Document 2 — Design Blueprint

Title: Semantic-Convergence Erasure System Architecture
Purpose: Internal design, patents, implementation guidance

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1. Design Intent

This document captures the invention as a **computational architecture**, independent of academic framing. It describes how irreversibility is controlled structurally, not heuristically.

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2. Core Principles

1. **Identity Persistence** — Entities are never overwritten; they evolve.
2. **Append-Only State Evolution** — History is preserved until explicitly collapsed.
3. **Explicit Erasure Semantics** — Erasure is deliberate, counted, and justified.
4. **Semantic Convergence** — Meaning stabilizes even as structure evolves.

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3. Layered Architecture

Layer A — Reversible State Core

• Append-only updates
• No destructive mutation
• Identity tracked across versions

Layer B — Semantic Evaluation Layer

• Fixed query set Q defines meaning
• Semantic signature = outputs of all queries in Q

Layer C — Erasure Controller

• Detects semantic equivalence
• Collapses redundant states
• Maintains representative + witness

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4. Erasure Semantics

Erasure occurs **only** when semantic equivalence is proven relative to Q.

For each semantic class: - Keep one canonical representative - Keep one reversible witness - Collapse all others

Irreversibility counter increments by the number of collapsed states.

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5. Identity Persistence Model

Entities: - Possess stable identifiers - Accumulate versions over time - Never lose identity through updates

Identity persistence is the key distinction from classical overwrite systems.

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6. Semantic Convergence Detection

Semantic convergence is detected when consecutive states produce identical query outputs for Q.

This is deterministic, scoped, and auditable.

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7. Hardware Implications (Non-Claim)

This model: - Reduces mandatory erasure - Lowers theoretical heat generation - Is compatible with reversible or classical hardware

No hardware implementation is claimed.

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8. Implementation Notes

- Can be implemented as a virtual machine
- Can wrap existing systems as a control layer
- Suitable for agents, databases, monitoring engines

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9. What This Is NOT

- Not a new law of physics
- Not quantum computation
- Not erasure-free computation
- Not drop-in hardware replacement

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10. Summary

Semantic-Convergence Erasure is a **system-level invention**: irreversibility becomes an architectural decision governed by meaning, not memory pressure.