



Dental Clinic Appointment Automation System

This repository contains an **n8n-based appointment automation system** for a dental clinic. It exposes APIs to:

- Fetch available appointment slots
- Book appointments
- Prevent double bookings
- Store appointments in Google Sheets
- Create Google Calendar events
- Return structured API responses

💡 Sticky Notes (Quick Understanding)

🟡 Sticky Note 1 – Purpose

Automate dental clinic appointments with real-time availability, conflict checking, calendar booking, and centralized storage.

🟡 Sticky Note 2 – Key APIs

- **GET Available Slots** → `/api/available-slots`
- **POST Book Appointment** → `/api/book-appointment`

🟡 Sticky Note 3 – Core Tools

- **n8n** → Automation engine
- **Google Sheets** → Appointment database
- **Google Calendar** → Doctor calendar & notifications

🟡 Sticky Note 4 – Safety Checks

- Input validation (email, duration, price)
- 24-hour advance booking rule
- Conflict detection against existing bookings

🟡 Sticky Note 5 – Outputs

- JSON API responses
- Calendar event for doctor
- Sheet records for admin & analytics



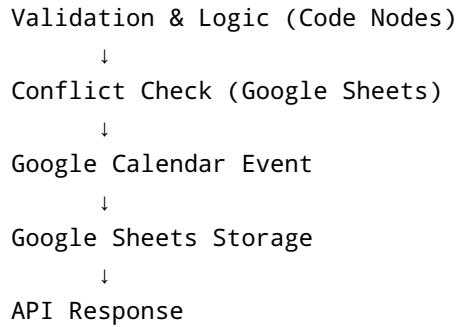
System Architecture

Client / Frontend



n8n Webhook APIs





👉 API Endpoints

🤩 Get Available Slots

Endpoint

```
GET /api/available-slots
```

Query Parameters | Parameter | Required | Description | |-----|-----|-----| | date | No | YYYY-MM-DD (defaults to today UTC) | | duration | No | Appointment duration in minutes (default 60) |

Logic - Reads existing bookings from Google Sheets - Applies clinic office hours (09-12, 13-17) - Removes conflicting & next-24-hour slots

Response Example

```
{
  "date": "2025-12-20",
  "duration": 60,
  "slots": [
    { "start": "09:00", "end": "10:00" }
  ],
  "totalAvailable": 1
}
```

😀 Book Appointment

Endpoint

```
POST /api/book-appointment
```

Request Body

```
{
  "name": "John Doe",
  "email": "john@email.com",
  "phone": "123456789",
  "service": "Dental Cleaning",
  "date": "2025-12-22",
  "time": "14:00",
  "duration": 1,
  "staff": "Dr. Smith",
  "price": 50
}
```

Workflow Steps

1. Validate request fields
2. Generate unique booking ID
3. Combine date & time into ISO format
4. Check conflicts against Google Sheets
5. Create Google Calendar event
6. Store booking in Sheets
7. Return success or failure response

Success Response

```
{
  "status": "success",
  "booking_id": "BK-123456",
  "message": "Appointment booked successfully",
  "date": "2025-12-22",
  "time": "14:00"
}
```

Failure Response

```
{
  "status": "error",
  "message": "Time slot no longer available"
}
```



Data Storage (Google Sheets)

Sheet: Appointments

Stores confirmed bookings - Booking ID - Patient Name - Email - Phone - Appointment Date & Time - Status - Price

Sheet: Analytics

Used for reporting & tracking trends

Calendar Integration

- Creates event in **Google Calendar**
- Event includes:
 - Patient name
 - Service type
 - Booking ID
 - Staff member
 - Price

This acts as the **doctor notification system**.



Validation & Error Handling

- Missing fields → workflow error
 - Invalid email → rejected
 - Overlapping appointments → blocked
 - Invalid date/time → rejected
-



Setup Instructions

1. Import workflow JSON into n8n
 2. Configure credentials:
 3. Google Sheets OAuth
 4. Google Calendar OAuth
 5. Update:
 6. Calendar ID
 7. Spreadsheet ID
 8. Activate workflow
-

Cost Estimation

Below is an **estimated monthly cost breakdown** for running this Dental Clinic Appointment Automation system. Costs may vary based on usage and region.

Platform & Infrastructure Costs

Component	Tool	Estimated Cost / Month
Automation Engine	n8n Cloud (Starter)	\$20 – \$50
(Alternative)	Self-hosted n8n (VPS)	\$10 – \$25

Google Workspace Services

Service	Usage	Cost
Google Sheets API	Appointment storage	Free (within limits)
Google Calendar API	Doctor scheduling	Free (within limits)
Google Workspace Account	Required for Calendar & Sheets	\$6 – \$12 / user

Notification Costs (Optional)

Channel	Provider Example	Estimated Cost
Email	Gmail / SMTP	Free
SMS	Twilio	\$0.007 – \$0.01 per SMS
WhatsApp	Twilio / Meta	\$0.03 – \$0.05 per message

Example Monthly Scenario

Assumptions: - 300 appointments/month - 1 reminder SMS per appointment - n8n Cloud Starter plan

Item	Cost
n8n Cloud	\$20
Google Workspace	\$6
SMS (300 × \$0.01)	\$3

Item	Cost
Total Estimated Cost	~\$29/month

⌚ Scaling Cost Considerations

- More doctors → additional Google Workspace users
 - Higher bookings → SMS/WhatsApp costs increase linearly
 - Self-hosting n8n reduces platform cost but adds server maintenance
-

⌚ Future Enhancements

- SMS / WhatsApp reminders
 - Appointment cancellation endpoint
 - Admin dashboard
 - Multi-doctor availability
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👂 Suggested GitHub Repo Structure

```
📦 dental-appointment-automation
├── 📄 README.md
├── 📁 n8n-workflows
│   └── 📄 appointment-automation.json
├── 📁 docs
│   └── 📄 api-reference.md
└── 📄 LICENSE
```

👉 License

MIT License – Free to use and modify

💡 **Cost Optimization Tips** - Use email reminders instead of SMS where possible - Self-host n8n for high-volume clinics - Archive old Google Sheet records to keep performance high

👉 Maintained by

Dental Clinic Automation using **n8n + Google Workspace**