

Cloud-Based Multi-Hospital Management System

SaaS-Based Digital Healthcare Platform for Clinics & Hospitals Enhancement & Delivery Proposal

Executive Summary

The **Multi-Hospital Management System** is a comprehensive, cloud-based SaaS platform designed to streamline operations across hospitals, dental clinics, and multi-specialty medical

facilities. Tailored specifically for the healthcare and dental sectors, this solution empowers administrators, doctors, staff, and patients through a unified ecosystem that integrates Electronic Health Records (EHR), appointment management, billing, pharmacy, lab coordination, inventory, CRM, and more — all while maintaining strict role-based access, compliance, and security.

As a **Software-as-a-Service (SaaS)** application, this system eliminates the burden of local infrastructure, maintenance, and updates, offering an always-available, scalable solution with minimal onboarding time. Hospitals and clinics can subscribe to only the modules they need —

from essential patient management to advanced features like digital treatment plans, lab workflow automation, e-commerce for medical equipment, and patient self-service portals. The platform supports a **multi-tenant architecture**, enabling centralized monitoring and control

by a Superadmin while allowing each clinic or hospital to operate independently within its own

data space. Role-specific dashboards ensure that each user — whether a receptionist, doctor,

nurse, pharmacist, technician, or accountant — gets a personalized and task-focused interface

to enhance productivity and accountability.

With robust communication capabilities including SMS, WhatsApp, and email integrations, the

platform not only supports clinical operations but also enhances patient engagement, retention,

and satisfaction. Detailed reporting and analytics modules help decision-makers gain real-time

insights into operational efficiency, financial health, and service delivery.

The system is also future-ready, with e-commerce integration for equipment procurement,

scalable billing models, lab interfacing, and a mobile-optimized patient portal — making it a complete digital backbone for modern healthcare providers. Whether it's a single dental clinic or

a chain of multi-specialty hospitals, this solution adapts to their workflow, expands with their growth, and ensures better healthcare outcomes through technology.

2. Objectives

1. **Enable centralized monitoring and management of multiple dental clinics from a single dashboard.**
2. **Provide a role-based access control system for Superadmin, Admin, Doctors, Receptionists, Lab, Inventory, and CRM.**
3. **Simplify patient onboarding, appointment booking, walk-ins, and tracking.**
4. **Offer advanced case file management with medical history, diagnosis, examination, and treatment plans.**
5. **Enable patients to review and approve treatment plans via digital signature.**
6. **Integrate billing, installment tracking, and outstanding balance management.**
7. **Streamline lab workflows including case creation, design selection, and order status tracking.**
8. **Provide real-time reports on patient metrics, financials, lab performance, and doctor productivity.**
9. **Empower clinics with inventory management, purchase/sales ordering, and supplier records.**
10. **Facilitate patient engagement with WhatsApp/SMS/email-based communication and feedback.**
11. **Enable accountants or financial consultants to export year-end financial summaries.**
12. **Offer secure and intuitive patient portals to view medical records and appointments.**
13. **Support CRM operations like reminders, reviews, marketing follow-ups, and contact requests.**

3. Scope of the Project

The **scope of the Multi-Hospital Management System** encompasses the full digital transformation of operational, clinical, and administrative workflows in hospitals, dental clinics, and healthcare institutions using a modular SaaS-based approach. The platform is designed to cater to multiple clinics under a single administrative umbrella, each functioning independently but connected through a centralized system with role-based access, data segregation, and real-time reporting. At its core, the system will facilitate the **registration and management of multiple clinics and hospitals**, with each entity having its own set of doctors, staff, departments, and operational data. The platform will allow hospital administrators and receptionists to manage daily

appointments, patient registrations (both scheduled and walk-ins), digital case files, and the entire patient lifecycle — from first contact to post-treatment follow-up.

Doctors will be able to document patient history, prescribe treatments, create digital treatment plans, and send them for patient approval using secure channels such as SMS or WhatsApp. Nurses, pharmacists, and technical staff will be provided with interfaces to manage their respective duties such as medication fulfillment, inventory tracking, and equipment operation.

The platform will also cover non-clinical operations such as **billing, installment-based payments, inventory management, lab order tracking, shift planning for staff, petty cash handling, and financial exports for taxation**. A public-facing appointment booking interface and a secure patient portal are also within scope to enhance engagement, transparency, and Convenience.

Additionally, **CRM capabilities will be integrated** for automated communications, feedback collection, and promotional messaging, while **an embedded e-commerce module** allows clinics to order medical equipment directly through the platform.

The system is being developed as a **multi-tenant, subscription-based SaaS platform**, meaning clinics can activate and pay for only the modules they need. This ensures scalability

and affordability for both small clinics and large hospital networks.

4. Module Overview

4.1 Superadmin Module

Manages the entire SaaS platform and governs clinic operations across all tenants.

View all clinics with status – See which clinics are active, expired, or pending setup.

Renew, suspend, or deactivate clinics – Directly control subscription access per clinic.

Add new clinic accounts – Onboard new clinics instantly from the admin interface.

Control global ecommerce inventory – Define equipment/medicine catalogs available to clinics.

Manage subscription plans – Create and assign pricing tiers and billing cycles.

Generate cross-clinic reports – Visualize multi-clinic metrics like revenue, patient traffic, etc.

Access full audit trail – Track user logins, actions, and data changes.

Set global configurations – Toggle CRM modes, integrations, or platform-wide limits.

Monitor SMS/WhatsApp usage – Track communication credits and usage reports.

4.2 Clinic Admin Module

Manages one specific clinic's operations, financials, staff, and configuration.

Dashboard with clinic overview – Live view of appointments, finances, patients.

Manage doctors and staff – Add/remove users, assign departments and shifts.

Billing & payment tracking – Create bills, handle installments, mark payments.

Enable patient portal access – Send secure login link to selected patients.

Monitor lab orders and inventory – Keep tabs on lab activity and stock levels.

Export financial reports – Share detailed data with CA/accountant at year-end.

Petty cash and expense management – Track small operational expenses.

Enable/disable clinic features – Toggle modules like lab, CRM, inventory, etc.

4.3 Doctor Module

Doctors manage their appointments, patient care, diagnosis, and prescriptions.

View today's appointments – Schedule view for daily or weekly consultations.

Access patient case files – View medical/dental history, complaints, and allergies.

Perform examinations – Record clinical notes, diagnoses, and observations.

Create treatment plans – Offer multiple options with costs and remarks.

Request patient consent digitally – Get signatures for chosen treatment plans.

Prescribe medicines with templates – Use saved templates to issue e-prescriptions quickly.

Share prescriptions via WhatsApp/SMS/Email – Instantly send prescription to patients.

Review appointment history – Check status, notes, and token logs.

4.4 Receptionist Module

Handles front-desk duties, patient intake, and communication.

Register walk-in and new patients – Capture all necessary profile and contact info.

Book doctor appointments – Schedule per slot with real-time availability.

Track patient status – View who's waiting, being treated, or missed.

Send appointment reminders – Automated messages via WhatsApp/SMS.

Manage token and queue system – Assign and update tokens per patient.

Update CRM status – Log reviews, no-shows, or feedback messages.

Print or share visit summary – Export visit history for the patient.

4.5 Lab Work Module

Manages prosthetic and dental lab orders integrated with patient files.

Add lab orders for new or repeat cases – Link to existing patients and doctors.

Capture tooth number and design specs – Include pontic and collar details.
Assign lab and order date – Choose vendor and expected delivery date.
Track order status – Move between Placed → Received → Completed.
Export and send order details – Share via print, email, or WhatsApp.

4.6 Accounting Module

Simplifies end-of-year financial operations and tax-ready exports.

Export income & payment data – Generate ledgers for filing and audit.
Track all patient payments – See total paid, due, and outstanding amounts.
Filter by mode of payment – Breakdown by UPI, card, cash, or insurance.
Generate summary by date range – Daily, weekly, monthly, or yearly snapshots.
Petty cash report – Track clinic expenses like utility bills, office supplies, etc.

4.7 Inventory Module

Tracks medical supplies, purchase orders, and stock movement.

Create purchase and sales orders – Manage clinic buying and selling activities.
Maintain supplier directory – Store vendor details and contact history.
Organize items by group – Medicines, surgical tools, stationery, etc.
Receive low-stock alerts – Get notified before critical supplies run out.
Track item history – See movement in/out and expiry timelines.

4.8 CRM Module

Handles patient communication, feedback, and retention.

Send automated messages – Confirm appointments or follow-up reminders.
Trigger feedback requests – Collect experience ratings post-treatment.
Run promotional campaigns – Send birthday messages, newsletters, or offers.

Track interaction logs – See all communication history per patient.
Manage doctor mobile number requests – Log patient interest or requests.

4.9 Patient Portal Module

Secure online access for patients to manage their care journey.

Login via OTP-based URL – Patients set a password from secure SMS link.
View appointments and treatment plans – Know what's scheduled and proposed.
Check prescriptions and case files – Review dosage, notes, and diagnoses.
Track billing and installments – Know paid, due, and current balance.
Download reports and consent forms – Access x-rays, treatment history, etc.
Contact doctor or clinic – Request WhatsApp messages or direct calls.
The portal can be disabled anytime by doctor – Controlled access ensures

Security.

4.10 Discover Area (Public Portal)

Used by the general public to find and request appointments.

Search clinics or doctors by location – Filter by city or area.

View digital visiting cards – Each doctor has a sharable, mobile-friendly card.

Request appointment online – Public can book and clinic gets notified.

Map integration – Direct link to clinic location on Google Maps.

5. Proposed Solutions

5.1. Role-Based Access Control (RBAC)

Ensures the right data reaches the right person — securely and efficiently.

- **Granular Permission Tiers** – Define exact access rights per role (e.g., receptionists can view but not edit billing; doctors can access only their assigned cases).

- **Audit Logs for All Activities** – Every action is logged (e.g., who updated a prescription or changed inventory levels).

- **Customizable Role Templates** – Clinics can create new roles based on combinations of permissions.

- **Separation by Clinic Context** – Data is strictly sandboxed per clinic; users from Clinic A cannot access Clinic B.

5.2. Centralized SaaS Management Console

Gives Superadmin complete control over the platform, clinics, subscriptions, and compliance.

Manage Clinics at Scale – Onboard new clinics, view active/inactive status, and control plan renewals.

Subscription & Plan Management – Assign billing cycles, renewals, and trial periods from a single interface.

Multi-Clinic Analytics – Real-time KPIs across all clinics (e.g., patient volume, revenue growth, CRM engagement).

Configuration Broadcasting – Push global settings like price changes or new treatment categories to all clinics.

5.3. Comprehensive Case File Architecture

A unified patient file structure designed specifically for dental workflows.

Structured & Searchable Data – Segmented into profile, diagnosis, treatment plan, history, billing, and files.

Multiple Treatment Plan Support – Doctors can propose options; patients approve with

digital signature.

Consent & Compliance Integration – Attach signed forms for RCTs, surgery, or anesthesia via patient portal.

Full Audit of Patient Journey – From first visit to last payment, everything is logged and printable.

Smart Notes & Tags – Add visit notes, flag allergies, or record lifestyle info (e.g., smoking habits).

5.4. Omnichannel CRM Integration (WhatsApp, SMS, Email)

Boosts engagement, follow-ups, and clinic brand with timely, intelligent communication.

Event-Driven Messaging – Auto-send messages based on actions (appointment booked, bill due, plan approved).

Feedback & Reputation Engine – Patients get follow-up messages prompting them to leave reviews.

Promotional Campaigns – Clinics can run birthday, festival, or seasonal offers with templates.

Consent-Aware Messaging – Patient privacy respected with opt-in/opt-out toggles.

Communication Logs per Patient – Track who received what and when — great for legal safety too.

5.5. Digital Lab Workflow for Dental Cases

Replaces manual slips and calls with structured lab coordination, reducing errors and delays.

Detailed Lab Orders – Capture tooth numbers, pontic design, collar details, shade selections.

Status Lifecycle Management – Order Placed → In Progress → Delivered → Adjusted.

Auto-Reminders for Labs – Notify if the due date approaches without delivery.

Vendor Tracking – Know which lab does what best; review cost and success rates.

Attachment & Print Option – Orders can be printed, emailed, or WhatsApped directly.

5.6. Clinic-Focused Inventory Management

Optimized for dental clinics that balance consumables, tools, and recurring supply needs.

Categorical Grouping – Surgical instruments, medicines, disposables, etc., are grouped logically.

Smart Low Stock Alerts – Alert admins based on usage patterns and minimum thresholds.

Supplier Management – Maintain list of suppliers with GST details, contact, and PO

history.

Integrated Sales & Purchase Orders – Track clinic orders, incoming stock, and expired goods.

Role-Based Item Access – Only authorized users can approve purchase or access cost Data.

5.7. Advanced Reporting & Business Intelligence Suite

Turns operational data into decision-ready insights.

Collection Reports – View revenue by date range, payment mode, or user.

Patient Analysis – Understand patient age, gender, registration trends, and retention.

Doctor-wise Performance – Track appointments, revenue, missed consultations per doctor.

Work Reports – View service delivery metrics (e.g., number of treatments by category).

Revenue Trends – Monthly/yearly projections, including CRM response rates.

5.8. Compliance-Ready Export & Financial Tools

Makes audits and taxation smooth for clinics and CAs.

Full Financial Ledger – Export income, expenses, and billing to Excel or PDF.

Petty Cash Logs – Track non-patient expenses like electricity, equipment, staff salaries.

Tax & GST Summary – Optional integration for Indian tax requirements.

Backup & Data Portability – Easy export for migration or offline records.

5.9. Patient Portal for Self-Service Access

Improves transparency and reduces admin workload.

Secure Patient Login – Send a portal link via SMS where the patient sets a password.

Access Treatment History – All past and upcoming appointments visible.

Download Prescriptions, Bills, X-rays – Easily share with insurance or referrals.

Digital Treatment Plan Approval – Sign off digitally on chosen treatment option.

Portal Deactivation Option – Clinicians can revoke access with one click.

5.10. Discover & Appointment Public Interface

A mini-doctor directory and self-booking tool to enhance visibility and streamline new bookings.

Search by Location & Specialty – Helps new patients find nearby doctors.

Doctor Digital Visiting Card – Shareable profile with number, timings, clinic map.

Simple Appointment Request – Patient books, clinic gets instant notification.

SEO-Friendly Public Microsite – Helps each clinic show up on search engines.

5.11. Communication Integration (WhatsApp, Email & SMS)

A powerful multi-channel communication engine is integrated throughout the system to ensure timely notifications, secure file sharing, and enhanced patient engagement.

The system supports **WhatsApp Business API**, **SMS gateways**, and **transactional email services**, enabling clinics to send reminders, prescriptions, treatment plans, lab reports, and payment alerts directly to patients in real time.

All communications are logged and linked to the corresponding patient record, ensuring traceability and audit readiness. Message templates are customizable and comply with consent and data protection guidelines.

This unified communication layer enhances operational efficiency, reduces no-shows, and improves the overall patient experience — all without requiring third-party tools or manual messaging.

165.12. Subdomain Setup for Each Clinic

Each clinic onboarded to the system will be assigned a dedicated subdomain (e.g., [clinicname.healthplatform.com](#)). This subdomain will serve as the unique digital space for the clinic, ensuring better brand identity, accessibility, and integration of public-facing and internal modules.

Subdomain setup includes:

Clinic-specific branding and logo

Secure HTTPS access (Wildcard SSL to be provided by the client)

Dedicated login portal for clinic users (staff, doctors, admin)

Linkage to the clinic's public microsite and patient portal

This approach enhances multi-tenancy, separates data access, and gives each clinic a professional online presence under the centralized SaaS platform.

5.13. Public Portal for Each Clinic

Alongside the core system, a custom public portal is created for every clinic — accessible via their subdomain. This patient-facing microsite helps promote the clinic,

increase appointment requests, and offer key patient services online.

Key features of the public portal:

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Doctor Profiles: Photos, specializations, available timings, and booking links

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Patient Reviews & Ratings: Authentic feedback section to build trust and transparency

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Clinic Overview: About the clinic, address with map, contact number, working hours

- **Online Appointment Request:** Simple form for patients to request visits without calling
- **Announcements/Notices:** Optional section for holiday notices, vaccination drives, Etc.

176. Pricing & Subscription Plans

The **Multi-Hospital Management System** is offered as a **comprehensive SaaS platform** with

all modules included under a single subscription. Clinics and hospitals do not need to purchase modules individually — every feature from appointment management to billing, lab

workflows, patient portals, CRM, and inventory is available by default, making it a seamless all-in-one healthcare solution.

To support various types and sizes of healthcare facilities, we offer flexible subscription models:

6.1. Monthly Subscription

Ideal for clinics looking to try the system before a long-term commitment

Includes all system features and updates

No long-term lock-in — cancel or upgrade any time

Perfect for new or small clinics with up to 5 doctors

Billed monthly per clinic/hospital

6.2. Quarterly Subscription

Suitable for medium-sized practices with predictable workflows

Includes priority support and system customization options

Slightly discounted compared to the monthly plan

Mid-sized dental clinics or hospitals benefit from better resource planning

Billed every 3 months per clinic/hospital

186.3. Annual Subscription

Best value for high-volume or multi-location facilities

Includes custom branding, clinic microsite, and premium support

Free migration assistance for existing data

Long-term clinics can lock in lower rates with full platform access

Billed once per year per clinic/hospital

7. Technology Stack

Component Technology

Backend Golang

Framework Echo

Frontend **Next.js** + Tailwind CSS

Database PostgreSQL

Containerization Docker

Authentication JWT

Search Engine Elasticsearch

Queue

Management

RabbitMQ

SMS service AWS SNS

Wildcard SSL To be provided by the client

9. Technical Approach

Golang (Backend)

Fast and efficient backend language ideal for high-concurrency healthcare SaaS applications.

Echo (Framework)

Lightweight and performant Go web framework for building RESTful APIs with role-based access and middleware support.

Next.js (Frontend)

Modern React-based framework offering server-side rendering for fast, SEO-friendly user interfaces.

Tailwind CSS (Frontend Styling)

Utility-first CSS framework for building responsive and visually consistent healthcare dashboards.

PostgreSQL (Database)

Robust relational database to manage structured healthcare data with strong support for complex queries and transactions.

Docker (Containerization)

Ensures consistent and scalable deployment across development, staging, and production environments.

JWT (Authentication)

Stateless token-based authentication mechanism used for secure, role-specific access control across modules.

ElasticSearch (Search Engine)

Powerful search engine to enable fast, filtered, and fuzzy search across patients, doctors, appointments, and reports.

RabbitMQ (Queue Management)

Manages asynchronous tasks such as sending WhatsApp/SMS alerts, feedback requests, and report generation.

AWS SNS (SMS Service Integration)

Used for delivering transactional and automated SMS alerts to patients and staff for appointment confirmations, reminders, feedback requests, and more.

Wildcard SSL Certificate

A wildcard SSL certificate (*
.yourdomain.com) must be procured and provided by the client. CloudHouse Technologies will assist with configuration and deployment during server setup.

1. Requirement**Analysis & UI/UX****Design**

4 Weeks Detailed discovery of clinic workflows, stakeholder interviews, and high-fidelity wireframes and prototypes for all modules and roles.

2. Backend**Architecture & API****Development**

8 Weeks Design of scalable architecture, multi-tenancy setup, secure REST APIs, database design, and all core services (auth, EHR, billing, lab, etc.).

3. Frontend**Development (Web****Portals)**

6 Weeks Development of responsive web interfaces using Next.js + Tailwind for all dashboards (Admin, Doctor, Receptionist, Patient, Superadmin).

4. Role-Based Features**& Integrations**

3 Weeks Implementing deep integrations: WhatsApp, SMS, patient portal access, CRM, consent forms, and lab

workflows with full role-based control.

5. QA, Testing & Bug

Fixing

2 Weeks End-to-end functional testing, performance validation, security audit, cross-browser and device testing, with iterative fixes.

6. Data Migration &

Deployment

Preparation

1 Week Preparing server, environment, container orchestration (Docker), clinic-specific data migration (if needed), and staging setup.

7. Final Deployment &

User Training

2 Weeks Deployment on production servers, domain configuration, walkthrough training for all roles, and final round of feedback collection.

12. SaaS Delivery Benefits

The Multi-Hospital Management System is delivered as a SaaS (Software as a Service)

platform — meaning clinics and hospitals can access all features via the internet without

worrying about infrastructure, maintenance, or manual updates. This modern delivery

model provides a wide range of operational, financial, and technological benefits for healthcare institutions of all sizes.

Here's how your clinic or hospital benefits from SaaS:

12.1. No Installation or Setup Required

Users can access the system directly through a browser — no need for local server setups, hardware installations, or complex configurations.

12.2. Quick Onboarding

Clinics can be onboarded and fully operational within hours. New doctors, branches, or

users can be added instantly without disrupting service.

12.3. Automatic Updates & New Features

All users receive updates simultaneously — including security patches, new modules, enhancements, and compliance features — without downtime or manual upgrades.

12.4. Enterprise-Grade Security

Data is stored securely in the cloud with encryption at rest and in transit. User activity

logs, role-based access control, and secure login mechanisms (e.g., JWT) ensure compliance with healthcare data standards.

12.5. Scalability On-Demand

Whether managing a single dental clinic or a network of hospitals, the system scales effortlessly. Add users, locations, and modules without needing IT support.

2512.6. Lower Upfront Costs

With SaaS, there are no infrastructure or licensing investments. Clinics pay a predictable

subscription fee that includes hosting, maintenance, and updates — reducing CapEx and

converting it into OpEx.

12.7. Multi-Device Accessibility

Doctors, staff, and administrators can securely access the platform via desktop, tablet, or

mobile browser — from the clinic, at home, or on the move.

12.8. Centralized Multi-Clinic Management

Superadmins and hospital groups can centrally monitor all clinics/hospitals from one dashboard — ideal for franchises or government health networks.

12.9. Data Backup & Disaster Recovery

Your data is automatically backed up and protected against accidental loss or system failures, ensuring continuity of care and audit-readiness.

12.10. Third-Party Integration Ready

Easily connect with WhatsApp, SMS gateways, payment gateways, CRM tools, and lab

systems — enabling seamless communication and automation.

12.11. Role-Based Multi-User Support

Supports multiple user types — doctors, nurses, admins, receptionists, lab staff — each

with customized dashboards and permissions.

12.12. Real-Time Reporting & Insights

Access dashboards and downloadable reports at any time — giving administrators full

visibility into appointments, revenue, inventory, and patient trends

26This SaaS model ensures that every clinic — whether rural or urban, small or large — can

operate with enterprise-level digital capability without investing in complex IT systems.

14. Conclusion

The Multi-Hospital Dental Management SaaS application is a transformative platform engineered to modernize how dental clinics operate, collaborate, and scale. It merges the power of cloud infrastructure with intuitive design and dental-specific workflows, offering an end-to-end solution from patient intake to lab work, billing, inventory, and beyond. With robust access control, integrated communication tools, financial and medical analytics, and patient engagement modules, the system not only boosts productivity but enhances patient satisfaction and clinic profitability. Our platform is ready for deployment and scale, offering you a future-ready foundation for managing dental healthcare operations.