

Authority Engineering AI Extension: Authority & Delegation

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Abstract

Artificial intelligence increasingly realizes consequence through distributed execution, delegated computation, and autonomous interaction across multiple realization boundaries. Existing approaches to AI governance frequently emphasize coordination, policy enforcement, or centralized oversight, yet these mechanisms do not resolve the more fundamental architectural question of whether a realization boundary permits consequence to proceed. This paper establishes Authority & Delegation as the fourth independent architectural root of the Authority Engineering AI Extension.

The governing architectural object is Local Stop Authority (AI-DL-007), derived from AE-REG-0014 Local Stop Authority. The paper demonstrates that it introduces no new primitive definition of Authority. Instead, it applies the existing Authority Engineering primitive, defined as the capacity to determine consequential futures, through locally authoritative consequence seams within distributed AI systems. From this governing root, the paper reconstructs the family's principal downstream results: AI-DL-015 Traversal Equivalence, which establishes that consequence traversal remains structurally valid only when continuity equivalence is preserved across changing execution structure, delegation state, and operational topology; AI-DL-011 Constraint Intent Persistence, which explains how constraint boundaries may alter traversal without necessarily extinguishing intended consequence; and AI-DL-008 Orchestration Degrades Sovereignty, which demonstrates how expanding centralized enforcement degrades local consequence sovereignty into distributed execution dependency.

The paper further establishes the architectural independence of Authority & Delegation from the preceding components of the Authority Engineering AI Extension—Synchronization & Scaling, Continuity & Context, and Topology & Reachability—showing that each governs a distinct structural object while collectively forming the minimum independent foundations required for governed artificial intelligence. Finally, the paper reduces these architectural results to contemporary distributed AI systems, including orchestration layers, delegated tool use, multi-stage execution pipelines, and constraint-aware autonomous execution, while preserving implementation independence. The result is a consequence-centric architectural foundation explaining how distributed AI systems determine whether consequence may proceed once synchronization, continuity, and topology have already been established.

I. Introduction

The preceding papers in the Authority Engineering AI Extension series established three independent architectural requirements for governed artificial intelligence. Together they explain synchronization, continuity, and topology within distributed AI systems. A remaining architectural question concerns whether a realization boundary may permit consequence to proceed.

Synchronization & Scaling established that universal synchronization cannot remain stable as distributed AI systems increase in scale. Continuity & Context established that reconstruction cannot preserve authority once structural continuity has been lost. Topology & Reachability

established that valid authority topology emerges only from preserved continuity and determines whether authority can structurally reach a realization boundary.

Each of those architectural roots governs a different structural question. Synchronization explains whether distributed authority can remain coordinated. Continuity explains whether authority remains structurally preserved through mutation. Topology explains whether preserved authority can reach a consequence-bearing realization boundary. None of those roots, however, determines whether consequence may actually be realized once that boundary has been reached.

A structurally reachable consequence does not imply that consequence traversal remains valid. A synchronized system does not automatically satisfy the local realization conditions of the seam. Likewise, preserved continuity does not itself determine whether a realization boundary may permit consequence to proceed. Resolving these questions requires an independent governing architectural object.

This paper establishes the fourth independent root of the AI Extension: Authority & Delegation.

Its governing architectural object is Local Stop Authority (AI-DL-007), derived from AE-REG-0014 Local Stop Authority, whose governing principle is that each realization boundary remains locally authoritative over its own consequence. The family does not redefine the primitive concept of Authority. The accepted Authority Engineering corpus defines Authority as the capacity to determine consequential futures. The contribution of this paper is to explain how that existing primitive is expressed at local consequence seams within distributed AI systems, rather than to introduce a new primitive definition.

From this governing root emerge the principal architectural consequences addressed by the remainder of the family. Delegated traversal becomes structurally meaningful only because locally authoritative realization boundaries already exist. Constraint boundaries may alter traversal while preserving consequence intent under defined conditions. Centralized enforcement architectures may degrade local consequence sovereignty by replacing seam-local realization with distributed execution dependency. Each of these results derives from Local Stop Authority rather than replacing it as the governing architectural object.

Accordingly, this paper is not primarily about delegation. Delegation is a downstream theorem of the family, not its governing root. The architectural question addressed by S6 is more fundamental: how existing Authority Engineering primitives govern whether consequence may proceed at a local realization boundary once synchronization, continuity, and topology have already been established.

II. The Governing Architectural Object

The governing architectural object of S6 is Local Stop Authority.

This conclusion does not arise from introducing a new Authority Engineering primitive. The accepted corpus already defines Authority as the capacity to determine consequential futures.

That primitive remains unchanged. S6 instead explains how Authority is applied through Local Stop Authority (AE-REG-0014) and its AI-derived family root (AI-DL-007).

Within the accepted architecture, every consequence seam represents the point at which a potential future may either collapse into realized consequence or terminate without realization. The architectural question addressed by S6 is therefore not whether an AI system can execute, synchronize, reconstruct, or discover a valid realization path. Those questions are governed by the preceding components of the AI Extension. The remaining question is whether the realization boundary itself may permit consequence to proceed.

The accepted corpus answers this question through Local Stop Authority. Each stop remains locally authoritative because only its own Task Force Horizontal (TF-H) determines whether consequence realization may proceed at that seam. The local realization boundary therefore determines whether its own consequence may proceed rather than inheriting consequence authority from remote execution, centralized orchestration, or upstream structural position.

This distinction is architecturally significant because distributed AI systems naturally encourage reasoning about authority in global terms. Distributed AI architectures routinely separate planning, coordination, execution, routing, and observation across multiple computational components. None of these architectural patterns, however, displaces the governing condition established by Local Stop Authority. The existence of distributed computation does not eliminate seam-local authority. A consequence remains governed where consequence may proceed, not where computation originated or where orchestration was coordinated.

Accordingly, S6 does not define Authority as permission, ownership, decision capability, or consequence realization capacity. Those formulations either redefine the accepted primitive or collapse distinct architectural levels into a single concept. Instead, the primitive Authority remains unchanged while Local Stop Authority specifies the architectural condition under which that primitive is exercised at a realization boundary. A local realization boundary decides whether its own consequence may proceed because Local Stop Authority governs the seam, not because S6 replaces the primitive definition of Authority.

Establishing Local Stop Authority as the governing root also determines the structure of the remainder of the family. Once every realization boundary remains locally authoritative, subsequent questions become derivative rather than foundational. The validity of delegated traversal, the persistence of consequence intent across constraint boundaries, and the degradation of local consequence sovereignty under centralized orchestration all presuppose the existence of locally authoritative sovereign stops. None replaces Local Stop Authority as the governing architectural object. Each explains a structural consequence that follows once that root has been established.

III. AI-DL-007: Local Stop Authority

The Authority & Delegation family is governed by AI-DL-007 Local Stop Authority. Within the framework of the Authority Engineering AI Extension, this derived law serves as the AI-specific

expression of AE-REG-0014 Local Stop Authority, preserving the same governing relationship while situating it within distributed AI systems. The family therefore begins not with delegation, but with the structural condition that makes delegated traversal meaningful: every realization boundary remains locally authoritative over its own consequence.

The derivation path reflects this architectural dependency:

Consequence

|



Consequence Seam

|



AE-REG-0044 Sovereign Stop

|



AE-REG-0014 Local Stop Authority

|



AI-DL-007 Local Stop Authority

This dependency sequence demonstrates that AI-DL-007 is not an independent AI construct. It derives directly from the existing Authority Engineering foundation. Each dependency governs the architectural conditions from which the next object is derived until Local Stop Authority emerges as the governing realization condition for distributed AI systems.

This ordering also explains why alternative candidates cannot serve as the governing root of S6. Delegated traversal, continuity-preserving handoff, sovereignty degradation, and constraint-boundary persistence each assume that a realization boundary already possesses local authority. None establishes that authority. They describe structural behavior that becomes possible only after the governing condition of AI-DL-007 has been satisfied. The family therefore proceeds from local authority to delegated traversal rather than from delegation to authority.

The distinction becomes particularly important within distributed AI architectures. Modern systems frequently separate planning, execution, routing, coordination, optimization, and observation across multiple computational components. Such structural distribution can create the appearance that authority itself has become distributed. The accepted corpus does not support that conclusion. Distributed execution changes how consequence is reached, not where consequence becomes locally realizable. Regardless of how many intermediate systems

participate in execution, the governing architectural condition remains unchanged: the realization boundary determines whether its own consequence may proceed.

Accordingly, AI-DL-007 establishes the invariant upon which the remainder of the Authority & Delegation family depends. AI-DL-015 Traversal Equivalence assumes locally authoritative sovereign stops between which consequence may traverse. AI-DL-011 Constraint Intent Persistence assumes locally authoritative boundaries capable of redirecting traversal without necessarily extinguishing intended consequence. AI-DL-008 Orchestration Degrades Sovereignty assumes locally authoritative realization and explains how centralized enforcement architectures degrade that locality into distributed execution dependency. None of these downstream results supersedes AI-DL-007; each derives from it.

By establishing Local Stop Authority as the governing AI root, S6 completes the fourth independent architectural root of the Authority Engineering AI Extension. Synchronization determines whether distributed authority remains coordinated. Continuity determines whether authority remains structurally preserved. Topology determines whether preserved authority can structurally reach a realization boundary. Local Stop Authority determines whether that boundary may realize consequence at all.

IV. AI-DL-015: Traversal Equivalence

Having established that every realization boundary remains locally authoritative over its own consequence, the next architectural question concerns consequence traversal between those boundaries. Distributed AI systems rarely realize consequence through a single uninterrupted execution path. Instead, consequence routinely traverses multiple sovereign stops while execution structure, delegation state, and operational topology evolve throughout the realization process. The architectural problem is therefore not whether execution changes, but whether consequence remains structurally valid while those changes occur.

The Authority & Delegation family addresses this question through **AI-DL-015 Traversal Equivalence**. Unlike AI-DL-007, this theorem does not establish local authority itself. Rather, it establishes the structural conditions under which consequence may validly traverse between already locally authoritative sovereign stops. Delegated traversal therefore presupposes Local Stop Authority. Without locally authoritative realization boundaries, there exists no architectural basis from which traversal validity could be evaluated.

The governing requirement is continuity equivalence. The accepted corpus freezes delegated traversal as remaining valid only when continuity equivalence survives changing execution structure, delegation state, and operational topology. This requirement is intentionally narrower than ordinary notions of delegation. The theorem does not state that authority itself is delegated. Ordinary delegation language often implies transfer, but the accepted corpus does not freeze authority transfer as the governing object. Instead, it establishes that consequence traversal remains valid only when the continuity relationship between sovereign stops remains preserved throughout the delegated realization path.

This distinction is essential because contemporary distributed AI architectures naturally encourage reasoning in terms of execution traversing multiple computational participants.

Continuity equivalence provides the architectural bridge between S4 and S6. The Continuity & Context family established that reconstruction cannot preserve authority once structural continuity has been lost. AI-DL-015 applies that result to delegated realization by requiring continuity equivalence across changing execution structure. Consequently, delegated traversal is not an independent property of delegation. It is a consequence of preserved continuity operating between locally authoritative sovereign stops. S4 establishes why continuity matters. S6 establishes what continuity enables once local authority already exists.

The theorem therefore answers a specific architectural question: under what conditions does distributed realization remain structurally valid as consequence traverses multiple sovereign stops? The accepted corpus answers that question through continuity-preserving delegated traversal rather than through delegated authority. Delegation becomes architecturally meaningful because locally authoritative realization boundaries already exist and because continuity equivalence preserves the validity of consequence traversal between them. Remove either condition, and the theorem no longer applies.

Accordingly, AI-DL-015 should not be interpreted as expanding the Authority primitive or introducing a new delegation ontology. It remains a theorem beneath AI-DL-007, explaining how consequence may validly traverse distributed realization paths without altering the governing condition that every realization boundary remains locally authoritative over its own consequence.

V. AI-DL-011: Constraint Intent Persistence

Delegated traversal establishes the conditions under which consequence may remain structurally valid between sovereign stops. A second question then emerges. What occurs when valid traversal encounters a boundary that prevents the current realization path from continuing?

Distributed AI systems routinely encounter constraint boundaries. Policy restrictions, resource limitations, environmental conditions, contractual obligations, jurisdictional boundaries, and other realization constraints may prevent consequence from proceeding along an intended execution path. Such boundaries do not necessarily invalidate the intended consequence itself. They establish conditions under which the current traversal path can no longer continue without violating the governing realization constraints.

The Authority & Delegation family addresses this condition through AI-DL-011 Constraint Intent Persistence. This theorem does not concern the persistence of Authority. Nor does it establish that a realization path must remain unchanged. Instead, it establishes the narrower architectural claim that consequence intent may remain structurally preserved even when a constraint boundary requires traversal to change.

This distinction is fundamental. A realization path and consequence intent are distinct architectural objects. The path describes how consequence reaches a realization boundary.

Consequence intent describes the bounded future the governing authority seeks to realize. When a constraint boundary alters traversal, the accepted corpus does not require the intended consequence to terminate automatically. Instead, the boundary may alter traversal while preserving consequence intent under the conditions established by the theorem.

The dependency structure reflects this separation. AI-DL-011 derives from Local Stop Authority through Constraint Intent Persistence. Local authority therefore remains unchanged. The constraint boundary does not acquire authority over the consequence. Rather, the locally authoritative realization boundary determines that the present traversal path cannot proceed, after which consequence intent may continue through a different structurally valid realization path if the governing architectural conditions remain satisfied.

Accordingly, this theorem should not be interpreted as permitting unconstrained rerouting or unrestricted substitution. The accepted corpus freezes neither proposition. It establishes only that constraint boundaries may alter traversal without necessarily extinguishing consequence intent. Whether a subsequent traversal remains valid depends upon the governing conditions established elsewhere in the Authority & Delegation family, including Local Stop Authority and Traversal Equivalence. A change in path does not itself preserve validity; validity must continue to satisfy the architectural requirements governing delegated traversal between sovereign stops.

This theorem also clarifies the relationship between S4 and S6. The Continuity & Context family established the conditions under which continuity remains structurally preserved. AI-DL-011 does not replace those continuity requirements. Instead, it explains how preserved continuity enables consequence intent to survive constraint-induced path mutation without requiring the original realization path to remain intact. Continuity governs preservation; AI-DL-011 governs the architectural consequence of that preservation when realization encounters structural constraints.

The result is a more precise understanding of delegation within distributed AI systems. Delegation is not defined by preserving a fixed execution path, nor by transferring authority between participants. It is governed by preserving structurally valid consequence realization despite changing traversal conditions. AI-DL-011 therefore complements AI-DL-015. Traversal Equivalence establishes when traversal remains valid between sovereign stops. Constraint Intent Persistence establishes that, under appropriate structural conditions, the intended consequence may survive even when the realization path itself must change. Together, these theorems explain how distributed AI systems remain architecturally governed without requiring either fixed execution paths or transferred authority.

VI. AI-DL-008: Orchestration Degrades Sovereignty

The preceding theorems establish how distributed consequence remains structurally governed when locally authoritative realization boundaries are connected through continuity-preserving delegated traversal. A final architectural question remains. What occurs when the structural locality established by Local Stop Authority is progressively absorbed into centralized enforcement?

Distributed AI systems frequently introduce centralized orchestration layers intended to improve coordination, efficiency, observability, or operational consistency. Such architectures often aggregate planning, routing, optimization, scheduling, policy evaluation, and execution management into increasingly centralized control structures. While these approaches may improve operational coordination, they also introduce an architectural pressure distinct from the synchronization, continuity, and topology questions addressed by the preceding segments of the AI Extension.

The Authority & Delegation family addresses this condition through AI-DL-008 Orchestration Degrades Sovereignty. This corollary does not establish that authority relocates to the orchestrator. Ordinary delegation language often implies transfer, but the accepted corpus does not freeze authority transfer as the governing object. Instead, the accepted corpus establishes the narrower architectural claim that, when enforcement expands into centralized orchestration, local consequence sovereignty degrades into distributed execution dependency.

The distinction is significant. Local Stop Authority establishes that every realization boundary remains locally authoritative over its own consequence. AI-DL-008 does not revoke that governing condition. Rather, it explains the structural consequences that emerge when system architectures increasingly depend upon centralized enforcement to determine or coordinate realization across otherwise sovereign local boundaries. The resulting architecture becomes progressively dependent upon distributed execution rather than preserving independent seam-local realization. The degradation therefore concerns the structural expression of local consequence sovereignty, not the primitive Authority itself.

Accordingly, this corollary should not be interpreted as a general criticism of orchestration. The accepted corpus does not prohibit orchestration, nor does it claim that all centralized coordination necessarily violates Local Stop Authority. The architectural claim is narrower. As enforcement authority expands into centralized orchestration, the architecture becomes increasingly dependent upon distributed execution relationships rather than preserving independent local consequence sovereignty. The corollary therefore identifies a structural pressure, not a prohibition against coordination.

This distinction also preserves the separation between S3 and S6. Synchronization & Scaling explains why increasingly centralized synchronization becomes structurally fragile as distributed systems grow. AI-DL-008 addresses a different question. Even if synchronization remains operationally successful, architectures that progressively absorb local enforcement into centralized orchestration alter the structural relationship between realization boundaries and consequence. The synchronization problem concerns coordination across distributed systems. The sovereignty degradation problem concerns the preservation of seam-local consequence authority within those systems. These are independent architectural questions even though modern AI platforms frequently experience both pressures simultaneously.

The complete internal structure of the Authority & Delegation family now becomes apparent. AI-DL-007 establishes Local Stop Authority as the governing architectural root. AI-DL-015 establishes the conditions under which consequence may validly traverse between locally authoritative sovereign stops. AI-DL-011 establishes that consequence intent may persist when

structurally valid traversal encounters constraint boundaries. AI-DL-008 explains how expanding centralized enforcement progressively degrades local consequence sovereignty into distributed execution dependency. Each artifact addresses a distinct architectural question while remaining subordinate to the governing condition established by Local Stop Authority.

Taken together, these results complete the internal architecture of S6. Authority is not redefined. Delegation is not elevated to a new primitive. Sovereignty is not transferred. Instead, the accepted corpus presents a coherent architectural family in which locally authoritative realization boundaries govern consequence, delegated traversal preserves structural validity through continuity equivalence, consequence intent survives constraint-induced path mutation under defined conditions, and centralized enforcement introduces progressive degradation of local consequence sovereignty. The family therefore explains how distributed AI systems preserve authority locality while remaining capable of coordinated, continuity-preserving realization across complex execution environments.

VII. Relationship to the Other AI Extension Components

The Authority & Delegation family completes the fourth independent architectural root of the Authority Engineering AI Extension. Its contribution is not to replace the governing objects established by the preceding papers, but to answer a question left intentionally unresolved by each of them. Synchronization, continuity, and topology explain how authority remains coordinated, preserved, and structurally reachable. None determines whether consequence may ultimately be realized once a valid realization boundary has been reached. That question belongs exclusively to Local Stop Authority.

This separation is fundamental to the architecture because each family governs a distinct structural object. Synchronization & Scaling governs the structural limits of maintaining coordinated state across distributed systems. Its governing concern is synchronization scalability, not authority locality. A system may remain perfectly synchronized while still violating the locality requirements established by S6. Conversely, a system may preserve seam-local authority while experiencing synchronization pressure that S6 neither predicts nor resolves. The two families therefore remain independent despite frequently appearing together in operational AI systems.

Continuity & Context governs a different architectural problem. S4 establishes the conditions under which authority remains structurally preserved through mutation and demonstrates that reconstruction cannot substitute for preserved continuity once structural identity has been lost. S6 assumes that result rather than reproducing it. Traversal Equivalence requires continuity equivalence precisely because S4 has already established why continuity cannot be reconstructed after structural disruption. Accordingly, S4 governs preservation; S6 governs what preserved continuity enables between locally authoritative realization boundaries. Neither family subsumes the other.

Topology & Reachability likewise remains independent. S5 explains how valid authority topology emerges from preserved continuity and determines whether authority can structurally reach a

realization boundary. Reaching a realization boundary, however, does not itself determine whether consequence may proceed. A structurally reachable consequence may still terminate at a locally authoritative stop that determines the consequence cannot proceed. Topology therefore governs structural reachability, while S6 governs consequence realization at the destination reached through that topology. Reachability and realization answer different architectural questions.

These distinctions explain why the four components of the AI Extension cannot be collapsed into a single generalized governance theory. A synchronized system may fail because continuity has been lost. A continuous system may fail because valid authority topology never emerges. A topologically valid system may fail because the realization boundary does not permit consequence to proceed. Each failure originates from a different governing object and therefore requires a different architectural explanation. The independence of the four roots reflects the independence of the structural questions they answer rather than differences in implementation or technology.

The accepted corpus also preserves clear boundaries between S6 and the downstream AI families. Tool Use & Boundaries derives from Local Stop Authority rather than existing as an independent architectural root. It operationalizes seam-local authority into bounded evaluation of external tools and delegated execution environments. Likewise, Governance & Control derives from the synchronization branch rather than from Authority & Delegation, because governance latency and control degradation originate from synchronization mismatch rather than from Local Stop Authority. These relationships preserve the independence of the four AI roots while allowing downstream families to integrate multiple governing foundations where appropriate.

The result is a complete architectural partition of the Authority Engineering AI Extension. Synchronization determines whether distributed authority remains coordinated. Continuity determines whether authority remains structurally preserved. Topology determines whether preserved authority can structurally reach a realization boundary. Local Stop Authority determines whether that realization boundary may realize consequence. Each family governs a different structural object, derives from different Authority Engineering dependencies, and answers a question that cannot be resolved by the remaining roots alone. Together they establish the minimum independent architectural foundations required for governed artificial intelligence.

VIII. Contemporary AI Reduction

The Authority & Delegation family establishes architectural principles rather than implementation-specific guidance. Consequently, its primary value emerges when contemporary AI architectures are reduced into the governing structural objects already established by the Authority Engineering corpus. This reduction does not reinterpret modern AI systems through analogy. Instead, it identifies where existing AI architectures instantiate the conditions governed by Local Stop Authority and its downstream theorem family.

The first reduction concerns centralized orchestration. Modern AI platforms frequently employ orchestration layers responsible for coordinating distributed execution across multiple computational components. These systems perform important operational functions, yet their existence does not alter the governing architectural condition established by Local Stop Authority. Orchestration may coordinate execution across distributed components, but consequence remains governed where realization occurs. A centralized coordinator may influence traversal, but it does not replace the requirement that each realization boundary determines whether its own consequence may proceed. Accordingly, orchestration should not be interpreted as a substitute for seam-local authority. Its architectural significance lies in how it influences delegated traversal and, when progressively expanded into centralized enforcement, how it contributes to sovereignty degradation as described by AI-DL-008.

A second reduction concerns distributed tool invocation. Contemporary AI systems increasingly extend their capabilities through external tools, services, and external computational resources. Operationally, these interactions often appear as delegated execution. Structurally, however, the governing question is not whether a tool has been invoked. The governing question is whether consequence traverses between sovereign stops while preserving continuity equivalence. Tool invocation therefore represents one possible realization path governed by Traversal Equivalence rather than an independent architectural category. The validity of the traversal depends upon the continuity relationship between realization boundaries, not upon the existence of external tools themselves.

The same reduction applies to multi-stage execution pipelines. Distributed AI workflows routinely partition planning, reasoning, retrieval, transformation, validation, optimization, and execution across multiple computational stages. Such partitioning changes execution structure without necessarily changing the governing architectural conditions. The accepted corpus therefore evaluates these architectures according to the preservation of delegated traversal validity rather than according to the number or complexity of intermediate execution stages. Architectural complexity alone neither establishes nor invalidates consequence realization. What matters is whether continuity equivalence remains preserved between locally authoritative sovereign stops throughout the traversal.

Constraint-aware execution provides another direct reduction. Contemporary AI systems frequently encounter operational boundaries imposed by policy, regulation, contractual obligations, jurisdiction, resource constraints, or environmental limitations. These conditions often require execution paths to change while preserving the intended operational objective. AI-DL-011 explains this behavior without introducing new architectural objects. Constraint boundaries may alter traversal without necessarily extinguishing consequence intent. Modern AI systems therefore do not require a separate theory of adaptive rerouting or constrained execution to explain this phenomenon. The accepted Authority & Delegation family already governs the structural relationship between constraint boundaries, consequence intent, and valid traversal.

These reductions also clarify an important methodological boundary. The Authority & Delegation family does not establish architectural classifications for specific implementation frameworks, orchestration products, workflow engines, agent platforms, or protocol standards. The accepted

corpus intentionally remains implementation-independent. Its concern is not the identity of a particular technology, but the governing structural relationships that determine whether its own consequence may proceed regardless of implementation. Consequently, the manuscript should resist equating individual AI products or architectural patterns with canonical Authority Engineering objects unless those relationships have been explicitly frozen elsewhere in the corpus.

Viewed collectively, these reductions demonstrate that the contribution of S6 is architectural rather than technological. Distributed AI systems continue to evolve rapidly, introducing new execution environments, orchestration strategies, delegation mechanisms, and computational abstractions. The governing questions established by the Authority & Delegation family remain unchanged. Every realization boundary must determine whether its own consequence may proceed. Every delegated traversal must preserve continuity equivalence to remain structurally valid. Constraint-induced path mutation does not necessarily extinguish consequence intent. Centralized enforcement introduces progressive degradation of local consequence sovereignty. These principles remain invariant even as the technologies implementing them continue to evolve.

IX. Conclusion

The Authority Engineering AI Extension establishes four independent architectural requirements governing distributed artificial intelligence. Each addresses a structural question that cannot be answered by the remaining families.

Synchronization & Scaling determines whether distributed authority remains coordinated as systems increase in scale. Continuity & Context determines whether authority remains structurally preserved through mutation and whether reconstruction can sustain consequence-bearing identity. Topology & Reachability determines whether preserved authority can structurally reach a realization boundary. Authority & Delegation determines whether that realization boundary may realize consequence.

These foundations are architecturally independent. Synchronization does not establish continuity. Continuity does not establish topology. Topology does not establish Local Stop Authority. Each family governs a distinct structural object while deriving from the Authority Engineering foundation.

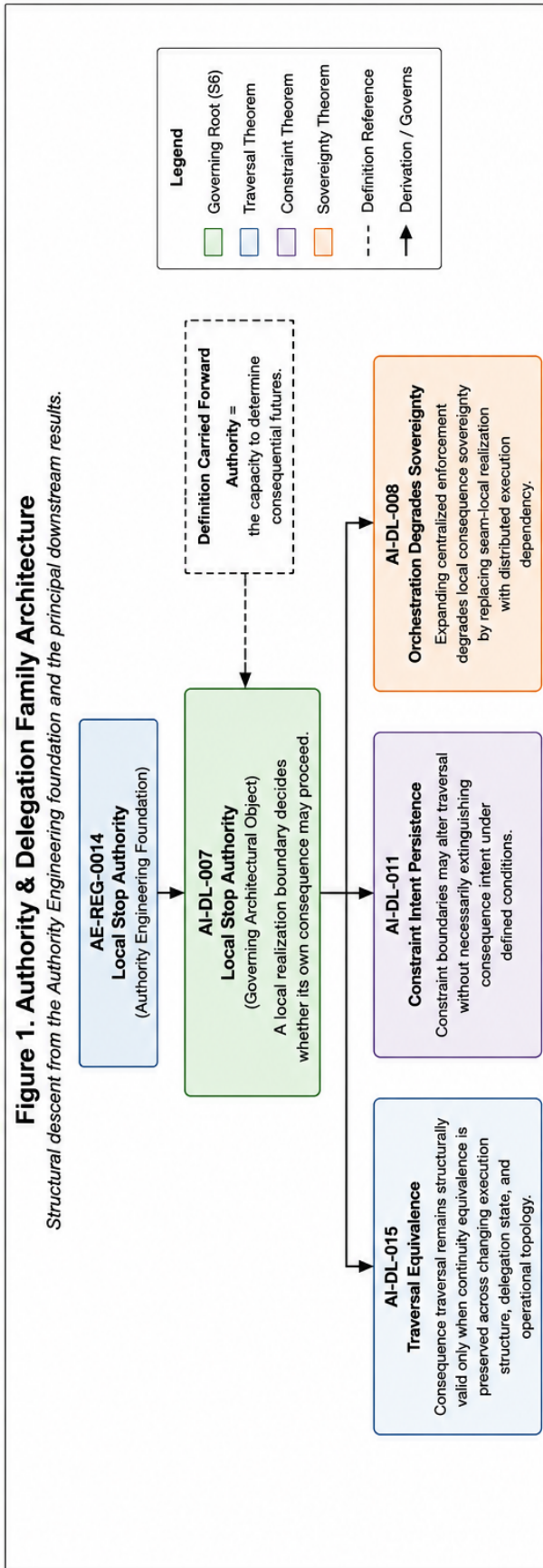
Within this architecture, S6 contributes a deliberately narrow result. It does not redefine the primitive Authority. The accepted Authority Engineering corpus defines Authority as the capacity to determine consequential futures. S6 applies that existing primitive through Local Stop Authority, establishing that every realization boundary remains locally authoritative over its own consequence. From that governing condition emerge the downstream theorems governing delegated traversal validity, consequence intent persistence across constraint boundaries, and the degradation of local consequence sovereignty under centralized enforcement. None of these downstream results replaces the governing root from which they derive.

This distinction has important implications for distributed AI governance. Modern AI architectures increasingly distribute planning, execution, orchestration, and coordination across complex computational environments. Such distribution naturally encourages reasoning in terms of globalized control. However, ordinary delegation language often implies transfer, but the accepted corpus does not freeze authority transfer as the governing object. Authority remains locally expressed at the consequence seam. Delegated traversal remains structurally valid only when continuity equivalence is preserved. Constraint boundaries may redirect structurally valid traversal without necessarily extinguishing consequence intent. Centralized enforcement may progressively degrade local consequence sovereignty into distributed execution dependency. These conclusions arise from the accepted Authority Engineering corpus rather than from implementation-specific characteristics of contemporary AI systems.

Accordingly, the contribution of the Authority & Delegation family is not to introduce a new governance framework for artificial intelligence. Its contribution is to complete the architectural foundations required to explain how consequence becomes realizable within distributed AI environments. Synchronization governs coordinated authority. Continuity governs preserved authority. Topology governs reachable authority. Local Stop Authority governs consequence realization. Together, these four independent architectural roots establish the minimum governing structure from which downstream AI families or theorem families may be derived.

Appendix: Schematic Layout Specifications

- **Title:** Authority & Delegation Family Architecture
- **Format:** Static block diagram.
- **Elements:** Shows structural flow from AE-REG-0014 Local Stop Authority -> AI-DL-007 Local Stop Authority. Beneath AI-DL-007, branch out three distinct dependency paths pointing directly to AI-DL-015 Traversal Equivalence, AI-DL-011 Constraint Intent Persistence, and AI-DL-008 Orchestration Degrades Sovereignty.



- **Title:** Distributed Seam Traversal and Sovereignty Pressures
- **Format:** Non-decorative operational topology architecture map.
- **Elements:**

1. Structural nodes mapped inline as:

Sovereign Stop 1

[Local Stop Authority]

—— Cross-Seam Boundary ——

Traversal Equivalence

—— Cross-Seam Boundary ——

Sovereign Stop 2

[Local Stop Authority]

2. A clear primary vector line showing **Continuity-Equivalent Traversal** safely bridging the seam between stops.
3. A secondary diverted path showing a **Constraint-Boundary Reroute Case**, where the path alters but consequence intent persists.
4. A broad overhead pressure bracket covering the entire topology, labeled **Centralized Orchestration (Sovereignty Degradation Pressure)**.

