

Architecture of Parity: Mio v0.0.5

Photos, Voice, and the Security Gauntlet

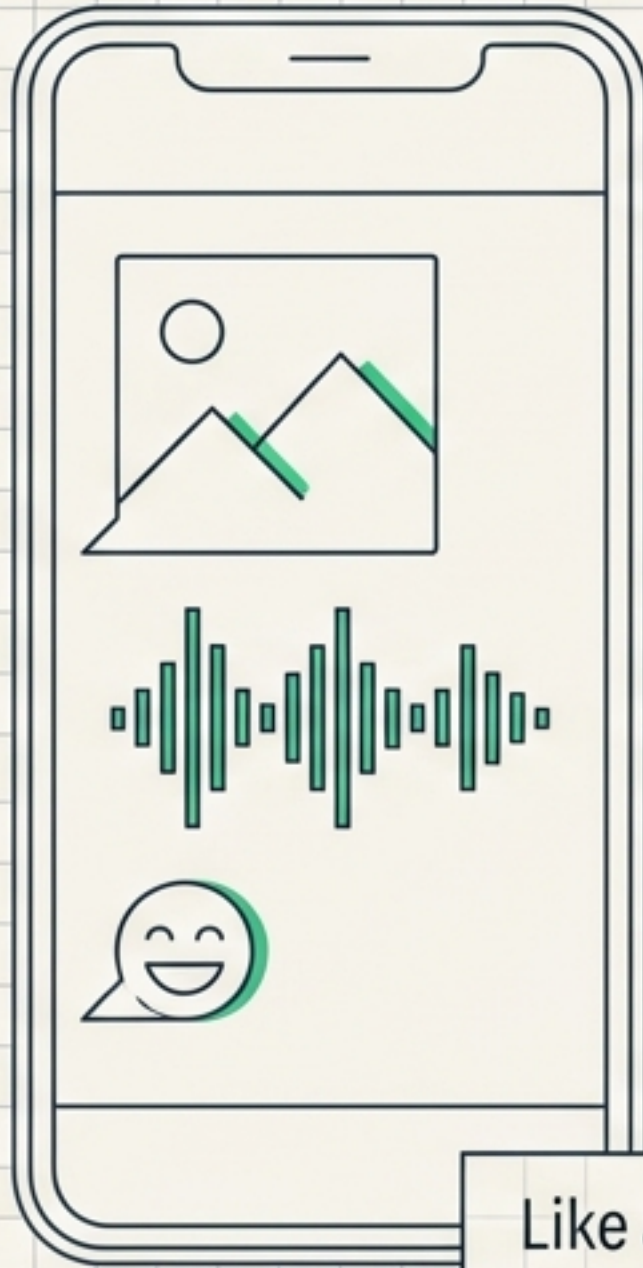
FILES_CHANGED: 38

LINES_ADDED: 3,009

TIME_TO_RELEASE: 28m 00s

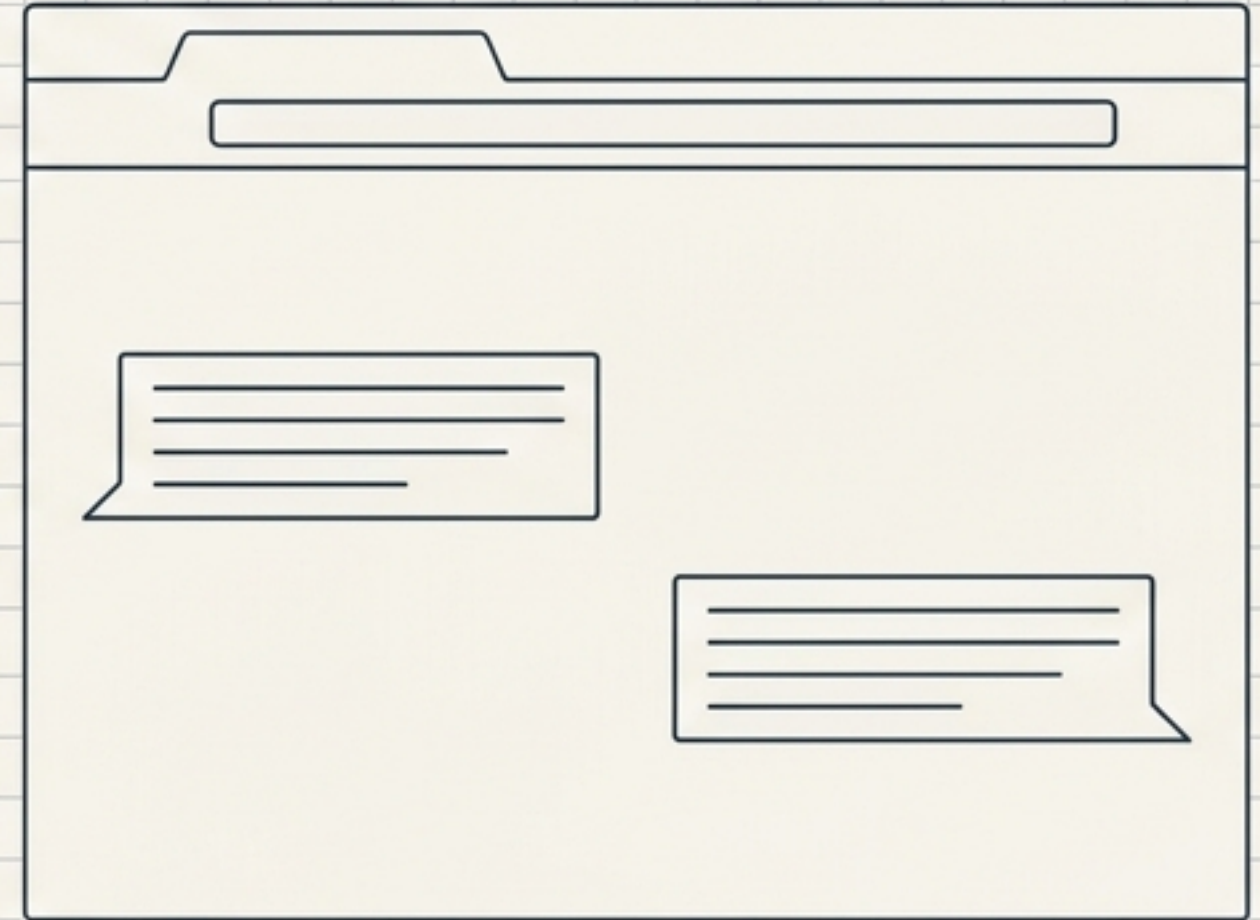
CORE_OBJECTIVE:
Telegram/Web Feature Parity

MULTIMODAL (Since v0.0.2)



Like a phone with no camera. The web chat looked real, but lacked the core interactions required for a modern messaging loop.

TEXT-ONLY (v0.0.4)

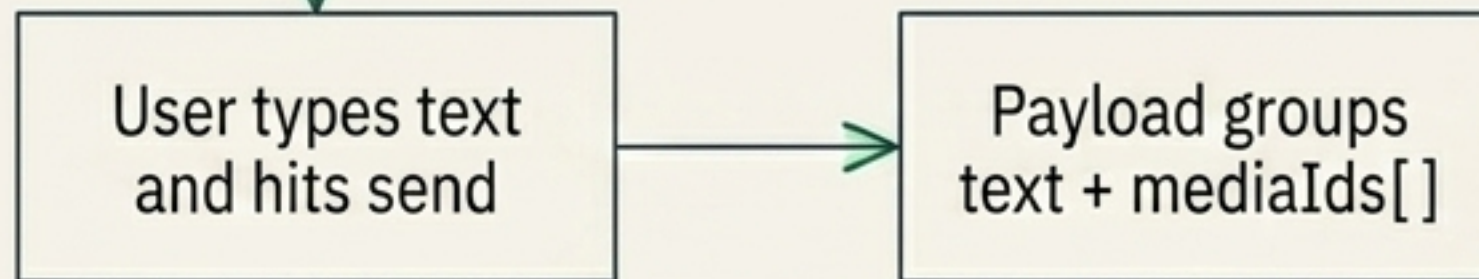


Two-Phase Upload Architecture

Phase 1: Upload



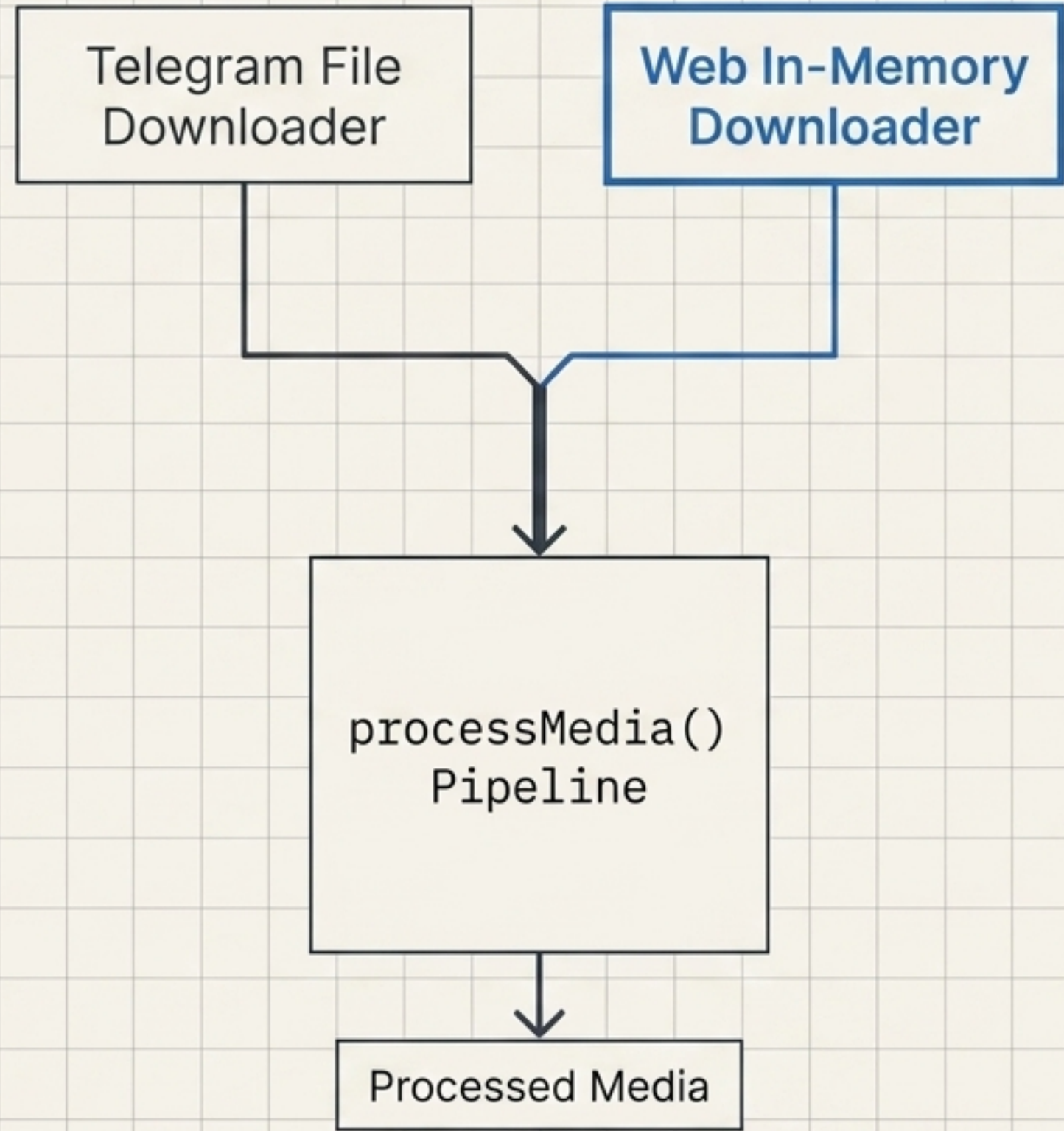
Phase 2: Send



Insight: upload != send. Separating operations enables graceful error handling, UI progress states, and attachment review before commitment.

Upload vs. Send Diagnostic Matrix

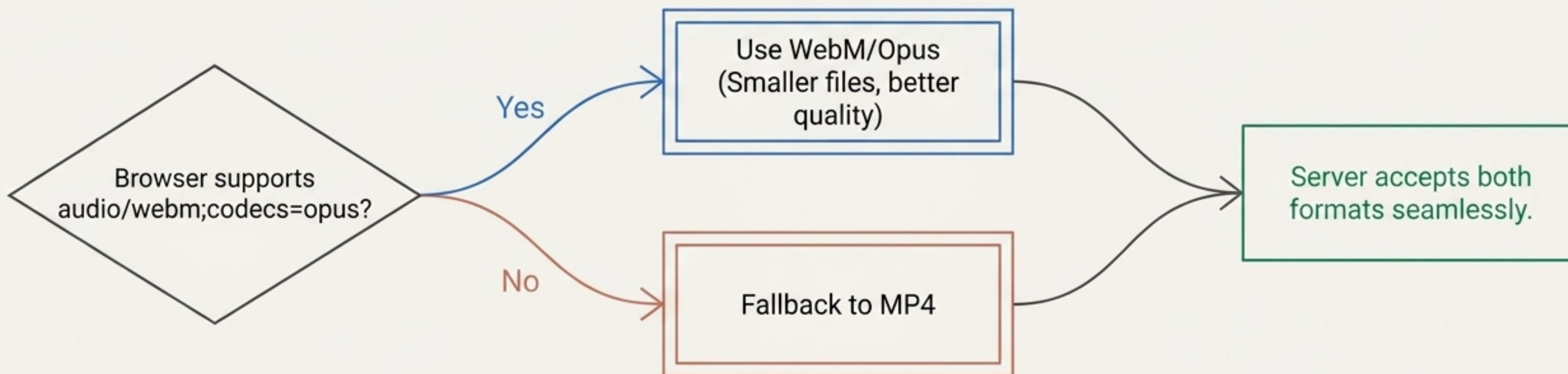
	Phase 1: Upload	Phase 2: Send
Endpoint	POST /chat/media	POST /message
Action	Client streams file bytes to server immediately.	Client transmits composed message payload.
Primary Payload	Raw media buffer.	text + mediaIds[] array.
Critical Failure Modes	Invalid file format, File size limit exceeded, Server memory pressure.	Authentication failure, Rate limiting.



One pipeline. Two input sources. Zero duplicated processing logic. The web downloader wraps uploaded buffers in the exact same interface Telegram uses.

Browser Codec Negotiation Logic

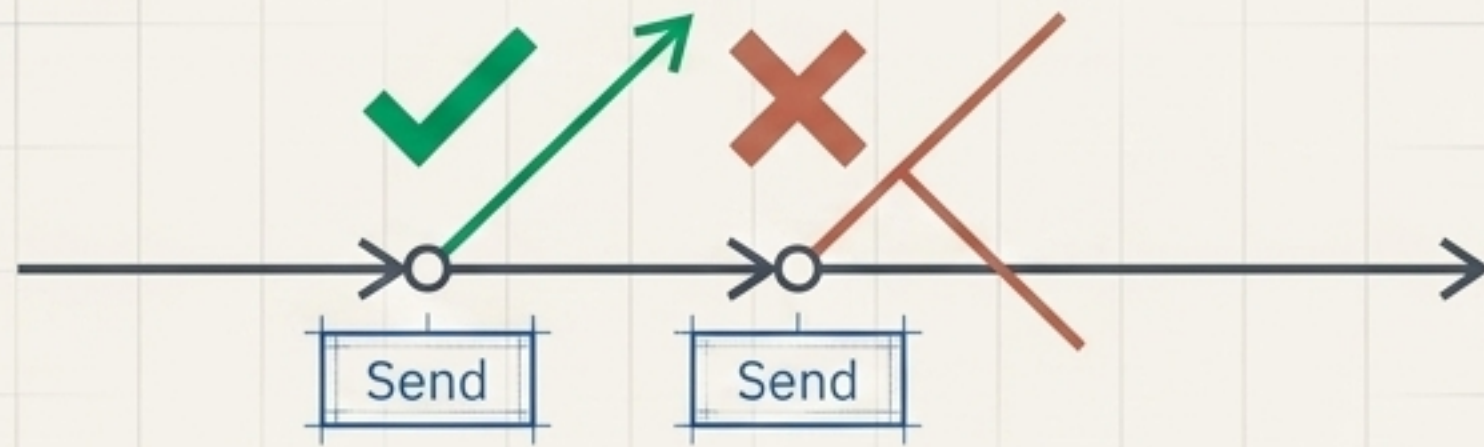
	Chrome	Safari	Firefox
Native Opus Support	Yes	Historically No	Variable
Target Codec	audio/webm;codecs=opus	audio/mp4	Negotiated



The Voice Double-Send Guard

Implemented a `sendingVoiceRef` with a `try/finally` block to prevent concurrent firing of async flows.

Included mic permission error toasts and a hardcoded 5-minute maximum recording limit.

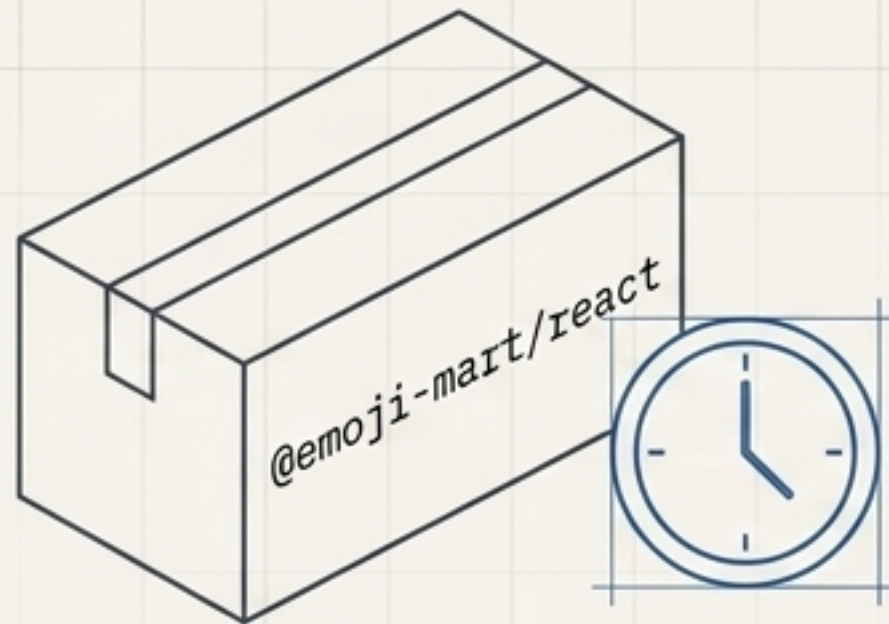


Rapid Double-Tap

The Emoji Payload

The emoji picker is a heavy component. Implemented lazy loading to protect initial page load speeds.

Includes full Chinese locale integration.



Delayed Loading

The Environment vs. Database Matrix

v0.0.4 & Earlier: Hardcoded Env Vars

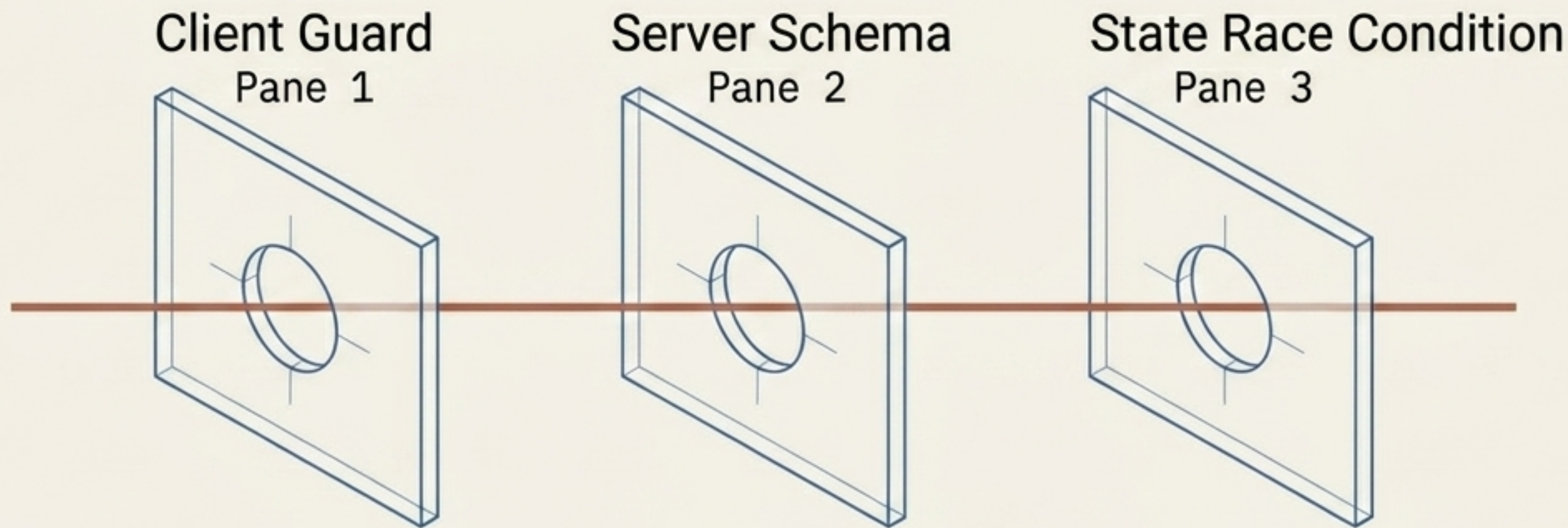
- Stored in `.env`
- Requires full server redeploy to add/remove users
- Developer-only access

v0.0.5: Database & Admin UI

- Migrated to `telegram_allowlist` table ([Migration 0003](#))
- In-memory cache backed by DB with startup preload
- UI Admin Panel at `/admin`
- Env var retained strictly as a fallback

From developer tool to operational product.

The Silent Voice Bug: A Three-Layer Failure Vector



Client Guard

`flushToServer` early return. Voice-only messages lacked text, tripping the non-empty check and silently discarding the payload.

Server Schema

`ChatSchema` used `.min(1)`. The server rejected empty text strings even if `mediaIds` existed.

State Race Condition

`setTimeout(500)` waited for state updates before reading `mediaIds`, creating unreliable timing.

The Heartbeat NULL Threshold Fix



User Onboarding Complete

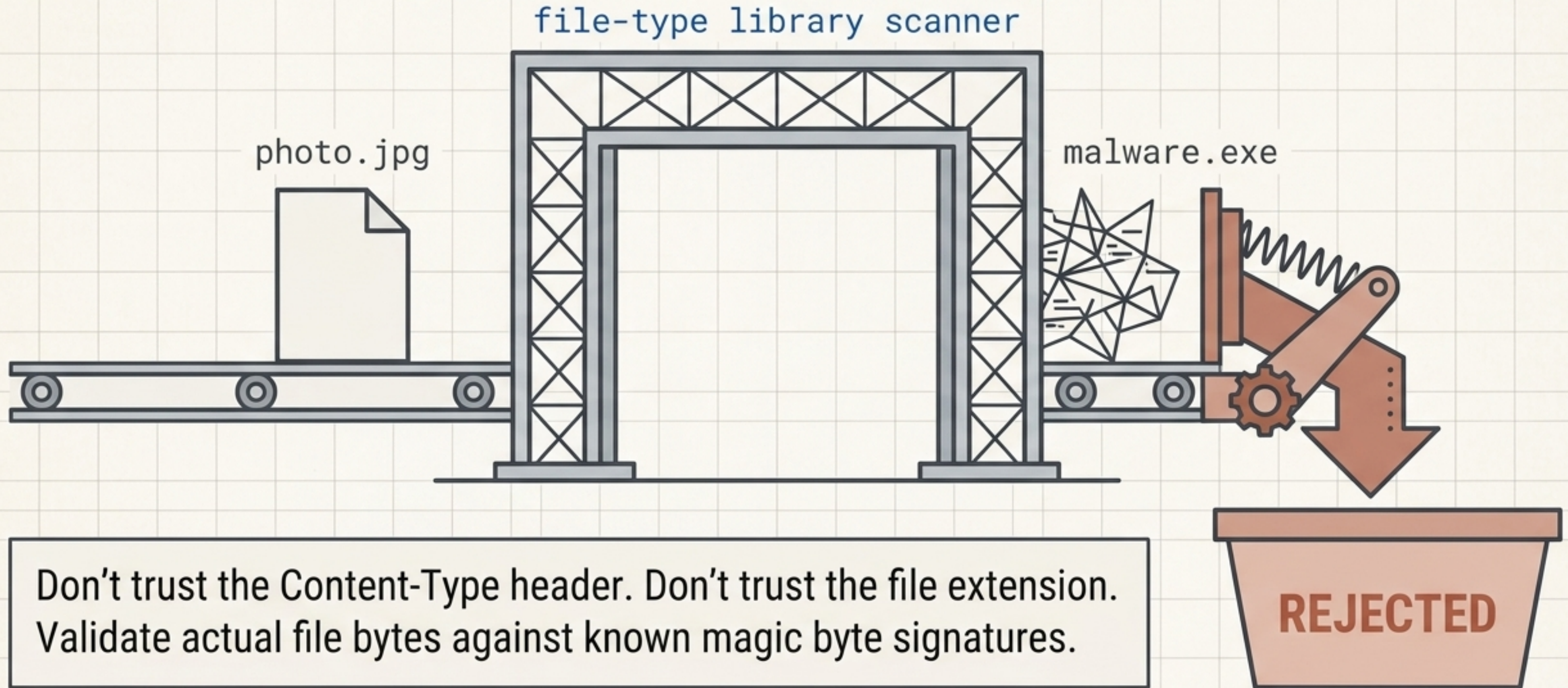
The Stale Threshold

`lastMessageAt = NULL`

	<code>NULL < Threshold = NULL (Drop)</code>
	Result: New users were silently excluded from proactive messaging.

The Fix: Adding "OR `lastMessageAt IS NULL`" ensures Mio reaches out, saving the critical first impression.

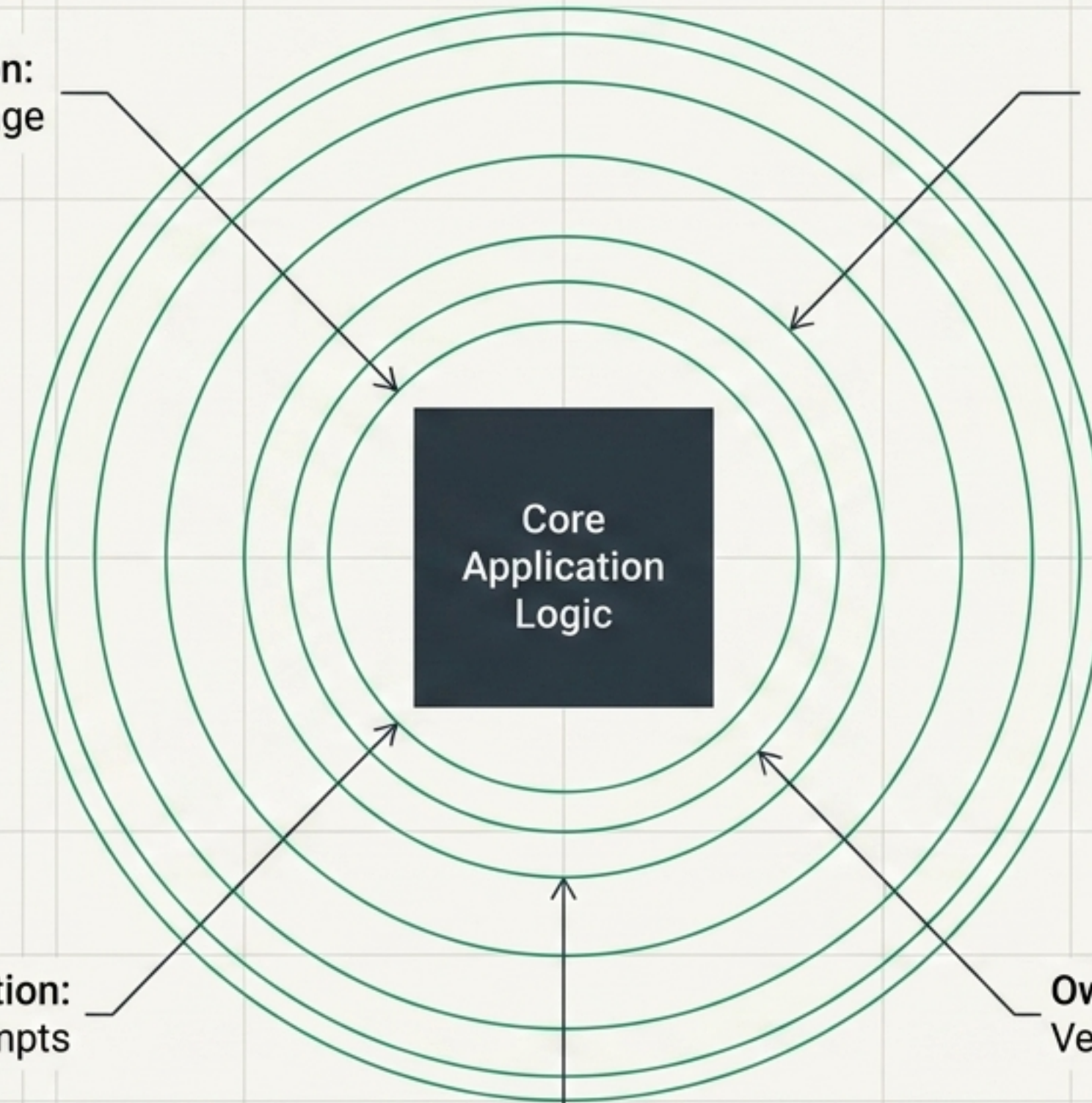
Data Validation Logic: Byte-Level Verification



17 Security Issues Found & Fixed Across 2 Audit Iterations

Reflected Error Truncation:
Prevents payload information leakage

Global Memory Cap: 500MB
limit & max 3 files per user



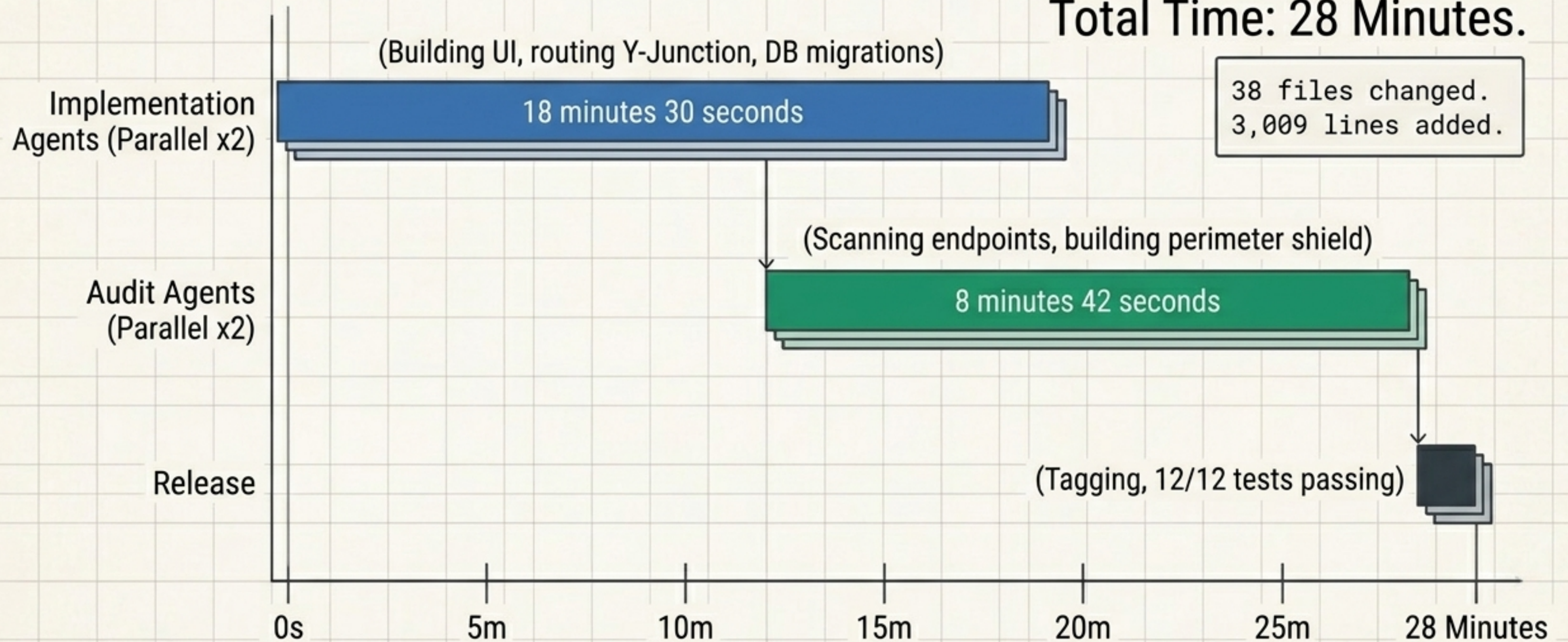
Filename Sanitization:
Strips path traversal attempts

Ownership Checks:
Verifies userId on web downloader closure

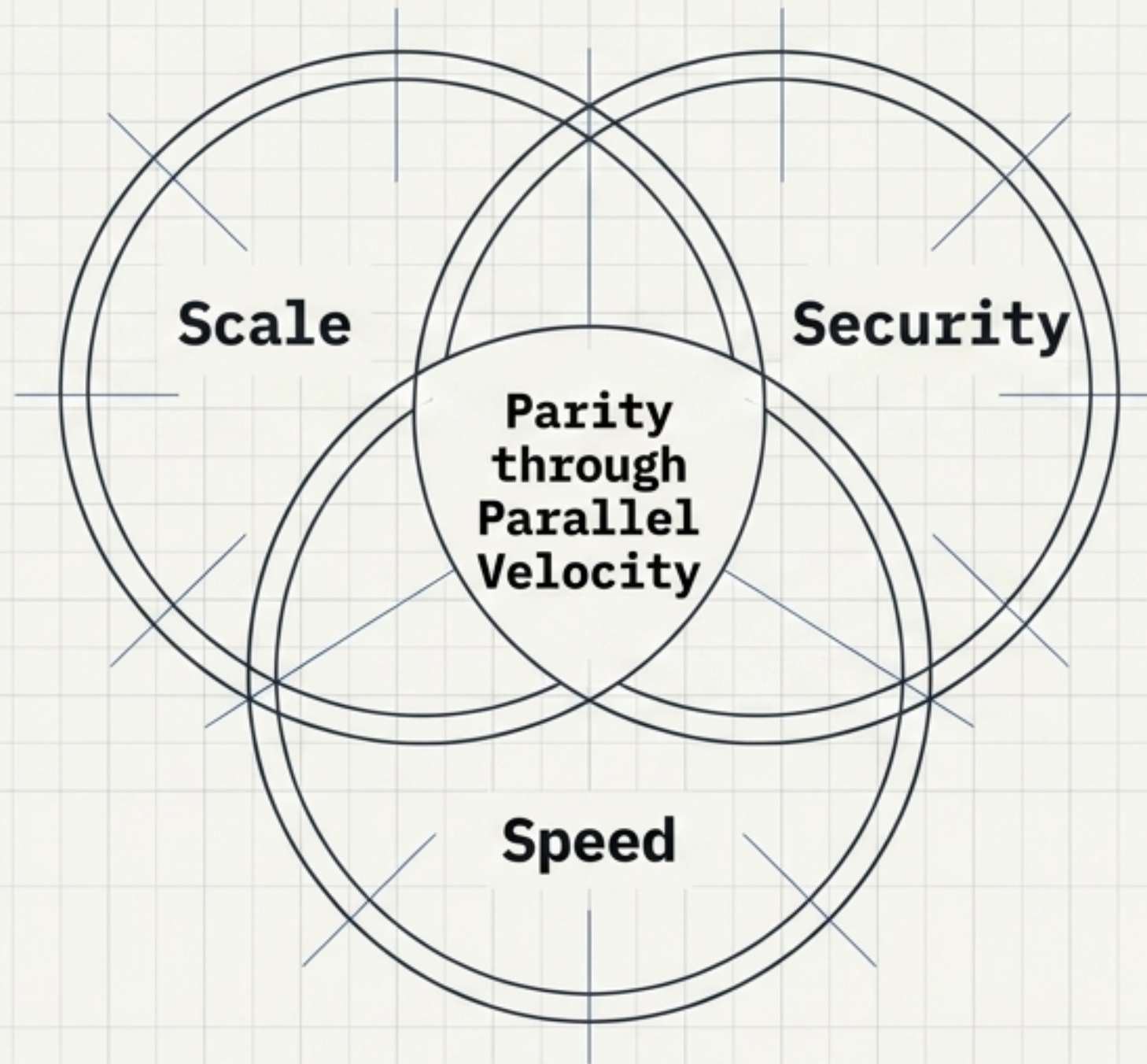
URL Scheme Filtering:
Strictly blob: and https: allowed

Parallel Execution Timeline: Implementation to Release

Total Time: 28 Minutes.



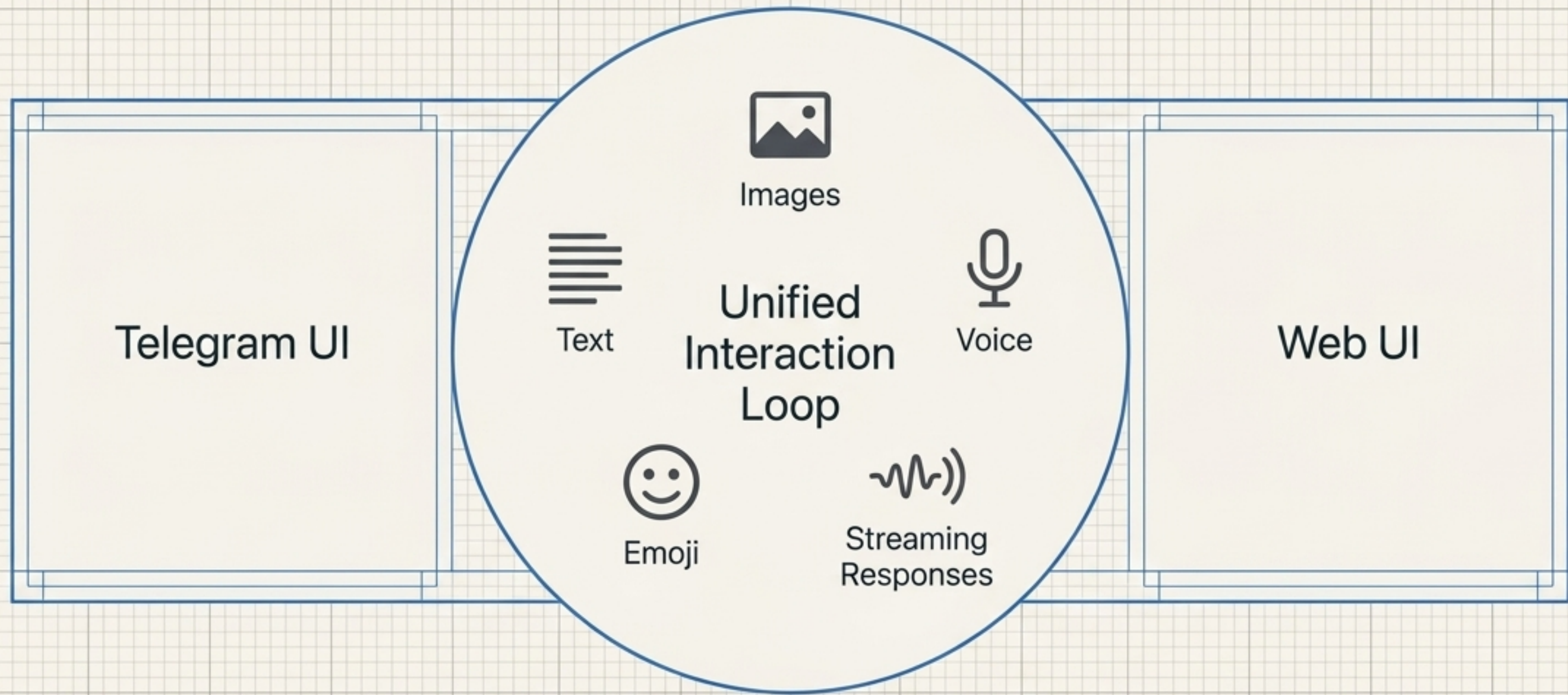
Parity through Parallel Velocity: Synthesis of Scale, Security, and Speed



⚡ v0.0.5 proves that AI-driven development changes the nature of scaling

⚡ Enables simultaneous architectural expansion and rigorous security auditing that would typically require weeks

⚡ The web chat is no longer a second-class citizen



The core interaction loop is complete. Everything Telegram can do, the browser can do too. Both channels now speak the exact same language.