

Software Requirements Specification (SRS)

Title: Cloud-Based Smart Healthcare Monitoring and Management System

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1. Introduction

1.1 Purpose

This Software Requirements Specification (SRS) document defines the complete functional and non-functional requirements for the Cloud-Based Smart Healthcare Monitoring and Management System. The purpose of this document is to provide a clear, precise, and unambiguous description of system requirements to ensure full requirement satisfaction and to function as a formal reference for academic evaluation and system development.

1.2 Scope

The Cloud-Based Smart Healthcare Monitoring and Management System is a web-based healthcare solution designed to support hospitals, clinics, and healthcare providers in monitoring patient health conditions and managing medical records efficiently. The system enables real-time health monitoring, electronic health record management, appointment scheduling, reporting, and analytics using cloud computing technologies. It supports multiple user roles including Patients, Doctors, Healthcare Staff, and System Administrators. The system aims to reduce manual processes, improve healthcare accessibility, enhance decision-making, and ensure secure handling of sensitive medical data.

1.3 Definitions, Acronyms, and Abbreviations

- **SRS** – Software Requirements Specification
- **EHR** – Electronic Health Records
- **RBAC** – Role-Based Access Control
- **AI** – Artificial Intelligence
- **NFR** – Non-Functional Requirements

1.4 References

- IEEE Std 830-1998 – IEEE Recommended Practice for Software Requirements Specifications

1.5 Overview

This document is organized to describe the system context and overall behaviours, followed by detailed functional requirements, non-functional requirements, interface specifications, constraints, assumptions, and future enhancements.

2. Overall Description

2.1 Product Perspective

The proposed system is a centralized, modular, and scalable cloud-based web application that integrates patient monitoring, healthcare management, secure data storage, reporting, and analytics. It runs as an independent system but is designed to support future integration with external healthcare services, laboratories, and wearable health devices.

2.2 Product Functions (High-Level)

- User authentication and role-based authorization
- Patient registration and health profile management
- Real-time health data monitoring
- Electronic health record management
- Appointment scheduling and management
- Medical report generation
- Notifications and alerts
- Audit logging and analytics.

2.3 User Classes and Characteristics

| User Class | Description |
|------------------|--|
| Patient | Individuals accessing their health records and monitoring data. |
| Doctor | Medical professionals checking patient health and reviewing reports. |
| Healthcare Staff | Support staff managing appointments and records. |
| System Admin | Technical authority with full system control |

2.4 Operating Environment

- Web browser-based access

- Client-server architecture
- Secure communication over HTTPS

2.5 Design and Implementation Constraints

- Compliance with healthcare data privacy regulations
- Enforcement of role-based access control
- Continuous internet connectivity requirement

2.6 Assumptions and Dependencies

- Users have valid credentials.
- Cloud services are still available.
- Health monitoring data is entered manually or via connected devices.

3. Specific Requirements

3.1 Functional Requirements

3.1.1 Authentication and Authorization

- **FR-1:** The system shall allow users to register using a unique identifier or email address.
- **FR-2:** The system shall authenticate users using secure credentials.
- **FR-3:** The system shall enforce role-based access control for all system features.

3.1.2 Patient Management

- **FR-4:** The system shall allow healthcare staff to add, update, and manage patient profiles.
- **FR-5:** The system shall allow patients to view their personal health records.

3.1.3 Health Monitoring

- **FR-6:** The system shall record patient health parameters such as heart rate, temperature, and blood pressure.
- **FR-7:** The system shall store monitoring data securely in the cloud.

3.1.4 Appointment Management

- **FR-8:** The system shall allow patients to request medical appointments.

- **FR-9:** The system shall allow doctors to approve or reschedule appointments.

3.1.5 Reporting and Records

- **FR-10:** The system shall generate medical reports for doctors and patients.
- **FR-11:** The system shall support an audit log of critical system activities.

3.2 Non-Functional Requirements

3.2.1 Security

- **NFR-1:** The system shall encrypt sensitive data before storage.
- **NFR-2:** The system shall ensure secure data transmission.

3.2.2 Performance

- **NFR-3:** The system shall respond to user requests within acceptable time limits.

3.2.3 Scalability

- **NFR-4:** The system shall support concurrent access by many users.

3.2.4 Reliability

- **NFR-5:** The system shall ensure high availability and data consistency.

3.2.5 Usability

- **NFR-6:** The system shall provide an intuitive and role-specific user interface.

3.3 External Interface Requirements

3.3.1 User Interfaces

- Web-based graphical user interface accessible through modern browsers

3.3.2 Software Interfaces

- Cloud storage services
- Notification services

4. System Models

4.1 Use Case Diagram

Primary Actors: Patient, Doctor, Healthcare Staff, System Admin
Major Use Cases include patient registration, health monitoring, appointment scheduling, report generation, and system administration.

4.2 Class Diagram

Key classes include User, Patient, Doctor, Health Record, Appointment, Report, and Audiology, defining system structure and relationships.

4.3 Sequence Diagram

Illustrates interactions such as patient health data entry, doctor review, and report generation.

4.4 Activity Diagram

Represents workflows such as health monitoring and appointment management.

4.5 Deployment Diagram

Includes client devices, cloud-based application server, database server, and external services.

5. Future Enhancements

- Mobile application support
- Wearable device integration
- AI-based health risk prediction

6. Conclusion

This SRS document provides a comprehensive specification of the Cloud-Based Smart Healthcare Monitoring and Management System. It serves as a foundation for system design, development, testing, and academic evaluation.