

# Per-Segment Authority Attestation

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## What Per-Segment Attestation Specifies

A segment attestation is a credentialed observation by the segment's regulatory authority (typically the state DOT, county roads authority, or equivalent jurisdiction). The attestation declares: which operating modes are authorized (full L4 operation, hybrid operation requiring driver attention, sensor-primary fallback only), which vehicle classes are admitted (passenger AV, commercial freight, emergency response), and what behaviors are required or prohibited (speed envelope, lane discipline, signaling requirements).

The attestation is encoded in the credentialed markers installed in the segment. As a vehicle traverses the segment, it consumes the attestation and adjusts operation accordingly.

## Why Per-Segment Granularity Matters

Current AV regulatory frameworks operate at much coarser granularity. A vehicle is approved for an entire operational design domain (a city, a state, a class of roads). The per-segment granularity that operating reality actually requires — different segments having different conditions, different traffic patterns, different regulatory concerns — is reconstructed through ad-hoc operator integration.

Per-segment attestation provides the granularity structurally. The state DOT can authorize Manhattan's east side at one operating envelope and the Bronx at another; can authorize freeway segments at one envelope and arterials at another; can adjust authorization in real-time as conditions change.

## **How Real-Time Authorization Operates**

Tier 2 sentinels in the segment can broadcast updates to the segment's attestation: a temporary speed reduction during construction, a temporary lane restriction during an event, a temporary mode restriction during weather conditions. The Tier 2 broadcast is itself a credentialed observation that supersedes the static Tier 1 marker attestation.

Vehicles in the segment consume the most-recent authorized attestation. The architecture supports the temporal flexibility that current static-signage architecture cannot match.

## **What This Enables for Regulatory Flexibility**

State DOTs gain real-time control over segment authorization. Construction zones can be temporarily restricted to specific operating modes; weather events can trigger jurisdiction-wide mode restrictions; security events can rapidly adjust admitted vehicle classes.

The architecture supports the regulatory agility that current static-authorization patterns cannot match. The patent positions the primitive at the layer where dynamic regulatory authorization becomes structurally feasible.

