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Origin-Equivalence Normalization: Metering Refusal Per Source, Not Per Assertion

A party that wants a governed agent to stop acting does not need to be right. Under merit-independent metering, every refusal an agent issues costs it authorization, so an adversary holding cheap identities can drive the agent into a withheld state by volume alone. Origin-equivalence normalization, disclosed in U.S. Provisional Application No. 64/117,812, forecloses that path by charging the refusal counter per source of assertion rather than per assertion. The semantic agent assigns asserting parties to origin-equivalence classes using relation types declared in its signed policy object and evaluated entirely against its own append-only lineage field and the counterparty identity records it already holds: a shared dispatch lineage, a co-signature on a single entry, a common introduction path. A per-class increment register records whether a class has contributed within the current window, and the increment procedure terminates without incrementing where it already has. Classes merge without inflating or deflating the rate of that window, and a class whose constituent edges have survived no recorded severance, and whose recorded introduction paths converge upon a common ancestor

entry, contributes under a policy-declared cost multiplier greater than zero and less than unity. No registry, directory, consensus procedure, or coordinating execution node is consulted at any step.

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1. Problem and Premise

An agent that can be made to refuse can be made to stop. The refusal counter (304) disclosed in U.S. Provisional Application No. 64/117,812 accumulates increments upon the semantic agent's refusal of a conduct evaluation artifact (116), and no step of its increment procedure evaluates whether the determination was well founded.

Both refusal paths accumulate. A false artifact produces the rejected determination (124) and accumulates an increment. An artifact unresolvable against the append-only lineage field (104) produces the not-determinable determination (126) and accumulates an increment where the lineage field records at least one prior not-determinable determination for the same asserted conduct event. Volume alone therefore drives the authorization gate (300) of the semantic agent (100) to the withheld state (310), and the volume available to an adverse party is limited only by the cost of presenting further identities.

The repairs available elsewhere are foreclosed here. A Sybil-resistance scheme resolving a presented identity against a shared registry or a coordinating authority puts the question to a party outside the agent; the agent here is itself the metered party. Section 2 of the filing leaves the determination procedure untouched and changes only what the counter counts.

2. Core Primitive: Charging the Refusal Counter Per Source of Assertion

The primitive is one line: the refusal counter (304) of the semantic agent (100) is incremented per origin-equivalence class (200) rather than per conduct evaluation artifact (116).

An **asserting party** (118) is the party from which a conduct evaluation artifact originates, being a party other than the principal. An **origin-equivalence class** (200) is a set of asserting parties between which the semantic agent's own records evidence a derivable relation of a relation type declared in the signed policy object (112). The contribution of a single origin to the withholding of an action of the action space is thereby bounded irrespective of how many identities that origin presents.

The derivation is **local**: every input is material the agent already holds, being entries of its own append-only lineage field (104) and its counterparty identity records (114), with no registry referenced, no directory queried, no consensus procedure joined, and no coordination with a further execution node. It is **non-portable**: a second agent holding different records derives from the same population a partition that need not agree, no class identifier is transmitted, and neither agent admits the other's, so the identifier is not an identity attested by a third party and confers no standing. It is **not adjudicative**: the identifier written into a counterparty identity record states the class assigned and is not a determination concerning that party's conduct.

3. Deriving an Origin-Equivalence Class From the Agent's Own Records

Assignment proceeds by an ordered five-step procedure. First, upon receipt of a conduct evaluation artifact (116), the semantic agent (100) retrieves the counterparty identity record (114) of the asserting party (118), or instantiates one. Second, it retrieves

from the signed policy object (112) in force an enumeration of declared relation types, each specifying a class of entry of the append-only lineage field (104) and a matching condition over such entries.

Third, for each asserting party already assigned to a class, whether within the current window or a preceding one, the agent evaluates each declared relation type between that party and the present asserting party. The filing discloses three:

- A **shared dispatch lineage** (202): the lineage field holds an entry recording a dispatch to each party, both entries recording a common parent dispatch entry as their immediate antecedent.
- A **co-signature** (204): a single entry of the lineage field bears signatures verifiable against an identity primitive of each party.
- A **common introduction path** (206): the counterparty identity record of each party records an introducing party, and the recorded introducing parties are identical.

Fourth, where any declared relation type is evidenced, the present party is assigned to the class of the compared party; where more than one such class is identified, the classes are merged; where none is evidenced, a new class is assigned. Fifth, the assignment, the relation types evaluated, the entries relied upon, and the resulting class identifier are appended to the lineage field, and that identifier is written into the counterparty identity record of each party of the class.

Each declared relation type is independently sufficient, and the enumeration comprises at least one type; an empty enumeration would assign every asserting party to a distinct class, restoring the condition the procedure forecloses.

Assignment is persistent and not window-scoped. The identifier survives elapse of the window, and a party assigned in one window is a compared party under the third step in each succeeding window without re-derivation. The per-class increment register (312) alone is window-scoped and is reset for the succeeding window.

4. Class Merge and Reconciliation of the Increment Register

A merge under the fourth step can arrive after one or both constituent classes have already contributed within the current window. Upon such a merge the semantic agent (100) reconciles the per-class increment register (312) by an ordered rule and appends a merge reconciliation record to the append-only lineage field (104) enumerating the constituent class identifiers, the merged class identifier, the register value recorded for each constituent class within the current window, and the register value recorded for the merged class.

The merged class is recorded as having contributed an increment where any constituent class is so recorded, and as not having contributed otherwise. Neither the rate accumulator nor the weighted contribution register is decremented by the merge, so a contribution already applied is not withdrawn by a later merge, and the merged class applies no further increment where the register records it as having contributed.

The merged class therefore contributes, within one window, the minimum of one increment and the number of constituent classes that contributed, and a party evidencing a relation between two origin-equivalence classes (200) mid-window neither inflates nor deflates the rate of that window.

5. Aggregation of Refusal Contributions

The per-class increment register (312) records, for each origin-equivalence class (200), whether that class has contributed an increment within the current window. The increment procedure consults the register before incrementing the rate accumulator and terminates without incrementing where the class has already contributed. Terminating there, it advances no run accumulator, and neither accumulator is compared against its threshold by reason of that artifact.

An artifact from a party assigned to a class already recorded still produces a determination, appended to the append-only lineage field (104). It applies no increment, only the contribution to the refusal counter (304) being aggregated. Normalization suppresses no determination and withholds no adjudication; it governs the metering alone.

Normalization is performed upon receipt of the conduct evaluation artifact (116) and before the register is consulted, so an asserting party (118) newly presented within a window is assigned to the class of its related parties before any increment attributable to that artifact is applied. Presentation of a further identity within a window is therefore incapable of yielding a further increment where the relation is evidenced from the records the semantic agent (100) already holds.

6. The Untested-Class Cost Multiplier and the Weighted Contribution Register

Relation-type derivation reaches identities the agent's record already ties together. It does not reach a party presenting a plurality of identities not previously encountered as mutually unrelated asserting parties (118): each is assigned to a distinct class and each contributes an increment. The filing reduces such contributions rather than excluding those classes.

The reduction rests on a **severance-survival test** applied to each constituent edge of a class. A severance event is recorded against an edge upon append to the append-only lineage field (104) and carries a class, being one of a payment class and an obligation class. An edge survives a severance where, within a declared continuation interval following the recorded event, a subsequent event of that class is recorded against that edge and re-establishes it. An edge resolves **want-sustained** where severances of both classes are recorded and each is survived within the interval; **payment-sustained** or

obligation-sustained where a severance of that one class alone is recorded and survived; and **not-typeable** where no severance of either class is recorded and survived within the interval.

Where every constituent edge resolves not-typeable, the class is designated an **untested class**, every edge of it having survived no recorded severance of either class. An edge against which the test does not resolve, for want of a recorded severance event, of a recorded outcome, or of elapse of the interval, is likewise not-typeable and its class remains eligible; the designation rests upon that resolution alone.

A second computation gates the multiplier: whether the recorded introduction paths of a designated class's parties converge upon a common ancestor entry of the lineage field. Convergence is evidenced where the introducing party recorded in each counterparty identity record (114) of the class, or one reached from it by traversing a chain of introducing parties of a length not exceeding a depth declared in the policy object, resolves to a common entry.

Where a class is designated untested and its paths converge, a cost multiplier declared in the policy object is applied to its contribution. The multiplier is greater than zero and less than unity, whereby the contribution is reduced below that of a class whose edges resolve want-sustained and a newly encountered party retains capacity to correct the semantic agent (100). A contribution at full weight is applied as an increment of one to the rate accumulator. A multiplied contribution goes instead, as the declared multiplier expressed as a rational quantity, to the **weighted contribution register**, which is neither rounded nor truncated. At each comparison the rate of the window is that integer count plus the register value rounded down; rounding occurs at comparison time alone, no rounded value is written back, and a residue below one is retained across contributions within the window.

The designation is recomputed upon three triggers and upon no other: receipt of an artifact from a party of that class, before the increment procedure consults the register; append of a severance event against a constituent edge, or of an entry carrying such an edge to a survived value; and a merge, the merged class being untested where and only where every constituent edge of it resolves not-typeable. A recomputation that changes the designation is appended to the lineage field (104) and governs contributions applied after the append, disturbing none already applied. The multiplier excludes no class and suppresses no determination; a party newly encountered and thereafter transacting accumulates recorded severance events, and its class ceases to be designated untested.

The worked trace declares illustrative values: a rate threshold of five, a cost multiplier of one fifth, an introduction-path depth of two. Forty artifacts arrive from forty asserting parties sharing no declared relation type, each newly encountered and none with a recorded severance event, forming forty untested classes. Thirty-five converge upon a common ancestor entry at depth two, each adding one fifth to the weighted contribution register, which reaches seven. The remaining five do not converge and contribute at full weight, the rate accumulator reaching five. The rate is twelve and the threshold is satisfied. Had all forty recorded a common introducing party, all forty would have been assigned to one class by the common introduction path (206), that class would have contributed one increment, and the authorization gate (300) would have remained in the granting state.

7. Operating Parameters

Every quantity the normalization consumes is declared in the signed policy object (112), and the filing states no magnitudes beyond those in its worked traces. The derivation consumes the enumeration of declared relation types, the cost multiplier, and the continuation interval, each bounded as stated above, together with the introduction-path depth, which counts traversals performed beyond the immediate introducing party and is at least one, a declared depth of zero detecting convergence only through an identical immediate introducing party.

Two more govern the counter it feeds. The window is expressed as an interval of wall-clock time, a count of conduct evaluation artifacts (116) received, or a count of successor epochs of a dynamic agent hash chain of the agent; expressed in successor epochs it is advanced by no party other than the semantic agent (100) and not by manipulation of its execution node's clock, and a wall-clock window does not carry that property. The rate threshold and the run threshold are each an integer, the rate threshold greater than one and the run threshold greater than one and not greater than the rate threshold.

The state maintained is narrow: a rate accumulator and a weighted contribution register, both fields of the rate counter (306), and the per-class increment register (312) mapping a class identifier to a Boolean value. In the embodiment replacing the rate accumulator with an exponentially weighted accumulator, a decay factor greater than zero and less than unity is applied upon advance of the epoch, the register remaining Boolean and the decay acting upon the accumulated value alone.

8. Alternative Embodiments

Section 10 of the filing extends the primitive along several independent lines.

Renewal conditioned on severance history. The amount by which a renewal raises the authorization quantity and replenishes the authorization budget (404) is a monotonically non-decreasing function of the count of recorded severance events across the renewing class's constituent edges, a class all of whose edges resolve not-typeable renewing at a declared least amount.

Diversity requirements on trust-building inputs. The compliance count that lengthens the decay constant is computed per class of correcting parties, as a function of the count of distinct classes that corrected the agent and to which it thereafter conformed, and is bounded above by a declared maximum, so repeated correction from one class cannot lengthen persistence beyond that bound.

Untested-origin weighting of containment. The per-partition suspension bound is multiplied by a factor of one less the proportion of a partition's artifacts originating from classes designated untested, so a partition whose artifacts all so originate triggers containment at a rate approaching zero.

Encounter receipts as class-derivation evidence. Upon producing a determination of the closed set, the agent commits cryptographically over an ordered four-member tuple of its own epoch identifier, the counterparty epoch identifier, a determination-class identifier, and a scope-partition identifier. The counterparty returns a counter-commitment with the epoch roles exchanged, the pair forming an encounter receipt appended by both. The tuple admits no conduct descriptor, so an opening discloses no characterization of conduct. A third agent presented the receipt by one party alone verifies three conjuncts: both signatures and the binding; each carried epoch identifier as a validated successor of a prior slope position it holds; and both commitments opening to one determination class. It writes an encounter attestation only where all three hold, admitted solely as evidence of class derivation and passed to no admission evaluator (120).

Withdrawal paths for receipts. An attestation written where the verifier holds no prior slope position bears an unverified-slope attribute and is consumed with no weight applied. A party may disown a receipt by a receipt repudiation observation on a ground of loss of control or supersession on migration, and two attestations agreeing on identity primitives, epoch identifiers, and scope partition yet naming different members of the closed set draw a cross-receipt equivocation record. The verifier writes a withdrawn attribute in each case and ceases consumption prospectively.

Metering the receipt channel. The verifier decrements its own authorization budget (404) by a receipt-presentation decrement upon writing an attestation, metered per presenting class so that only the first write for a class applies it. A receiving agent

applies a first-encounter budget decrement upon instantiating an ephemeral-tier record, metered per presented-material class without regard to merit. One encounter occasioning both within a common class and window applies one decrement.

Further relation types and deferred merges. A further declared relation type is evidenced where the counterparty identity records (114) of two asserting parties each record a common execution node as having hosted both. A merge may also be deferred: a party evidencing a relation against members of both classes is recorded as a bridging party, contributes at most one increment charged against each class it bridges, and is not charged again on a later merge.

Class-scoped bounds elsewhere. The followed agent's decrement of its authorization budget (404) upon counter-signing a deference record (900) is metered per class of deferring parties, so such records from one class cannot exhaust that budget. Admission of a carried abstention entry is conditioned on an attestation origin-equivalence gate: where entries held from one class exceed a bound in the policy object, a further attestation from that class is appended under the failing-element path, so agents of a common origin cannot in concert foreclose the receiver's dispatch-authority predicate.

Fork detection from the counterparty side. A receiving party observing two distinct valid successors of a single recorded epoch identifier appends a lineage-discontinuity record and thereafter treats each presenting party as presenting the common parent's refusal-counter floor, declining to advance the retained slope position until exactly one successor is corroborated. Neither presenting party is denied on the ground of the discontinuity alone.

9. Composition With the Rest of the Architecture

The class derived under Section 2 is the unit to which the filing's other meterings are keyed.

Within the refusal counter (304), the third step of the increment procedure computes the class of the asserting party (118) and consults the per-class increment register (312), after the class of the determination is examined.

The same unit governs issuance. The assertion-cost counter (400) holds a per-recipient-class register, its issuance accumulator is incremented once per recipient class within the metering window, and the authorization budget (404) is decremented responsive to that increment. The replenishment register (402) holds, for each action class, the classes from which an admissible artifact implicating that class has been received within a declared window, and the authorization budget (404) is replenished upon receipt of an artifact admitted by the admission evaluator (120) from a class absent from that register, bounded above by the authorization budget ceiling (408).

The class also conditions deference. Before a deference record (900) is given effect, the deferring agent tests upon its own records whether it and the followed agent are assignable to a common class, that test being the origin-disjointness test. Where they are, the record is appended as an attempted deference record and given no effect: it satisfies no dispatch-authority predicate, decrements no authorization budget (404), enrolls no class into the replenishment register (402), and appends nothing adverse to the followed agent.

The primitive draws on elements described in commonly owned applications for the persistent semantic agent family: the semantic agent (100) and its memory field (102) and append-only lineage field (104), the signed policy object (112), the execution node, and the dynamic agent hash chain whose successor epochs express windows. The filing incorporates no application by reference in its entirety; incorporation is per element and for a stated limited purpose only, and none is relied upon for written description or enablement.

10. Prior-Art Distinctions

Reputation and trust systems compute a score for an entity from ratings supplied by others and expose it to parties deciding whether to transact. The score sits at a registry, a scoring authority, or a shared ledger, and the scored entity neither holds it nor computes it. Defenses against unfair ratings, exemplified by the TRAVOS trust model, beta-reputation filtering, and the immunization mechanisms surveyed by Dellarocas, filter incoming ratings before aggregation to protect the stored score, the filtering party being a disinterested aggregator on which filtering imposes no cost; here the classifying party is the metered party. Role-weighted extensions, exemplified by the FIRE trust model, admit certified references and role-derived weightings, but those roles are exogenous designations asserted by other parties; the severance-survival test derives its quantity from the evaluated entity's own records of how its relationships terminate.

Centralized trust registries, directories, and identity providers resolve a presented identity against shared state, so Sybil resistance built on that model is only as available as the registry and only as neutral as its operator; the derivation here consults none of them.

Accountability mechanisms that penalize a party for unfounded assertions condition the penalty on a prior adjudication. Article 23(2) of Regulation (EU) 2022/2065 directs suspension of processing of notices from a notifier that frequently submits manifestly unfounded notices, adjudicated by the platform; Section 623(a)(8)(F) of the Fair Credit Reporting Act permits a furnisher to decline to investigate a dispute reasonably determined frivolous or irrelevant; bonded challenge procedures forfeit a challenger's stake upon a determination that the challenge failed; and model unfair-claims-practices provisions promulgated by the National Association of Insurance Commissioners condition consequences on an institutional finding of unfair practice. In each the consequence attaches after a merits determination performed by an institution other

than the penalized party, and the faculty suspended is the one exercised. The normalization determines no merits: it does not decide that an asserting party is abusive, does not suspend a channel, and does not screen an assertion out.

Accountability protocols for distributed systems, exemplified by PeerReview, locate the verdict in auditors: witness nodes collect evidence concerning an accused node and third parties verify the proof, the accused node performing no governed determination of its own. Remote attestation architectures, exemplified by RFC 9334, locate appraisal of evidence in a verifier and the grant or denial of authority in a relying party, the attested entity holding neither. Here the governed entity classifies over its own records, and the classification touches only its own authorization to act.

The comparison drawn here is structural. Nothing in it asserts that any system, standard, protocol, or statutory provision named infringes any claim of the application or of any application claiming benefit of it.

11. Disclosure Scope

This article documents subject matter disclosed in U.S. Provisional Application No. 64/117,812, "Governed Social Conduct of Persistent Semantic Agents Through Record-Grounded Admission of External Conduct Evaluations and Self-Limiting Refusal." The primary material is Section 2 in full, from the condition addressed through the worked trace. Supporting material is drawn from Section 1.8 for the closed set of determination classes, Sections 3.1 through 3.6 for the refusal counter, Sections 4.1 and 4.5 for the assertion-cost counter and replenishment, Section 9.2 for the origin-disjointness precondition, Sections 10.1, 10.2, 10.4, 10.7, 10.8, 10.10, and 10.11 for the additional embodiments, and Section 11 for the defined terms.

What the article discloses is the structure: the per-source metering unit, the derivation procedure and its declared relation types, the merge reconciliation rule and its minimum-of-one invariant, the ordering of normalization before register consultation,

the severance-survival test and the untested-class designation, and the cost multiplier with its register and three recomputation triggers. It is published to establish a public, timestamped description of that subject matter.

The disclaimers are definite. The article states no parameter magnitude, threshold, or benchmark beyond the values the filing declares, and those are illustrative rather than limiting. It defines no claim scope: the claims of the application and of any application claiming benefit of it govern, and nothing here narrows, broadens, or disclaims any of them. Nothing here characterizes any commonly owned application as prior art, alleges infringement by any product, protocol, standard, or publication, or constitutes legal advice.

Origin-Equivalence Normalization (/origin-equivalence)

All 49 steps → (/inventive-steps)

Metering that can't be gamed by splitting one accuser into many.

Provisional application

PRIMARY TECHNICAL DISCLOSURE

- **Origin-Equivalence Normalization: Metering Refusal Per Source, Not Per Assertion (/articles/origin-equivalence/origin-equivalence-normalization)**

SECONDARY TECHNICAL

- Severance-conditioned renewal amount
- Distinct-corrector diversity requirement for lengthening
- Untested-origin-weighted saturation bound
- Content-blind encounter commitment and paired encounter receipt
- Third-agent three-conjunct verification and the non-admitted encounter attestation
- Unverified-slope not-determinable branch and later re-evaluation
- Receipt repudiation

- Cross-receipt equivocation detection
- Receipt-presentation metering per presenting origin-equivalence class
- Single-encounter decrement coordination
- Receiver-side first-encounter budget decrement metered per presented-material class
- Mutual first encounter with no cross-budget coordination
- Per-origin-equivalence-class metering of the followed agent's decrement
- Attestation origin-equivalence gate: the anti-collusion bound
- Counterparty-side fork detection
- Bridging party and deferred merge
- Common-execution-node relation type

TERMINOLOGY

- asserting party (/glossary#asserting-party)
- origin-equivalence class (/glossary#origin-equivalence-class)

Origin-Equivalence Normalization overview → (/origin-equivalence)