



RECEIPTRADAR

A Privacy-First, Self-Hosted Financial Operating System

By Minh Triet Vu

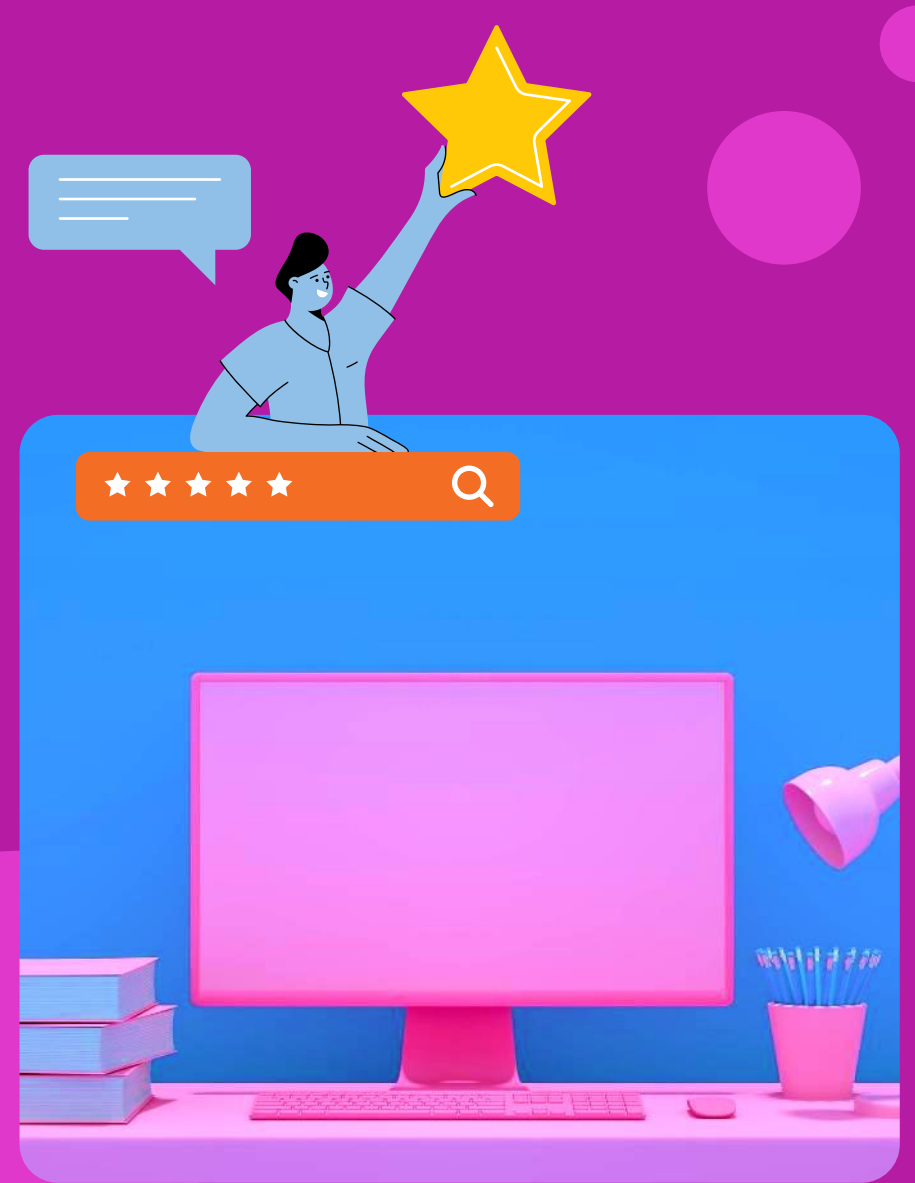
FINANCIAL BLIND SPOTS



- Tracking expenses manually is high-friction and error-prone
- **Current Market Failures:**
 - Manual Apps
 - Bank Sync
 - Commercial Scanners
- **The mission: To build to zero friction, real-time tracker that acts like an accountant in your pocket, with data privacy in mind**

YOUR ACCOUNTANT IN WHATSAPP

- Core concept: A headless, chat-based interface powered by a self-hosted AI backend
- Features:
 - Smart vision: Instantly reads receipt photos, extracting vendors, dates, and line items
 - Intent Understanding: Handles natural language commands like "Set food budget to \$500" without buttons
 - Live Visualization: Auto-generates professional financial dashboards in Google Sheets
 - Privacy-First: Self-hosted architecture ensures financial data never leaves the user's-controlled ecosystem





SYSTEM DESIGN & STACK

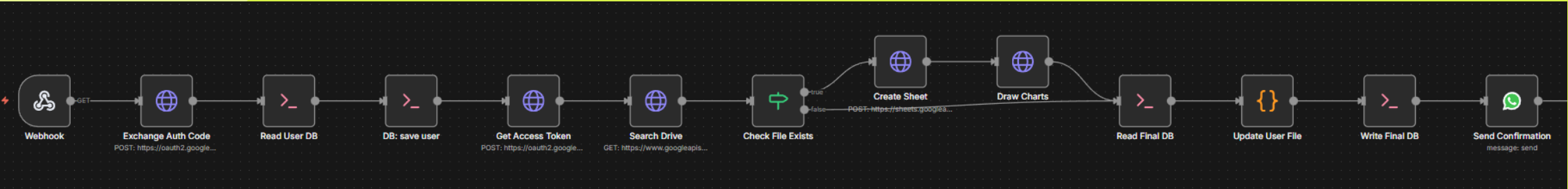
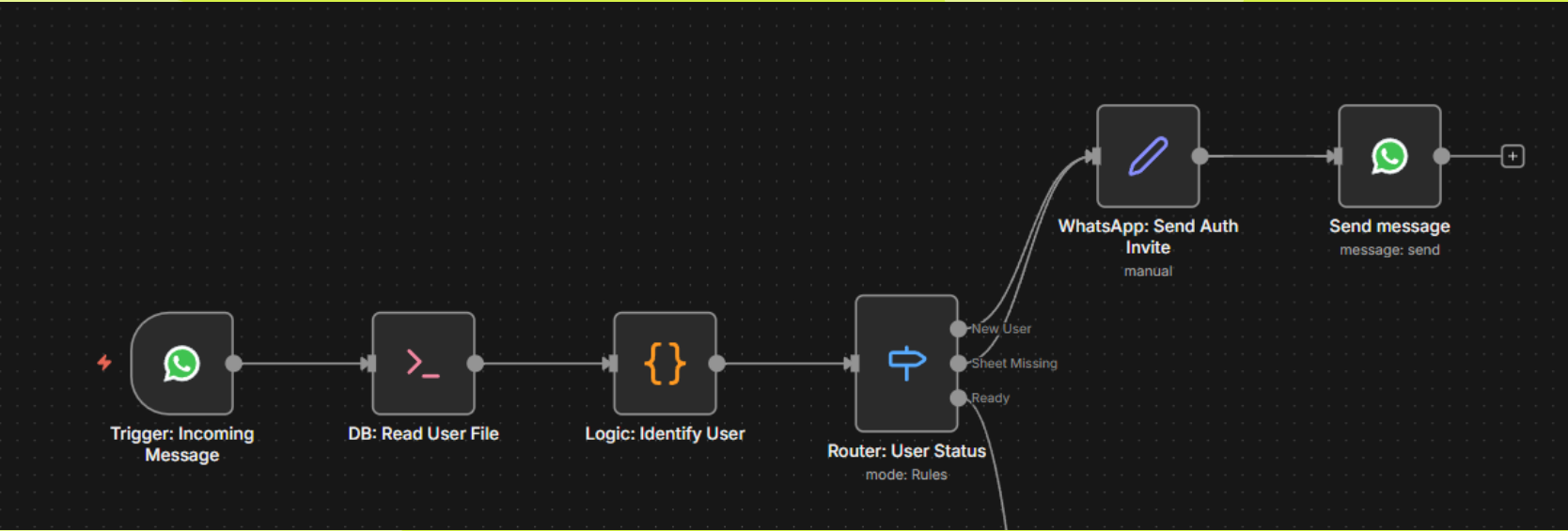
Infrastructure:

- Containerization: Docker & Docker Compose
- Orchestration: n8n
- Tunneling: Ngrok

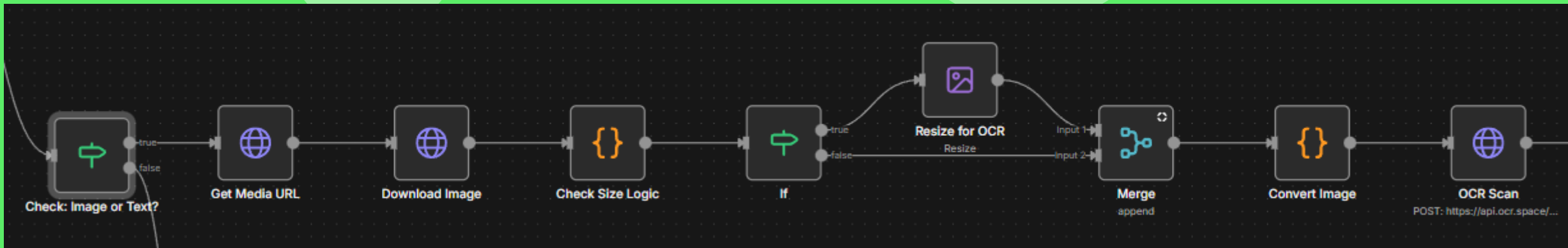
Tech Stack:

- Frontend: WhatsApp Cloud API.
- Database: JSON-based state management (Hot-swappable to PostgreSQL).
- AI Layer: Google Gemma 3 (via OpenRouter) + OCR.space.
- Storage: Google Sheets API v4.

HEADLESS AUTHENTICATION



INTELLIGENT IMAGE PROCESSING



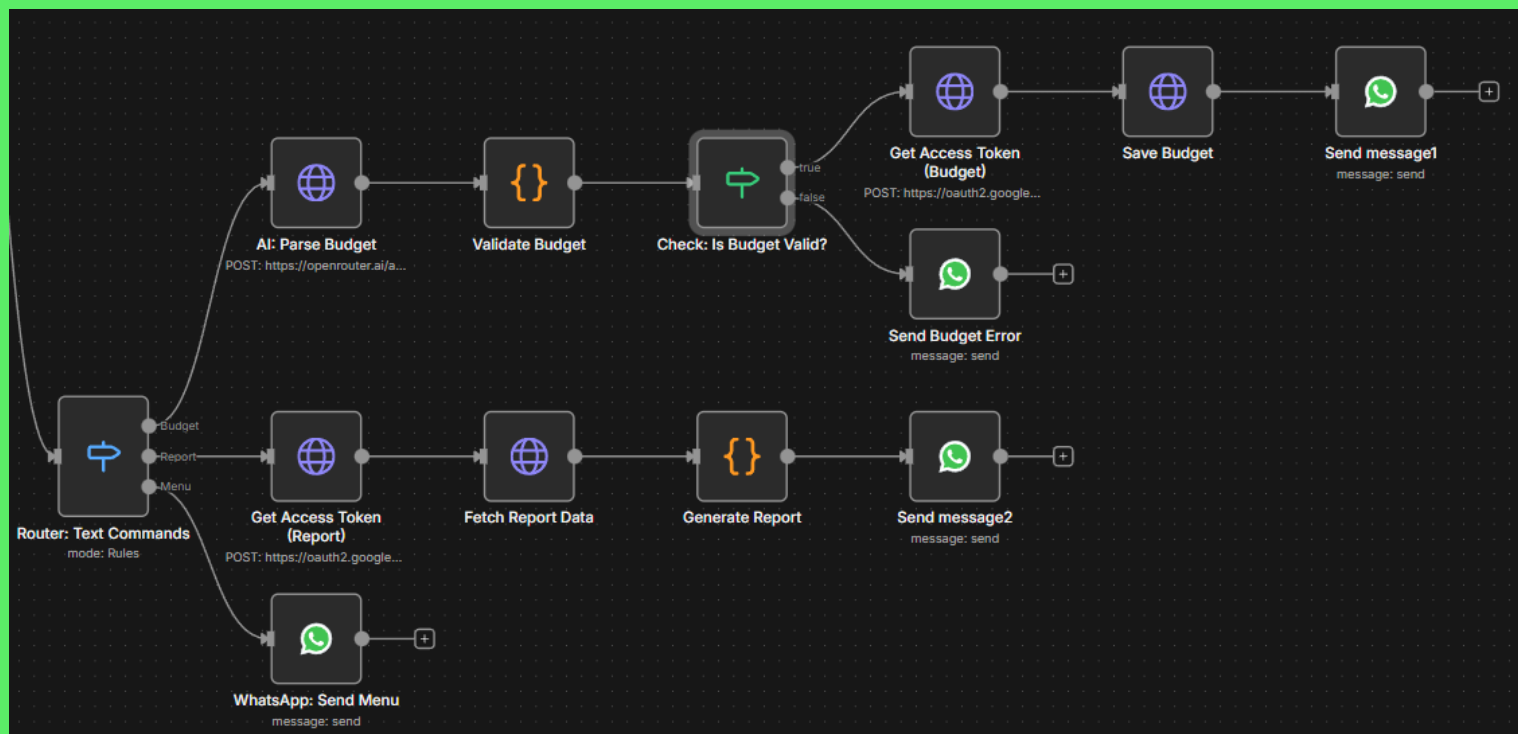
- **Challenge: Balancing API limits**
- **Solution:**
 - Analysis: System checks payload size/dimensions
 - The fork:
 - > 1MB: Route through Resize Node (Downscale to 1600px)
 - < 1MB: Bypass directly to preserve maximum fidelity
 - The merge: Path reconverge for Base64 conversion and AI ingestion

AI ANALYSIS & DATA LOGIC



- The AI Layer:
 - Contextual Correction: Fixes OCR errors
 - Smart Categorization
- Backend logic:
 - Deduplication:
 - Batching

NATURAL LANGUAGE COMMAND CENTER



Setup Complete! 🚀

I have successfully connected to your spreadsheet:

📄 **YOUR AI TRACKER**

🤖 HOW TO USE ME

📷 Scan a Receipt

Just send me a photo! I will extract the data and log it.

💰 Set Budgets

Type Budget to set your monthly spending limits.

📊 Check Spending

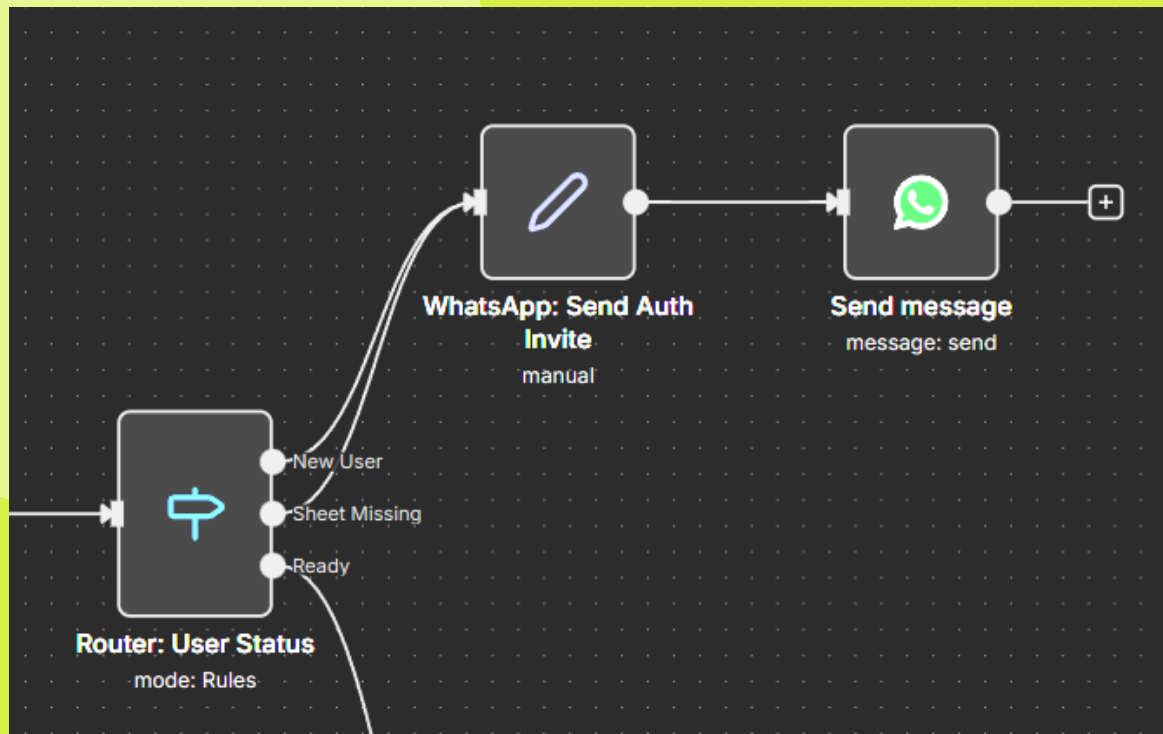
Type Report to see how much you have spent.

❓ Need Help?

Type Menu to see this list again.

Ready when you are! Try sending a receipt photo now. 📌 8:25 p.m.

HANDLING EDGE CASES

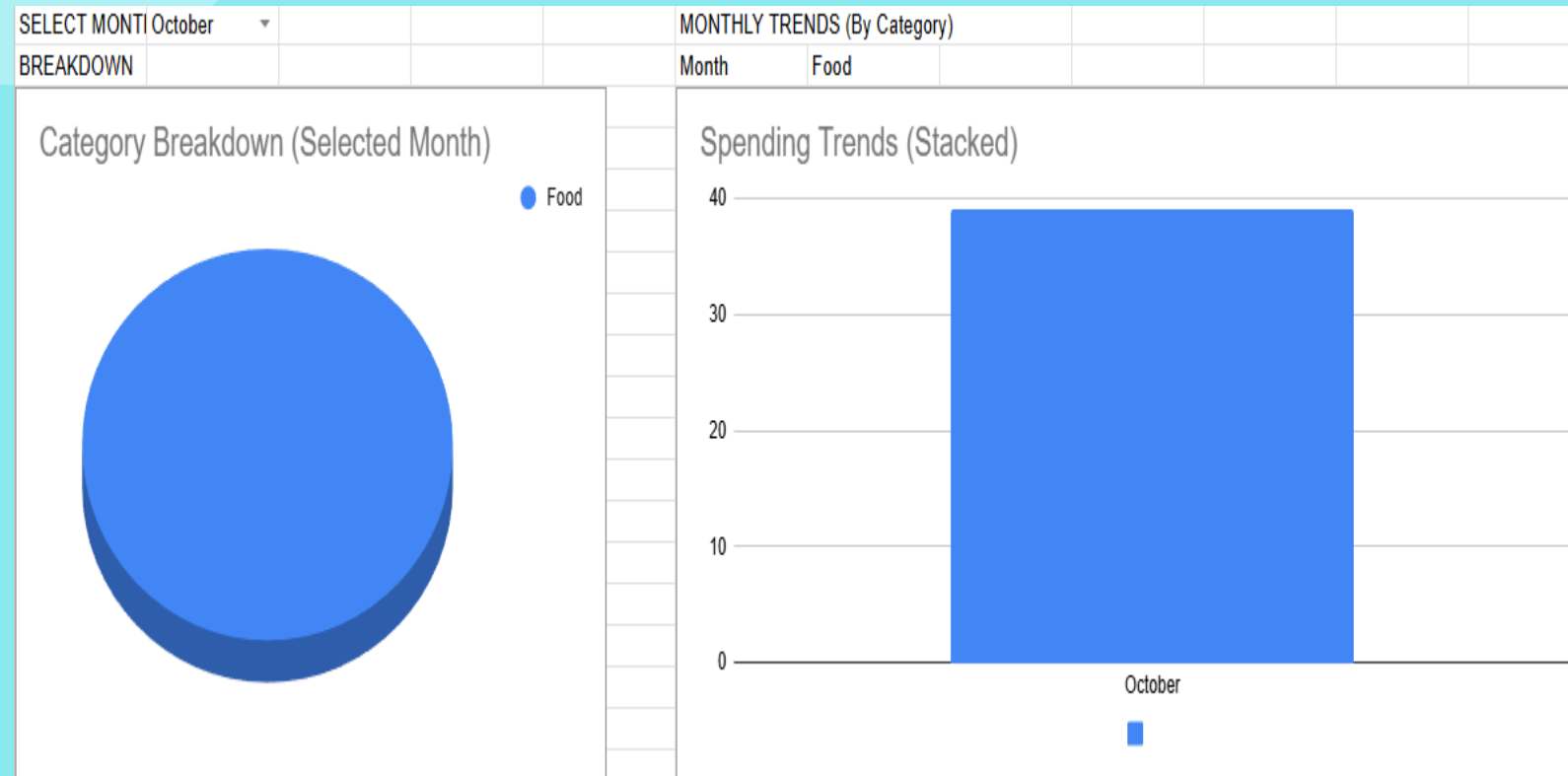


- The Scenario: A “zombie user”
- The Challenge: A valid auth token pointing to a missing resource
- The Solution: Intelligent Routing
 - Router Node validates 2 flags: User Exists? And Sheet ID Valid?
 - Auto-repair: Sheet ID is missing, reroute user back to Onboarding Flow

INSTANT FINANCIAL CLARITY AND PRIVACY

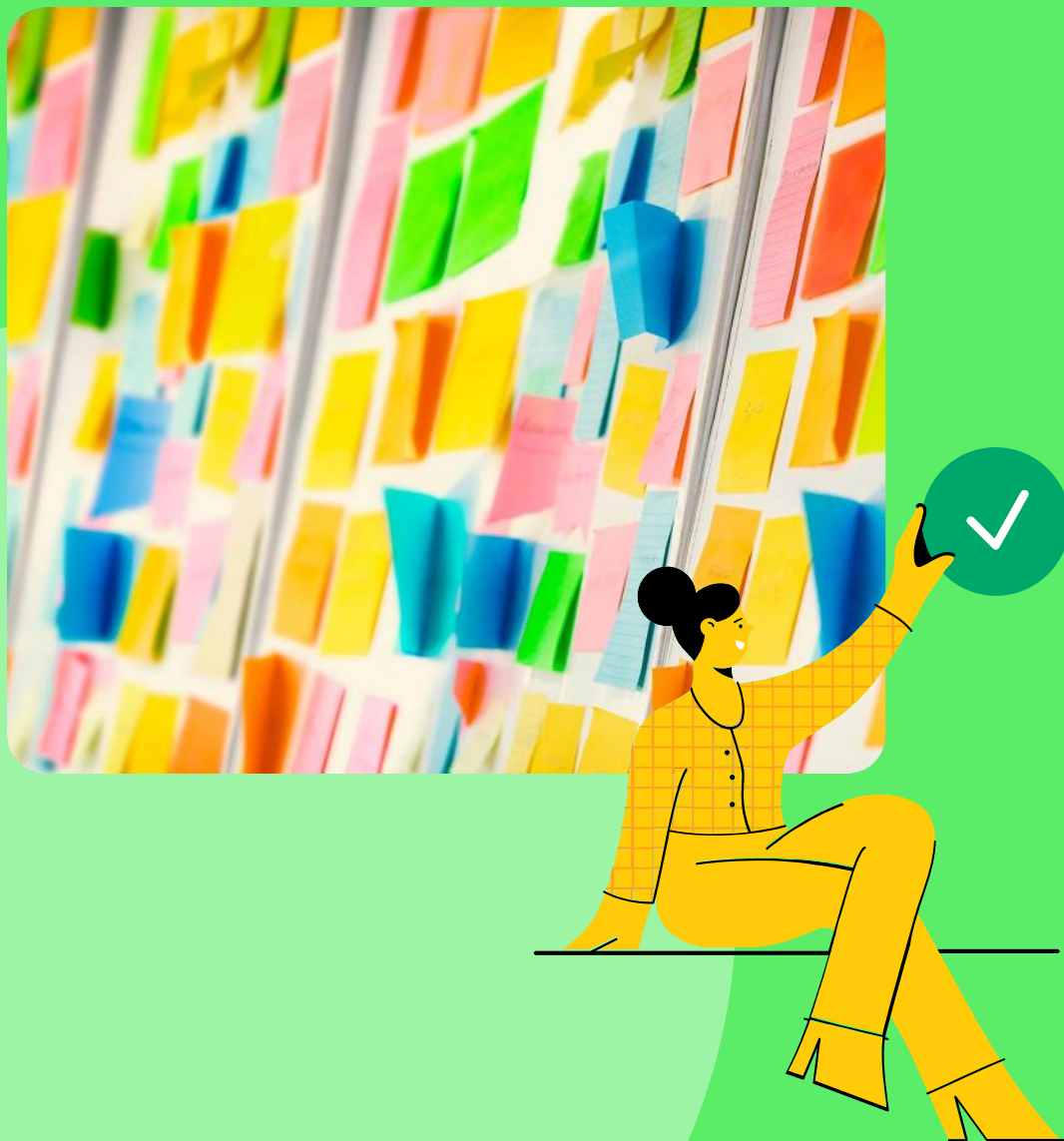
- **The Engineering:**

- Programmatic Build: The system uses the Google Sheets API batchUpdate method.
- Dynamic Injection:
 - Injects complex =QUERY() formulas for real-time pivot tables
 - Creates Data Validation dropdowns for date filtering
 - Generates native Charts (Pie & Stacked Bar) that update live



FUTURE ROADMAP

- **Scalability:** Switch JSON storage to Postgre
- **Temporal Scaling:** Aggregates data by Month Name
- **Conversational Analytics**
- **Duplicate Detection Engine**
- **Multi-Currency Support**
- **Multi-Language Support**



THANK YOU

