

Medsphere

System Requirements Document (SRD)

Version 1 – March 08, 2024

Group 6

Adonia Sequeira

Ganesh Kumar Rajasekar

System Requirements

[Medsphere]

VERSION: [1] REVISION DATE: [08 Mar 2024]

Approval of the System Requirements indicates an understanding of the purpose and content described in this deliverable. By signing this deliverable, each individual agrees with the content contained in this deliverable.

Approver Name	Title	Signature	Date

Contents

Section 1 Purpose.....	4
Section 2 General System Requirements.....	4
2.1 Major System Capabilities.....	4
2.2 Major System Conditions.....	5
2.3 System User Characteristics.....	5
2.4 System Functionality.....	5
2.5 System Integration.....	5
2.6 Data Components.....	5
2.7 System User Interface Requirements.....	5
2.8 System Reporting Requirements.....	5
Section 3 Security & Privacy Requirements.....	5
Section 4 Support Requirements.....	5
Section 4 Training Requirements.....	5
Section 5 References.....	5
Section 6 Glossary.....	6

Section 1 Purpose

The purpose of the System Requirements Document is to specify the overall system requirements that will govern the development and implementation of the system. The document will also establish initial function, infrastructure, reporting, security, training and support requirements and system acceptance criteria agreed upon by the project sponsor and key stakeholders.

1.01 Title of System

Medsphere: Integrated Healthcare Appointment Hub

1.02 System/Project Scope

The purpose of this software solution is to improve access and convenience in healthcare appointment scheduling while minimizing administrative complexity. It overcomes the limits of existing alternatives with innovative features.

Virtual waiting rooms, multilingual help and video recordings are provided to ensure that the user has a flawless experience. In this approach, the application reduces paperwork and creates a simple process. It caters to audiences in a variety of languages and provides video recordings so that consumers can rewatch the video if they missed any crucial details. Furthermore, patients are not required to pay a no-show fee because the virtual waiting room function eliminates the need to do so.

1.03 Project Importance

This solution is significant because it can improve patient experiences and outcomes by streamlining scheduling, increasing access through multilingual support and allowing for more meaningful telehealth encounters with recording/transcripts.

By combining the previously mentioned characteristics, we may increase customer support while also streamlining visits and connectivity throughout the healthcare system. Providing a personalized dashboard allows the user to be happy with the system's functionality. Virtual waiting rooms could enable clients to get later appointments, which would be advantageous in terms of customer satisfaction. Multilingual support and virtual waiting rooms let healthcare providers and patients communicate clearly, building trust and understanding. Through enhanced coordination, the solution has the potential to minimize the time between suggestions, diagnosis, and treatment.

1.04 Background

This approach will help both patients and healthcare practitioners. Patients have easier access to appointments, shorter in-office wait times and improved communication with doctors.

Virtual technologies enable providers to improve the organization, eliminate no-shows and serve more patients.

1.05 Critical Success Factors

1. User-Centric Design Outcome: The system must be simple to use for both patients and professionals. Simplifying interfaces, improving workflows and incorporating patient/provider feedback throughout the design are important.

Factors:

- Conducting user research using surveys, interviews, etc.
- Create personas and user journey maps.
- Use an agile method to design based on the user's feedback

Conditions:

- Budget allocated to carry out user studies.
- Commitment from stakeholders to consider user feedback.
- Organizational culture that values user experience

Tools:

- Wireframing & Prototyping tools like Figma, Adobe XD, etc.
- Analytics tools like Google Analytics

Skills:

- User research skills like surveying, interviewing, etc.
- Interaction and visual design skills
- Analytics skills to interpret usage data

2. Flexible integration capabilities: The scheduling solution must easily interface with a variety of workflows and healthcare IT platforms.

Factors:

- Utilizing modular components and open standards in architecture.
- Providing comprehensive documentation and samples.

Conditions:

Developed guidelines and standards for integration with the API management platform and specialized integration engineering team

Tools:

- API documentation tools like Swagger, Stoplight
- API testing tools like Postman, SoapUI

Skills:

- Infrastructure management skills
- API design and development skills
- Healthcare systems integration experience

3. Scalability: The system architecture must be extremely scalable to accommodate massive numbers of appointment scheduling transactions. This requires cloud-native architecture, load balancing and database capacity planning. Scalability guarantees performance reliability.

Factors:

- Architecting for horizontal scaling and elasticity
- Caching and optimization for performance
- Load testing and capacity planning

Conditions:

- Cloud-native or containerized architecture
- Infrastructure automation and orchestration
- Monitoring and alerting on key metrics

Tools

- Cloud platforms like AWS, Azure, GCP
- Container platforms like Kubernetes
- Load testing tools like JMeter, Locust

Skills:

- Cloud architecture and provisioning skills
- Optimization and performance tuning skills
- Capacity planning and modeling skills

1.06 Key Performance Indicators (KPIs)

Overall Patient Satisfaction

Directly measures patients' experience in using the platform to schedule appointments. Higher satisfaction rate suggests that the software is providing benefit and value to users.

Patient Wait Time

Quantifies the time between scheduling an appointment on the platform and the actual doctor visit. Reduced wait times indicate patients are able to access healthcare services more quickly/efficiently.

1.07 Planned Milestones for the Software Solution

Initiation Phase: The initiation phase will focus on getting the project started and building the groundwork for future development. Key milestones will include project team onboarding, requirement collection through stakeholder interviews and use case analysis.

Build phase: The build phase will include the fundamental development of the scheduling app. The milestones will include:

- Developing the appointment scheduling engine and backend components for the provider management and availability.
- Developing patient and provider web/mobile interfaces for scheduling, rescheduling and other workflows.
- Provisioning the cloud infrastructure and environments required to run the solution.

Test Phase: Testing milestones will focus on quality assurance.

- Unit and integration testing of individual components.
- End-to-end system testing and staging deployments are used to validate the entire stack.

Implementation Phase: The implementation phase will make the system live for real-world usage:

- Deployment and integration with production and live data sources.
- Supporting user acceptance testing with the targeted end users.
- Create training programs and user guides.

Post Implementation:

- Monitoring usage and optimizing performance based on real-world data.
- Planning new features and capabilities for future releases.

1.08 Planned Milestones for the Class Project

Initiation Phase

Through exhaustive requirements gathering sessions with all stakeholder groups, including providers, patients and clinic administrators, we will capture every nuance of the complex scheduling workflows and use cases. These inputs will coalesce into comprehensive requirements that serve as the foundation for development.

Development Phase

We will architect the scheduling software utilizing state-of-the-art technologies to create a solution finely tuned for performance, scalability and flawless integration capabilities. We will

employ agile techniques to frequently demo new features and gather ongoing user feedback to continuously refine the experience.

Testing Phase

With systematic rigor and thoroughness, we will put the integrated solution through its paces. Our testing efforts will simulate real-world conditions to ensure the system exceeds expectations before going live.

Deployment Phase

With smooth coordination, we will skillfully migrate the polished scheduling solution to production environments and integrate it with the electronic health records system.

1.09 Description of the System

The healthcare appointment scheduling system is a powerful web and mobile platform that streamlines and optimizes the booking process for patients and providers. Patients may easily search for doctors based on their specialty, insurance and availability and then schedule, reschedule, or cancel appointments online. Multilingual support in Spanish, Chinese, and other languages guarantees access for all patients.

The system centralizes provider schedules across all sites, providing real-time visibility into open slots. Providers can use availability rules and preferences to automatically populate their calendars. Patients are placed in virtual waiting rooms with two-way chat prior to their virtual or in-person encounter. Virtual visits record video consultations with recording and automated transcripts.

Customizable dashboards provide providers and managers with data-driven insights. Flexible APIs enable interaction with clinic electronic health record systems and payment platforms, resulting in a more simplified patient experience.

HIPAA-compliant security and access restrictions ensure patient data protection. Notifications and reminders sent via SMS, email, call and push notifications help to reduce patient no-show. Intuitive interfaces and workflows meet specific clinic needs and improve coordination.

Overall, the feature-rich scheduling system seeks to improve patient happiness and retention while increasing physician productivity through optimal schedule density and optimized booking.

1.10 Competing Systems

Two major competing systems in the patient appointment scheduling app space are:

Zocdoc:

Zocdoc is one of the most popular services for scheduling medical appointments online. It has a large network of providers throughout the United States and covers a wide range of specialties. Patients can easily select providers based on their preferences, insurance coverage and geographic location. The Zocdoc interface allows users to monitor real-time availability and schedule appointments online at any time of day. It is capable of effectively integrating telehealth services. Nonetheless, Zocdoc is more concerned with helping patients find new providers than with scheduling pre-existing physician-patient appointments at a specific healthcare facility. The platform's user-friendly layout and advanced search filters make it simple for patients to discover new healthcare options and schedule appointments with providers they have not met before. While Zocdoc allows customers to schedule appointments with their current providers, its primary goal is to link them with a varied network of doctors, specialists, and healthcare facilities that they may not have considered before.

SolutionReach:

Appointment scheduling is a key feature of SolutionReach's comprehensive patient relationship management solution. Patients can make direct bookings through a practice's website or Facebook page using the scheduling tool. With SolutionReach's comprehensive calendar management capabilities, practices may manage their schedules and change the types and duration of appointments. Furthermore, the software provides email and text reminders to reduce the amount of no-shows. While SolutionReach is an effective tool for office workflow, patients may not have the same seamless experience with it as they would with other specialized scheduling applications. The patient experience could be improved and virtual visits could be integrated more effectively. However, SolutionReach's holistic approach to patient relationship management, which includes appointment scheduling, calendar management and appointment reminders, makes it an attractive option for healthcare offices looking to streamline operations and increase patient engagement.

1.11 System Differentiation

- Multilingual Support
- Video Recordings with Transcripts
- Personalized Dashboard

Section 2 General System Requirements

2.1 Major System Capabilities

1. The system shall be accessible via the Internet.
2. The system shall be available 24/7 with minimum 99.9% uptime.
3. The system shall be accessible via web and native iOS and Android mobile apps.
4. The system shall support up to 10,000 concurrent users.
5. The system shall have page load times under 5 seconds.
6. The system shall have encryption in transit and at rest for all patient data.
7. The system shall be able to register and login by doctors and clinics.
8. The system shall integrate with one or more telehealth platforms for video visits.
9. The system shall provide role-based admin access for clinic staff to manage schedules.

2.2 Major System Conditions

1. The system shall use a modern web application architecture with discrete front-end, back-end, and database layers.
2. The system's back-end shall be built with a server-side language such as Node.js, Python/Django or Ruby.
3. The system shall utilize a cloud-based hosting environment like AWS, Google Cloud or Microsoft Azure for scalability and reliability.
4. The system database shall be managed by a relational database service, such as Amazon RDS, Cloud SQL or Azure SQL Database.
5. The system's front-end shall be built with React, Angular or Vue.js frameworks.
6. The system shall implement secure communication using HTTPS and web socket protocols.
7. The system shall interact with third-party telehealth/videoconferencing APIs to enable virtual visit capabilities.
8. The system shall be created with a microservices-based architecture that allows components to scale independently

2.3 System User Characteristics

1. The system shall allow patients to filter doctors based on geography, specialty, insurance acceptance, etc.
2. The system shall allow patients to access the web browser or mobile apps (iOS/Android) from any location to search for doctors, view availability and book appointments.
3. The system shall enable doctors/providers to access the system via web or mobile apps to manage their schedules, set availability, view/confirm booked appointments.
4. The system shall permit patients to filter and search for doctors based on parameters like location, specialty, insurance accepted, ratings, etc.
5. The system shall integrate video conferencing capabilities for patients and doctors to conduct virtual visits.
6. The system shall allow clinic administrative staff to access via web to oversee doctor profiles, locations, appointment types/durations.
7. The system shall send automated reminders to patients for upcoming appointments via email/text/push notifications.

8. The system shall enable patients to reschedule or cancel existing appointments through the mobile app or website.

2.4 System Functionality

1. The system shall allow patients to search for and view available doctors based on specialty, location, insurance accepted, and other filters.
2. The system shall display the real-time calendar availability of selected doctors and allow patients to book appointments in available time slots.
3. The system shall support booking both virtual (video) appointments as well as in-person visits.
4. The system shall provide functionality for patients to reschedule or cancel scheduled appointments.
5. The system shall send automated reminders to patients via email/text for upcoming appointments.
6. The system shall have a provider portal allowing doctors to manage their schedules, block off time, and view/approve appointment requests.
7. The system shall enable healthcare staff to configure doctor schedules, appointment types/durations, and manage clinic operational calendars.
8. The system shall generate reports on appointment statistics, no-show rates, and other utilization metrics.

2.5 System Integration

1. The system shall support single sign-on (SSO) authentication for users and healthcare providers.
2. The system shall integrate with popular calendar applications (e.g., Google Calendar, Outlook) for seamless appointment synchronization.
3. The system shall interface with payment gateways to facilitate online appointment booking and payment processing.
4. The system shall integrate with video conferencing platforms for virtual appointments.
5. The system shall support bi-directional data synchronization with healthcare provider databases.
6. The system shall integrate with translation services for multilingual support.
7. The system shall provide secure file transfer capabilities for sharing medical records and documents.
8. The system shall integrate with messaging platforms for appointment reminders and notifications.

2.6 Data Components

1. The system shall include a patient table containing fields for patient demographic information such as name, date of birth, gender and contact details.
2. The system shall have a patient table field to store the patient's insurance provider and plan details.
3. The system shall have a Doctor table containing fields for doctor's name, specialty, qualifications and clinic location(s).

4. The system shall include an Appointment table with fields for patient ID, doctor ID, appointment date/time, visit type (virtual or in-person), and status.
5. The system shall have a Clinic table with fields for clinic name, address, operating hours, and associated doctors.
6. The system shall include a User Account table to store login credentials and roles (patient, doctor, admin, etc.).
7. The system shall include a table to store patient-doctor relationships and history.
8. The system shall have a Payments table to record transaction details for paid appointments or services.
9. The system shall include a Messages table to log communication between patients and providers.
10. The system shall include an Audit Logs table to track user activities and changes within the system.

2.7 System User Interface Requirements

1. The system shall offer a secure user authentication process, requiring patients to log in with unique credentials to access appointment scheduling features.
2. The system shall display a comprehensive list of available doctors, including their specialties, qualifications, and availability, enabling patients to make informed choices.
3. The system shall allow users to filter and search for doctors based on various criteria, such as location, specialty, availability, and patient reviews.
4. The system shall support the scheduling of both virtual and in-person appointments, giving patients the flexibility to choose their preferred mode of consultation.
5. The system shall provide a real-time calendar view, allowing patients to see doctors' availability and choose suitable time slots for appointments.
6. The system shall incorporate a secure messaging system to facilitate communication between patients and doctors, ensuring confidentiality and compliance with healthcare privacy standards.
7. The system shall provide a profile section for patients to manage their personal information, medical history, and preferences, ensuring accurate and up-to-date records.
8. The system shall have a notification system to remind patients of upcoming appointments, including both virtual and in-person sessions.
9. The system shall allow patients to leave feedback and reviews for doctors, contributing to a transparent and reliable rating system for healthcare providers.

2.8 System Reporting Requirements

1. The system shall provide operational reports on appointment volumes, cancellations, no-shows.
2. The system shall provide utilization reports highlighting schedule gaps and density.
3. The system shall track user activity and access with audit reporting.
4. The system shall report on provider performance including patient satisfaction.

5. The system shall generate and provide detailed appointment reports for administrators, summarizing the number of appointments scheduled, canceled, and rescheduled over a specified period.

Section 3 Security Requirements

1. The system shall implement role-based access controls to ensure users can only access data and functionality based on their assigned roles (patient, doctor, admin etc.).
2. The system shall require strong password policies and support multi-factor authentication for all user accounts to prevent unauthorized access.
3. The system shall be compliant with HIPAA regulations for safeguarding protected health information (PHI) and follow security best practices in healthcare.
4. The system shall maintain detailed audit logs of all user activities, data changes and login attempts to enable security monitoring and forensics investigations.
5. The system shall provide secure encrypted backups and have a disaster recovery plan to protect against data loss.

Section 4 Support Requirements

1. The system shall provide a comprehensive knowledge base and FAQs to enable users (patients, doctors, staff) to self-troubleshoot and find solutions to common issues.
2. The system shall have a built-in help and feedback mechanism allowing users to submit support requests, report bugs and provide suggestions from within the application.
3. The system shall undergo regular releases and updates to apply bug fixes, security patches and introduce new features based on user feedback and evolving requirements.
4. The system shall integrate with IT service management tools for centralized ticketing, issue tracking and resolution workflows
5. The system's user training requirements shall be documented, and relevant training materials/sessions made available to ensure effective onboarding and adoption.

Section 4 Training Requirements

1. The system shall have comprehensive user guides and training manuals tailored for different user roles like patients, doctors, clinic staff and administrators.
2. The system's deployment shall include hands-on training sessions conducted by qualified instructors for key clinic staff and super-users before go-live.
3. The system's training materials shall be available in multiple formats like documents, videos, and interactive simulations to accommodate diverse learning styles.
4. Training requirements shall be assessed periodically, and updated materials developed for significant system changes or new features.

5. The system's training shall cover important areas like data privacy, security awareness, and compliance in addition to functional use cases.
6. Hands-on certification programs shall be established to validate user proficiency and determine training needs.

Section 5 References

Provide a list of all documents and other sources of information referenced in this document and utilized in its development. Include for each the document number, title, date, and responsible office/author.

Document No.	Document Title	Date	Author

Section 6 Glossary