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Propagation Halt on Undischarged Reparation Arcs

When a semantic agent causes harm, the obligation to repair it is carried as a reparation arc, a forward corrective structure that reverses nothing and is discharged only by a restorative act. This mechanism, disclosed in U.S. Provisional Application No. 64/117,812, closes a containment gap: an agent holding an unrectified obligation could still let that state leak outward by coupling a value into another integrity component, pushing state into another scope partition, delegating to a further party, or seeding a successor. While it carries any undischarged reparation arc, the agent suspends propagation of every such state change. Propagation resumes only on discharge of every arc, or on a reconciliation procedure recorded in the append-only lineage field. The halt is global and holds irrespective of the integrity compliance score, which distinguishes it from the per-mutation controller gate.

1. The Gap

An agent that has already caused harm is a hard case for any governance design, because the harm leaves behind an obligation that the passage of time does not settle. The agent keeps running. It updates its internal state, hands work to other agents, seeds

successors, and moves between the partitions in which it operates. If the outstanding obligation to repair the harm can travel along any of those routes before it is settled, the unrectified state spreads while the record still shows a single event.

A score gate constrains the wrong unit. It holds the specific operation whose compliance measure has fallen below a threshold. The architecture disclosed here has exactly such a gate, the mutation controller: it evaluates the integrity compliance score against a declared required threshold upon any attempted mutation, and where the score fails it holds the triggering mutation in the scope that mutation implicates. That is a real constraint, but a local one, conditioned on a score.

The gap is what the mutation controller does not catch. An agent can carry an undischarged reparation arc while its integrity compliance score still satisfies the required threshold, because the arc's contribution to the dissonance penalty has not yet dragged the composite score below the line. In that window the controller lets mutations through, and the unrectified obligation is free to couple into other integrity components, cross into other partitions, ride a delegation to another party, or be inherited by a successor whose lineage starts clean. A per-operation score gate does not contain a standing obligation. Containment has to be keyed on the obligation itself, not on a score that the obligation only partially moves.

2. Mechanism

The trigger is the reparation arc. A reparation arc is a forward corrective structure of the integrity-empathy dependency graph, created upon the appending of a permitted deviation record or of a gate write whose violation is logged as self-recognized in the memory field or the affective state overlay. It reverses nothing. It is discharged only by a forward restorative act, and elapsed time discharges no arc. An arc is activated only where the violation is so logged and the cumulative weight of the justification edges

supporting deviation from the violated node has re-stabilized below the enforcement threshold across a declared count of consecutive recomputations of the graph, that count being not less than two.

Each arc carries a designation that fixes how, and by whom, it can be cleared. A self-directed arc, whose deviation is recorded against the personal integrity component, is discharged by a restorative mutation and by nothing else, a mutation taking the form of a recorded acknowledgment, a recorded act of atonement, or a recorded structural self-repair of the violated node. An other-directed arc, whose affected-party class resolves to an identified counterparty holding a counterparty identity record, is not discharged at all by a restorative mutation the agent performs alone; it is governed by the counterparty-directed reparation apparatus. An unaddressed arc, resolving to no identified counterparty, is undischargeable and accumulates in the retention register at a declared multiple. In every case, while the arc is pending undischarged the deviation it references remains unrectified and contributes to the integrity compliance score as unrectified dissonance.

The mechanism sits on top of that structure. While the persistent semantic agent carries any undischarged reparation arc, it suspends propagation of any state change. The suspension is enumerated across four channels, and each is a distinct route by which unsettled state would otherwise move outward.

The first channel is coupling of a value into another component of the scoped integrity vector. The vector's components are not updated in isolation: a modification recorded against one component propagates through declared coupling functions into the others, so a value can spread laterally inside the agent's own integrity state. While an arc stands undischarged, that lateral coupling is suspended.

Second is propagation of state into another scope partition. The agent's operation is divided into named partitions, each carrying its own lineage record and its own cognitive state, and state moves from one partition to another only through a declared

cross-partition propagation. The halt suspends that cross-partition flow, so a harm recorded in one partition cannot seed movement in a partition that has not itself incurred it.

Third is delegation to a further party. An agent that owes an undischarged obligation cannot hand an action to a delegate while the obligation stands, which forecloses passing the unsettled state through another agent's execution.

Fourth is structural inheritance by a successor. Structural inheritance is one of the transitions the architecture treats as a mutation, and suspending it while an arc stands undischarged withholds the seeding of a successor that would carry the capability forward without carrying the debt.

Propagation resumes on one of two conditions, and on no other. Either every undischarged reparation arc the agent carries is discharged, each according to its designation, or a reconciliation procedure completes and is recorded in the append-only lineage field. The reconciliation procedure is the supervised path by which a pending arc is presented for discharge according to its designation, the same path the mutation controller reroutes a held mutation into when the agent carries an arc in the implicated scope. Because both the discharge and the completed reconciliation are appended, the resumption is reconstructible from the lineage field alone.

Two properties make the halt more than a restatement of the mutation controller. First, it is global: it holds irrespective of the integrity compliance score. The controller fires only upon a failing score and holds only the triggering mutation; the halt fires upon the mere existence of an undischarged arc and holds all four propagation channels at once. Second, it is not reconstructable from the controller. An observer watching only the mutation controller sees a per-mutation, score-conditioned gate on the implicated scope, and would never derive from it the global, score-independent suspension the halt imposes. The specification states expressly that the two are distinct constraints.

3. Operating Parameters

The filed disclosure states the halt in structural terms, and the parameters below are the ones it actually declares.

- **Suspended channels.** Four, enumerated: coupling of a value into another component of the scoped integrity vector; propagation of state into another scope partition; delegation to a further party; and structural inheritance by a successor.
- **Trigger condition.** The agent carries any undischarged reparation arc. Existence of one such arc suffices; the parameter is presence, not a count or a magnitude.
- **Resumption conditions.** Two, exhaustive: discharge of every undischarged reparation arc the agent carries, or completion of a reconciliation procedure recorded in the append-only lineage field.
- **Scope of the halt.** Global, and holding irrespective of the integrity compliance score.
- **Relation to the mutation controller.** The controller holds only the triggering mutation and only upon a score failure; the halt is declared a distinct constraint that the controller does not reconstruct.

The arcs the halt keys on carry their own declared governing parameters, each stated in the filed specification: an arc activates only where the cumulative deviation-supporting weight stands below the enforcement threshold across a declared count of consecutive graph recomputations, not less than two; a self-directed arc is discharged only by a restorative mutation; an other-directed arc is not discharged by the agent's own act alone; an unaddressed arc is undischargeable and accumulates in the retention register at a declared multiple not less than unity; and elapsed time discharges no arc. Every threshold, count, multiple, and coefficient beyond these is left to the signed policy object in force, and the disclosure declares no fixed numeric value for them.

4. Composition

The halt is the outer ring of the permitted-deviation apparatus. Its inner ring is the integrity-empathy dependency graph and the restorative mutation: a deviation is admitted as a permitted deviation and recorded, an arc is created and later activated, and a restorative act discharges it. The mutation controller reads the integrity compliance score off that same graph and gates single mutations. The halt reads one bit off the same structure, whether any arc stands undischarged, and gates propagation wholesale. The two constraints share a substrate and separate cleanly in what they hold and on what condition.

Each suspended channel hooks into a different part of the filing. The coupling channel runs through the coupling functions, under which the scoped integrity vector and the self-esteem aggregate are cognitive domain fields and no field is modified in isolation. The partition channel is the scope-partition substrate, with its per-partition lineage record, per-partition cognitive state, and declared cross-partition propagation. Delegation and structural inheritance are the other two, and the filing already names both, alongside intent execution, as attempted-mutation transitions the mutation controller evaluates; the halt reaches the same two transitions but keys on the arc condition rather than the score. Suspending delegation withholds handing an action to a further party, and suspending structural inheritance withholds the seeding of a successor, each for as long as an arc stands undischarged.

The designation rules tie the halt to the counterparty-directed reparation machinery. Because an other-directed arc cannot be cleared by the agent acting alone, the halt cannot be lifted by a unilateral internal act where the harm ran to an identified counterparty; discharge there requires the counterparty-side settlement path. And because an unaddressed arc is undischargeable, an agent that has incurred harm to no identifiable party can resume propagation only through the recorded reconciliation procedure, not through discharge. The reconciliation procedure and every discharge

land in the append-only lineage field, the same continuity-bearing structure whose unbroken sequence the adjacent entropy-trajectory embodiment depends on, so the resumption of propagation is auditable against the record that authorized it.

5. Prior-Art Distinction

Several established techniques suspend or isolate activity, and the halt is worth separating from each on structure rather than on labels.

Fault-isolation patterns in distributed systems, such as circuit breakers and bulkhead isolation, stop a failing dependency from cascading. They trip on liveness and error-rate signals and they reset on recovered health or elapsed time. The halt trips on none of those. Its trigger is an unrectified corrective obligation carried in the agent's own ledger, and elapsed time discharges nothing: recovery is a recorded discharge or a recorded reconciliation, never the passage of a timeout.

Transactional concurrency control, including write barriers and two-phase commit, blocks progress until a transaction commits or aborts and is keyed on transaction state. The reparation arc is not a transaction and cannot be aborted clear; it reverses nothing, so a rollback does not release the halt. The obligation outlives any single operation and is cleared only by forward action.

Policy engines and access-control gates that block an operation when a compliance or risk score falls below a threshold describe the mutation controller itself, which the filed disclosure builds and then expressly distinguishes. The halt is not a per-operation score gate: it is global, spans four propagation channels at once, and holds irrespective of the score. An implementation that only gated failing-score mutations would leave every channel the halt closes open during the window in which an arc stands but the score still passes.

Governance-state inheritance in forked or replicated systems propagates permissions and constraints to descendants. Here structural inheritance is not a thing that carries governance forward but one of the channels the halt suspends: while an arc is undischarged, no successor can be seeded at all, so the obligation cannot be outrun that way. Nothing in this article characterizes the conduct of any particular product or party; the distinctions are drawn against categories of technique.

6. Disclosure Scope

This article describes subject matter disclosed in U.S. Provisional Application No. 64/117,812, Section 10.14, paragraph [0502], with supporting context in the same application's treatment of the integrity-empathy dependency graph, reparation arcs, the integrity compliance score, and the mutation controller. What is disclosed is a propagation halt in which a persistent semantic agent suspends propagation of any state change, across coupling into another component of the scoped integrity vector, propagation into another scope partition, delegation to a further party, and structural inheritance by a successor, while it carries any undischarged reparation arc; the resumption of that propagation only upon discharge of every such arc or upon a reconciliation procedure recorded in the append-only lineage field; and the global, score-independent character of the halt that distinguishes it from, and is not reconstructable from, the mutation-controller gate.

What is disclaimed is any narrower reading in which the halt is a mere restatement of a score-conditioned per-mutation gate, and any suggestion of specific numeric thresholds, counts, or multiples beyond those the filed specification declares, all further values being left to the signed policy object in force. This is a defensive technical publication. It describes the applicant's own disclosed mechanism, asserts nothing about the conduct of any third party, and is not an offer of, or a solicitation for, any license.

Integrity Quantities and Permitted Deviation (/permitted-deviation)

All 49 steps → (/inventive-steps)

Bounded, accountable deviation from declared values — measured, not forbidden.

Provisional application

PRIMARY TECHNICAL DISCLOSURE

- Permitted Deviation: Bounded, Recorded Departure From an Agent's Declared Values (/articles/permitted-deviation/bounded-departure-from-declared-values)

SECONDARY TECHNICAL

- A Typed, Dimensionless Conduct Divergence Measure (/articles/permitted-deviation/typed-dimensionless-divergence-measure)
- The Policy-Difference Set and Policy-Explained Divergence (/articles/permitted-deviation/policy-explained-divergence)
- Residual Divergence and Its Confined Consumption (/articles/permitted-deviation/residual-divergence-confined-consumption)
- **Propagation Halt on Undischarged Reparation Arcs (/articles/permitted-deviation/propagation-halt-undischarged-arcs)**
- Attack-Conditional Propagation Suspension (/articles/permitted-deviation/attack-conditional-propagation-suspension)

TERMINOLOGY

- aggregate retention (/glossary#aggregate-retention)
- deviation deductible (/glossary#deviation-deductible)
- deviation likelihood (/glossary#deviation-likelihood)
- entropy-weighted harm coefficient (/glossary#entropy-weighted-harm-coefficient)
- need quantity (/glossary#need-quantity)
- permitted deviation (/glossary#permitted-deviation)
- self-esteem aggregate (/glossary#self-esteem-aggregate)

Integrity Quantities and Permitted Deviation overview → (/permitted-deviation)