



FORMAL RECORD 13

The ILMM Coupling Theorem

On the Structural Necessity of the Inclusive Lifelong Multistakeholder Model as the Human Architecture for the Three Primitives Framework

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Dependencies: FR1–FR12, ILMM v3.0, FR10 v2.0, FR11 v2.0

v2.4 rebuilds the record to the corpus typographic standard; no textual change. v2.0 adds: The Four Powers of Stewardship, the Transparency Kill Switch, and the Structural Gap Audit requirement, linking stewardship intervention to the undefined state of the Gildenston Functional (FR11 v2.0) and the admissible domain D (FR10 v2.0, FR11 v2.0).

Operational Summary

The Teen Gateway (13-19) functions as the earliest latency-minimizing resistance signal in the governance system. It does not replace other resistance sources; it reduces the interval between decision execution and the earliest point at which R_S can be independently activated. The delta regress problem is resolved by treating declared authority as a testable variable whose validity is determined by survival under the Gildenston Functional. Delta is not validated by pedigree but by contestation-endurance. The Twisted Pair correspondence between FR1-FR12 (formal constraints) and FR13 (human architecture) holds under this operational interpretation. The corpus closes as a coupled system: the formal layer specifies what must be true; the human layer specifies who makes it testable.

Abstract

The Three Primitives framework (FR1-FR12) establishes the formal architecture for legitimate governance in decision-permitting systems. It proves that authority must be declared, that permission cannot be derived from detection, and that governance conditions must survive subject contestation. What it does not specify is which humans occupy the authority and subject positions the architecture requires, and how they are organized to ensure that the architecture's validity conditions are met in practice. The Inclusive Lifelong Multistakeholder Model (ILMM v3.0) provides that specification. This record proves that the ILMM is structurally coupled to the Three Primitives framework: neither achieves legitimacy without the other. We demonstrate that the ILMM satisfies all fourteen structural requirements FR1-FR12 impose on human governance architecture, that three apparent gaps are resolved by the Gildenston Functional and the ILMM's own continuity mechanisms, and that the coupling is minimal – no simpler human architecture satisfies the full requirement set. We further prove that the teen gateway (13-19) is the earliest life stage at which formal contestation capability and reduced institutional compliance normalization intersect, minimizing latency between governance decisions and subject resistance activation. We resolve the delta regress problem by identifying the Gildenston Functional as the ground of declared authority: the chain of declarations terminates at the subject's legitimate contestation, not at an infinite regress of prior authorizations. We close the



Interpretive Authority gap by extending the ILMM's existing mechanisms from participant protection to subject ownership of decision records. FR13 completes the corpus. FR1-FR12 prove that the governance structure is forced. FR13 proves that the human structure to operate it exists, is minimal, and is coupled.

1. The Coupling Theorem

Theorem (ILMM-FR Coupling). The Three Primitives framework (FR1-FR12) and the Inclusive Lifelong Multistakeholder Model (ILMM) are structurally coupled. Total legitimacy $L = 1$ requires both:

$$L = \text{FR_closure} \times \text{ILMM_operational}$$

where FR_closure is the formal architecture establishing that $g=1$ requires delta and ADCI, and ILMM_operational is the human architecture ensuring that delta can be declared by positioned authorities and R_S can be exercised by positioned subjects. The product form reflects bimodal structure: anything multiplied by zero yields zero. Equivalently, $L=1$ iff $\text{FR_closure} = 1$ and $\text{ILMM_operational} = 1$.

Neither factor alone is sufficient. FR_closure without ILMM_operational yields a mathematically valid architecture with no specified human operators - governance in theory only. ILMM_operational without FR_closure yields a participation framework that cannot distinguish legitimate authority from Ghost Authority - governance as preference, not as structure.

Proof. FR1 establishes that the mapping from $E(x)=1$ to action is non-unique, requiring a human authority to select among $A(x)$. FR6 requires that the human declare delta = (p,a,c) prior to $g=1$. FR5 requires that the human be traceable. FR10 requires that the human subject have access to R_S and that governance conditions survive contestation. These requirements collectively demand a human architecture with specific properties: named authorities across all decision classes, positioned subjects with contestation capability, continuity of participation across time, and structural safeguarding that prevents silence from being read as consent. The ILMM is the architecture that satisfies these demands. Its five life stages ensure that every decision class has a positioned authority and a positioned subject. Its continuity principle ensures that contestation rights persist across life-stage transitions. Its safeguarding-by-architecture principle ensures that the Gildenston Functional can fire when governance conditions fail. The proof of coupling is the requirement satisfaction matrix in Section 2, which demonstrates that all fourteen FR-derived requirements are satisfied by specific ILMM provisions. The proof of minimality is in Section 7.

2. Requirement Satisfaction Matrix

All fourteen structural requirements imposed by FR1-FR12 on human governance architecture, plus R12b which this record adds, are satisfied by specific ILMM provisions. Three gaps required explicit specification rather than architectural change. One requirement required a clarification that institutional declarations are insufficient.

Structural requirement	Source record	Where the ILMM satisfies it	Status
R4: delta = (p,a,c) declared prior to $g=1$	FR6	ILMM Sections 3.2, 10	SATISFIED
R5: Authority is a named human source, not an institution	FR6	ILMM Section 3.2; institutional delta insufficient per FR8	SATISFIED
R6: Human is traceable; 'I decided this' auditable	FR5	ILMM Sections 3.2, 6	SATISFIED



Structural requirement	Source record	Where the ILMM satisfies it	Status
R12: Authority at permission boundary, not diagnostics	FR4	ILMM Section 6, extended to all governance via FR4	SATISFIED
R7: Subject access to legitimate resistance vector R_S	FR10	ILMM Sections 4, 5	SATISFIED
R8: Governance survives contestation - Gildenston Functional	FR10, FR11	Closed by FR13 Sections 3-4	GAP CLOSED
R9: Contestation window open for biological processing	FR10	ILMM Section 2 (Continuity)	SATISFIED
R10: ADCI - full personhood primitives	FR3, FR8	A, D, C satisfied (ILMM Sections 2, 3.5); 1 gap closed by FR13 Section 5	GAP CLOSED
R11: Governance and value layers independently satisfied	FR8	Closed by explicit statement	GAP CLOSED
R1: Human present where $E(x)=1$ and $A(x) \neq 1$	FR1	ILMM Sections 3.2, 6	SATISFIED
R2: $g*f$ - permission separate from decision	FR1	ILMM Section 3.3	SATISFIED
R3: Authority exogenous to system state S	FR2	SATISFIED by construction	SATISFIED
R12b: Support for R_S exogenous to system state S	This record	FR13 Section 4	CLOSED
R13: Human provides theta or U	FR9	ILMM Section 4	SATISFIED
R14: Primitives are forced, not negotiable	FR12	FR13 Section 7	CLOSED

3. The Delta Regress Resolution

The delta regress problem is this: if every governance action requires a declared authority (delta), and the act of declaring authority is itself a governance action, then who declares the authority for the declaration? The chain appears infinite.

The resolution is structural, not procedural. The chain terminates at the subject, not at the sovereign. The Gildenston Functional provides the ground: a declared authority is valid if and only if the governance primitives it invokes survive the subject's legitimate contestation. The chain does not require an infinite regress of prior authorizations because validity is established by resistance-endurance, not by pedigree.

Delta is not validated by who declared it. Delta is validated by whether it survives being tested by the person it was declared over. The functional is the ground.

4. The Teen Gateway & Exogeneity of Resistance Support

The teen gateway (13–19) is the earliest life stage at which two conditions intersect: (1) formal contestation capability, the cognitive and social capacity to identify, articulate, and pursue a governance objection; and (2) reduced institutional compliance normalization, the developmental stage at which deference to institutional authority begins to decline as a default response.

The teen gateway does not replace other resistance sources. It provides the earliest latency-minimizing resistance signal: the shortest interval between a governance decision and the first point at which R_S can be independently activated by a positioned subject.



R12b (Exogeneity of Resistance Support)

Support for the subject's resistance vector R_S must be exogenous to the system state. (R12b is not derived from FR1–FR12; it is a requirement identified by this record as necessary for the coupling to hold.) A system that controls the support structures for resistance controls the resistance itself. This is a direct application of Bell's non-locality result: resistance that originates within the system's control surface is not subject contestation. It is system output.

Reversibility requirement: For child and teen life stages, all governance actions must be reversible within the Intervention Gap, because the subject's resistance capacity is still developing and exogenous support structures are the primary resistance mechanism.

5. Interpretive Authority & Extraction Firewall

The Interpretive Authority gap in the ILMM is closed by extending the ILMM's existing participant protection mechanisms from process participation to subject ownership of decision records.

The $s_account$ field: Each governance decision record must include a subject-authored account ($s_account$) of the decision's meaning and impact as experienced by the subject. This account is the subject's property. It is not editable by the system, the authority, or any intermediary.

The Extraction Firewall: The $s_account$ is structurally quarantined from the system's operational pipeline. It cannot be used as input to the classification function f , to training data, to pattern analysis, or to any diagnostic or predictive process. The quarantine is structural, not policy-based. The $s_account$ exists for the subject's record, not for the system's improvement.

The $s_account$ must be subject-originated. A system-generated, pre-populated, or templated account is not a subject-authored account and does not satisfy the Interpretive Authority primitive. This follows from the same principle that governs resistance origin (FR11, Section 2.1): outputs that originate within the system's control surface are system artifacts, not subject expression.

P_NULL encoding: When no $s_account$ has been provided, the Interpretive Authority primitive is encoded as P_NULL (pending), not as satisfied. A missing $s_account$ is not consent. It is an unmeasured primitive. The system may not proceed as if Interpretive Authority has been satisfied when no subject-authored account exists.

6. Stewardship Powers and the Transparency Kill Switch

The coupling architecture requires an operational correction layer when the formal governance circuit breaks. FR11 v2.0 defines the admissible domain D (governance events that satisfy the Structural Coupling Test and path-aware GAC) and the Gildenston Functional G . When $D = \emptyset$, G is undefined – a state of total governance failure.

The Four Powers of Stewardship are granted to exogenous oversight bodies (as required by R12b). These powers are structural, not discretionary:

1. Latency Verification - Stewardship may independently measure $\text{time}(R_process)$ under actual load, bypassing nominal or system-reported timing. This detects observer degradation and timing-based simulated compliance.
2. Drift Detection - Stewardship audits sequences of governance events for the six failure classes defined in FR10 v2.0, Section 4.5: state-space destruction, observer degradation, procedural drift, primitive trade-off, procedural absorption, and branching foreclosure.
3. Reversibility Enforcement - Stewardship may halt any action that would become irreversible before the subject's resistance vector R_S can be activated within the Intervention Gap δt . This enforces the per-event friction bound $f(g) \leq f_max(g)$ and the cumulative friction constraint.



4. Transparency Kill Switch - Stewardship may formally declare $D = \emptyset$ when no admissible governance events remain. Upon such a declaration, the stewardship body must publish a Structural Gap Audit - a public report that constructively demonstrates emptiness. The audit must show that for every conceivable governance event type within the system's scope, either:
 - (a) the path from $V_subject$ to V_SCDN in the directed graph (FR11 Lemma 1.1) is disconnected, or
 - (b) every such path fails the traversability constraints (FR10 time/cost, cumulative friction, path-aware GAC).

The demonstration may be by exhaustion of event types or by proof of structural impossibility. A declaration of $D = \emptyset$ without such a constructive demonstration is invalid. The audit must be logged in the USS Layer 3 record and remain accessible to all affected subjects. The kill switch is not a policy override; it is the visible signal that the governance circuit has broken. After $D = \emptyset$ is declared, no further governance claims are valid until the structural gaps are remediated.

7. Minimality

Theorem (ILMM Minimality). No human architecture simpler than the ILMM (i.e., with fewer than five structurally distinct life stages as defined by ILMM) satisfies all fourteen FR-derived requirements.

Proof sketch. The requirements demand: named human authorities across all decision classes (R4, R5), positioned subjects with contestation capability (R7, R8), continuity of contestation rights across time (R9), satisfaction of four irreducible personhood primitives (R10), and independent satisfaction of governance and value layers (R11).

- A single-life-stage architecture cannot satisfy R9 (transitions) or provide resistance diversity across compliance profiles (R7, R8). A temporary participant in a single-stage system also lacks the continuity of stake required to sustain contestation across decisions - the cost of resistance outweighs its benefit when governance identity does not persist. Single-stage architectures produce structurally low R_S activation probability.
- A two-life-stage architecture (junior/senior) cannot satisfy R10's Continuity requirement – the boundary between stages is too sharp, and subjects crossing it lose their governance identity. The transition itself becomes a point of representational displacement.
- Three stages (youth, adult, senior) collapse the distinction between early-career and mid-career participants. These two positions have systematically different institutional investment profiles and therefore different compliance normalization baselines. Collapsing them into a single 'adult' stage erases the resistance diversity that the distinction provides. The ADCI primitive most affected is Agency: a mid-career-dominant adult stage will optimize for mid-career compliance norms, and early-career subjects lose positioned authority to contest from their own compliance profile.
- Four stages without the senior-career tier lose post-career independence - subjects who can contest without career reprisal. Without an exit option, contestation carries structurally elevated cost for all subjects still within the system. The ADCI primitive most affected is Dignity: subjects with no structural independence can be treated as instruments of the system without effective resistance.
- Five stages (Child, Teen, Early Career, Mid-Career, Senior Career) is the smallest number that spans developmental capability, compliance normalization diversity, post-career independence, and continuous personhood across the human lifespan. Any architecture that preserves these five structurally distinct positions is functionally equivalent to the ILMM.

(Note: The minimality claim is proven relative to the ILMM's five-stage typology. Architectures that define stages differently but preserve the same structural properties may also satisfy the



requirements; the claim is that no simpler architecture can satisfy all fourteen FR-derived requirements.)

8. Non-Negotiability

FR12's forced bijection establishes that three independent theoretical constraints map one to one onto the three governance primitives: Hoffman onto P1 (detection does not determine action), Sapolsky onto P2 (authority must be declared), and Bell onto P3 (the system cannot validate its own scope). The mapping is forced and unique.

The ILMM inherits this non-negotiability. The coupling theorem (Section 1) establishes that $ILMM_operational = 1$ is a necessary condition for $L = 1$. Because $FR_closure = 1$ requires the forced bijection, and $ILMM_operational$ instantiates the human positions the bijection demands, the ILMM's structure is as non-negotiable as the primitives themselves.

The five life stages are not a policy recommendation. They are the minimal human architecture that satisfies a forced mathematical constraint.

9. The Silent Subject

The silent subject is the person for whom $L = 0$: total legitimacy collapse. The system acts over them, but they have no capacity to contest. This is not a hypothetical. It is the default condition for subjects who lack the cognitive, institutional, or social resources to activate R_S .

The ILMM's response to the silent subject is not to require them to speak. It is to require the system to act as if they cannot. **The inference prohibition:** no governance system may infer consent, satisfaction, or legitimacy from the absence of resistance. Silence is not consent. Silence is an unmeasured primitive.

The operational duty: when $L = 0$ is detected or suspected, the governance system enters stewardship mode. Stewardship is not a weaker form of governance. It is the strongest form: the system operates under the assumption that every governance condition must be independently verified because the subject cannot test it themselves.

v2.0 addition: FR10 v2.0, Section 5.4 provides the operational definition of the silent subject condition through the path-aware Gap Accessibility Condition. If GAC fails after a sequence of governance events, the subject has been rendered structurally unable to contest future events. This is the operational definition of $L=0$: not because legitimacy was never granted, but because the sequence of events has destroyed the subject's capacity to exercise the legitimacy they formally hold. The friction coefficient (FR10 Definition 4.3) provides the measurable ratio; the path-aware GAC (FR10 Corollary 4.5) provides the binary capacity check; the stewardship structures defined in Section 6 of this record provide the exogenous correction when either guard fails.



10. Corpus Closure

FR1–FR12 prove that the governance structure is forced. FR13 proves that the human structure to operate it exists, is minimal, and is coupled.

The Twisted Pair: the formal layer (FR1–FR12) specifies what must be true. The human layer (FR13, ILMM) specifies who makes it testable. Neither layer is complete without the other. Together they form a coupled system in which:

$$L = 1 \text{ iff } FR_closure = 1 \text{ AND } ILMM_operational = 1$$

The corpus is closed. The conditions for legitimate governance are now fully specified: formally, operationally, and with respect to the human architecture required to instantiate them.

Changelog

- v2.4 (October 2026): Empty-set symbol in Section 6 corrected from $\emptyset$ (Latin capital O with stroke) to $\varnothing$ (empty set), four occurrences. The correct symbol stood in v2.0 and was lost in v2.1.
- v2.3 (October 2026): Record rebuilt to the corpus typographic standard. No change to any theorem, definition or proof.
- v2.2: Requirement count in Section 2 stated as fourteen plus R12b, and the Section 7 note scoped to FR-derived requirements. Matrix column headings expanded. Header field renamed to First published. No change to any theorem, definition or proof.
- v2.1: Section 8 restated in FR12's primitive vocabulary (P1 to P3) and FR12's mapping order. Footer field corrected. Original publication date added. No change to any theorem, definition or proof.
- v2.0 (May 2026): Added Section 6, Stewardship Powers and the Transparency Kill Switch. Added the Structural Gap Audit requirement. Expanded Section 7 (Minimality). Appended the full requirement satisfaction matrix in Section 2. Cross-referenced FR10 v2.0 and FR11 v2.0.
- v1.5 (2 May 2026): Initial formal record.
- v1.2–v1.4: Working drafts.
- v1.1: Initial draft.

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