Agentic Trades Voice Agent - Detailed Design

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Complete Repository Description

This repository contains a production-ready voice scheduling API integrated with OpenAI Realtime for live calls, Twilio for PSTN bridging, Stripe for deposits, Postgres/PostGIS for data and dispatch, and CloudWatch for metrics.

```
./
  .env.example
  Dockerfile
  README.md
  docker-compose.yml
  package.json
  tsconfig.json
  migrations/
    001_init.sql
    002_schema.sql
  src/
    index.ts
    lib/
      config.ts
      db.ts
      metrics.ts
    services/
      notify.ts
      payments.ts
      pricing.ts
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    routes/
      api.ts
      health.ts
      payments.ts
      voice.ts
    llm/
      agent.ts
  docs/
    Architecture.pdf
    Design.pdf
    Runbook.pdf
    architecture-diagram.png
```

File-by-File Descriptions

- **.env.example** — Documented env variables for local/prod.

- **Dockerfile** — Container build: installs deps, builds TS, starts server.

- **README.md** — Top-level overview, quickstart, endpoints, operations notes.

- **docker-compose.yml** — Local dev: PostGIS container + API service.

- **package.json** — NPM metadata; scripts (dev/build/migrate/lint/format).

- **tsconfig.json** — TypeScript compiler settings.

- **migrations/001_init.sql** — Enables Postgres extensions (postgis, pgcrypto).

- **migrations/002_schema.sql** — Full business schema with functions and views.

- **src/index.ts** — Server bootstrap: registers plugins (websocket, CORS, rate-limit, rawBody), mounts routes, listens.

- **src/lib/config.ts** — Environment schema & validation via zod; centralizes config values.

- **src/lib/db.ts** — Postgres connection pool.

- **src/lib/metrics.ts** — CloudWatch helper to publish custom metrics.

- **src/services/notify.ts** — Twilio SMS sender.

- **src/services/payments.ts** — Stripe client + Checkout Session creator for deposit links.

- **src/services/pricing.ts** — PricingEngine: computes quote, emergency and complexity multipliers.

- **src/services/scheduling.ts** — SchedulingEngine: generates open 2-hour slots excluding existing jobs.

- **src/routes/api.ts** — Business API: realtime summary, manual booking, analytics, competitive position, listings.

- **src/routes/health.ts** — Health endpoint with DB check.

- **src/routes/payments.ts** — Stripe webhook (/webhooks/stripe); verifies signature; marks deposit paid.

- **src/routes/voice.ts** — Twilio webhook (/incoming) + WS /media endpoint. Wires OpenAI Realtime session and logs agent turns.

- **src/llm/agent.ts** — OpenAI Realtime agent + session builder for Twilio audio; includes pricing/scheduling/booking/escalation tools.

- **docs/Architecture.pdf** — Architecture doc with diagram.

- **docs/Design.pdf** — Detailed design and repo map.

- **docs/Runbook.pdf** — Operational run book.

LLM Agent

The LLM resides in src/llm/agent.ts and runs the RealtimeAgent with custom tools. The /media WebSocket binds Twilio audio to the session and captures agent turns for QA.

Security

Twilio signature validation; Stripe webhook signature; rate-limiting; environment validation.

Data Flow

Voice -> Twilio -> /incoming -> /media -> Realtime session -> Tools -> DB/Stripe -> Notifications; webhooks update job deposit status.

Database

Schema includes customers, jobs, calls, agent_turns, metrics, and dispatch entities; PostGIS used for territory/technician proximity logic.