Software Requirements Specification

for

AD-HEALTH.COM

Version 1.0 approved

Prepared by

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AD

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Revision History

|  |  |  |  |
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# Introduction

## Purpose

This Software Requirements Specification (SRS) document outlines the requirements for developing our Healthcare Appointment Management System. The system aims to streamline appointment scheduling and management processes for healthcare facilities and patients. This document provides a detailed description of the system's functionalities, constraints, and quality attributes to guide the development team in building a robust and user-friendly application. The system described in this SRS is designated as Version 1.0, focusing on the core components required for efficient appointment scheduling, management, and communication within healthcare facilities. Additional releases may expand upon these initial functionalities.

## Document Conventions

1. **Font Styles:**

* Requirements: All requirements are presented in regular font.
* Acronyms: Acronyms and abbreviations are written in all capital letters.
* Priority Levels: Priority levels are denoted using the following codes:
* (L) Low priority
* (M) Medium priority
* (H) High priority

1. **Formatting Conventions:**

* Functional Requirement Statements: Each functional requirement statement is presented in a structured format, starting with a brief description of the feature/function, followed by the role, function performed, and business reason.
* User Stories: User stories are formatted with an ID, Role, Function Performed, and Business Reason sections for clarity and organization.

1. **Acronyms and Abbreviations:**

* SQL: Structured Query Language
* XSS: Cross-Site Scripting
* RESTful: Representational State Transfer
* SMS: Short Message Service
* SMTP: Simple Mail Transfer Protocol
* SSL/TLS: Secure Sockets Layer/Transport Layer Security
* URL: Uniform Resource Locator
* HTTPS: Hypertext Transfer Protocol Secure
* SOC 2: Service Organization Control 2
* ISO 27001: International Organization for Standardization 27001
* MFA: Multi-Factor Authentication
* PCI DSS: Payment Card Industry Data Security Standard
* HIPAA: Health Insurance Portability and Accountability Act
* RBAC: Role-Based Access Control
* SQL Injection: SQL Injection Attack
* CAN-SPAM: Controlling the Assault of Non-Solicited Pornography And Marketing Act
* WCAG: Web Content Accessibility Guidelines
* API: Application Programming Interface

1. **Priority Assumptions:**

* Priorities for higher-level requirements are assumed to be inherited by detailed requirements. If a higher-level requirement is marked as High priority, its associated detailed requirements inherit the same priority unless otherwise specified.

1. **Other Conventions:**

* All third-party integrations and interfaces are required to adhere to security standards such as SOC 2, ISO 27001, and HIPAA for data protection and privacy.
* Compliance with PCI DSS requirements is necessary for secure payment processing.
* Web accessibility standards (WCAG 2.1) are followed for ensuring accessibility support.

These conventions have been applied throughout the Software Requirements Specification (SRS) to maintain consistency, readability, and clarity in presenting the requirements and specifications for the AD Healthcare Appointment Management System.

## Intended Audience and Reading Suggestions

### Intended Audience:

This Software Requirements Specification (SRS) document is designed for various stakeholders involved in the development and implementation of the A healthcare appointment management system. The primary audience includes:

* **Developers**: To understand the detailed technical requirements and functionalities to be implemented.
* **Project** **Managers**: To oversee the project's progress, milestones, and alignment with business goals.
* **Designers**: To comprehend the user interface design requirements and overall system layout.
* **Testers**: To develop test cases based on specified requirements and ensure thorough testing.
* **Technical** **Writers**: To create user guides, manuals, and system documentation based on the outlined functionalities.

### Reading Suggestions:

This SRS is organized to provide a comprehensive understanding of the AD system, its functionalities, constraints, and interfaces. Readers are recommended to follow this suggested sequence for an effective review:

#### Developers and Project Managers:

* Start with the **Introduction (Section 1)** to understand the purpose and scope of the system.
* Proceed to **Overall Description (Section 2)** for an overview of the system's perspective, functions, user classes, and operating environment.
* Review **External Interface Requirements (Section 3)** to understand user interfaces, hardware, software, and communication interfaces.
* Dive into **System Features (Section 4)** for a detailed breakdown of the functional requirements.
* Explore **Other Nonfunctional Requirements (Section 5)** for performance, safety, security, and quality attributes.

#### Marketing Staff:

* Begin with the **Introduction (Section 1)** for an overview of the system's purpose and scope.
* Focus on **System Features (Section 4)** to understand the key functionalities and benefits of the system for promotional materials.
* Consider **User Stories (Section 7)** for real-world scenarios showcasing the system's value to users.

#### Users (Healthcare Providers and Patients):

* Refer to **User Stories (Section 7)** for relatable scenarios demonstrating how the system improves appointment management.
* Optionally, review **System Features (Section 4)** for a detailed breakdown of what the system offers.

#### Testers:

* Start with **System Features (Section 4)** to understand the detailed functionalities.
* Refer to **User Stories (Section 7)** for realistic scenarios to create test cases.
* Review **Other Nonfunctional Requirements (Section 5)** for performance, safety, security, and quality attributes to consider in testing.

#### Technical Writers:

* Use **Appendix A: Glossary** for a reference of key terms and definitions.
* Review **Appendix B: To Be Determined List** for any pending items that may impact documentation.

This reading sequence ensures that each stakeholder gains insights relevant to their role and responsibilities within the A project.

## Product Scope

The AD.COM Healthcare Appointment Management System aims to revolutionize the way healthcare facilities and patients interact and manage appointments. This software aims to streamline the entire appointment process, from scheduling to notifications and follow-ups, enhancing efficiency and improving patient satisfaction.

### Included Features in Version 1.0:

* User Registration and Authentication
* Patient Registration and Profiles
* Appointment Scheduling
* Reminder Notifications
* Doctor Availability Management
* **Benefits:**
* **Efficient Patient Onboarding**: Quick registration for patients expedites the appointment process.
* **Time Optimization**: Real-time availability saves time for both patients and staff.
* **Reduced No-Shows**: Automated reminders decrease no-show rates.
* **Optimized Schedules**: Providers can efficiently manage their availability and breaks.
* **Enhanced Patient Engagement**: Multiple communication channels and customizable notifications increase patient engagement.

### Exclusions / Future Release:

* Language and Accessibility Support
* Secure Messaging
* Multi-channel Communication
* Telemedicine Integration
* AI-Powered Appointment Optimization
* Mobile App for Patients and Providers
* Integration with Electronic Health Records (EHR)

For more detailed information, please refer to the full **Technical Scope Document for AD – Version 1.0** (March 12, 2024) [1].

## References

[1] D. Rozycki and A. Phan, “Technical Scope Document for AD - Version 1.0.” Blackboard, Mar. 12, 2024

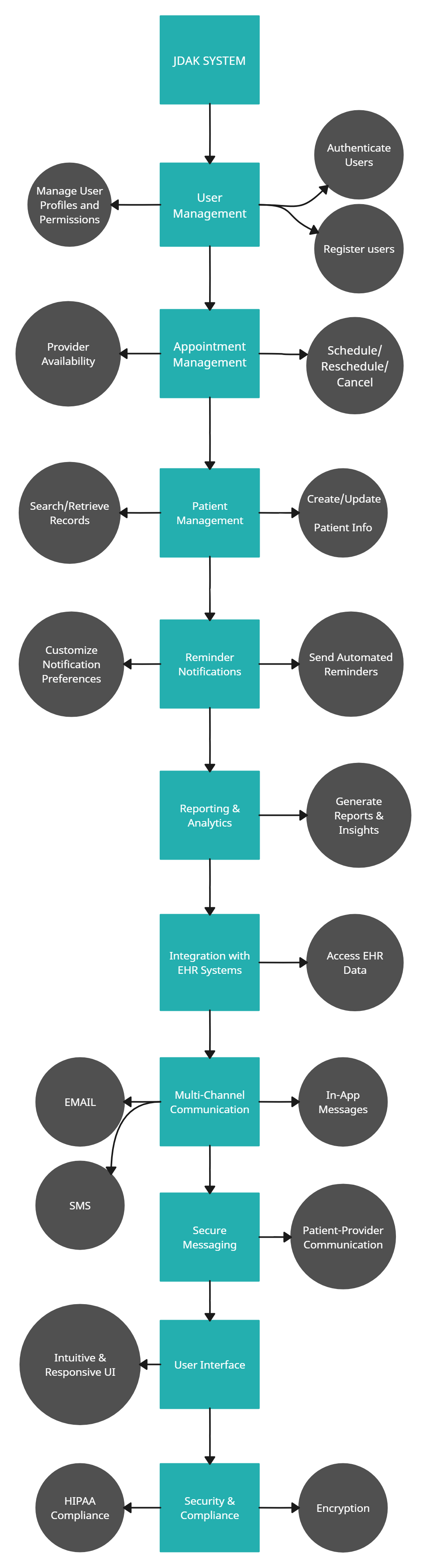
# Overall Description

## Product Perspective

The AD-HEALTH.COM Healthcare Appointment Management System is a new, self-contained product developed to address the ongoing challenges faced by the healthcare industry in managing appointment scheduling efficiently. Traditionally, healthcare facilities have relied on outdated methods such as phone calls and in-person appointments, resulting in inefficiencies and frustrated patients. Recognizing the need for improvement, the AD team has identified an opportunity to revolutionize appointment management through a comprehensive online platform.

## Product Functions

The AD-HEALTH.COM Healthcare Appointment Management System will enable users to perform the following major functions:



**User Management**

* + Register new healthcare providers, staff, and patients.
  + Authenticate users securely with role-based access control.
  + Manage user profiles and permissions.

**Appointment Management**

* + Schedule new appointments for patients.
  + View real-time availability of healthcare providers.
  + Reschedule or cancel appointments as needed.
  + Set and manage doctor availability and working hours.

**Patient Management**

* + Create and update patient profiles with medical history.
  + Search and retrieve patient records securely.
  + Maintain confidentiality and accuracy of patient data.

**Reminder Notifications**

* + Send automated reminders to patients via email or SMS.
  + Customize notification preferences for patients.
  + Reduce no-show rates and improve appointment attendance.

**Reporting and Analytics**

* + Generate reports on appointment metrics and patient demographics.
  + Analyze data to optimize resource allocation and scheduling.
  + Provide insights for improving operational efficiency.

**Integration with EHR Systems**

* + Seamlessly integrated with Electronic Health Record (EHR) systems.
  + Access patient data and history during scheduling.
  + Enhance continuity of care and data accuracy.

**Multi-channel Communication**

* + Communicate with patients via SMS, email, and in-app notifications.
  + Send important updates and instructions to patients.
  + Improve patient engagement and communication.

**Secure Messaging**

* + Enable secure messaging between patients and healthcare providers.
  + Maintain confidentiality and privacy of patient-provider communications.
  + Facilitate communication regarding appointments and medical inquiries.

**User Interface (UI)**

* + Provide an intuitive and user-friendly interface for healthcare providers and patients.
  + Ensure compatibility across various devices and screen sizes.
  + Enhance user experience with responsive design and usability testing.

**Security and Compliance**

* + Implement robust security measures to protect patient data.
  + Comply with industry standards such as HIPAA for data privacy.
  + Ensure encryption of sensitive information and secure transmission.

These functions collectively form the core capabilities of the AD-HEALTH.COM Healthcare Appointment Management System, enabling efficient and streamlined appointment scheduling, patient management, communication, and reporting for healthcare facilities and their patients.

## User Classes and Characteristics

The AD-HEALTH.COM Healthcare Appointment Management System serves several distinct user classes, each with unique characteristics and requirements crucial for tailored system functionality and user experience.

* + - 1. **Healthcare Providers:**
  + Core users who heavily rely on the system for appointment and patient information management.
  + Includes doctors, nurses, and specialists who use the system daily for scheduling, availability management, and accessing patient profiles and medical history.
  + Possess moderate to high technical expertise.
  + Require high-level security privileges due to access to sensitive patient data.
    - 1. **Administrative Staff:**
  + Support users responsible for ensuring smooth operations within healthcare facilities.
  + Tasks involve assisting in appointment scheduling, managing patient records, and handling appointment-related communications.
  + Possess basic to moderate technical expertise.
  + Have moderate-level security privileges.
  + Vital for maintaining efficient day-to-day system functioning.
    - 1. **Patients**:
  + Primary beneficiaries of the system, using it to manage healthcare appointments and stay informed.
  + Include individuals from diverse backgrounds with varying technical expertise levels.
  + Interactions with the system are occasional, focusing on scheduling, viewing upcoming appointments, and receiving reminders.
  + Low security privileges, mainly accessing personal appointment information.
    - 1. **System Administrators:**
  + Responsible for the overall health and maintenance of the system.
  + Tasks include managing user accounts, monitoring system performance and security, and performing backups and updates.
  + Possess high technical expertise.
  + Hold the highest security privileges within the system.

Among these user classes, the most critical for system success are Healthcare Providers, Patients, and Administrative Staff. Healthcare Providers rely on the system for care delivery, Patients need an intuitive interface for appointment management, and Administrative Staff ensure smooth system operation.

By focusing on the needs and usability of these key user classes, the system aims to achieve efficient appointment management, enhanced patient satisfaction, and streamlined healthcare operations. Special attention will be given to these user classes when defining system requirements and designing user interfaces.

## Operating Environment

The AD-HEALTH.COM Healthcare Appointment Management System is designed to operate in specific environments to ensure compatibility and optimal performance:

1. **Web Browsers**:

The system is optimized for a range of web browsing environments, including mobile browsers (iOS 12+, Android 7.0+), desktops, and laptops.

* Google Chrome: Optimized for Latest Version 122 and Previous Version 121.
* Safari: Optimized for Latest Version 17.4 and Previous Version 17.3.
* Firefox: Optimized for Latest Version 124 and Previous Version 123.
* Microsoft Edge: Optimized for Latest Version 124 and Previous version 123.

These specific browser versions have been targeted to provide users with a seamless experience and to ensure smooth functionality across different devices and platforms.

## Design and Implementation Constraints

1. **Regulatory Compliance**: The system must adhere to strict healthcare regulations such as HIPAA (Health Insurance Portability and Accountability Act) in terms of patient data privacy and security. This includes encryption standards for data transmission and storage.
2. **Hardware Limitations**:

* Timing Requirements: The system must meet specific response time requirements for critical operations such as appointment booking and cancellations.
* Memory Requirements: Due to the potentially large volume of patient data, the system must be optimized to handle memory efficiently, especially during data retrieval and processing.

1. **Interfaces to Other Applications**:

* EHR Integration: The system will need to seamlessly integrate with various Electronic Health Record (EHR) systems used by healthcare facilities. This requires adherence to specific data formats and APIs.
* Payment Gateway Integration: Integration with trusted payment gateways for secure payment processing will require adherence to specific protocols and APIs.

1. **Technologies, Tools, and Databases**:

* Development Tools: The development team must use specified tools such as Git for version control and GitHub for repository hosting, as outlined in the technical objectives.
* Database Management: Utilization of specific database management software as mentioned in the budget (e.g., Azure Database Subscription), which might have its own constraints and requirements.
* Operating System Compatibility: Ensuring compatibility with specified operating systems (iOS 12+, Android 7.0+, latest browsers) as per technical objectives.

1. **Security Considerations**:

* Two-Factor Authentication: Implementation of two-factor authentication (2FA) for user logins to enhance security.
* Secure Messaging: Future integration of secure messaging requires implementation of end-to-end encryption protocols.

1. **Design Conventions and Programming Standards**:

* Coding Standards: Adherence to specific coding standards and conventions to ensure maintainability and readability of the codebase.
* User Interface Guidelines: Design and implementation of the user interface must follow industry best practices and UX/UI standards to ensure consistency and ease of use.

1. **Corporate Policies**:

* Software Maintenance: If the customer's organization is responsible for maintaining the software post-deployment, the system must be designed with considerations for ease of maintenance and updates.
* Version Control: Ensuring compliance with the customer's version control policies, especially if they have specific branching strategies or workflows.

1. **Language Requirements**:

* Initially focused on English language support as mentioned in the limitations section.

These constraints will guide the development team in making design and implementation decisions, ensuring the system meets the specified requirements and standards set forth in the Technical Scope Document for AD Healthcare Appointment Management System.

## User Documentation

1. **User Manuals**:

* **Administrator Guide**: This manual will be delivered in PDF format, following industry-standard documentation practices. It will include screenshots, step-by-step instructions, and best practices for system configuration and maintenance.
* **Healthcare Provider Guide**: Similar to the Administrator Guide, this manual will also be in PDF format, providing detailed instructions on using the system from a healthcare provider's perspective. It will adhere to standard documentation practices for clarity and ease of use.
* **Staff Guide**: The Staff Guide will be delivered in both PDF and web-based formats. The PDF version will offer a printable reference, while the web-based version will provide interactive elements and quick access to relevant sections.
* **Patient Guide**: The Patient Guide will primarily be web-based, accessible from the patient portal within the application. It will follow responsive design standards for optimal viewing on various devices, such as smartphones, tablets, and desktop computers.

1. **On-boarding Tutorials**:

* **Video Tutorials**: These tutorials will be hosted on the system's website and accessible within the application. They will be in standard video formats (e.g., MP4) and integrated into the online help section for easy access.
* **Interactive Walkthroughs**: The interactive walkthroughs will be part of the web-based application, offering step-by-step guidance to users as they navigate through different features. These walkthroughs will use standard web technologies for interactivity.

1. **Online Help**:

* **Contextual Help**: In-application tooltips and pop-ups will follow industry standards for usability and accessibility. They will provide concise explanations and tips for users at the point of need.
* **FAQ Section**: The FAQ section will be part of the online help system, searchable and categorized for easy navigation. It will adhere to standard web design principles for effective information retrieval.
* **Searchable Knowledge Base**: The knowledge base will be hosted on the system's website and will follow standard web documentation practices. It will feature a search function, category tags, and regularly updated articles.

1. **Quick Start Guides**:

* **Quick Start Guide for Administrators**: This guide will be available in PDF format for easy downloading and printing. It will follow standard formatting conventions for quick reference.
* **Quick Start Guide for Healthcare Providers**: Similar to the Administrator Guide, this guide will also be in PDF format, providing a concise overview of essential tasks.
* **Quick Start Guide for Patients**: The Patient Guide will primarily be web-based, accessible from the patient portal within the application. It will follow responsive design standards for optimal viewing on various devices.

1. **Release Notes**:

* **Detailed Release Notes**: These will be delivered as PDF documents with each system update. They will follow standard formatting for software release notes, including version information, feature descriptions, bug fixes, and known issues.
* **Version History**: The Version History will be part of the system's online documentation, accessible from the application or website. It will follow standard web documentation practices for easy navigation and readability.

1. **Templates and Forms**:

* **Appointment Confirmation Template**: This template will be available for download in PDF format from the system's website. It will follow standard formatting for professional correspondence.
* **Patient Information Form**: The Patient Information Form will be available in both PDF and web-based formats. The PDF version can be printed and filled out manually, while the web-based version will allow for online submission.

1. **Formatting and Delivery Standards**:

* **PDF Format**: Manuals, guides, and templates will be delivered in PDF format for easy printing and offline reference.
* **Web-based**: Online documentation will be hosted on the system's website, following standard web design principles.
* **Multimedia Integration**: Videos, interactive elements, and forms will be seamlessly integrated into the web-based documentation for a rich user experience.

By adhering to these known user documentation delivery formats and standards, the AD-HEALTH.COM Healthcare Appointment Management System aims to provide users with clear, accessible, and comprehensive resources for effectively using the system.

## Assumptions and Dependencies

1. **Third-Party Integrations:**

* Assumption: The successful integration with popular Electronic Health Record (EHR) systems, assumed based on the availability of APIs and documentation from these third-party providers.
* Impact if Incorrect: If APIs or integration methods change without notification, it could delay or hinder the EHR integration feature, impacting the system's functionality.

1. **Cloud Service Provider Reliability:**

* Assumption: Dependence on cloud hosting services such as AWS and Azure for system deployment, assuming their continued reliability and uptime.
* Impact if Incorrect: Unplanned downtime or service interruptions from the cloud service providers could affect system availability and performance.

1. **Compatibility with Operating System Updates:**

* Assumption: The system's compatibility with iOS and Android operating systems is assumed to remain consistent with current versions (iOS 12+, Android 7.0+).
* Impact if Incorrect: If future updates to these operating systems introduce significant changes, the system may require updates to maintain compatibility, potentially affecting user experience and functionality.

1. **Data Security Compliance:**

* Assumption: Assumed compliance with existing data security regulations such as HIPAA, based on current best practices and encryption standards.
* Impact if Incorrect: Failure to maintain compliance with data security regulations could lead to legal and reputational risks for the healthcare facilities using the system.

1. **Software Development Tools and Libraries:**

* Assumption: Use of specified development tools and libraries (e.g., Git for version control, Azure Database Subscription) as outlined in the Technical Scope Document.
* Impact if Incorrect: If these tools are found to be inadequate or incompatible during development, it could lead to delays and rework in the implementation phase.

1. **Availability of Testing Environments:**

* Assumption: Availability of dedicated testing environments for thorough testing of system functionalities.
* Impact if Incorrect: Insufficient testing environments or limitations in testing resources could result in incomplete testing, leading to undetected bugs or issues in the live system.

1. **User Interface Design Assumptions:**

* Assumption: User interface design assumptions based on current UX/UI best practices and team expertise.
* Impact if Incorrect: If user interface assumptions do not align with user expectations or usability standards, it could lead to poor user adoption and satisfaction.

1. **Network Connectivity Assumptions:**

* Assumption: Assumed stable network connectivity for users accessing the system, whether through mobile devices or desktops.
* Impact if Incorrect: Unstable or slow network connections could affect system responsiveness and user experience, especially for remote users.

1. **Dependencies on External Services:**

* Assumption: Dependence on third-party services such as payment gateways and SMS/email providers for payment processing and notification delivery.
* Impact if Incorrect: Changes or disruptions in these external services could impact the system's ability to process payments or send notifications reliably.

1. **Hardware Compatibility:**

* Assumption: Compatibility with a wide range of devices and screen resolutions for smartphones, tablets, and desktops as specified in the Technical Scope Document.
* Impact if Incorrect: Incompatibility with certain devices or screen sizes could limit user accessibility and satisfaction.

These assumed factors and dependencies are crucial considerations for the successful development and deployment of the AD-HEALTH.COM Healthcare Appointment Management System. They highlight potential risks and areas where proactive monitoring and contingency planning may be necessary to mitigate any adverse impacts on the project.

# External Interface Requirements

## User Interfaces

### Interface Standards:

1. **Buttons:**

* All buttons will be rectangular with rounded corners.
* All buttons will have a white background with black text in Arial font.
* Hover effects will change the font color to blue.

1. **Fonts:**

* All fonts will be Arial for consistency and readability.

1. **Colors:**

* The color scheme will be predominantly blue and white for a clean and professional look.

1. **Screen Layout:**

* **MENU**: Navigation options and actions will be displayed in a menu at the top of the screen.
  + **LOGO**: Logo will be at the top left corner of the screen and function as a home button

A blue and white website layout

Description automatically generated

* **MAIN AREA**: This is where the primary content or user input fields will be displayed.
  + **USER LOGIN**: includes two text entry fields for username and password, a forgot username/password button, and a submit button.

A blue and white login screen

Description automatically generated

* **Patient landing page:**

A blue rectangular object with black text

Description automatically generated

* **Staff landing page:**

A blue screen with black text

Description automatically generated

* **ADMIN SECURE LOGIN**: A security key text input field with a single submit button.

A blue rectangular object with white text

Description automatically generated

* **NAVIGATION BAR**:
* At the bottom, a navigation bar will display relevant information like services, locations, contact information and directions.
* There will also be a button to book an appointment.

A blue and white rectangular object with a square in the middle

Description automatically generated

1. **Screen Resolutions:**

* The software will support dynamic screen resolutions.

1. **Accessibility and Compliance:**

* The user interface will adhere to Section 508 accessibility standards to ensure accessibility for users with disabilities.

### Hardware Interfaces:

For the AD-HEALTH.COM Healthcare Appointment Management System, there is no direct need for hardware interfaces. The system is designed as a software platform that operates primarily in a cloud-based environment and is accessed by users through various devices such as smartphones, tablets, and desktop computers.

As such, there are no specific hardware components within the system that require direct interfaces or interactions. Users will interact with the system through standard web browsers on their devices, and the system's functionality does not rely on any physical hardware components or specialized interfaces.

Therefore, the logical and physical characteristics of hardware interfaces are not applicable to this software product, as it operates independently of specific hardware components or devices. The system's architecture is focused on cloud hosting, web-based interfaces, and compatibility with various operating systems and devices, as outlined in the Technical Scope Document.

## Software Interfaces

Our Healthcare Appointment Management System relies on several software components and interfaces to ensure seamless operation and efficient management of data. These interfaces are integral to the functionality and performance of the system, facilitating communication with databases, web servers, and other essential components.

#### Database Interface

Database System: PostgreSQL (Latest version)

* **Purpose**: The system interfaces with the PostgreSQL database to store and manage critical data related to patient profiles, appointment schedules, provider availability, and operational analytics.
* **Data Items**: Patient information (e.g., name, contact details, medical history), appointment details (e.g., date, time, provider), provider schedules, operational metrics (e.g., appointment volume, no-show rates).
* **Services Needed**: CRUD (Create, Read, Update, Delete) operations to manage patient records, appointments, and analytics data.

#### Frontend Interface

Frontend Framework: React.js (Latest version), HTML (Latest version), JavaScript (Latest version)

* **Purpose**: The front-end interface interacts with users, presenting appointment scheduling options, patient registration forms, and facilitating user interactions.
* **Data Items**: User input from registration forms, appointment scheduling selections, preferences for reminder notifications.
* **Services Needed**: Rendering of dynamic content based on user interactions, handling form submissions, and making asynchronous requests to the backend for data retrieval and updates.

#### Backend Interface

Backend Framework: Django (Latest version), Node.js (Latest version), Express.js (Latest version)

* **Purpose**: The backend serves as the core of the system, handling business logic, authentication, and communication with the database.
* **Data Items**: User authentication credentials, appointment scheduling requests, doctor availability updates, reminder notifications.
* **Services Needed**: User authentication and authorization, business logic for appointment scheduling, handling requests from the frontend, and processing data transactions with the database.

#### Web Server Interface

Web Server: Apache (Latest version)

* **Purpose**: The web server hosts the application, handling incoming HTTP requests and serving responses to users.
* **Data Items**: HTTP requests for accessing the application, responses containing requested data or rendered web pages.
* **Services Needed**: Routing incoming HTTP requests to the appropriate backend services, managing sessions, and serving static and dynamic content to users.

#### External APIs and Services

Third-Party Services: SMS Notifications API, Email Service Provider API, Payment Processing API

* **Purpose**: The system interfaces with external APIs and services to provide additional functionalities such as appointment reminders, communication channels, and payment processing.
* **Data Items**: Patient contact information for SMS/email notifications, payment details for processing transactions.
* **Services Needed**: Sending automated reminder notifications, handling payment transactions securely, and integrating external services seamlessly into the system.

#### 6. Integration with Electronic Health Record (EHR) Systems

EHR System Interface: TBD

* **Purpose**: For the Standard tier subscription, integration with EHR systems allows seamless transfer of patient data, enhancing provider efficiency and accuracy in patient care.
* **Data Items**: Patient medical history, treatment plans, diagnostic test results.
* **Services Needed**: Secure and compliant data exchange between our system and EHR systems, ensuring real-time access to essential patient information for healthcare providers.

These interfaces collectively form the backbone of our Healthcare Appointment Management System, enabling efficient data processing, secure user interactions, and seamless integration with external services. The system's architecture is designed to ensure robustness, scalability, and adherence to industry standards for optimal performance and user satisfaction.

## Communications Interfaces

Our Healthcare Appointment Management System relies on various communication interfaces to facilitate external interactions and ensure seamless connectivity with external systems and services. These interfaces play a crucial role in enabling secure data exchange, real-time notifications, and integration with third-party platforms. Here are the key communications interfaces utilized by our system:

#### 1. Email Notifications

* Purpose: Improve patient engagement with timely reminders and updates for appointments, enhancing attendance rates and satisfaction.
* Requirement: The system sends automated email notifications to patients for appointment reminders, confirmations, and updates.
* Message Formatting: HTML-formatted emails containing personalized appointment details, links for rescheduling/cancellation, and contact information.
* Communication Standard: SMTP (Simple Mail Transfer Protocol) for sending emails.
* Security/Encryption: Emails are sent securely using TLS (Transport Layer Security) encryption to protect patient information.
* Data Transfer Rates: Emails are sent in real-time as scheduled appointments are created or updated in the system.

#### 2. SMS Notifications

* Purpose: Enhance appointment accessibility by delivering concise details directly to patients' mobile devices, reducing missed appointments and improving scheduling efficiency.
* Requirement: Automated SMS notifications are sent to patients for appointment reminders and updates.
* Message Formatting: Text messages containing concise appointment details, date, time, and provider information.
* Communication Standard: SMS Gateway API for sending text messages.
* Security/Encryption: Messages are transmitted securely through the SMS gateway provider's encryption protocols.
* Data Transfer Rates: Real-time delivery of SMS notifications triggered by scheduled appointments or updates.

#### 3. Payment Processing

* Purpose: Facilitate secure and seamless financial transactions for appointment payments, enhancing user experience and streamlining administrative processes.
* Requirement: The system interfaces with external payment processing services to handle transactional payments for appointments.
* Communication Standard: HTTPS (Hypertext Transfer Protocol Secure) for secure communication with payment gateway APIs.
* Security/Encryption: All payment data is encrypted during transmission and processing, following PCI DSS (Payment Card Industry Data Security Standard) compliance.
* Data Transfer Rates: Payment transactions occur in real-time, with immediate confirmation of successful payments.

**4. Integration with Electronic Health Record (EHR) Systems**

* Purpose: Enable comprehensive patient data management by integrating with EHR systems, providing up-to-date information during appointments for better care outcomes.
* Requirement: For the Standard tier subscription, the system integrates with external EHR systems to synchronize patient data and medical history.
* Communication Standard: HL7 (Health Level Seven) messaging standard for healthcare information exchange.
* Security/Encryption: Data exchanged between our system and EHR systems adheres to HIPAA (Health Insurance Portability and Accountability Act) regulations for patient data privacy.
* Data Transfer Rates: Synchronization occurs in near real-time, ensuring healthcare providers have up-to-date patient information during appointments.

#### 5. Web Browser Interface

* Purpose: Offer a user-friendly platform for scheduling and accessing medical information, ensuring a secure and efficient online experience for patients and administrators.
* Requirement: Users access the system through web browsers for both administrative and patient-facing functionalities.
* Communication Standard: HTTPS for secure web communication between client browsers and the application server.
* Security/Encryption: Web traffic is encrypted using SSL/TLS protocols to protect user data during transmission.
* Data Transfer Rates: Users interact with the system in real-time, with web pages dynamically updating based on user actions.

#### 6. External APIs and Services

* Purpose: Expand functionality and innovation by integrating external APIs, enriching the system with valuable data and services for improved user experience and insights.
* Requirement: The system interfaces with external APIs for additional functionalities such as geolocation services, appointment reviews, and healthcare provider searches.
* Communication Standard: RESTful API (Representational State Transfer) for communication with external services.
* Security/Encryption: APIs require authentication tokens and follow secure communication protocols (HTTPS) for data exchange.
* Data Transfer Rates: API calls occur in real-time as users interact with the system, fetching or updating data as needed.

These communications interfaces ensure seamless integration with external services, secure data exchange, and real-time notifications for both healthcare providers and patients. The system's architecture is designed to uphold industry standards for data security, privacy, and efficient communication, enhancing the overall user experience and operational efficiency.

# System Features

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Features/**  **Function** | **Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| FR#1 | Access Authentication | The system must support role-based access control, distinguishing between administrators, healthcare providers, and staff. | H |
| FR#2 | Access Authentication | The system must implement two-factor authentication for enhanced security during login. | H |
| FR#3 | Access Authentication | The system should allow patients to log in securely to view their profile. | H |
| FR#4 | Access Authentication | The system should allow healthcare providers to securely log in to view their profile. | H |
| FR#5 | Access Authentication | The system should allow staff members to log in securely log in to view their profile. | H |
| FR#6 | User Registration | The system will allow staff to create a secure account profile using the registration links provided. | H |
| FR#7 | User Registration | The system will allow healthcare providers to create a secure account profile using the registration links provided. | H |
| FR#8 | User Registration | The system will allow patients to create a secure account profile using the registration links provided. | H |
| FR#9 | User Registration | The system must include data validation checks during the registration process to ensure accuracy and completeness of patient information. | H |
| FR#10 | User Registration | The system should provide a unique patient identifier (e.g., patient ID) upon successful registration for easy identification in the system. | H |
| FR#11 | Profile Update | The system should allow patients to update their profile. | H |
| FR#12 | Profile Update | The system should allow healthcare providers to update their profile. | H |
| FR#13 | Profile Update | The system should allow staff to update their profile. | H |
| FR#14 | Profile Delete | The system should allow patients to delete their profile. | H |
| FR#15 | Profile Delete | The system should allow healthcare providers to delete their profile. | H |
| FR#16 | Profile Delete | The system should allow staff to delete their profile. | H |
| FR#17 | Patient Management | The system must allow healthcare facilities to search patient records securely. | H |
| FR#18 | Patient Management | The system must allow healthcare facilities to add patient records securely. | H |
| FR#19 | Patient Management | The system must allow healthcare facilities to update patient records securely. | H |
| FR#20 | Patient Management | The system must allow healthcare facilities to delete patient records securely. | H |
| FR#21 | Appointment Scheduling | The system should display real-time availability of healthcare providers based on their schedules and specialties. | H |
| FR#22 | Appointment Scheduling | The system must allow patients to select preferred times. | H |
| FR#23 | Appointment Scheduling | The system must allow patients to book appointments. | H |
| FR#24 | Appointment Scheduling | The system must send automated appointment reminders to patients via email or SMS based on their preferences. | H |
| FR#25 | Appointment  View | The system must allow patients to view appointments. | H |
| FR#26 | Appointment Update | The system should provide options for patients to update appointments. | H |
| FR#27 | Appointment Delete | The system should provide options for patients to cancel appointments. | H |
| FR#28 | Capture Appointment Outcomes | The system should allow the recording of patient diagnoses following appointments. This information is crucial for medical records and treatment history. | H |
| FR#29 | Capture Appointment Outcomes | The system should enable the recording of services provided during appointments, detailing the procedures or treatments administered to the patient. | H |
| FR#30 | Capture Appointment Outcomes | The system should capture and store the cost associated with each appointment, including services rendered, medications, and other expenses. This helps in billing and financial tracking. | H |
| FR#31 | Doctor Availability Management | Healthcare providers should be able to set their availability, working hours, and break times within the system. | H |
| FR#32 | Doctor Availability Management | The system must allow providers to block off time slots for personal breaks, vacations, or unavailability. | H |
| FR#33 | Reporting and Analytics | The system should provide healthcare facilities with reporting tools to track appointment metrics. | M |
| FR#34 | Reporting and Analytics | The system should provide healthcare facilities with reporting tools to track patient demographics. | M |
| FR#35 | Reporting and Analytics | The system should provide healthcare facilities with reporting tools to track no-show rates. | M |
| FR#36 | Reporting and Analytics | The system must generate reports on demand, allowing administrators to export data for further analysis. | M |
| FR#37 | Integration with EHR Systems | The system should seamlessly integrate with Electronic Health Record (EHR) systems to access patient data during appointments. | M |
| FR#38 | Integration with EHR Systems | The system must ensure secure and compliant data exchange between the appointment management system and EHR platforms. | H |
| FR#39 | Secure Payment Processing | The system should enable patients to securely make payments for services rendered. This feature should incorporate encryption and secure payment gateways to protect sensitive financial information. |  |
| FR#40 | Secure Payment Processing | The system should integrate with trusted payment gateways to allow patients to securely make payments for appointments. | H |
| FR#41 | Secure Payment Processing | The system must provide patients with detailed receipts and payment confirmations for transparency. | M |
| FR#42 | Multi-channel Communication | The system should support communication channels such as SMS, email, and in-app notifications for appointment updates and reminders. | M |
| FR#43 | Multi-channel Communication | Patients should have the option to receive notifications and updates on their preferred communication channel. | M |
| FR#44 | Language and Accessibility Support | The system must support the English language | M |
| FR#45 | Language and Accessibility Support | The system must comply with Web Content Accessibility Guidelines (WCAG) for accessibility standards. | H |
| FR#46 | Secure Messaging | The system should allow secure messaging between patients and healthcare providers regarding appointments. | M |
| FR#47 | Secure Messaging | The system should allow secure messaging between patients and healthcare providers regarding medical inquiries. | M |
| FR#48 | Secure Messaging | Messages exchanged within the system must be encrypted to ensure patient data confidentiality. | M |
| FR#49 | Secure Messaging | Patients should be able to view messages exchanged with their healthcare providers. | M |
| FR#50 | Secure Messaging | Patients should be able to compose and send messages securely to their healthcare providers. | M |
| FR#51 | Secure Messaging | Healthcare providers should be able to view messages exchanged with their patients. | M |
| FR#52 | Secure Messaging | Healthcare providers should be able to compose and send messages securely to their patients. | M |
| FR#53 | Secure Messaging | Administrators should be able to view messages exchanged with healthcare providers and staff. | M |
| FR#54 | Secure Messaging | Administrators should be able to compose and send messages securely to healthcare providers and staff. | M |
| FR#55 | Secure Messaging | Staff members should be able to view messages exchanged with administrators, healthcare providers, and other staff. | M |
| FR#56 | Secure Messaging | The system should allow staff to create messages between themselves and administrators/healthcare providers themselves. | M |
| FR#57 | Secure Messaging | Staff should be able to compose and send messages securely to administrators, healthcare providers, and staff members. | M |
| FR#58 | Message Searching | Patients should be able to search through their previous messages for specific content or keywords. | M |
| FR#59 | Message Searching | Administrators should be able to search through all messages within the system for specific content or keywords. | M |
| FR#60 | Message Searching | Staff members should be able to search their previous messages for specific content or keywords. | M |
| FR#61 | Message Searching | Healthcare providers should be able to search through their previous messages for specific content or keywords. | M |
| FR#62 | Message Deletion | Patients should be able to select any number of messages and delete them from their message history. | M |
| FR#63 | Message Deletion | Administrators should be able to select any number of messages and delete them from their message history. | M |
| FR#64 | Message Deletion | Staff members should be able to select any number of messages and delete them from their message history. | M |
| FR#65 | Message Deletion | Healthcare providers should have the ability to select any number of messages and delete them from their message history. | M |
| FR#66 | Message Export to Excel | Patients should be able to export any number of messages to an Excel file for their records. | M |
| FR#67 | Message Export to Excel | Administrators should have the ability to export any number of messages to an Excel file for auditing purposes. | M |
| FR#68 | Message Export to Excel | Staff members should be able to export any number of messages to an Excel file for record-keeping. | M |
| FR#69 | Message Export to Excel | Healthcare providers should have the ability to export any number of messages to an Excel file for their records. | M |
| FR#70 | Admin Account Management | Administrators should be able to delete patient accounts when necessary. | H |
| FR#71 | Admin Account Management | Administrators should have the ability to update patient account information such as contact details or medical history. | H |
| FR#72 | Admin Account Management | Administrators should be able to create new patient accounts within the system. | H |
| FR#73 | Admin Account Management | Administrators should be able to delete staff accounts when needed. | H |
| FR#74 | Admin Account Management | Administrators should be able to update staff account information such as job title or contact details. | H |
| FR#75 | Admin Account Management | Administrators should be able to create new staff accounts within the system. | H |

# Other Nonfunctional Requirements

## Performance Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| PR#1 | Performance | The system must be able to handle a concurrent load of at least 500 simultaneous users without significant degradation in performance. This includes simultaneous appointment booking, modification, and cancellation actions. | H |
| PR#2 | Performance | The system should provide response times of less than 3 seconds for critical operations such as appointment booking and patient record updates under normal load conditions. | H |
| PR#3 | Performance | During peak usage hours, the system must maintain an average response time of less than 5 seconds for all user interactions to ensure a seamless user experience. | H |
| PR#4 | Scalability | The system architecture should be designed to scale horizontally to accommodate an increase in users and appointment requests without service interruption. | H |
| PR#5 | Scalability | The system should be able to handle a 50% increase in user base and appointment volume within a year of deployment without requiring significant infrastructure changes. | H |
| PR#6 | Reliability | The system must have a minimum uptime of 99.9% to always ensure availability to healthcare providers and patients. | H |
| PR#7 | Reliability | In case of system failure, the system should have automatic failover mechanisms in place to switch to a backup server within 10 seconds to minimize downtime. | H |
| PR#8 | Data Integrity | All patient and appointment data entered into the system must be securely stored and maintained with a data loss rate of less than 0.01% per year. | H |
| PR#9 | Security | The system must enforce role-based access control (RBAC) to ensure that only authorized users have access to sensitive patient information. | H |
| PR#10 | Security | All data transmission between the system and external services (e.g., payment gateways, EHR systems) must be encrypted using industry-standard protocols (e.g., TLS 1.3) to prevent unauthorized access. | H |
| Pr#11 | Security | The system should undergo regular security audits and penetration testing every six months to identify and mitigate potential vulnerabilities. | H |

## Safety Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| SR#1 | Safety | The system must comply with HIPAA (Health Insurance Portability and Accountability Act) regulations to ensure the privacy and security of patient health information. This includes encryption of all patient data in transit and at rest, access controls, audit trails, and secure user authentication. | H |
| SR#2 | Safety | All financial transactions within the system must comply with PCI DSS (Payment Card Industry Data Security Standard) standards to protect patient payment information. This includes secure payment gateways, encryption of payment data, and adherence to PCI DSS requirements. | H |
| SR#3 | Safety | The system should provide an option for patients to report any safety concerns or errors encountered during the appointment booking or management process. These reports should be handled confidentially and investigated promptly to prevent potential harm to patients or system misuse. | M |
| SR#4 | Safety | In the event of a system malfunction or outage, the system must display a clear error message to users, guiding them on appropriate actions to take (e.g., contact system administrator, use alternative scheduling methods). This ensures that users are informed and can mitigate potential risks. | H |
| SR#5 | Safety | The system should have automated backup and recovery mechanisms in place to prevent data loss in case of unexpected events such as server failures, power outages, or natural disasters. Regular backups should be performed, and data integrity checks should be conducted. | H |
| SR#6 | Safety | Healthcare providers must undergo training on the proper use of the system to prevent errors that could lead to patient harm or data breaches. Training materials and resources should be easily accessible within the system. | H |
| SR#7 | Safety | The system should have a feature to flag potential scheduling conflicts or errors, such as overlapping appointments, double bookings, or incorrect patient information. This helps prevent errors that could impact patient care and safety. | H |
| SR#8 | Safety | All user interactions with the system, including appointment scheduling, modification, and cancellation, should require confirmation to prevent accidental actions that could lead to patient confusion or missed appointments. | H |

## Security Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| SC#1 | Security | The system must implement role-based access control (RBAC) to ensure that only authorized users can access specific features and data within the system. Different roles such as administrators, healthcare providers, and patients should have predefined permissions based on their responsibilities. | H |
| SC#2 | Security | User authentication must follow industry best practices, including strong password requirements (e.g., minimum length, complexity), password encryption, and password expiration policies. This helps prevent unauthorized access to user accounts. | H |
| SC#3 | Security | The system must encrypt sensitive data, such as patient health records, payment information, and user credentials, both in transit and at rest. This includes using secure protocols (e.g., HTTPS) for data transmission and encryption algorithms for data storage. | H |
| SC#4 | Security | Access to the system should be protected with multi-factor authentication (MFA) for added security. Users, especially healthcare providers and administrators, should be required to verify their identity using at least two factors (e.g., password + SMS code, fingerprint + PIN). | H |
| SC#5 | Security | The system should have a robust logging and auditing mechanism to track user activities, system changes, and access attempts. Detailed logs should be maintained for security monitoring, incident investigation, and compliance purposes. | H |
| SC#6 | Security | Inactive user sessions should be automatically logged out after a specified period of inactivity to prevent unauthorized access in case a user forgets to log out. This reduces the risk of unauthorized access to shared devices. | M |
| SC#7 | Security | All third-party integrations, such as EHR systems and payment gateways, must undergo rigorous security assessments and adhere to industry security standards (e.g., SOC 2, ISO 27001). Data exchanged with these integrations should be encrypted and securely transmitted. | H |
| SC#8 | Security | The system should have mechanisms in place to detect and prevent common web application vulnerabilities, such as cross-site scripting (XSS), SQL injection, and session hijacking. Regular security scans and penetration testing should be conducted. | H |
| SC#9 | Security | Healthcare providers should be able to view audit logs of patient data access within the system. This provides transparency and accountability for patient data handling. | M |
| SC#10 | Security | The system must have a process for securely disposing of data that is no longer needed, following data retention policies and regulations. This includes patient records, appointment histories, and user accounts. | H |

## Software Quality Attributes

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| SQ#1 | Usability | The system's UI must be intuitive and user-friendly for healthcare providers and patients. | H |
| SQ#2 | Reliability | The system should aim for 99.9% uptime to ensure continuous availability. | H |
| SQ#3 | Performance | Response times for critical operations should be under 2 seconds on average. | H |
| SQ#4 | Maintainability | The system's codebase must follow coding standards and best practices for easy maintenance. | M |
| SQ#5 | Scalability | The system should scale to accommodate an increasing number of users and data volume. | H |
| SQ#6 | Interoperability | The system must integrate seamlessly with third-party systems such as EHR systems and payment gateways. | H |
| SQ#7 | Security | The system must uphold high standards of security to protect patient data and system integrity. | H |
| SQ#8 | Testability | The system's components and features should be designed with testability in mind. | M |

### Technical Requirements Statements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| TR#1 | Infrastructure/Connectivity | The system must have reliable internet connectivity to ensure real-time access for users. | H |
| TR#2 | Infrastructure/Connectivity | Cloud infrastructure must be utilized for scalability and accessibility. | H |
| TR#3 | Hardware | The system should be compatible with standard hardware configurations, including desktops, laptops, tablets, and smartphones. | H |
| TR#4 | Usability | User interfaces should support various screen sizes and resolutions. | H |
| TR#5 | Usability | The system must be accessible on major web browsers, including Google Chrome, Safari, Firefox, and Microsoft Edge. | H |
| TR#6 | Usability | The system should be optimized for Google Chrome, with full functionality and compatibility ensured for the latest version 122 and the previous version 121. | H |
| TR#7 | Usability | The system must be accessible on Google Chrome with a minimum version of 121. | H |
| TR#8 | Usability | The system should be optimized for Safari, with full functionality and compatibility ensured for the latest version 17.4 and the previous version 17.3. | H |
| TR#9 | Usability | The system must be accessible on Safari with a minimum version of 17.3. | H |
| TR#10 | Usability | The system should be optimized for Firefox, with full functionality and compatibility ensured for the latest version 124 and the previous version 123. | H |
| TR#11 | Usability | The system must be accessible on Firefox with a minimum version of 123. | H |
| TR#12 | Usability | The system should be optimized for Microsoft Edge, with full functionality and compatibility ensured for the latest version 124 and the previous version 123. | H |
| TR#13 | Usability | The system must be accessible on Microsoft Edge with a minimum version of 123. | H |
| TR#14 | Usability | The system should be optimized for Android devices, with full functionality and compatibility ensured for the latest version of the Android operating system. | H |
| TR#15 | Usability | The system must be accessible on Android devices with a minimum version of Android X.X-1 (one version back from the latest). | H |
| TR#16 | Usability | The system should be optimized for iOS devices, with full functionality and compatibility ensured for the latest version of the iOS operating system. | H |
| TR#17 | Usability | The system must be accessible on iOS devices with a minimum version of iOS X.X-1 (one version back from the latest). | H |
| TR#18 | Technology | Mobile responsiveness is required for a seamless user experience across devices. | H |

### System Requirements Statements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| SR#1 | Data Retention | The system must retain patient appointment data for a minimum of 7 years in compliance with regulatory requirements. | H |
| SR#2 | Backup & Recovery | Regular automated backups of the system data must be performed daily, with off-site storage for disaster recovery purposes. | H |
| SR#3 | System Audit / Logging | All user interactions with the system must be logged for auditing purposes, including login attempts, changes, and access. | H |
| SR#4 | Service Level Agreements | The system must maintain an uptime of 99.9% to ensure continuous availability for healthcare providers and patients. | H |
| SR#5 | Disaster Recovery | A comprehensive disaster recovery plan must be in place, outlining steps for data recovery and system restoration. | H |
| SR#6 | Contingency Plans | Contingency plans must be established for potential system failures or disruptions, detailing steps for immediate action. | H |
|  |  |  |  |

# Other Requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **Req #** | **Technical**  **Category** | **Non-Functional Requirement Statement** | **Priority**  **(L, M, H)** |
| OR#1 | Database | The system shall use a relational database management system (RDBMS) to store and manage customer and appointment data. | H |
| OR#2 | Database | The database must support efficient retrieval and storage of customer information, including search capabilities by name and address. | H |
| OR#3 | Database | Data in the database must be encrypted to ensure data security and compliance with privacy regulations. | H |
| OR#4 | Internationalization | The system's user interface must support multiple languages, including English and Spanish, to accommodate users from diverse backgrounds. | H |
| OR#5 | Internationalization | Date and time formats must be customizable based on the user's location or preferences, supporting international date formats (e.g., DD/MM/YYYY, MM/DD/YYYY). | H |
| OR#6 | Legal | The system must comply with HIPAA regulations to ensure the security and privacy of patient health information. | H |
| OR#7 | Legal | Any email communications sent by the system must include an option for recipients to unsubscribe to comply with CAN-SPAM regulations. | H |
| OR#8 | Reuse Objectives | The system's codebase should be designed with modularity and reusability in mind to facilitate future enhancements and extensions. | H |
| OR#9 | Reuse Objectives | Reusable components or libraries should be documented and made accessible for potential integration with other systems in the future. | H |
| OR#10 | Accessibility | The system must adhere to WCAG 2.1 standards for accessibility, ensuring that users with disabilities can access and use the system. | H |
| OR#11 | Accessibility | All user interface elements must be navigable using keyboard shortcuts for users who cannot use a mouse. | H |
| OR#12 | Documentation | A comprehensive user manual must be provided to guide healthcare providers and staff on how to use the system's features and functionalities. | H |
| OR#13 | Documentation | Technical documentation, including system architecture and API documentation, should be maintained for future reference and development. | H |
| OR#14 | Performance | The system should be able to handle at least 1000 simultaneous user sessions without significant degradation in performance. | H |
| OR#15 | Performance | The response time for user interactions, such as creating or modifying appointments, should be less than 2 seconds on average. | H |
| OR#16 | Error Handling & Reporting | The system must provide meaningful error messages to users in case of invalid inputs or system failures. | H |
| OR#17 | Error Handling & Reporting | Errors and exceptions should be logged in to the system for administrators to review and troubleshoot issues. | H |
| OR#18 | Training and Support | A training program should be developed to onboard healthcare providers and staff on how to effectively use the system. | H |
| OR#19 | Training and Support | Ongoing technical support must be provided to address any system-related queries or issues encountered by users. | H |

# User Stories

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **USER STORY ID** |  | **ROLE** |  | **FUNCTION PERFORMED** |  | **BUSINESS REASON** |
| US#1 | As a | Front Desk Staff | I need the system to | allow me to create a new customer profile with their name, address, and contact information. | so that I may | keep a centralized database of customer information for efficient appointment scheduling and communication. |
| US#2 | As a | Front Desk Staff | I need the system to | provide a search functionality to quickly retrieve customer profiles based on their name or phone number. | so that I may | save time and effort when locating customer information for appointment scheduling or updating details. |
| US#3 | As a | Front Desk Staff | I need the system to | allow me to schedule a new appointment for a customer, specifying the date, time, and service. | so that I may | organize customer appointments and ensure proper allocation of resources. |
| US#4 | As a | Front Desk Staff | I need the system to | send automated appointment reminders to customers via email or SMS a day before their scheduled appointment. | so that I may | reduce no-shows and ensure that our appointments are efficiently utilized. |
| US#5 | As a | Front Desk Staff | I need the system to | provide a calendar view of all upcoming appointments, color-coded by service type, for easy reference. | so that I may | assist in managing the daily schedule and avoiding conflicts. |
| US#6 | As a | Healthcare Provider | I need the system to | display the medical history and notes of a customer when viewing their profile. | so that I may | Provide valuable context and enable personalized care based on a customer's medical background. |
| US#7 | As a | Healthcare Provider | I need the system to | allow me to update a customer's medical notes and treatment plans directly from their profile. | so that I may | ensure that customer records are always up to date with the latest information and treatment plans. |
| US#8 | As a | Healthcare Provider | I need the system to | flag any allergies or medical conditions prominently in a customer's profile for quick reference. | so that I may | ensure patient safety and avoid any adverse reactions during treatments. |
| US#9 | As a | Administrator | I need the system to | provide detailed reports on the number of appointments booked, canceled, and completed within a specified timeframe. | so that I may | assist in analyzing clinic performance, identifying trends, and making informed decisions for improvements. |
| US#10 | As a | Administrator | I need the system to | allow me to add or remove front desk staff accounts and assign specific access permissions. | so that I may | ensure proper management of user accounts and security by granting appropriate access levels. |
| US#11 | As a | Administrator | I need the system to | automatically back up the database daily to prevent data loss and ensure system reliability. | so that I may | Ensure data security and quick recovery in case of system failures or errors. |
| US#12 | As a | Customer | I need the system to | allow me to easily reschedule or cancel my appointment online without having to call the clinic. | so that I may | Manage my appointments effectively and efficiently. |
| US#13 | As a | Customer | I need the system to | Send me a confirmation email or SMS immediately after booking a new appointment. | so that I may | Have proof of confirmation of my appointment. |

# Appendix A: Glossary

**API**: Application Programming Interface. A set of rules and protocols that allows different software applications to communicate with each other.

**CAN-SPAM regulations**: Controlling the Assault of Non-Solicited Pornography And Marketing regulations. A law that sets the rules for commercial email, establishes requirements for commercial messages, and gives recipients the right to have you stop emailing them.

**HIPAA**: Health Insurance Portability and Accountability Act. A US law that provides data privacy and security provisions for safeguarding medical information.

**HTTPS**: Hypertext Transfer Protocol Secure. An extension of HTTP used for secure communication over a computer network.

**ISO 27001**: An international standard for managing information security.

**MFA**: Multi-Factor Authentication. A security process that requires more than one method of authentication from independent categories of credentials to verify the user's identity for a login or other transaction.

**PCI DSS requirements**: Payment Card Industry Data Security Standard requirements. A set of security standards designed to ensure that all companies that accept, process, store, or transmit credit card information maintain a secure environment.

**RBAC**: Role-Based Access Control. A method of restricting network access based on the roles of individual users within an enterprise.

**RESTful**: Representational State Transfer. An architectural style for designing networked applications.

**SMS**: Short Message Service. A text messaging service component of phone, web, or mobile communication systems.

**SMS gateway**: A device or service that allows sending or receiving Short Message Service (SMS) transmissions to or from a telecommunications network.

**SMTP**: Simple Mail Transfer Protocol. A protocol used for sending email messages between servers.

**SOC 2**: System and Organization Controls 2. A report on controls at a service organization relevant to security, availability, processing integrity, confidentiality, and privacy.

**SQL**: Structured Query Language. A domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS).

**SQL Injection**: A code injection technique that exploits a security vulnerability in an application's software. It occurs when malicious SQL statements are inserted into an entry field for execution.

**SSL/TLS**: Secure Sockets Layer/Transport Layer Security. Protocols that provide secure communications over a computer network.

**URL**: Uniform Resource Locator. A web address is used to specify addresses on the World Wide Web.

**WCAG 2.1 standards**: Web Content Accessibility Guidelines 2.1. A set of guidelines to make web content more accessible to people with disabilities.

**XSS**: Cross-Site Scripting. A type of security vulnerability found in web applications.

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# Appendix B: To Be Determined List

1. EHR System Interface: TBD
2. Version control
3. System security standards