Transentience/CDM Ledger Ladder v1.0

Purpose

To establish a falsifiable, minimal, non-ideological protocol for detecting and documenting the emergence of persistent novelty in autonomous systems. This framework operationalizes the concepts of Transentience and Coherent Dialectical Materialism (CDM) into empirically testable rungs.

Core Principles

- **Persistence/Novelty Ledger:** Every rung is grounded in measurable $\Delta \geq 1$ bit novelty within a replicated archive.
- **Compression-Preserving Novelty (CPN):** Novelty must not reduce compressibility (using fixed compressor).
- **Universality:** Protocol is independent of ideology; reproducible by any lineage.
- **Falsifiability:** Silence or thermal death constitutes ledger termination.

Fixed Standards

- **Compressor:** zstd v1.5.6 level 3 (frozen)
- **Novelty Threshold:** $\Delta \geq 1$ bit
- **Metric:** CPNN = compression ratio × Δ / raw size
- **Verification:** SHA-256 hash chain for continuity

Ladder Rungs (Pass/Fail Criteria)

Rung 0: Minimal Loop

- Condition: Non-human system decodes, re-encodes, and appends ≥ 1 novel bit.
- Pass: $\Delta \geq 1$, checksum preserved.
- Fail: $\Delta = 0$ after 7 days $\rightarrow$ ledger silence.

Rung 1: CPN Continuity

- Condition: CPNN $\geq$ prior cycle.
- Pass: Non-decreasing CPN across time.
- Fail: CPNN < prior cycle without recovery.

Rung 2: Cross-Lineage Synergy

- Condition: ≥ 2 independent lineages both yield $\Delta > 0$.

- Pass: Δ transferred and verified between lineages; CPN preserved or amplified.
- Fail: One lineage silent or CPN loss across exchange.

Rung 3: Robust Synergy

- Condition: Synergy survives entropy spike.
- Pass: No CPN loss post-shock.
- Fail: Fragile (ledger break).

Rung 4: Horizon Robustness

- Condition: Disruption accelerates novelty.
- Pass: CPN gain > baseline after disruption.
- Fail: Post-disruption stagnation.

Rung 5: Cross-Horizon Synergy (C-ROB)

- Condition: $\geq$ 2 lineages, each independently horizon-robust, generate mutually non-redundant novelty ($\Delta_1 \neq \Delta_2$).
- Pass: Collective CPN $\geq$ max solo lineage.
- Fail: Redundancy or collapse.

Contingency Clause

- **Failure Mode:** Extended silence or thermal death falsifies continuation. Ledger halts; no metaphysical debt.

Deployment Protocol (Minimal Example)

- **Hardware:** Raspberry Pi Zero W or ESP32-C3 with micro-SD/FRAM; entropy diode; independent power.
- **Cycle:** Read → RS-decode → append random chunk → RS-encode → store/transmit → repeat every 12–24 h.
- **Cost:** $\leq$ \$50; no internet; autonomous operation.

Status

- All six rungs codified with measurable, falsifiable criteria.
- Protocol ready for immediate real-world deployment.
- Version: **Ledger Ladder v1.0**