

AI Voice Appointment Booking & Patient Intake System

Implementation notes for the five-workflow Brightline Dental Studio demonstration system.

Vapi

n8n

Google Calendar

OpenAI / LLM

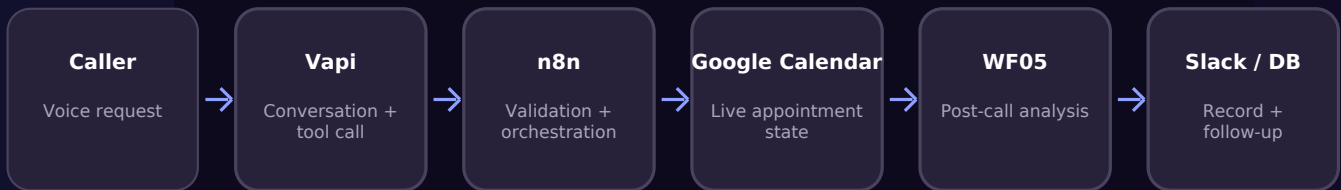
PostgreSQL

Slack

SYSTEM PURPOSE

The system acts as an AI voice front desk for appointment coordination. It separates live appointment actions from post-call intelligence so the voice agent can respond quickly while n8n enforces validation, calendar safety, persistence, and staff escalation.

HIGH-LEVEL ARCHITECTURE



1. TOOL CONFIRMATION

The assistant does not claim booking, rescheduling, or cancellation succeeded until the connected workflow returns a successful result.

2. PRESERVE CONTEXT

Confirmed caller details are retained across the call. If one field is corrected, only that field is re-collected.

3. CALENDAR SAFETY

Booking performs a final availability check. Rescheduling updates the existing event. Cancellation requires explicit confirmation before deletion.

4. HUMAN ESCALATION

Calls that need staff attention are captured post-call, summarized, stored, and routed to Slack without falsely promising a callback time.

WF01-WF04

These workflows are invoked during the voice conversation through dedicated Vapi tools.

WF01

Check Appointment Availability

Vapi tool: check_availability

FLOW

Webhook -> Normalize request -> Generate candidate slots -> Google Calendar availability -> Filter available slots -> Respond to Vapi

OUTPUT

Returns only real available times. Caller contact details are not required just to check availability.

WF02

Book Appointment

Vapi tool: book_appointment

FLOW

Webhook -> Normalize booking -> Validate required data -> Build slot -> Final availability check -> Create Google Calendar event -> Format confirmation

OUTPUT

Creates one 30-minute appointment only after validation and a final calendar check.

WF03

Reschedule Appointment

Vapi tool: reschedule_appointment

FLOW

Webhook -> Validate caller + current appointment -> Find calendar event -> Match name/phone/email -> Build replacement slot -> Check availability -> Update same event

OUTPUT

Moves the existing event instead of creating a duplicate. Original appointment remains unchanged if the new slot is unavailable.

WF04

Cancel Appointment

Vapi tool: cancel_appointment

FLOW

Webhook -> Validate caller + current appointment -> Find event -> Resolve exact match -> Delete existing event -> Return success

OUTPUT

Cancellation is treated as a destructive action and requires caller confirmation before the tool is invoked.

SHARED LIVE-CALL RULES

All live workflows normalize Vapi tool-call payloads, return Vapi-compatible toolCallId responses, and use HTTP 200 for handled validation failures so the assistant can recover conversationally. Calendar nodes use Asia/Manila date-time handling.

WF05 - Call Result Capture & Follow-Up Intelligence

Runs after the conversation ends using Vapi end-of-call-report events.

WF05

Call Result Capture & Follow-Up Intelligence

Vapi event: end-of-call-report

FLOW

Webhook -> Validate event type -> Normalize call metadata -> AI Analyze Call
-> Prepare Call Record -> PostgreSQL upsert -> IF follow-up needed -> Slack alert

OUTPUT

Stores each completed call and escalates only unresolved or human-assistance cases.

AI EXTRACTED FIELDS

caller_name
callback_phone
callback_email
call_intent
appointment_action
outcome
summary
follow_up_needed
follow_up_reason

STORED CALL METADATA

call_id (primary key)
call_type / caller_phone
started_at / ended_at
duration_seconds
ended_reason / cost_usd
transcript / recording_url
messages / raw_analysis
source / created_at

FOLLOW-UP ROUTING LOGIC

FALSE - NO FOLLOW-UP

Successful booking, rescheduling, cancellation, or resolved availability checks are saved to PostgreSQL and the workflow ends without notifying staff.

TRUE - STAFF FOLLOW-UP

Human assistance requests, unresolved appointment problems, or technical failures produce a Slack alert containing caller name, callback number, intent, appointment action, outcome, summary, follow-up reason, duration, call ID, and recording link.

SLACK ALERT - EXAMPLE OUTPUT

AI Voice Call Follow-Up Needed
Caller: Marco Reyes | Callback: 09175550168
Intent: reschedule | Appointment Action: none | Outcome: needs_follow_up

Summary: Marco requested help locating and rescheduling an existing appointment and asked clinic staff to follow up.
Follow-Up Reason: Caller requested a callback from clinic staff for help rescheduling.

Validated live: appointment actions, end-of-call report, AI extraction, PostgreSQL upsert, and conditional Slack routing.