* Email service (e.g., SendGrid) for notifications
* OTP API (e.g., Twilio, Firebase Auth) for phone number and email verification
* Future integrations: hospital and blood bank APIs

**3.4 Communication Interfaces**

* RESTful APIs for all client-server communications
* JSON as the standard data exchange format
* WebSocket support for real-time notifications

**4. System Features**

**4.1 Donor Registration and Management**

**4.1.1** User shall be able to register as blood donor and seeker by submitting required info [First Name, Last Name, Gender, Birth Date, Username, Password, Phone Number, Email, Street Address, City, District, Zip Code, Blood Group, Weight, Hemoglobin, Last Blood Donation Date]

**4.1.2** User shall receive registration confirmation email

**4.1.3** System shall show a pop up for successful user registration with registration ID

**4.1.4** User shall verify their phone number and email address to explore all feature available for registered users.

**4.1.5** User shall verify their identity by using share id API to obtain verification badge.  
**4.1.6** Users shall receive reminders for profile updates and donation eligibility.

**4.1.7** User shall receive approved emergency request notification.

**4.2 Blood Request and Allocation**

**4.2.1** Blood seekers shall submit detailed emergency requests (hospital info, patient condition, required blood type, quantity, Patient hemoglobin point, Platelet, Duty Doctor's Name and Number)   
**4.2.2** For emergency request The system shall match available donors within a 50km radius based on availability, last donation date, blood type and eligibility.  
**4.2.3** Priority email alerts shall be sent to nearby verified donors first.

**4.3 Inventory and Stock Tracking**

**4.3.1** Not included in the current scope but planned for future integration with blood banks.

**4.4 Notifications and Alerts**

**4.4.1** The system shall send reminders for donation eligibility every 4 months.  
**4.4.2** Notifications shall be delivered via email and push messages for emergencies and profile reminders.

**5. Other Non-Functional Requirements**

**5.1 Performance Requirements**

**5.1.1 Capacity**  
System shall support 10,000+ concurrent users.

**5.1.2 Dynamic Requirements**

* Search results must appear within 2 seconds; emergency alerts dispatched within 10 seconds.
* Search results will show the verified user profile first

**5.1.3 Quality**  
99.9% uptime with automatic failover for core services.

**5.2 Software System Attributes**

**5.2.1 Reliability**  
Backed by regular backups and error recovery processes.

**5.2.2 Availability**

* Accessible 24/7 except for scheduled maintenance.
* Data backup and recovery systems shall be implemented to meet GDPR and HIPAA continuity expectations.

**5.2.3 Security**

* All data shall be encrypted using AES-256; 2FA login supported.
* The system shall implement access control, encryption (AES-256 for data at rest, TLS for data in transit), and logging mechanisms aligned with WHO and HIPAA standards.
* Users shall be authenticated using secure login procedures, with role-based access permissions.

**5.2.4 Maintainability**  
Code shall follow modular design with API documentation and system logs.

**5.3 Business Rules**

* Donor must be at least 18 years old also 50 kg weight and medically eligible
* A 3-month interval between donations is mandatory
* Gender-based filtering is not allowed
* Blood seeker/donor will be able to see other user contact info once they register and verify their phone/email

**6. Other Requirements**

* Future features include hospital and blood bank integration
* Blockchain and ambulance services are out of scope
* Future feature blood bank integration is out of scope for now but will be added in future

**7. Appendices**

**Appendix A: Glossary**

* **Donor Badge**: Visual verification of donor identity status
* **Emergency Radius**: Area within 50km used during emergencies

**Appendix B: Analysis Models**

* Use case diagrams, sequence diagrams, and ER models will be included upon system design finalization

**Appendix C:** **Regulatory Compliance Mapping**

This appendix outlines how the system aligns with:

* HIPAA (access control, data protection, audit logs)
* GDPR (data minimization, consent, right to erasure)
* WHO Guidelines (ethical use, data lifecycle management)
* Digital Security Act 2018 (Bangladesh) (data confidentiality and breach management)

**Appendix D: Detail System Requirements & Functionality**

