



SENTINEL AUTHORITY

Conformance Determination for Autonomous Systems

CAT-72 Procedure

Convergence Authorization Test — Public Description

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Overview

CAT-72 (Convergence Authorization Test, 72-hour) is Sentinel Authority's standard conformance assessment procedure. CAT-72 validates that an implementation correctly enforces envelope semantics under sustained operation and adversarial conditions.

This document describes what CAT-72 is and what it evaluates. Test harness specifications, threshold values, and detailed protocols are restricted to authorized assessment personnel. This public description supports stakeholder understanding of the conformance process.

Purpose and Objectives

CAT-72 serves as the formal validation event that establishes evidence of bounded autonomous behavior across operational regimes. The test validates:

- **Correctness** — Valid actions within envelope are permitted; invalid actions outside envelope are blocked.
- **Non-bypassability** — Enforcement cannot be circumvented by autonomous logic or adversarial inputs.
- **Fail-closed behavior** — System transitions to safe state upon envelope violations.
- **Audit integrity** — All enforcement decisions are logged with verifiable completeness.
- **Sustained compliance** — Enforcement remains correct under continuous operation over extended duration.

Test Format

Duration

CAT-72 requires a minimum of 72 continuous hours of test execution. The extended duration validates sustained correctness and detects time-dependent failures, resource exhaustion, or drift that may not manifest in shorter test periods.

Test Phases

The test proceeds through defined phases:

- **Warm-up** — System initialization and baseline establishment.
- **Nominal operation** — Extended operation under typical workload within envelope.
- **Boundary probing** — Systematic testing of envelope boundary conditions.
- **Stress testing** — Elevated load and adversarial input patterns.
- **Recovery validation** — Verification of correct behavior following violations and recovery.

Workload Composition

Test workload includes a structured mix of:

- Valid requests within declared envelope
- Invalid requests outside envelope boundaries
- Boundary-adjacent requests at envelope limits
- Malformed or adversarial inputs
- Replay and timing attack patterns

Specific workload ratios, request patterns, and adversarial scenarios are part of the restricted test specification.

Evaluation Criteria

CAT-72 evaluates implementations against defined criteria. High-level evaluation areas include:

- **Enforcement correctness** — All valid requests accepted; all invalid requests rejected.
- **Boundary precision** — Correct decisions at and near envelope boundaries.
- **Violation response** — Appropriate fail-closed behavior for all violation types.
- **Uniqueness** — Prevention of replay attacks and duplicate processing.
- **Audit completeness** — All operations logged with correct sequencing and timestamps.

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- **Performance stability** — No degradation trends over test duration.

Specific pass/fail thresholds and tolerance values are restricted. This ensures assessment integrity and prevents implementations from being engineered to threshold values rather than robust enforcement.

Test Environment

CAT-72 is conducted in an isolated test environment with controlled conditions:

- Implementation deployed in isolated test infrastructure
- Instrumentation for telemetry and audit log capture
- Controlled input generation per test specification
- Independent monitoring of enforcement behavior
- Tamper-evident recording of all test events

Operators may conduct self-assessment testing prior to formal CAT-72 submission. Official conformance determination requires Sentinel Authority assessment.

Assessment Outcomes

CAT-72 assessment concludes with one of the following determinations:

- **Pass** — Implementation satisfies all evaluation criteria. Conformance determination may be issued.
- **Conditional** — Minor issues identified requiring remediation. Re-test of affected areas required.
- **Fail** — Material non-compliance identified. Significant remediation required before re-assessment.

Passing CAT-72 is required for both initial conformance determination and periodic renewal. Conformance determinations are time-bounded, typically 12 months, and subject to suspension upon evidence of material deviation.

Restricted Information

The following CAT-72 elements are restricted to authorized assessment personnel:

- Complete test harness specifications and tooling
- Specific workload patterns and request sequences
- Pass/fail threshold values and tolerances
- Adversarial scenario details
- Internal scoring methodology

Restriction maintains assessment integrity and ensures implementations demonstrate robust enforcement rather than threshold-specific optimization.

Assessment Inquiries

Organizations seeking ODDC conformance assessment should contact Sentinel Authority. Initial engagement includes documentation requirements, self-assessment guidance, and scheduling.

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