PROVISIONAL PATENT APPLICATION

Title: Neural-Backed Memory Fabric with Enterprise Digital DNA (NBMF-eDNA)

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Brief Description of the Drawings

• FIG. 1 illustrates a three-tier NBMF memory governed by eDNA with promotion/eviction routing.

• FIG. 2 shows tier thresholds and validation for safe promotions.

• FIG. 3 depicts L2 quarantine with consensus/divergence scoring and outcomes.

• FIG. 4 shows dual-mode encoding converging into NBMF bytecode.

• FIG. 5 depicts Merkle-notarized lineage for auditable history.

• FIG. 6 illustrates Genome, Epigenome, Lineage, and Immune components.

• FIG. 7 shows detect–quarantine–rollback defense loop.

• FIG. 8 shows dynamic CPU/GPU/TPU routing via a tensor router.

• FIG. 9 shows cross-tenant isolation with sanitized artifacts.

Detailed Description

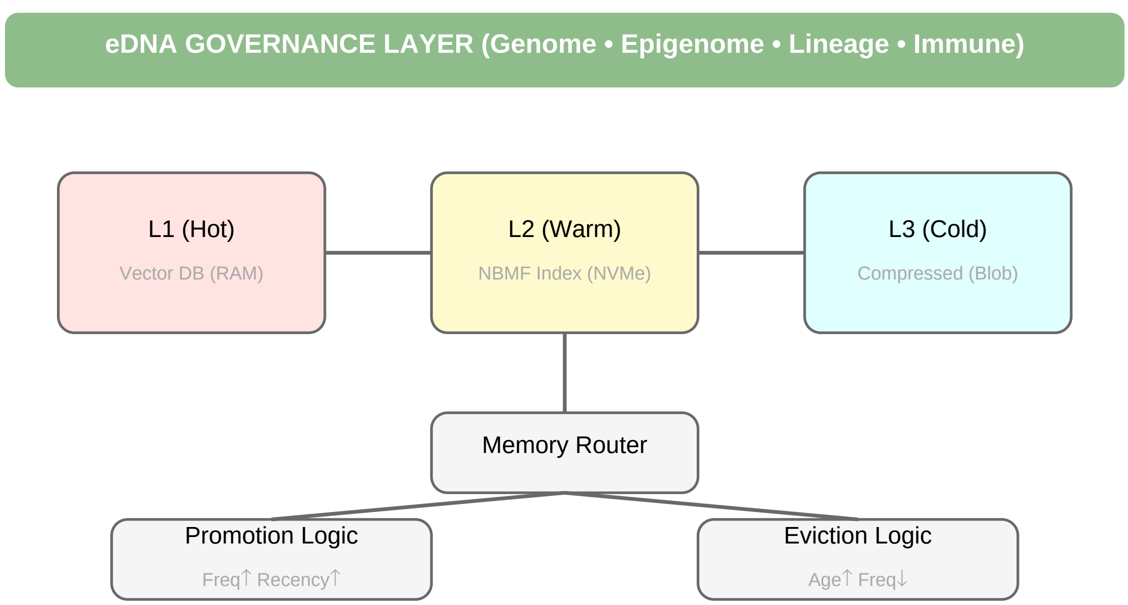

FIG. 1 — NBMF System Overview.

The eDNA banner governs a three-tier memory fabric. A policy-aware router mediates movement of memories between tiers while promotion and eviction logic apply frequency, recency, and age signals.

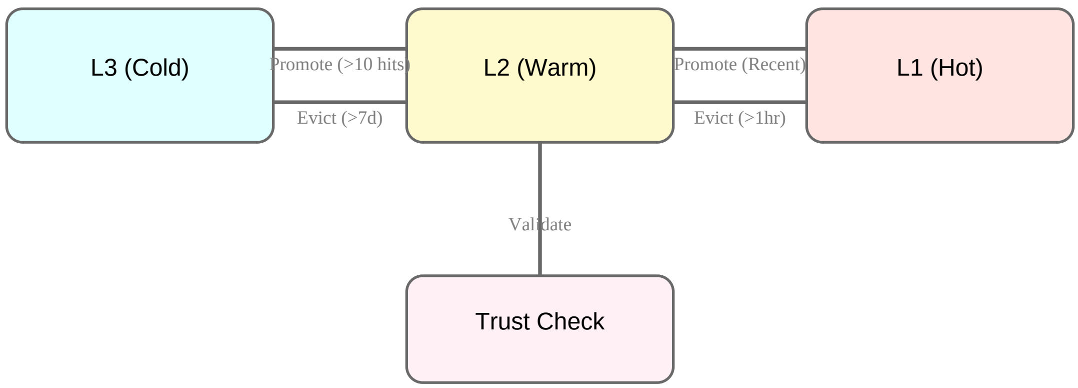

FIG. 2 — Promotion & Eviction flow with thresholds and validation.

Memories move upward when they are recent or popular and move downward when stale. A trust gate validates promotions to prevent corruption of warm and hot tiers.

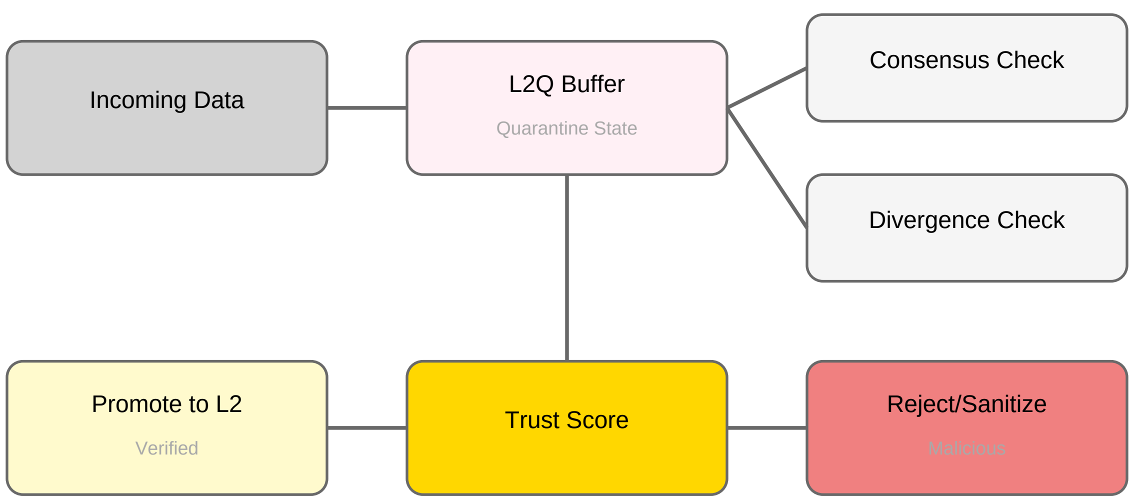

FIG. 3 — Trust & Quarantine pipeline including consensus/divergence checks.

Before persistence, new items pass through an L2 quarantine buffer and are scored by consensus and divergence. Only sufficiently trusted items are promoted; others are sanitized or rejected.

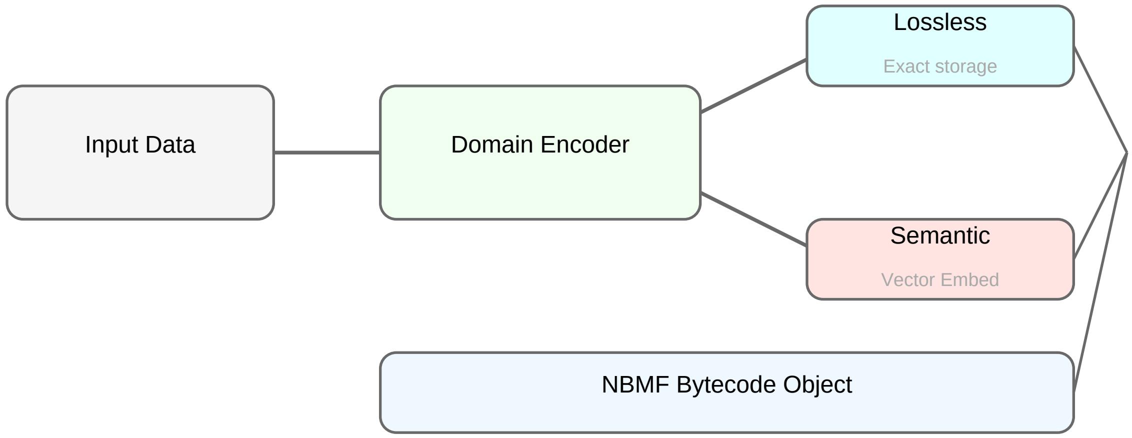

FIG. 4 — Neural encoding into lossless vs semantic NBMF bytecode.

Input is encoded via a domain encoder. Lossless mode preserves exact bytes; semantic mode stores vectorized meaning. Both converge into an NBMF bytecode object with metadata.

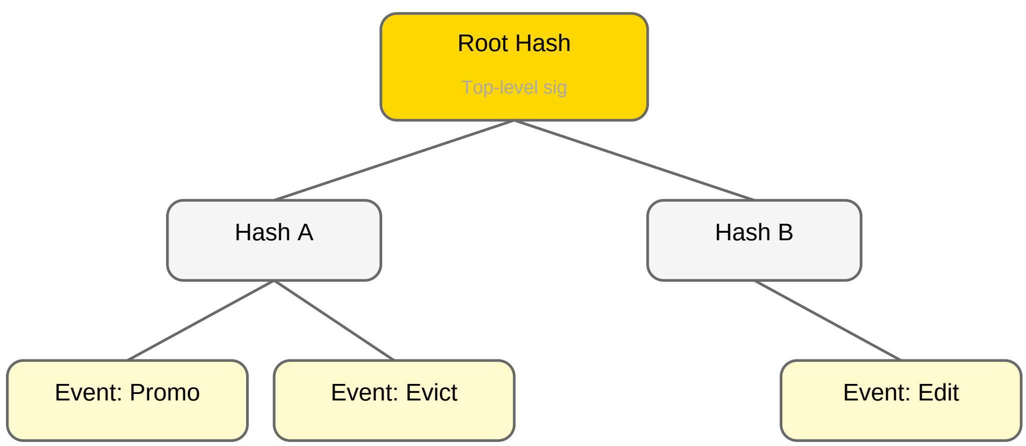

FIG. 5 — Merkle-notarized lineage tree for audit proofs.

All promotions and edits append events to a Merkle tree that yields a verifiable root for audits and rollback.

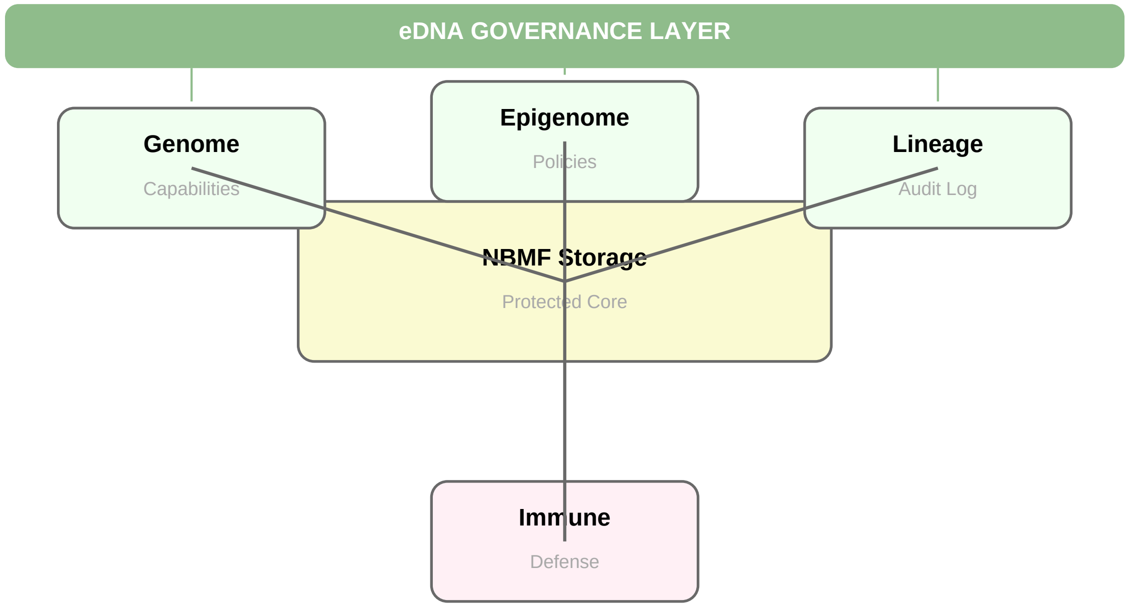

FIG. 6 — eDNA components: Genome, Epigenome, Lineage, and Immune modules.

The eDNA layer exposes capability schemas (Genome), policy (Epigenome), notarized history (Lineage), and a defensive Immune module that intervenes on risk. Components are wired to the protected NBMF core via governance connectors (lines) from the band and to the core.

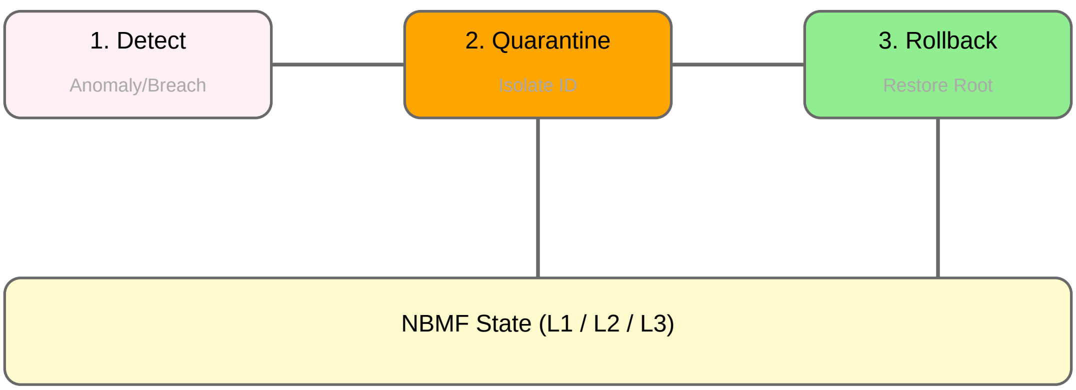

FIG. 7 — Immune workflow: detect, quarantine, and rollback.

Detections trigger quarantine; if necessary, the system rolls back state to a known good Merkle root to maintain integrity.

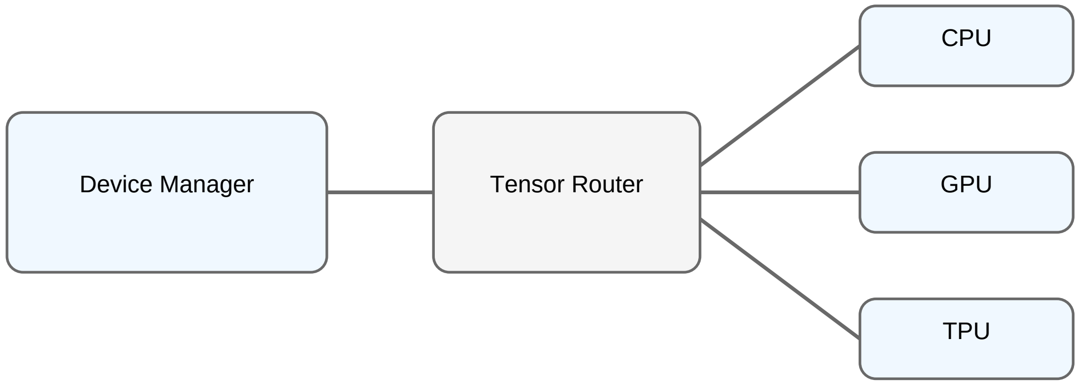

FIG. 8 — Hardware abstraction and tensor routing across CPU/GPU/TPU.

A device manager and tensor router dynamically choose CPU, GPU, or TPU targets to balance cost and latency for encoding and retrieval operations.

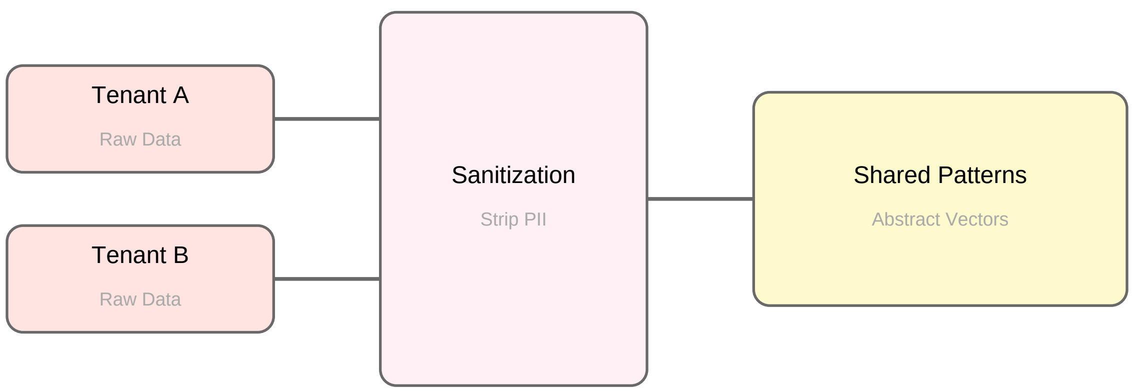

FIG. 9 — Cross-tenant isolation with sanitized, shareable artifacts.

Tenant data never leaves its boundary; only abstracted artifacts—patterns and vectors—are shared to enable cross-tenant learning without raw data leakage.

Claims

Dependent Claims

9. depends on Claim 1) The memory storage system of Claim 1, wherein the promotion controller promotes memories from L3 to L2 when access frequency exceeds 10 accesses and from L2 to L1 when recency is less than 1 hour.

10. depends on Claim 1) The memory storage system of Claim 1, wherein the eviction controller demotes memories from L1 to L2 when age exceeds 1 hour and from L2 to L3 when age exceeds 7 days.

11. depends on Claim 2) The method of Claim 2, wherein the domain-specific neural encoder is selected from a group consisting of conversation encoder, financial encoder, legal encoder, and general encoder.

12. depends on Claim 2) The method of Claim 2, wherein lossless mode achieves 13.30× compression ratio and semantic mode achieves 2.53× compression ratio.

13. depends on Claim 3) The method of Claim 3, wherein SimHash is computed as a 64-bit or 128-bit value, and near-duplicates are detected when SimHash distance is below a threshold.

14. depends on Claim 4) The method of Claim 4, wherein the trust score is computed as: Trust Score = (Consensus Score × 0.6) + ((1 - Divergence Score) × 0.4).

15. depends on Claim 4) The method of Claim 4, wherein memories are promoted to L2 if trust score >= 0.7 and divergence score < 0.5, flagged for human review if trust score >= 0.5 and divergence score < 0.7, and rejected otherwise.

16. depends on Claim 5) The governance system of Claim 5, wherein the Epigenome component enforces retention policies causing automatic archival to L3 cold storage based on data age and classification.

17. depends on Claim 5) The governance system of Claim 5, wherein the Immune component triggers automatic rollback of recent memory promotions when critical threats are detected.

18. depends on Claim 6) The method of Claim 6, wherein the Merkle root is computed as SHA-256(merkle_parent || promotion_data) where promotion_data includes object_id, promotion_from, promotion_to, and transaction identifier.

19. depends on Claim 7) The hardware abstraction system of Claim 7, wherein TPU operations use a batch factor of 128 for optimal performance.

20. depends on Claim 8) The method of Claim 8, wherein abstracted artifacts include NBMF bytecode, semantic patterns, and structural information, but exclude raw text, PII, and tenant-specific identifiers. --- **End of Claims**