SmartHealth360 – A Digital Health Monitoring Platform

1. Features

- User Dashboard: Overview of health metrics, activity, and goals.

- Vitals Tracking: Integration with smart devices (e.g., Fitbit, Apple Watch) to track heart rate, blood pressure, glucose, etc.

- Telemedicine: Real-time video consultations with certified doctors.

- AI Health Assistant: Chatbot-driven health advice and reminders.

- Reports: Monthly health summaries, downloadable as PDFs.

- Emergency Alert System: Automatic alerts to emergency contacts based on critical health events.

- Appointment Scheduler: Calendar and notification system for upcoming visits.

- Prescription Management: e-Prescriptions and reminders.

2. APIs

Authentication:

- POST /api/auth/login

- POST /api/auth/register

- POST /api/auth/logout

User Profile:

- GET /api/user/profile

- PUT /api/user/profile

Vitals:

- POST /api/vitals

- GET /api/vitals?date=YYYY-MM-DD

- GET /api/vitals/history

Appointments:

- GET /api/appointments
- POST /api/appointments
- DELETE /api/appointments/{id}

Consultations:

- POST /api/consultations/start
- GET /api/consultations/{id}
- POST /api/consultations/feedback

Reports:

- GET /api/reports/monthly
- GET /api/reports/download

3. Architectural Diagram

(Diagram representation)

```
Client (Web & Mobile)
      |
      v
  API Gateway
      |
      v
+----------------------+
|     Backend          |
|----------------------|
| - Auth Service       |
| - Vitals Service     |
| - Appointment Service|
| - Report Generator   |
| - Notification Engine|
+----------------------+
      |
      v
Database (PostgreSQL, Redis)
      |
      v
```

3rd-Party Services:
- Telemedicine SDK (Twilio)
- Health Data Sync (Apple HealthKit, Google Fit)

4. Tech Stack

Frontend: Angular 16, Tailwind CSS

Mobile: React Native

Backend: Node.js with NestJS

DB: PostgreSQL, Redis (caching), MongoDB (logs)

AI/ML: Python (FastAPI for health recommendations)

Auth: OAuth2, JWT

CI/CD: GitHub Actions, Docker, Kubernetes on AWS EKS

Monitoring: Prometheus + Grafana, ELK Stack

5. Software Architecture Document (SAD)

5.1 Overview

SmartHealth360 is a microservices-based architecture aimed at high scalability and reliability. Each service is independently deployable and follows DDD principles.

5.2 Key Modules

- User Management

- Vitals Ingestion & Storage

- AI Assistant Engine

- Video Consultation Service

- Notification & Alerts

5.3 Design Decisions

- Use of NestJS for structured server architecture.

- Decoupling via RabbitMQ between critical services (e.g., Vitals → Notification).

- Twilio for consultations to avoid reinventing video infra.

- AI assistant trained on anonymized patient interaction data (HIPAA-compliant).

5.4 Security

- HTTPS enforced throughout.

- Token expiration and refresh mechanisms.

- Encrypted data storage for sensitive information.

5.5 Deployment Strategy

- Blue/Green deployments using GitHub Actions.

- Rollbacks supported via versioned Docker containers.

6. Additional Metadata

Version: v1.0.0

Status: Beta

Compliance: HIPAA, GDPR

Data Retention Policy: 5 years

Supported Languages: English, Spanish, Hindi