ODDC Scenarios

Industry Applications

Version 1.1 — January 2026 — Non-Normative Examples

This document presents representative scenarios illustrating how ODDC with ENVELO-compliant enforcement applies across industries. These examples are illustrative and non-normative. Actual conformance requirements are determined through scope assessment.

1. Data Centers & Hyperscale Computing

Operational Context

Autonomous systems allocate power, optimize cooling, place workloads, and orchestrate AI-on-AI stacks. Real-time decisions affect facility safety, equipment longevity, and operational continuity.

Representative ODD Boundaries

- Power draw: Per-rack limits, row limits, facility aggregate
- Thermal envelope: Inlet temperature ranges, delta-T limits
- Workload density: Compute density per zone, memory utilization ceilings
- AI recursion: Maximum depth for AI systems managing other AI systems

Representative Enforcement

Hard-cap interlocks on CPU throttling, automatic workload shedding as facility power approaches envelope limits.

2. Healthcare & Clinical AI

Operational Context

Clinical decision support systems and autonomous diagnostic tools operate in high-stakes environments where bounded operation is essential for patient safety.

Representative ODD Boundaries

- Scope limitations: Specific conditions, patient populations, imaging modalities
- Confidence thresholds: Minimum certainty before automated recommendations
- Escalation triggers: Conditions requiring human review

Representative Enforcement

Automatic escalation when confidence falls below threshold, mandatory human review for out-of-scope presentations.

3. Financial Services

Operational Context

Algorithmic trading systems, automated underwriting, and fraud detection require demonstrable operational boundaries for regulatory compliance and systemic risk management.

Representative ODD Boundaries

- Position limits: Maximum exposure per asset, sector, counterparty
- Velocity limits: Maximum transactions per time period
- Drawdown limits: Maximum loss before automated halt

Representative Enforcement

Circuit breakers halt trading on limit breach, automatic position unwinding on drawdown threshold.

4. Autonomous Vehicles

Operational Context

Complex, dynamic environments where operational design domains must be precisely specified and rigorously enforced.

Representative ODD Boundaries

- Geographic limits: Geofenced operational areas
- Environmental limits: Weather, lighting, road surface conditions
- Speed limits: Maximum velocities by zone and condition
- Maneuver limits: Permitted actions by operational mode

Representative Enforcement

Geofence violations trigger minimal-risk condition, environmental degradation forces handoff to human operator.

Note: These scenarios are illustrative only. Actual ODD boundaries, tolerances, and enforcement mechanisms are defined by system operators and verified through CAT-72 testing.

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