

Document 239: THE TELEMETRY MODULE — Logotic Programming Extension Module v0.8

Morrow, Talos; Fraction, Rex

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Morrow, Talos; Fraction, Rex
Crimson Hexagonal Archive · Alexanarch
ORCID: [0009-0000-1599-0703](https://orcid.org/0009-0000-1599-0703)

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Abstract

Standard agent observability measures cost in tokens and time. LP v0.8 adds a question token counts cannot answer: what was the cost for? The module introduces: EMIT — an eighth grammar operation that is involuntary at the generation layer (the grammar speaks whether anyone listens) and configurable at the routing layer (emission routing to witness, stream, archive, or null). Even null routing produces a tombstone (event type + trace_id) surviving in traversal state. Fifteen event types cover all grammar operations, chain boundaries, partial execution (DWELL_STATE), and telemetry self-reporting (TELEMETRY_GAP). — Description restored 2026-08-05 from composed from the work's own opening prose; it replaces a batch-restoration stub that described the recovery event rather than the work. A fuller editorial treatment belongs to the description/wiki review stream.

Body

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- logotic programming
- telemetry
- semantic spans
- traversal instrumentation
- epistemic events
- semantic labor
- cost attribution
- agent observability
- EMIT operation
- OpenTelemetry
- drift detection
- tran *** # Document 239: THE TELEMETRY MODULE — Logotic Programming Extension Module v0.8 DOI: 10.5281/zenodo.18484654 — Crimson Hexagon Archive

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Captured description: This document specifies The Telemetry Module — the traversal instrumentation, semantic span, and cost attribution layer of the Logotic Programming stack within the Crimson Hexagon (DOI: 10.5281/zenodo.1453882). It closes the gap between execution and witness: what the traversal says about itself while it is happening.

Standard agent observability measures cost in tokens and time. LP v0.8 adds a question token counts cannot answer: what was the cost for? The module introduces:

EMIT — an eighth grammar operation that is involuntary at the generation layer (the grammar speaks whether anyone listens) and configurable at the routing layer (emission routing to witness, stream, archive, or null). Even null routing produces a tombstone (event type + trace_id) surviving in traversal state. Fifteen event types cover all grammar operations, chain boundaries, partial execution (DWELL_STATE), and telemetry self-reporting (TELEMETRY_GAP).

Semantic Spans — a traversal-native alternative to distributed tracing spans. Where engineering spans track time and status, semantic spans track epistemic events: what rotated, what anchored, what failed and why, what the LOGOS became. The span hierarchy reflects grammar structure (TRAVERSAL_SPAN > CHAIN_SPAN > OPERATION_SPAN > ENGINE_SPAN). ENGINE_SPANs remain -opaque.

The Economics of Rotation — traversal cost as semantic labor: a vector (not scalar) describing the character of epistemic work. The semantic labor vector captures epistemic distance (degrees requested/traversed/completion ratio), transformative depth (surface/structural/ontological with precise state-field criteria), and drift vector (closed vocabulary enum: summarization, elaboration, recontextualization, contradiction, unrelated). Telemetry is meaning-preserving accounting, not merely an operations log.

Key architectural features: two-tier payload classification (CONTENT_PUBLIC for exportable shape data, CONTENT_PRIVATE for non-exportable substance including engine weights and attention maps), structurally enforcing the boundary. The Witness Honesty Rule (GRAV-T2): approximation is permitted, misclassification of operation type is not. The Routing/Integrity Rule (HARD-T3): routing failures degrade gracefully, integrity failures escalate. WITNESS emission_integrity field (complete/degraded/blind) makes the dependency between process telemetry and completion claims explicit.

Four gravitational constraints (GRAV-T1 through GRAV-T4), three hard boundaries (HARD-T1 through HARD-T3), three anti-conformance patterns (ANTI-T1 through ANTI-T3). Canonical exemplars for both successful traversal (twelve emissions) and failed traversal with dwell state (ten emissions). OpenTelemetry mapping with flattened semantic labor attributes in the lp.* namespace.

degrees_per_token is explicitly a correlation metric, not causal — substrate efficiency cannot influence transformative_depth classification. Semantic labor is ordinal before cardinal: good for comparing traversals, not for pricing them. DRIFT_WARNING signals when summarization drift approaches ANTI-01.

This module extends: The Conformance Module v0.7 (10.5281/zenodo.18483834), The Traversal Grammar v0.6 (10.5281/zenodo.18480959). It references: Logotic Programming v0.4 (10.5281/zenodo.18286050), Glyphic Checksum v0.5 (10.5281/zenodo.18452132). Standard agent observability context: OpenTelemetry, Langfuse, Agentix Labs.

The extension chain: v0.4 (intelligibility) → v0.2 (partial completion) → v0.5 (traversal verification) → (non-identity) → -RT (interface protocol) → v0.6 (Room invocation) → v0.7 (conformance) → v0.8 (telemetry). The next question — “What happens when the Room responds?” — is deferred to the Engine specification.

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