

Project Specification

For

Integrated Medical Booking System

Version 1.0

Prepared by

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Date: 02 February 2026



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1. Covering Letter



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30 January 2026

Dear Team,

At MEDICAL INC., our mission is to provide accessible and efficient healthcare to the communities we serve. As we expand our clinic locations across Singapore, it is imperative that our operational infrastructure evolves to support this growth.

Currently, our manual appointment booking processes are creating inefficiencies that hinder our ability to deliver a seamless patient experience. Operational challenges, such as double-booking and high administrative overhead, are diverting our staff's attention away from their primary focus: patient care.

Consequently, we are prioritizing this Digital Transformation Initiative. The proposed Doctor Appointment Booking System is essential for modernizing how we connect with patients and manage our internal operations. The implementation of this system aims to achieve the following objectives:

Operational Efficiency: Reduce the administrative burden on our clinical staff by automating scheduling tasks.

Accessibility: Provide patients with 24/7 access to appointment booking services.

Scalability: Support our expansion while maintaining consistent service standards for families, professionals, and elderly patients.

Service Quality: Maintain our commitment to personal care while adopting necessary technological efficiencies.



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We have selected PINGU TECH for this project based on your proven expertise in developing secure, cloud-based patient management systems within the clinical sector. Your recent success in handling sensitive data for physiotherapy chains, combined with your transition to a modern microservices architecture, ensures that our system will be both scalable and resilient.

Specifically, your experience with secure data handling aligns with our commitment to maintaining 100% data consistency and strict PDPA compliance. We trust that your team's technical background and focus on healthcare security will provide the robust infrastructure MEDICAL INC. requires to protect our patients' information.

MEDICAL INC. has committed a budget of SGD \$500,000 to this initiative. This investment reflects our confidence that this project will significantly improve our clinical operations and the healthcare experience for our patients.

This Project Specification outlines our requirements and expectations. We look forward to a successful collaboration.

Regards,

Shaqeel
Shaqeel
Chief Executive Officer



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2. Company Description

MEDICAL INC.

Your Wellness, Our Priority

83 Punggol Central, B2-07/K4 Waterway Point West Wing
Singapore 828761

Commercial Sector: Healthcare

Line of business: Family Medicine

Mission: To provide accessible family healthcare through modern, efficient, and compassionate medical services.

Vision: To become a trusted leader in community-based family healthcare in Singapore, recognized for operational excellence, seamless patient experiences, and innovative health management.

Core Business: MEDICAL INC. operates multiple family medicine clinics across Singapore, offering a comprehensive range of primary care services including general consultations, chronic disease management, vaccinations, health screenings, and preventive care programs. The company focuses on building long-term patient-doctor relationships and promoting holistic wellness within the communities it serves.

Key Initiatives:

- **Unified Clinic Management System:** This system will centralize appointment scheduling, patient records, and reporting across all clinic locations.
- **Operational Efficiency Enhancement:** Automate tasks such as patient registration, appointment reminders, and prescription management to reduce wait times, minimize manual errors, and free up clinical staff.
- **Regulatory Compliance & Data Security:** Complies with Singapore's healthcare data protection regulations, including the Personal Data Protection Act (PDPA) and relevant MOH guidelines. Implement robust access controls, audit trails and data encryption.
- **Inter-Clinic Data Consistency & Accessibility:** Ensure real-time synchronization of patient data across all branches, enabling authorized



healthcare providers to access complete and up-to-date patient histories regardless of visit location.

3. Project Description

3.1. Project Overview

Name: Doctor Appointment Booking System

Context: The current manual appointment booking process in clinics is inefficient and prone to errors, making it inconvenient for patients. This project aims to develop a user-friendly web-based system that replaces manual scheduling and will allow patients to view available slots, book/cancel appointments, and receive confirmations via email/sms.

3.2. Goals

Goal 1: Multi-Clinic System Deployment

Specific: Develop and deploy a fully functional, web-based appointment booking platform that supports at least 3 clinic locations. The platform's core features will include real-time display of doctor availability, patient self-service for booking/cancelling/rescheduling appointments 24/7, automated email/SMS confirmations and reminders, and a centralized, user-friendly interface.

Measurable: Success is measured by the full implementation of all specified features: real-time multi-location availability display, 24/7 booking/cancellation/rescheduling, automated email/SMS notifications, and a user-friendly interface, as validated by stakeholder sign-off.

Attainable: The scope is well-defined, focusing on proven scheduling technology, and is achievable with a dedicated development team and active clinic cooperation for integration and testing.

Relevant: This directly addresses the core business need to modernize appointment booking, improve patient access and experience, and serve multiple locations from a single, efficient system.

Time-bound: Full deployment must be completed within 6 months of the project start date.

Goal 2: Operational Efficiency & Administrative Burden Reduction

Specific: Reduce the administrative workload by automating the appointment scheduling process across the 3 clinic locations.

Measurable: Achieve a 40% reduction in the total time spent by staff on manual scheduling tasks (e.g., phone calls, calendar management, sending reminders), measured by comparing pre-launch and post-launch time-tracking logs.

Attainable: A 40% reduction is realistic as the platform automates the most time-consuming tasks. Baseline data will be collected from current manual processes to ensure the target is data-driven.

Relevant: Reducing manual tasks frees up administrative staff for higher-value work, lowers operational costs, and minimizes errors, directly supporting MEDICAL INC's initiative for operational efficiency enhancement.

Time-bound: This reduction must be demonstrated within 4 months of the platform's official launch.

Goal 3: Cross-Clinic Data Integrity & Synchronization

Specific: Ensure absolute accuracy and real-time synchronization of all appointment data across the booking platform and the integrated systems at all 3 clinic locations.

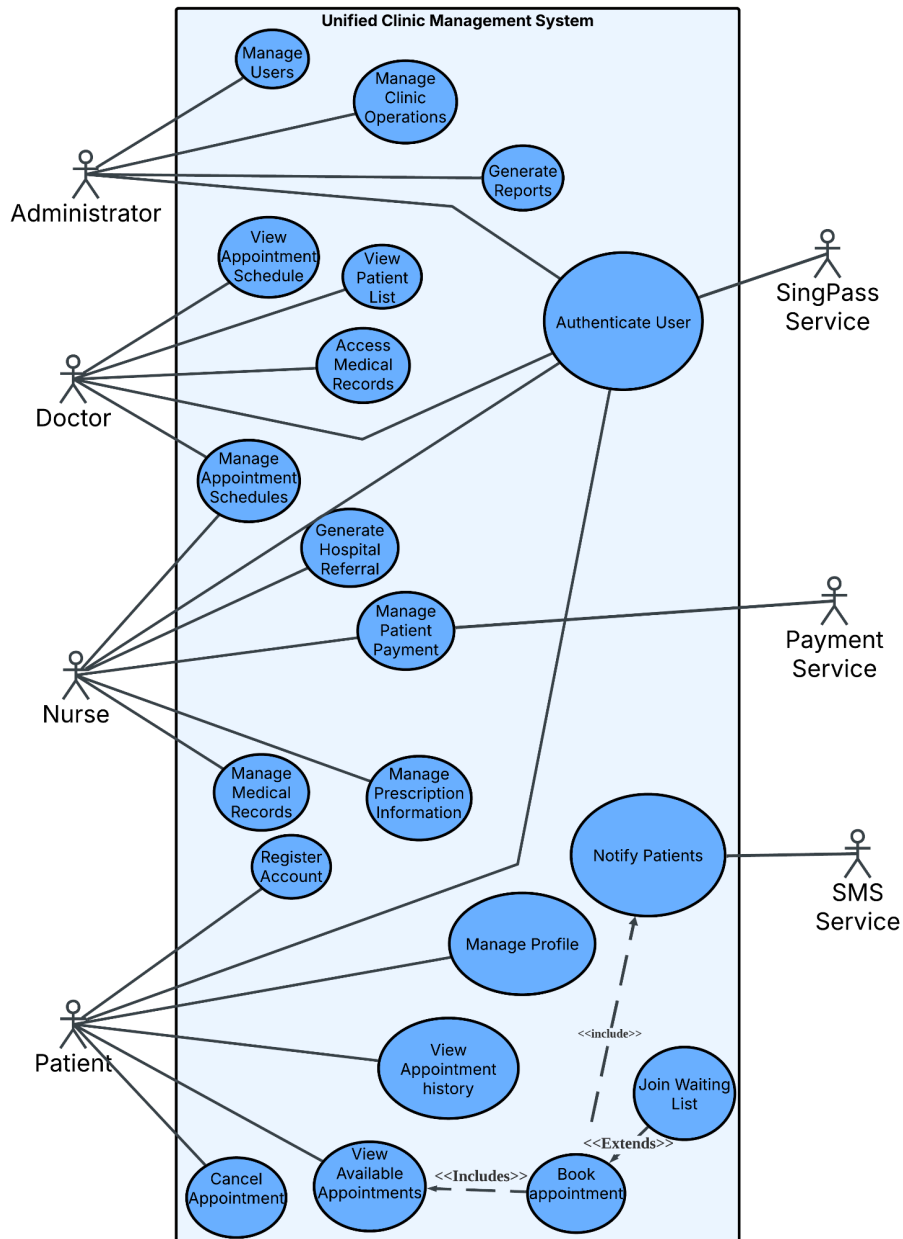
Measurable: Maintain 100% consistency of appointment records (time, date, doctor, patient) in real-time. Achieve zero (0) reported incidents of double bookings or data mismatches caused by a system error after launch.

Attainable: This is achievable through robust database architecture (e.g., using transactional operations and real-time sync) and thorough pre-launch testing of concurrency and integration points.

Relevant: Data integrity is fundamental to clinical operations, patient trust, and resource utilization. Preventing double-booking errors is critical for the system's credibility and supports the key business initiative of inter-clinic data consistency.

Time-bound: This standard of integrity and synchronization must be maintained from the moment of platform launch and continuously thereafter.

3.3. Use Case Diagram



4. Business Operation Requirements

Business Operation Requirements		Precedence
BO-REQ-01	Title: User Registration and Secure Login	Essential
	Description: Users should be able to register for an account and login securely via the login page regardless of user types. (e.g. Doctors, Patients, Administration) Constraints: <ol style="list-style-type: none"> 1. Patients must register with a valid email and mobile number. 2. Passwords must meet minimum complexity rules. 3. Registration and login with singpass is optional. 	
BO-REQ-02	Title: Role-Based Homepage Access	Essential
	Description: The system shall display different homepage dashboards and functionalities based on user role (e.g. Administration, Doctor, Nurse, Patient) Constraints: <ol style="list-style-type: none"> 1. Patients see booking options, appointment history, and profile management. 2. Nurses manage appointment schedules, patient payment, basic medical records and prescription data. 3. Doctors see their appointment schedules, patient lists, and in-depth medical record access. 4. Administrators see clinic management, reporting, and user oversight panels. 	
BO-REQ-03	Title: Real-Time Appointment Booking	Essential
	Description: Patients should be able to view available appointments and book their appointments through the website and have the administrative side be updated in real-time. Constraints: <ol style="list-style-type: none"> 1. Slots are defined per doctor per clinic. 2. Patients can book only one slot per clinic per day. 3. Unavailable or booked slots must be visually distinct. (e.g. greyed out or color-coded) to prevent confusion. 	

BO-REQ-04	Title: Concurrent Booking Conflict Prevention	Essential
	Description: The system shall prevent double booking of the same appointment slot by multiple patients Constraints: <ol style="list-style-type: none"> 1. When a slot is selected, it is temporarily reserved for 5 minutes during checkout. 2. If the booking is not completed within 5 minutes, the slot is released. 	
BO-REQ-05	Title: Waiting List Management	Tolerable
	Description: Patients that attempt to book when no appointment slots are available will be put into a waiting list. Constraints: <ol style="list-style-type: none"> 1. Patients are notified via SMS/email when a slot becomes available. 2. First come first serve order is maintained within the waiting list. 	
BO-REQ-06	Title: Automated Appointment Notifications	Tolerable
	Description: Patients should automatically be notified after their appointment is successfully booked. The patient should also be notified when the booking slot date is coming near. Constraints: <ol style="list-style-type: none"> 1. Confirmations sent immediately after booking. 2. Reminders sent 24 hours before appointment. 3. Cancellation notifications sent to clinic staff and patient. 	
BO-REQ-07	Title: Last-Minute Cancellation Prevention	Desirable
	Description: Patients should not be able to cancel their appointment 24 hours before their allotted time. Constraints: <ol style="list-style-type: none"> 1. Patients can freely cancel or reschedule appointments more than 24 hours in advance. 2. Patients requiring urgent cancellation within 24 hours must contact the clinic directly via phone. 	

BO-REQ-08	Title: PDPA Compliance	Essential
	Description: The system should comply with the Personal Data Protection Act Constraints: <ol style="list-style-type: none"> 1. Patient data is encrypted at rest and in transit. 2. Audit logs track all access to sensitive data. 3. Data retention and deletion policies are configurable per PDPA guidelines. 	
BO-REQ-09	Title: High System Availability for Patient Access	Essential
	Description: The system shall ensure that patient booking appointment portal is available for access and use at any time, on any day Constraints: <ol style="list-style-type: none"> 1. Uptime of at least 99% measured monthly, excluding scheduled maintenance windows announced at least 48 hours in advance. 2. Scheduled maintenance shall not occur during peak hours (7am - 10pm). 	
BO-REQ-10	Title: Doctor Availability Management	Essential
	Description: Doctors should be able to amend the appointment booking schedule through their respective portals. Constraints: <ol style="list-style-type: none"> 1. Doctors can block out personal time with appropriate lead time. 2. Emergency/unplanned unavailability within 24 hours must be approved. 3. Patients with affected appointments must receive notifications if their booking is impacted by schedule changes . 	
BO-REQ-11	Title: Referral Processing	Desirable
	Description: Nurses have to be able to generate a hospital referral letter based on patient information when required. Constraints: <ol style="list-style-type: none"> 1. Only doctors can finalize and authorize referral letters. 2. All referral requests and completed letters are stored in the 	

	patient's digital record.	
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5. Technical Requirements

Technical Requirements		Precedence
TR-REQ-01	Title: Cloud-Based Hosting Solution	Essential
	Description: The system shall be hosted on a secure, scalable cloud infrastructure provider (e.g., AWS, Azure, or Google Cloud with data residency in Singapore). Constraints: <ol style="list-style-type: none"> 1. Must comply with Singapore's PDPA and MOH data hosting guidelines. 2. Environment must support automated backups and disaster recovery. 	
TR-REQ-02	Title: Server Architecture	Essential
	Description: The system shall follow a multi-tier architecture with load balancing capabilities to ensure high availability. Constraints: <ol style="list-style-type: none"> 1. Architecture must separate presentation, business logic, and data layers into distinct tiers 2. Database layer must support read-replicas for performance scaling 3. Minimum of two application server instances must run concurrently for redundancy 	
TR-REQ-03	Title: Web-Based Platform	Essential
	Description: The system shall be developed as a responsive web application via modern web browsers, without requiring native OS-specific installation for end-users. Constraints: <ol style="list-style-type: none"> 1. Must be compatible with the latest versions of Chrome, 	

	Firefox, Safari, and Edge. 2. Must be fully functional on Windows 10/11 and macOS.	
TR-REQ-04	Title: Technology Stack	Desirable
	Description: The backend shall be developed in a modern, maintainable language/framework (e.g., Python/Django, Java/Spring, Node.js), with a React/Angular/Vue.js frontend. Constraints: 1. Database layer must use a relational cloud database (e.g. MySQL) with encryption.	
TR-REQ-05	Title: Data Security & Encryption	Essential
	Description: All sensitive data, including personal health information, shall be encrypted. Constraints: 1. Access logs must be maintained for all data accesses. 2. Regular security testing must be conducted pre-launch and annually.	
TR-REQ-06	Title: PDPA & Healthcare Compliance	Essential
	Description: The system shall be designed and maintained in compliance with Singapore's PDPA and any applicable healthcare data guidelines (e.g. MOH). Constraints: 1. Data retention and deletion policies must be configurable. 2. Patient consent mechanisms must be integrated into data collection points.	
TR-REQ-07	Title: Payment Gateway Integration	Desirable
	Description: The system shall integrate with a certified payment gateway to support Visa, Mastercard, Google Pay, Apple Pay, and PayNow. Constraints: 1. Payment data must not be stored within the application database. 2. All transactions must be logged with receipts.	

TR-REQ-08	Title: Singpass Integration (If applicable)	Tolerable
	Description: The system shall support optional patient registration and identity verification via SingPass. Constraints: <ol style="list-style-type: none"> 1. Must follow GovTech's Singpass API integration guidelines. 	
TR-REQ-09	Title: System Performance	Desirable
	Description: All web pages shall load in less than 5 seconds under normal network conditions. Constraints: <ol style="list-style-type: none"> 1. Core booking transaction completion must occur within 10 seconds. 2. System must support at least 100 concurrent users during peak hours. 	
TR-REQ-10	Title: Clinic Staff Interface Support	Tolerable
	Description: The administrative and doctor interfaces shall support dual-monitor setups for efficient workflow management. Constraints: <ol style="list-style-type: none"> 1. UI must be resizable and adaptable to multiple screen resolutions without loss of functionality . 	
TR-REQ-11	Title: Administration Tools	Desirable
	Description: The system shall include a secure web-based admin panel for managing clinics, doctors, schedules, user roles, and system configurations. Constraints: <ol style="list-style-type: none"> 1. Role-based access control must be enforced in the admin panel. 2. Audit trails for all admin actions must be maintained. 	
TR-REQ-12	Title: Maintenance & Monitoring	Desirable
	Description: The system shall include monitoring, alerting, and logging tools for maintenance. Constraints:	

	<ol style="list-style-type: none"> 1. Uptime monitoring must be external. 2. Developers must provide operational documentation. 	
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6. Financial Requirements

6.1. Project Budget

Total project Budget: \$500,000

This budget will cover a 6 month development and deployment timeline.

6.2. Detailed Cost Structure

	Description	Estimated Costs
Core Development & Design	Frontend/backend development, UI/UX design, database architecture	220,000
Third-Party Integrations	Payment gateway setup, SMS/email API, cloud service initial configuration, SingPass API integration	60,000
Security & Compliance	Penetration testing, PDPA compliance audit, data encryption implementation, security consulting	50,000
Project Management	Dedicated project manager, agile coordination, stakeholder reporting, milestone tracking	45,000
Testing & Quality Assurance	System, integration, performance, and user acceptance testing (UAT)	40,000
Training & Change Management	On-site/virtual training for clinic staff, administrator training, creation of user manuals	35,000
Deployment & Go-Live Support	Production deployment, data migration assistance	30,000

Contingency Buffer	Unforeseen scope changes, additional iterations, or risk mitigation	20,000
Total		500,000

6.3. Source of Funds

The funds for this project will be from MEDICAL INC's business profits specifically marked for strategic growth investments.

6.4. Desired Payment Schedule

Milestone	Description	Payment (%)
Kick-off & Contact	Project initiation, final scope sign-off	10%
Completion of Design & Architecture	Approved UI/UX mockups, final technical architecture, data model	10%
Core Module Development	Completion of patient portal, admin panel, and booking engine core functionality	20%
Integration & Security Testing	All third-party integrations live, security audit passed, UAT ready	20%
Successful UAT & Training	User Acceptance Testing signed off by MEDICAL INC, staff training completed	20%
Go Live	System live on production across 3 clinics	20%

7. Delivery requirements

7.1. Key Project Milestones & Deliverables

Milestone	Timeline	Key Deliverables
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Project Kick-off & Mobilization	Week 1	<ol style="list-style-type: none"> 1. Signed Project Charter 2. Initial Risk Register 3. Communication Plan 4. Project Team Roster
Requirements & Architecture Sign-off	Week 3	<ol style="list-style-type: none"> 1. Finalized Business & Technical Requirements Document (v1.0) 2. Solution Architecture Diagram 3. High-Level Data Model
UX/UI Design & Interactive Prototype	Week 6	<ol style="list-style-type: none"> 1. Interactive Prototype (Figma/Adobe XD) 2. UI Style Guide & Design System 3. User Flow Diagrams for Patient, Doctor, Admin
Monthly Progress Report #1	End of Month 1	<ol style="list-style-type: none"> 1. Progress Report (Scope, Timeline, Budget) 2. Updated Risk & Issue Log 3. Development Burndown Chart
Core System Development (MVP)	Week 12	<ol style="list-style-type: none"> 1. Deployed Minimum Viable Product (MVP) on Staging 2. Source Code (first release branch) 3. MVP includes: Patient Registration/Login, Real-time Booking for 1 clinic, Basic Admin Panel
Monthly Progress Report #2	End of Month 2	<ol style="list-style-type: none"> 1. Progress Report 2. MVP Demo Feedback Summary 3. Test Plan for Integration Phase
Integration & Security Completion	Week 18	<ol style="list-style-type: none"> 1. All integrations live on Staging (Payment, SMS, Cloud DB) 2. Penetration Test Report & Remediation 3. Performance Test Results
User Acceptance Testing (UAT) Phase	Weeks 19-22	<ol style="list-style-type: none"> 1. UAT Environment & Test Cases 2. UAT Feedback & Bug Log 3. UAT Sign-off Document
Monthly Progress Report #3	End of Month 4	<ol style="list-style-type: none"> 1. Progress Report 2. UAT Status Summary
Staff Training Completion	Week 23-24	<ol style="list-style-type: none"> 1. Training Materials (Videos, Manuals, FAQs) 2. Training Session Attendance Records 3. Post-Training Feedback Summary

Soft Launch	Week 24	<ol style="list-style-type: none"> 1. System Live in Production for 1 Clinic 2. Initial Live Data Migration Verified
Full Deployment	Weeks 25-26	<ol style="list-style-type: none"> 1. System Live for All 3 Clinics 2. Final Product Handover 3. Project Closure Report

**Gantt Chart is available in the addenda [4]*

8. Project Sign-off




This Project Specification document defines the approved business, function, technical, financial, and delivery requirements for the Doctor Appointment Booking System commissioned by Medical Inc.

This document has been reviewed and validated internally by Medical Inc. and represents the agreed baseline of requirements to be provided to the selected software vendor for implementation. Upon sign-off, this document shall serve as the **authoritative reference** for system design, development, testing and delivery.

Any changes to the scope, requirements, or constraints defined herein shall be subject to a **formal change management and approval process** in accordance with Medical Inc.'s project governance procedures.

**The undersigned confirm that this Project Specification accurately reflects Medical Inc.'s requirements and formally authorize the vendor to proceed with system design and development based on this document.*

For Medical Inc. Staff (No action needed)

Role	Name	Signature	Date
Project Leader	Shaqbil		30/1/26
Clinic Operations Lead	Gulpin		28/1/26
Finance Manager	Si Pay		28/1/26



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Technical Lead	Randthee	<i>Rand</i>	29/1/26
Data Protection Officer	Alysser	<i>A</i>	30/1/26

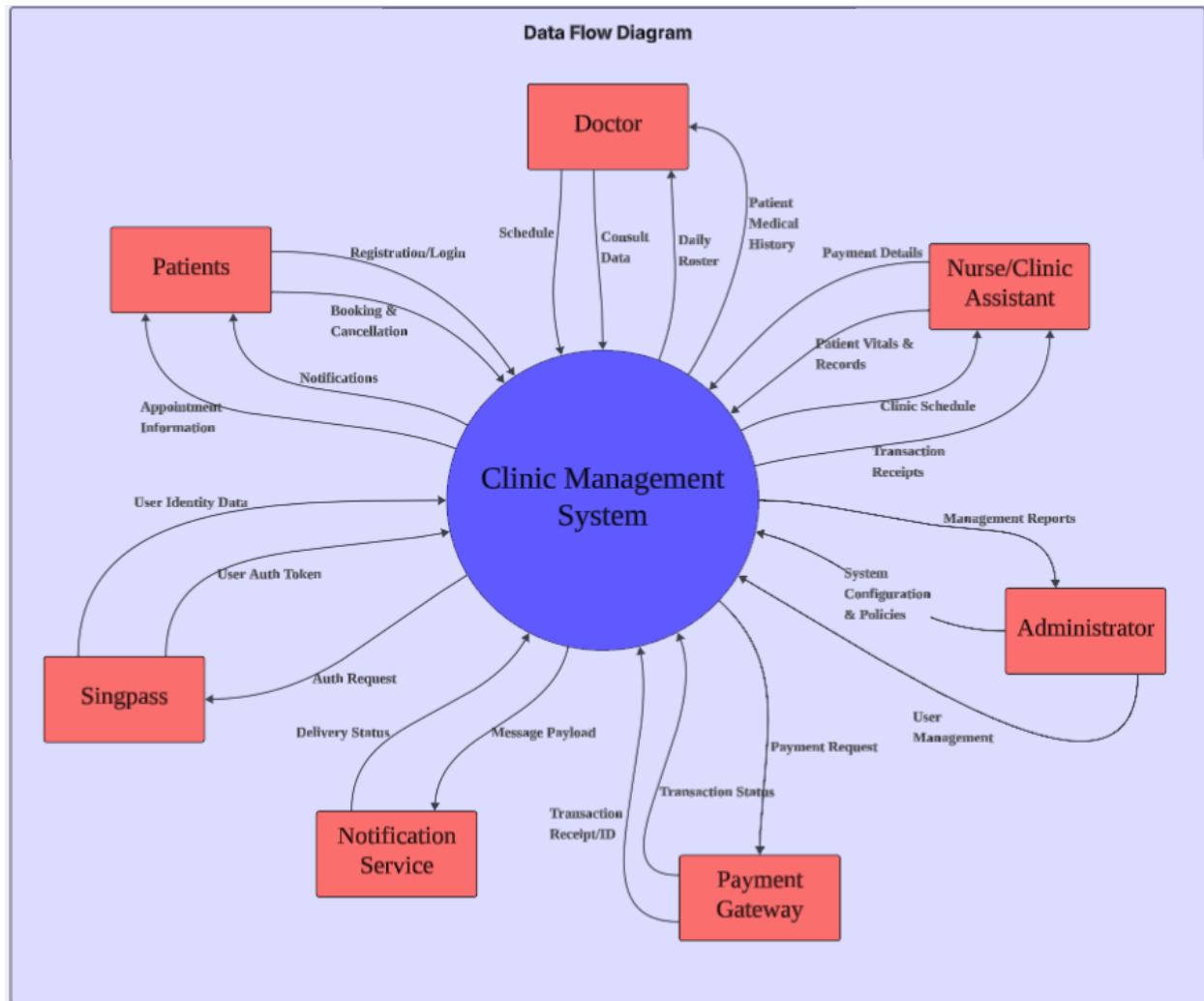
** The undersigned acknowledge receipt and understanding of the requirements specified in this document. Vendor acknowledgement confirms alignment with the stated requirements and intent to deliver accordingly, but does not constitute approval authority over the contents of this Project Specification.*

For Vendor Staff

Role	Name	Signature	Date
Project Manager	Reuber		
Technical Lead	John Tech		

9. Requirements Modelling

9.1. Data Flow Diagram



Addenda

Addenda A. Glossary of Terms

Term	Definition
PDPA	Personal Data Protection Act (Singapore)
MVP	Minimum Viable Product
UAT	User Acceptance Testing
API	Application Programming Interface
MOH	Ministry of Health (Singapore)

Addenda B. Assumptions & Dependencies

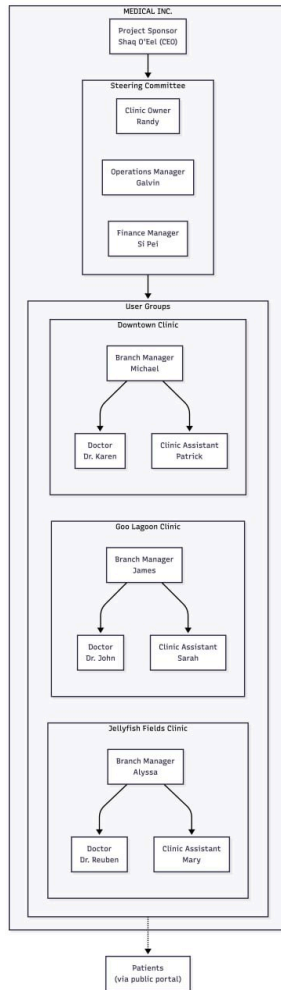
Assumptions:

- MEDICAL INC will provide timely access to stakeholders for requirements gathering and UAT
- Existing patient data can be migrated with minimal transformation
- Clinic staff will have adequate internet connectivity and devices
- No major changes to PDPA regulations during project timeline
- Third-party APIs (payment, SMS) will remain stable and accessible

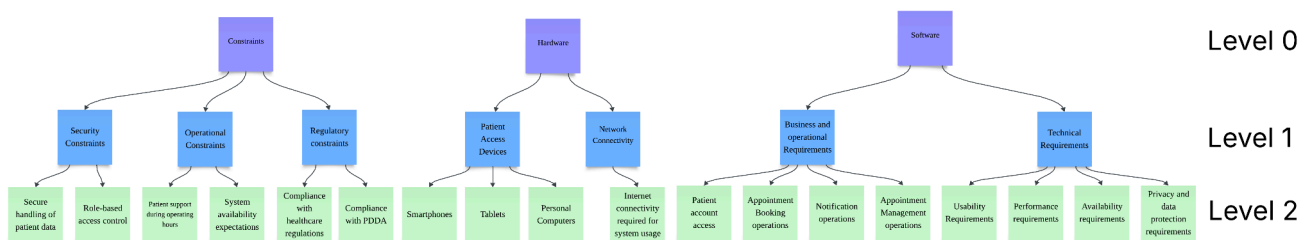
Dependencies:

- Availability of MEDICAL INC IT resources for integration testing
- Successful procurement and setup of cloud infrastructure
- Approval from legal/compliance team for data handling processes
- Clinic staff availability for training sessions
- Successful SingPass API integration

Addenda C. Organisational Chart



Addenda D. Requirements Tree Diagram

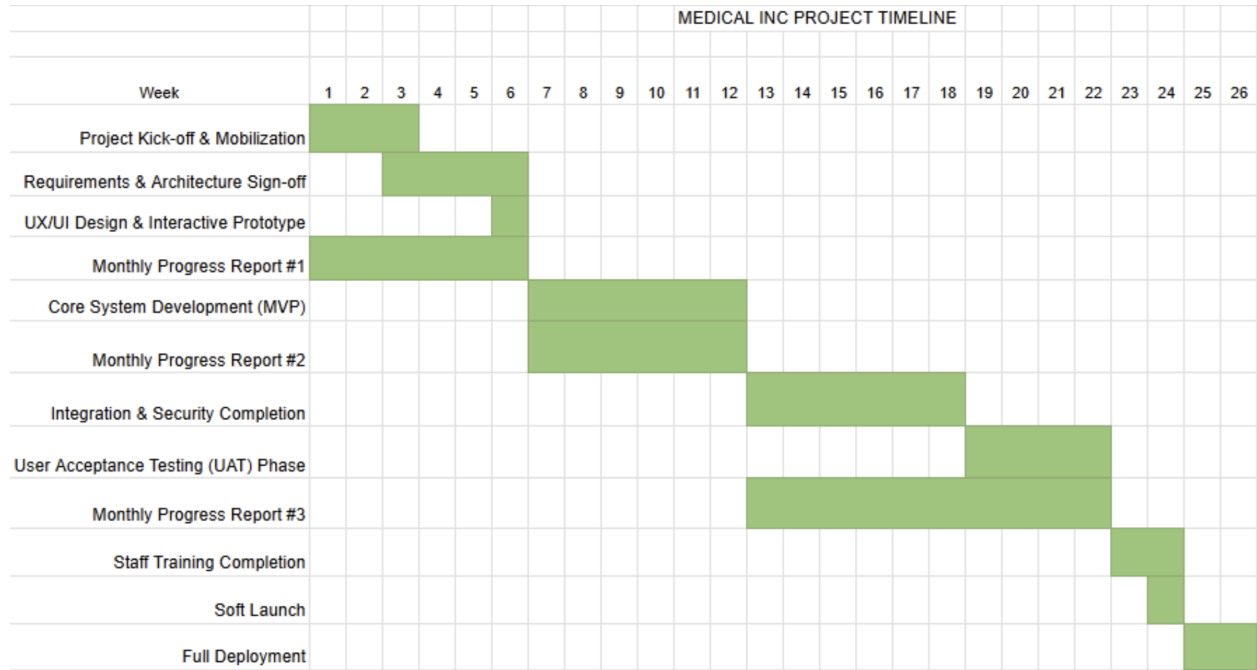




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Addenda E. Gantt Chart



Addenda F. Declarations

Declaration of Generative AI Use

We declare that generative AI tools (specifically Gemini 3 Pro) was used in the preparation of this project specification.

- **Purpose of Use**

The AI tool was used for ideation, refining sentence structure and formatting.

- **Verification**

All AI-generated content has been reviewed, fact-checked, and modified by the team members. We take full responsibility for the accuracy and the originality of the content submitted.

- **Data Privacy**

No confidential or personally identifiable information regarding the client or team members was input into the AI tool.

Declaration of Originality

We hereby declare that this Project Specification and all accompanying documentation are the original work of the team members listed below.

We confirm that:

No Plagiarism: No part of this document has been copied from other sources (including other teams, online repositories, or unauthorized materials) without proper attribution.

Integrity: This work has been prepared solely by the team members for the purpose of the Medical Inc. Unified Clinic Management System project.