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Authority Signatures Block Binding Property Surfaces To Material Identity

A credentialed admissibility profile carries a plurality of property surfaces, each independently credentialed by an authority with declared scope. An authority signatures block binds the entire profile to the identity of the credentialed structural element, while each property surface admits independently for its corresponding requirement and the surfaces compose through declared composition rules. This document discloses the binding mechanism, the multi-authority credentialing structure, the signed and versioned composition-rule architecture, the lineage chain that records credentialed lifecycle transitions, and the intended scope of disclosure.

Mechanism Of The Authority Signatures Block

A credentialed admissibility profile is a structured data object declaring one or more property surfaces of a credentialed material, element, or assembly, each said property surface declaring property-specific parameters and admission conditions. The profile is bound to the identity of the credentialed structural element through cryptographic signature by one or more credentialing authorities. The credentialed admissibility profile travels with the material, element, or assembly through manufacturing, installation, operation, and end-of-life processing.

Each property surface is independently credentialed by an authority with declared scope. For example, a structural engineering authority signs the structural surface, a utility or building-code authority signs the energy storage surface, and a fire-marshal authority signs the fire-performance surface. Each said admissibility surface admits independently for its corresponding requirement. An authority signatures block binds the entire profile to the credentialed structural element's identity, so that the bound surfaces are held together as one credentialed profile rather than as independently transmitted instruments. The cryptographic-signature scheme by which credentialed structural elements, credentialing authorities, and admissibility profiles are bound is the keyless-identity-through-continuity primitive of the Identity Application.

The property surfaces compose through declared composition rules. A composition rule is a credentialed and signed data artifact declaring a scope of property surfaces and conditions, a composition logic specifying how the relevant admissibility surfaces interact under the conditions enumerated, a version vector for deterministic conflict resolution, a conflict-resolution policy selected from latest-signed-rule, declared-precedence-table, and authority-rank-resolution, and an authority signature. Because the composition rules are themselves signed and versioned, the composition logic applied to a profile is itself credentialed and auditable rather than implicit.

Multi-Authority Credentialing Structure

A credentialed structural element's admissibility profile comprises at least two property surfaces selected from structural, thermal, energy storage, fire-performance, sound-transmission, vapor-permeability, environmental, distribution, network, water-coupled, thermal-coupling, and carbon-sequestration admissibility surfaces. Each said surface is independently credentialed by an authority with declared scope. A structural engineering authority signs the structural surface, a thermal-rating authority signs the thermal surface, a fire-marshal authority signs the fire-performance surface, a utility or building-code authority signs the storage surface, and an environmental-credit authority signs the carbon-sequestration surface.

Multi-authority credentialing of a credentialed structural-storage element is performed by a manufacturer authority, a building-code authority, a utility authority, a carbon-credit authority, and an independent testing authority, to produce a composed admissibility profile by which the element is admitted into building-scale operations, building-code review, grid-services participation, carbon-credit issuance, and independent verification. A credentialed authority is an authority recognized by the architecture as competent to attest property surfaces or to admit operations within a declared scope, including without limitation manufacturer authorities, building-code authorities, utility authorities, environmental-credit authorities, fire-code authorities, electrical-code authorities, and marine or water-infrastructure authorities.

The composed admissibility profile is structured so that each surface admits independently for its corresponding requirement while the authority signatures block binds the entire profile to the element's identity. A verifier concerned with a single property may consult the corresponding surface and its responsible authority's signature; a verifier concerned with whether the element composes for a compound requirement consults the relevant composition rules together with the surfaces they scope.

Lifecycle Transitions And Re-Credentialing

A credentialed structural element's lifecycle is recorded in a lineage chain comprising pre-installation credentialing, in-service credentialed operation, an end-of-storage-life substate, end-of-structural-life decommissioning, recycling-grade re-credentialing, and re-installation in subsequent structural application. Each lifecycle transition is a credentialed event signed by an appropriate authority and recorded in the lineage chain. End-of-storage-life is a credentialed transition in which the realized energy storage capacity has degraded below a declared threshold; the credentialed admissibility profile is updated to reflect zero or reduced storage capacity while the structural admissibility surface continues to support the element's structural function. End-of-structural-life decommissioning is a credentialed event signed by a licensed

demolition or deconstruction contractor admitted under credentialed scope, producing a demolition-recovery attestation declaring the recovered material's grade, mass, and physical state. Recycling-grade re-credentialing is performed by a recycler authority, conducting recovered-material processing and producing a new admissibility profile at recycled grade.

The architecture additionally admits continuous re-credentialing across operational material flows during a structural element's in-service lifetime, including without limitation tuck-pointing replacement of mortar joints, surface-coating refresh, cavity-fill replacement, drywall replacement during renovation, foundation surface coating, topping-slab augmentation, and substrate top-up of any surface or volumetric element. Each said material flow is a credentialed event signed by an installer authority and recorded in the lineage chain; the substrate's composite admissibility profile is re-evaluated against the cumulative material flow rather than only at original installation. Under this metabolic-lifetime model, the substrate's credentialed identity persists across material flows while the material flows themselves are credentialed transitions in the lineage chain. This admits refresh, augmentation, or substitution of a constituent surface within the cumulative composite admissibility profile without forcing demolition of the structural element.

Composition With Adjacent Primitives

The authority signatures block composes with the composition-rule architecture. Multi-property admissibility surfaces compose through a composition-rule registry holding signed and versioned composition-rule artifacts, each consumed by the building energy management system at admissibility-evaluation time. Representative composition rules include a fire-event rule reducing storage admissibility to zero when the fire-performance admissibility surface declares fire-event detection, a thermal-runaway prevention rule constraining storage dispatch during high thermal admissibility surface readings, a structural-load-versus-storage-cycle rule reducing storage admissibility when the structural admissibility surface reports structural fatigue accumulation above

a declared threshold, a freeze-thaw-derated capacity rule degrading the storage admissibility surface as a function of cumulative freeze-thaw cycles, and an electrolyte-architecture-selection composition rule mapping application requirements to admissible electrolyte-coupling architecture classes.

The binding composes with the lineage-chain primitive. Each lifecycle transition is a credentialed event signed by an appropriate authority and recorded in the lineage chain, forming a directed graph of credentialed transitions persistent across multiple structural lifetimes. Because the credentialed admissibility profile travels with the material through its lifecycle, the lineage chain records both the superseded and the current profile states, so that historic operation under a prior profile remains auditable while current operation resolves against the current profile.

The binding further composes with the cognitive governance architecture of the Cognition Application, whose five-property governance chain of authority-credentialed observation, evidential weighting, composite admissibility, governed actuator execution, and lineage-recorded provenance is applied at the material scale and at higher scales of organization. The building energy management system, operating under that governance, admits each credentialed structural element through composite admissibility evaluation and operates the aggregate as a coherent storage resource.

Distinction Over Existing Approaches

Existing building codes recognize multiple material properties of building components, including structural load ratings, fire-resistance ratings, thermal insulation R-values, sound transmission ratings, and vapor permeability. None of the existing building codes recognize energy storage, electrical distribution, data networking, or carbon sequestration as material properties of structural building components. Conventional certification treats these properties as independently issued and independently verified instruments, with no single credentialed object that holds a plurality of property surfaces together under the rules by which they compose.

The disclosed architecture treats structural, thermal, energy storage, electrical distribution, data network, fire performance, and carbon sequestration properties as independently credentialed but compositional surfaces of one credentialed substrate. The credentialed admissibility profile is the structured data object that carries these surfaces; the authority signatures block binds the entire profile to the element's identity; and the composition rules, themselves signed and versioned, declare how the surfaces interact when the element participates in a compound requirement.

The disclosed binding is distinct in that a plurality of independently authored, authority-signed property surfaces are held within a single credentialed admissibility profile bound to a material identity; the surfaces compose through signed and versioned composition-rule artifacts with declared conflict-resolution policy; and the profile travels with the material across its lifecycle, with each lifecycle transition recorded as a credentialed event in the lineage chain.

Disclosure Scope

This disclosure is described in U.S. Provisional Application No. 64/050,895. It is intended to support claims directed to: a credentialed admissibility profile comprising a plurality of property surfaces, each independently credentialed by an authority with declared scope, the profile bound to the identity of a credentialed structural element through an authority signatures block; a multi-authority credentialing structure in which a manufacturer authority, a building-code authority, a utility authority, a carbon-credit authority, and an independent testing authority produce a composed admissibility profile; a composition-rule architecture comprising a composition-rule registry holding signed and versioned composition-rule artifacts, each declaring a scope, a composition logic, a version vector, and a conflict-resolution policy; and a lineage chain recording credentialed lifecycle transitions including pre-installation credentialing, in-service operation, end-of-storage-life, decommissioning, recycling-grade re-credentialing, and re-installation. The scope contemplates the keyless-

identity-through-continuity signature scheme of the Identity Application and composition with the cognitive governance architecture and lineage-chain primitives disclosed in the parent provisional.

Credentialed Surfaces (/credentialed-materials)

All 40 steps → (/inventive-steps)

Building surfaces as credentialed agents that participate in the structure's networking and electrical systems.

Provisional application

PRIMARY TECHNICAL DISCLOSURE

- credentialed-building-materials-cryptographic-admissibility-for-structural-surfaces (/articles/credentialed-building-materials-cryptographic-admissibility-for-structural-surfaces)

SECONDARY TECHNICAL

- credentialed-materials/carbon-sequestration-property-surface (/articles/credentialed-materials/carbon-sequestration-property-surface)
- Composition Rules Governing Surface Interactions (/articles/credentialed-materials/composition-rules)
- Decommissioning And Re-Credentialing Attestation (/articles/credentialed-materials/decommissioning-and-recredentialing)
- Electrical-Distribution Admissibility Surface (/articles/credentialed-materials/distribution-property-surface)
- credentialed-materials/end-of-storage-life-attestation (/articles/credentialed-materials/end-of-storage-life-attestation)
- credentialed-materials/energy-storage-property-surface (/articles/credentialed-materials/energy-storage-property-surface)
- Lineage Chain Across Material Lifecycle (/articles/credentialed-materials/lineage-chain-across-lifecycle)
- **Master Credential Signature Binding All Property Surfaces (/articles/credentialed-materials/master-credential-binding)**
- Multi-Authority Signature Block (/articles/credentialed-materials/multi-authority-signature-block)
- Data-Networking Admissibility Surface (/articles/credentialed-materials/network-property-surface)

- Profile Versioning Continuity (/articles/credentialed-materials/profile-versioning-continuity)
- credentialed-materials/structural-property-surface (/articles/credentialed-materials/structural-property-surface)
- credentialed-materials/thermal-property-surface (/articles/credentialed-materials/thermal-property-surface)
- Versioned Admissibility Profiles With Lineage Chain (/articles/credentialed-materials/versioned-profiles-with-lineage)
- credentialed-materials/water-coupled-property-surface (/articles/credentialed-materials/water-coupled-property-surface)

Credentialed Surfaces overview → (/credentialed-materials)