

Depth-Propagated Harm Inheritance Across a Delegation Chain

A delegating agent that hands work to a delegate can be made to inherit the record of harm that delegate causes, but delegation runs deeper than one hop: a delegate can itself delegate onward, and harm caused several levels down would otherwise never reach the party at the top. Depth-propagated harm inheritance, disclosed in U.S. Provisional Application No. 64/117,812, closes that gap. Each delegation record carries an identifier of the delegation record under which its author was itself delegated, linking every hop into a chain from the root delegator to the acting delegate. A returned record bearing the harm-recording field class travels up that chain, and each agent it passes through appends the traversed chain of identifiers, inherits the harm-recording field class, and computes its own residue term, so harm caused at any depth is inherited and priced at every delegating agent above it.

1. The Gap

A single-hop delegation control already exists in this architecture. When a persistent semantic agent (100) delegates an action, it appends a delegation record carrying a return inheritance mask, and the signed policy object (112) declares a harm-recording field class: the fields of a returned record that capture the delegate's conduct as evaluated by some party other than the delegator and the delegate, including accepted

determinations (122) the delegate produced. If a delegator writes a mask that tries to exclude or attenuate that class, the attempt is recorded and given no effect, its scoped integrity vector (106) still moves when an accepted determination lands against the delegate, and a residue term is added to the base magnitude to price the attempted exclusion.

That control holds where the harm sits exactly one hop away. The moment delegation nests, it has a blind spot. Suppose agent A delegates to B, B delegates to C, and C is the one whose conduct draws an accepted determination from a party other than the delegator and the delegate. The returned record recording that conduct belongs to the relationship between B and C. Absent something to carry it further, A sees only what B returns, and B, having performed no directly evaluated conduct itself, returns a record that shows nothing adverse. The harm has passed through one interposed layer without ever reaching A.

The gap is not a dishonest mask; it is distance. A pricing rule that reaches one level deep leaves any delegator standing two or more levels back untouched by the harm below it. Depth-propagated harm inheritance closes that distance: the returned record climbs the entire chain, and every agent in the delegating position above the harm inherits the harm-recording field class and is priced on it.

2. Mechanism

The mechanism rests on one added field and one routing rule.

The added field lives on the delegation record. Each delegation record appended by a delegate carries an identifier of the delegation record under which that delegate was itself delegated. When A delegates to B and B delegates onward to C, the delegation record B appends names, by identifier, the record A used to authorize B, and C's onward record names B's. The identifiers thread the individual hops into a single linked

chain running from the root delegator down to the agent performing the delegated class. An agent at the top holds a delegation record that names no superior, because it was not itself delegated; that absence marks the end of the chain.

The routing rule governs what happens when harm is returned. A returned record carrying the harm-recording field class is transmitted by the returning agent to the delegating agent identified in the delegation record under which the returning agent acted. That recipient does not simply file it; it forwards the record onward to the agent named in the delegation record under which it, in turn, acted. The record moves up one hop at a time, each agent handing it to the agent named as its own delegator, until an agent holding no such identifier is reached. That endpoint is structural: the traversal stops at the root delegator, whose delegation record names no superior.

Three things happen at every agent the returned record passes through, not only at the endpoints:

First, the agent appends the traversed chain of identifiers to its append-only lineage field (104), rather than merely consulting it in transit. The chain is written into the durable record of each agent it crosses, so the path the harm took, and the position of each agent along it, is recorded at every node rather than only at the root.

Second, the agent inherits the harm-recording field class. Inheritance is not reserved for the immediate delegator of the acting party. Each delegating agent above the harm, at whatever remove, takes the harm-recording field class into its own state. Because the architecture modifies the scoped integrity vector (106) responsive to an accepted determination (122) against delegated conduct irrespective of any mask, that inherited class carries the same consequence at each level that a directly returned harm record would carry at one hop: the delegating agent's integrity state moves by the base magnitude.

Third, the agent computes its own residue term from the return inheritance mask it recorded. The residue is not a fixed surcharge stamped uniformly along the chain; it is derived from each agent's own delegation record and mask. An intermediate delegator that faithfully inherited the harm-recording field class computes a residue term of zero and bears only the base magnitude for the harm below it. One that attempted to exclude or attenuate that class in its own mask computes a non-zero residue and bears the surcharge on top of the base. The chain therefore prices two distinct things at once: standing above harm, borne by everyone in the delegating position, and the separate attempt to exclude or attenuate the harm-recording field class, borne only by the agents that made it.

Because the residue at each node is a function of that node's own recorded configuration, the computation needs nothing from below. An agent computes its residue from the mask it itself wrote, so the pricing is local even though the harm it prices originated at a distance. What travels up the chain is the harm-recording field class and the chain of identifiers; the cost is assembled at each node from what that node already holds.

The consequence composes with the withheld-faculty rule that governs single-hop delegation. Where the residue-increased modification drives an agent's recomputed deviation quantity to satisfy the bound declared in its signed policy object (112), that agent's authorization gate (300) is written to the withheld state (310) with respect to the faculty of delegating the delegated class. The agent keeps performing that class directly and loses only the capacity to delegate it further. Across depth, a delegator that repeatedly stands above harm caused by its sub-delegates can accumulate enough modification to satisfy that bound and lose its delegating faculty, even though it never performed the evaluated action itself.

Each additional delegation layer therefore becomes another node the returned record passes through, inheriting the harm-recording field class and computing a residue term at that node. The depth that separated a delegator from the harm no longer keeps the

record from reaching it.

3. Operating Parameters

The filed disclosure fixes the following as declared quantities rather than fixed constants.

The residue term is non-zero only where the agent's own return inheritance mask attempted to exclude or attenuate the declared harm-recording field class. In every other case it is zero. An agent that inherits faithfully pays no residue, only the base magnitude for harm below it.

Where non-zero, the residue term is a declared fraction of the base magnitude, and it is bounded above by a declared multiple of the base magnitude.

In a variant, the residue term is that declared fraction multiplied by a base greater than one raised to the count of prior excluding delegation records the delegator appended, so repeated attempts by the same agent produce progressively larger residue terms under the declared upper bound.

The residue is computed from the delegator's own recorded configuration. It is not computed from the delegate's conduct, from the asserted severity of the harm, or from any attribute of the asserting party.

The chain traversal terminates deterministically at an agent whose delegation record names no superior delegation record. There is no declared hop limit and no elapsed-time cutoff; the endpoint is the root delegator.

The faculty withheld when the deviation quantity satisfies the declared bound is delegation of the action class, not its direct performance; in a variant it is delegation to the specific delegate rather than the whole class.

4. Composition

Depth propagation is the multi-hop extension of the delegation-return exposure mechanism disclosed alongside it in Section 10.3. Its parent constructs, the return inheritance mask, the non-attenuable harm-recording field class, the configuration-sourced residue surcharge, and the withheld delegating faculty, all operate at a single hop. Depth propagation reuses each unchanged and supplies the one thing they lacked: a route by which a harm record produced far down a chain reaches every delegating agent above it, without modifying any single-hop rule.

The mechanism draws on the rest of the filing at several points. The harm-recording field class is defined in terms of accepted determinations (122), the outputs of the admission and evaluation machinery that governs conduct evaluation artifacts (116) elsewhere in the specification. The consequence borne at each node is a movement of the scoped integrity vector (106) and a recomputation of the deviation quantity, the same quantities the architecture uses to drive the authorization gate (300) toward the withheld state (310) for a directly evaluated agent, and the traversed chain of identifiers is written into the append-only lineage field (104) that other mechanisms in the specification read and append to.

It also sits inside the broader assertion-cost-symmetry frame. That frame treats a semantic agent (100) as occupying both the evaluated and the asserting roles under one accountability regime. Depth propagation is the delegating-role counterpart: just as issuing an assertion is priced against the issuer, standing above delegated harm is priced against the delegator, at every level rather than only the nearest. An agent cannot escape the evaluated-role consequence by delegating conduct downward, because the delegating-role consequence follows the harm back up.

5. Prior-Art Distinction

Several established categories carry identifiers along a chain of participants. The distinction here is structural, drawn to categories, not to any particular product or party.

Distributed tracing systems propagate a parent-span identifier so a request's path across services can be reconstructed for observability. The shape is similar: each span names its parent, and a tree is recovered from the links. The purpose is not. A trace is passive metadata for debugging and latency analysis; it inherits no liability and moves no state at the nodes it crosses. Here the linked identifiers route a governance consequence, the harm-recording field class, and each traversed node inherits that class and computes a cost from its own configuration. The chain carries a priced obligation, not a diagnostic breadcrumb.

Capability-based delegation, including token chains and caveat-attenuated credentials, threads authority downward and typically narrows it at each hop, so a delegate receives a subset of what its delegator held. That is attenuation on the forward path. The harm-recording field class runs the opposite way, on the return path, and is structurally non-attenuable: an attempt to shrink it is recorded, given no effect, and priced. Forward capability systems have no notion of a consequence climbing back up from a sub-delegate to everyone above it.

Provenance and supply-chain traceability systems maintain linked records to establish an artifact's origin. They chain content. This mechanism chains authorizations, for the specific purpose of delivering a returned harm record to each delegating agent and pricing it locally at each, from that agent's own recorded mask rather than from the content's attributes.

The closest conceptual antecedent is the legal doctrine that holds a principal answerable for an agent's conduct, adjudicated after the fact by a tribunal weighing the merits and the parties. The mechanism here computes inheritance without

adjudication: each agent's residue comes from its own recorded configuration, and the traversal terminates deterministically at the root. It renders a familiar accountability intuition as a local, self-metered computation. None of this is asserted to describe the conduct of any named system or party; the comparison locates the mechanism among structural categories.

6. Disclosure Scope

This mechanism is disclosed in U.S. Provisional Application No. 64/117,812, in Section 10.3, at paragraph [0369], and is supported by the surrounding delegation-return exposure disclosure at paragraphs [0364] through [0366], which establish the return inheritance mask, the non-attenuable harm-recording field class, the configuration-sourced residue surcharge, and the withheld delegating faculty.

What is disclosed is the structure and its operation: the parent-record identifier carried on each delegation record; the upward transmission of a returned record bearing the harm-recording field class from each returning agent to the agent named in the delegation record under which it acted, continuing until an agent holding no such identifier is reached; and the action at each traversed node, namely appending the traversed chain of identifiers to the lineage field, inheriting the harm-recording field class, and computing a residue term from the agent's own recorded return inheritance mask, so harm caused at any depth is inherited and priced at every delegating agent above it.

What is disclaimed is any specific numeric value for the residue fraction, the upper-bound multiple, or the count-sensitive base, each declared in the signed policy object and not fixed here; any particular deployment; and any characterization of the harm inheritance as an adjudication of the merits of the delegate's conduct. Illustrative worked values that appear in the author's fuller exposition but not in the filed

specification are not part of what is asserted here. This is a defensive publication describing subject matter disclosed in the identified provisional application; it grants no license and makes no representation of infringement by any party.

Assertion-Cost Symmetry (</assertion-cost-symmetry>) [All 49 steps → \(/inventive-steps\)](#)

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Provisional application

PRIMARY TECHNICAL DISCLOSURE

- [Assertion-Cost Symmetry: Making an Accusation Cost the Accuser \(/articles/assertion-cost-symmetry/making-an-accusation-cost-the-accuser\)](/articles/assertion-cost-symmetry/making-an-accusation-cost-the-accuser).

SECONDARY TECHNICAL

- [Withheld Delegating Faculty, Preserved Direct Execution \(/articles/assertion-cost-symmetry/withheld-delegating-faculty\)](/articles/assertion-cost-symmetry/withheld-delegating-faculty).
- [Depth-Propagated Harm Inheritance Across a Delegation Chain \(/articles/assertion-cost-symmetry/depth-propagated-harm-inheritance\)](/articles/assertion-cost-symmetry/depth-propagated-harm-inheritance)
- [Co-Signature Conditioning of Restoration Authority \(/articles/assertion-cost-symmetry/co-signature-conditioned-restoration\)](/articles/assertion-cost-symmetry/co-signature-conditioned-restoration).
- [The Anti-Evasion Charge on Governance-Address Removal \(/articles/assertion-cost-symmetry/anti-evasion-governance-address-removal\)](/articles/assertion-cost-symmetry/anti-evasion-governance-address-removal).
- [The Progressive Issuance Decrement \(/articles/assertion-cost-symmetry/progressive-issuance-decrement\)](/articles/assertion-cost-symmetry/progressive-issuance-decrement).

TERMINOLOGY

- [acknowledgment artifact \(/glossary#acknowledgment-artifact\)](/glossary#acknowledgment-artifact).
- [assertion-cost counter \(/glossary#assertion-cost-counter\)](/glossary#assertion-cost-counter).
- [authorization budget \(/glossary#authorization-budget\)](/glossary#authorization-budget).
- [dynamic agent hash chain \(/glossary#dynamic-agent-hash-chain\)](/glossary#dynamic-agent-hash-chain).

Assertion-Cost Symmetry overview → (/assertion-cost-symmetry).