

Xenese™ Distributed Intelligence Infrastructure

Asset Integrity Optimization for Oil and Gas Operations



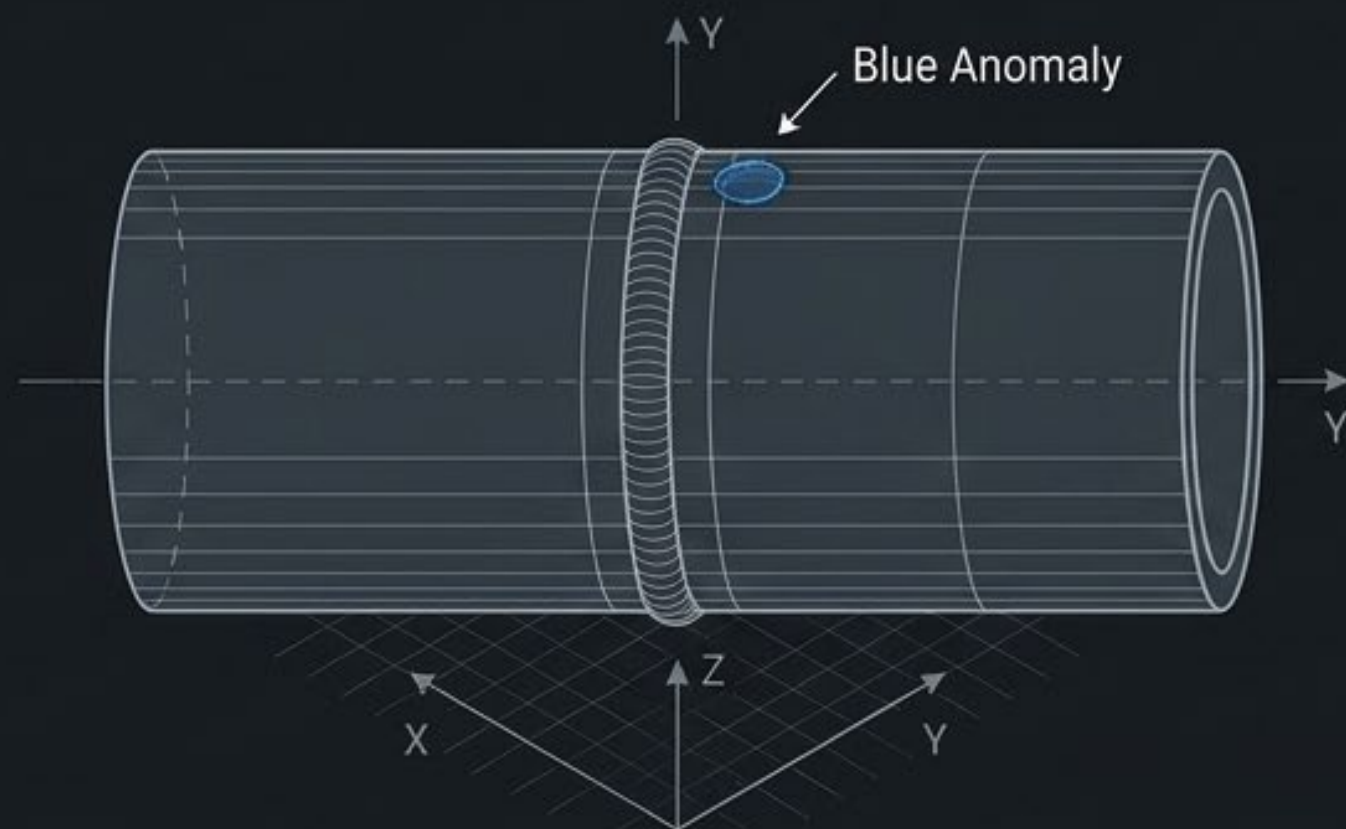
The greatest risk in asset integrity isn't a lack of data.

It is a lack of unified context and governed actions.

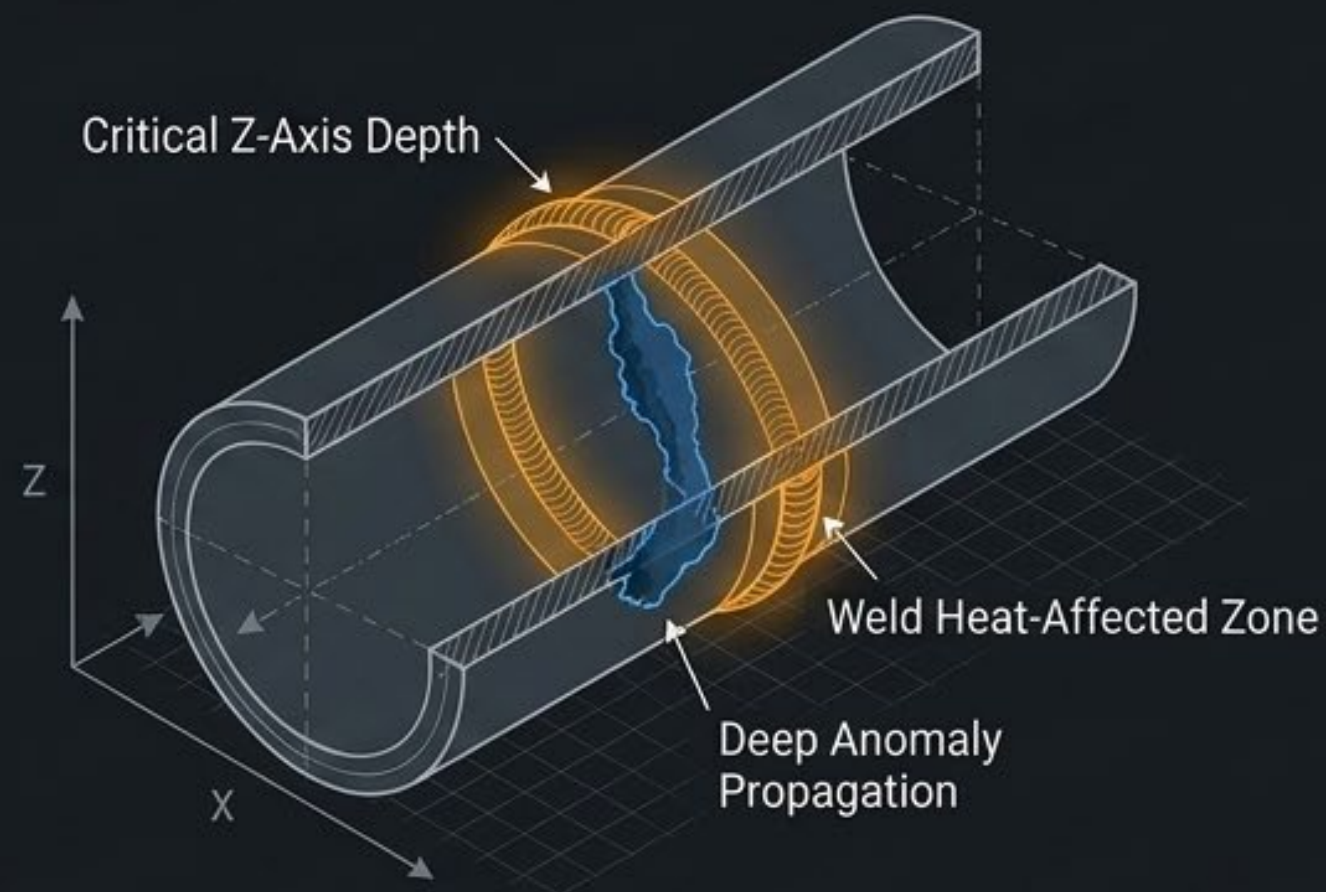
Exabytes of inspection data exist across Agbami. Yet analysis remains trapped in static views, forcing engineers to spend 80% of their time on data preparation rather than diagnostic judgment.

The Illusion of Safety in Two Dimensions

Plan-View (XY): Anomaly appears minor. Action: Monitor.



The 3D Z-Plane Reality.



The Limitation

Conventional integrity analysis is constrained to two dimensions.

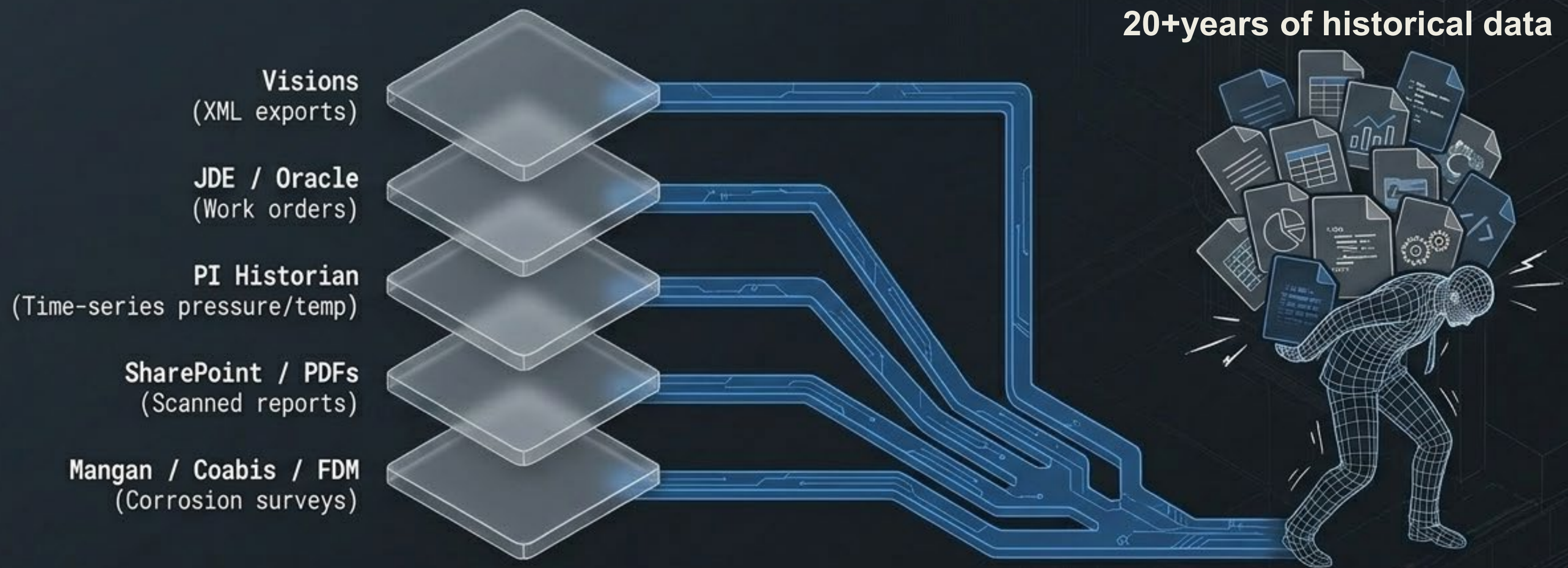
The Consequence

Laminate and layered degradation—especially combined sand, erosion, and corrosion—manifests at specific depths. A 2D inspection cannot represent whether a defect originates internally, externally, or mid-wall.

The Result

Misclassified risks and overly reactive shutdowns.

Trapped in Silos — 20+ Years of Data, Zero Unified View



The Friction	The Impact
Harmonizing heterogeneous data by asset, location, and time takes days or weeks.	The volume of findings frequently exceeds the capacity for immediate action. Not every anomaly requires emergency intervention, but manual triage delays critical discoveries.

Shifting to Continuous Control

Before Xenese

Time to Analyze:
Weeks to months

Analysis Cycle Time:
Quarterly/Annual

Manual Engineering Effort:
60–80% data prep

Straight-Through Decisioning:
Near zero

Specialist Team Size:
30+ engineers

Decision Auditability:
Manual narrative reports

With Xenese

Time to Analyze:
Hours to minutes (~95% reduction)

Analysis Cycle Time:
Continuous, on-demand (50%+ reduction)

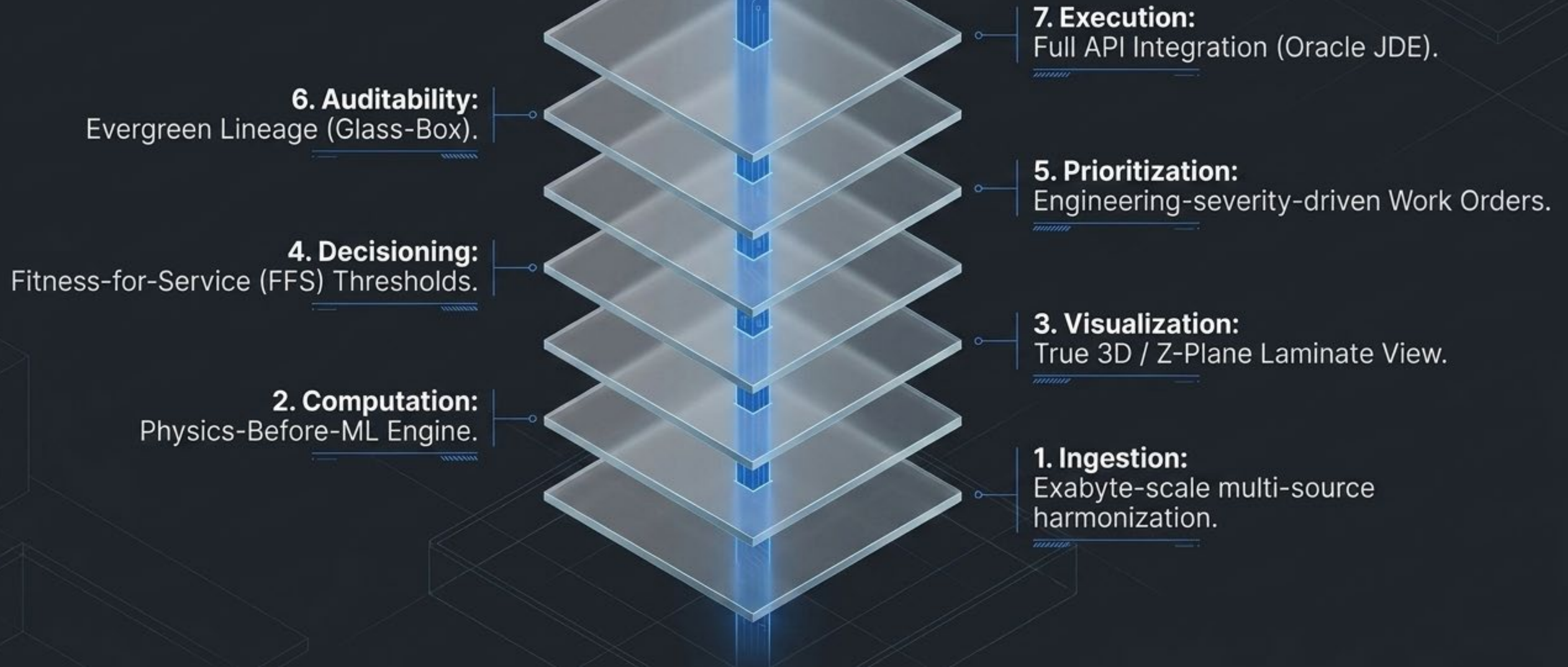
Manual Engineering Effort:
Judgment and review only (60–70% reduction)

Straight-Through Decisioning:
≥70% automation rate

Specialist Team Size:
4–6 person team with AI assist

Decision Auditability:
Full glass-box cryptographic lineage

The Xenese Architecture: Seven Pillars of Intelligence



Pillar I: Multi-Source Ingestion at Exabyte Scale



The Mechanism & Difference

Purpose-built Xenese Data Acquisition Service and Actor-Based Ledger Data Ingestion engine.

Automatically connects to enterprise Systems of Record (SORs) without manual file movement or manual ETL pipelines.



Native Connectors (Agbami-Relevant)

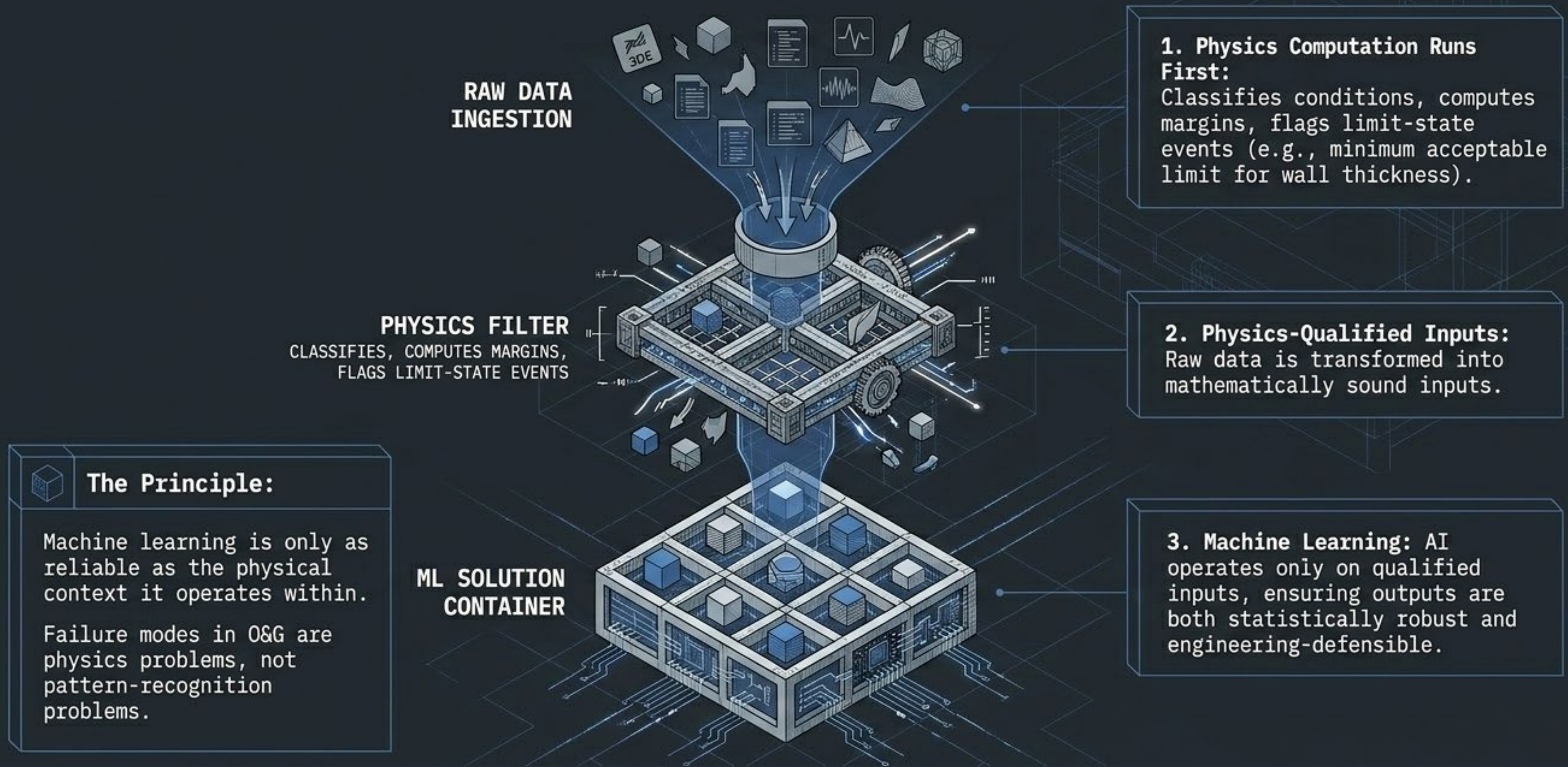
- **Visions:** API / Direct integration (Inspection reports)
- **JDE (Oracle):** API / DB connector (Work orders, maintenance)
- **PI Historian:** OSIsoft PI connector (Real-time process data)
- **SharePoint:** Microsoft Graph API



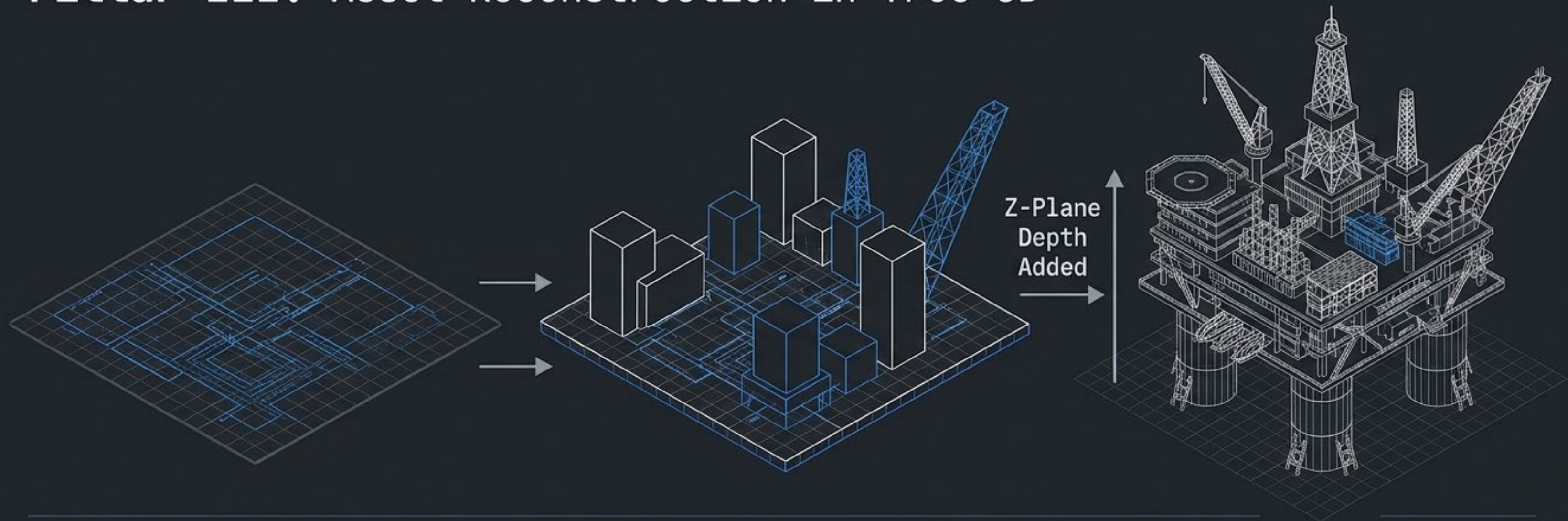
Scale of Processing

Context window of 128K-2M tokens up to Exabyte-scale distributed processing.

Pillar II: The Physics-Before-ML Engine



Pillar III: Asset Reconstruction in True 3D



The Z-Plane Solution

Xenese reconstructs assets by adding the critical depth dimension to all inspection data.

Parallel Execution

Distributed AI processes corrosion and degradation across the full asset geometry simultaneously—not sequentially.

Unified Interrogation

- Rotate and interrogate any section of the geometry.
- View through-wall conditions by depth layer.
- Cross-reference findings across different inspection cycles at the exact same 3D location.

The Value of Depth: From Hours to Minutes



Previous Approach:

Manual cross-referencing of 2D maps, NDT files, and coordinate diagrams.

3–8 hours
per finding.



Xenese Approach:

Unified 3D model with depth-resolved data; single-interface interrogation.

Under 5 minutes
per finding.

Operational Significance for Agbami:

Minimum thickness analysis across pipeline networks identifies cut points, degradation clusters, and hotspots enabling cut, repair, or replace decisions **in minutes rather than hours, days, or months.**

The Outcome:

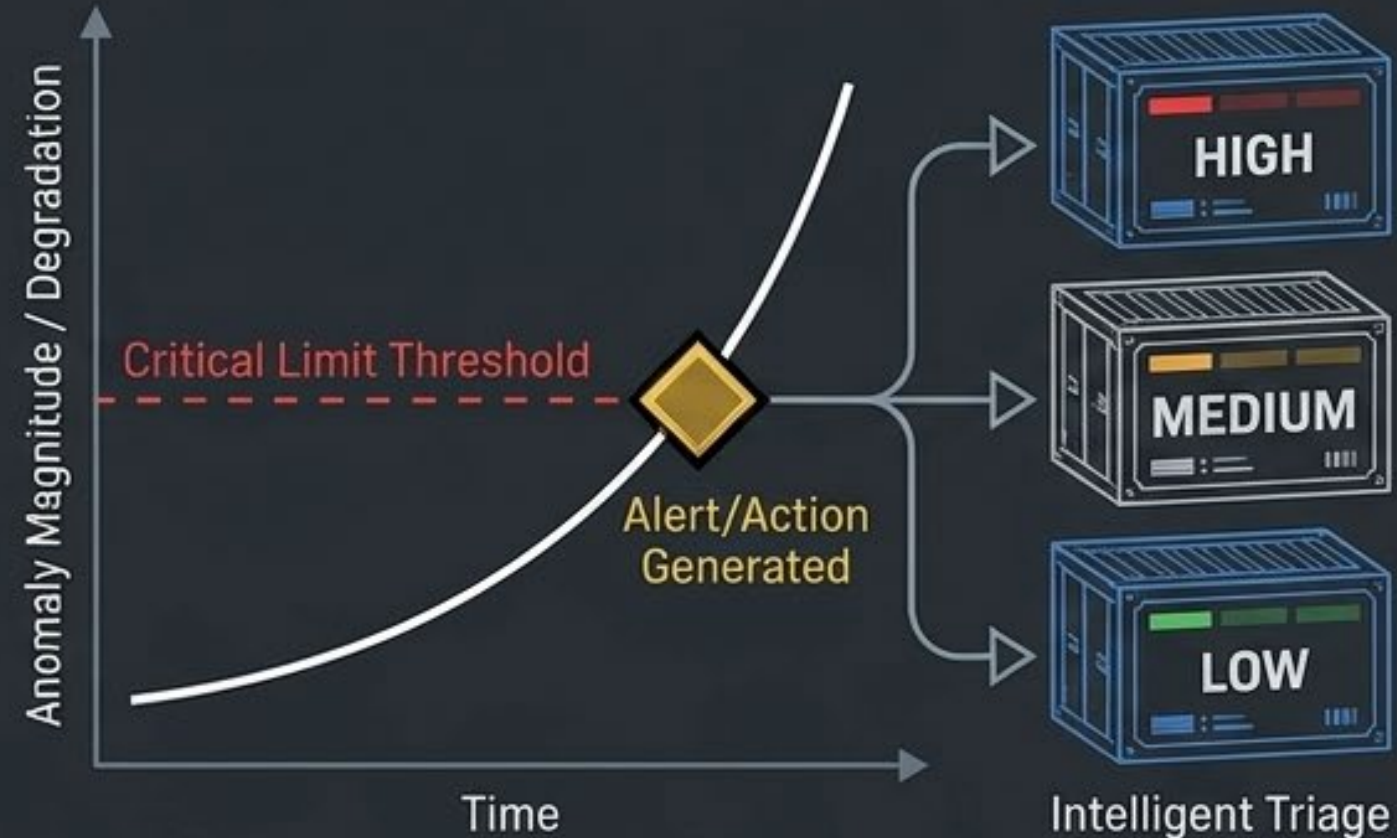
3D Laminate View evaluates conditions in true geometric context, eliminating the misclassification risk inherent in depthless data.

95% reduction in analysis time.

Pillars IV & V: Fitness-for-Service & Prioritization

Automated FFS Computation

- **Step 1:** Minimum Thickness ($t_{\min}$) computed from design pressure and material.
- **Step 2:** Measured Wall Condition mapped against $t_{\min}$ circumferentially.
- **Step 3:** Corrosion Rate projected for remaining life.

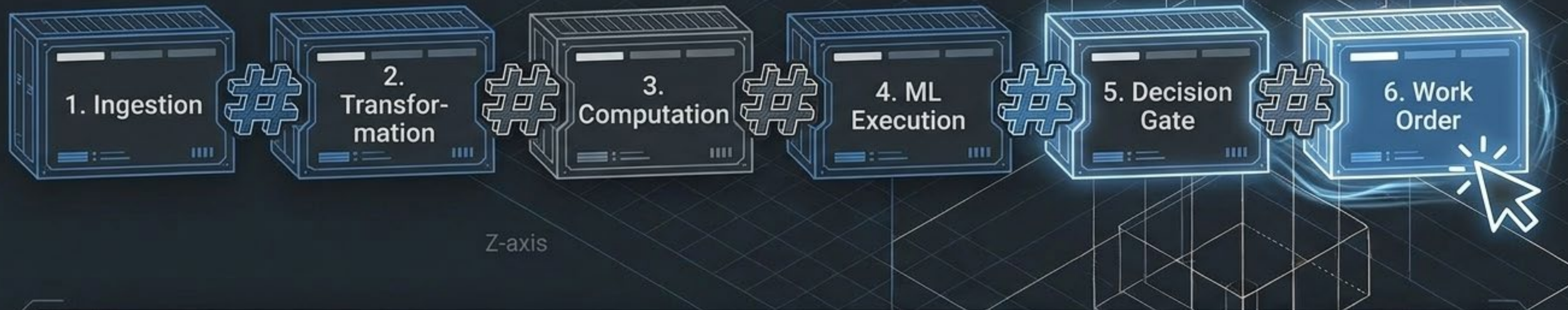


Intelligent Work Order Prioritization

- AI-informed engineering work requests are generated automatically when findings cross physics thresholds.
- Prioritization reflects true engineering severity, not manual queue order.

Z-axis

Pillar VI: Evergreen Lineage & Glass-Box Auditability



The Threat of Silent Data Mixing:

Analysis performed against stale datasets because the system couldn't track versions.

The Xenese Solution:

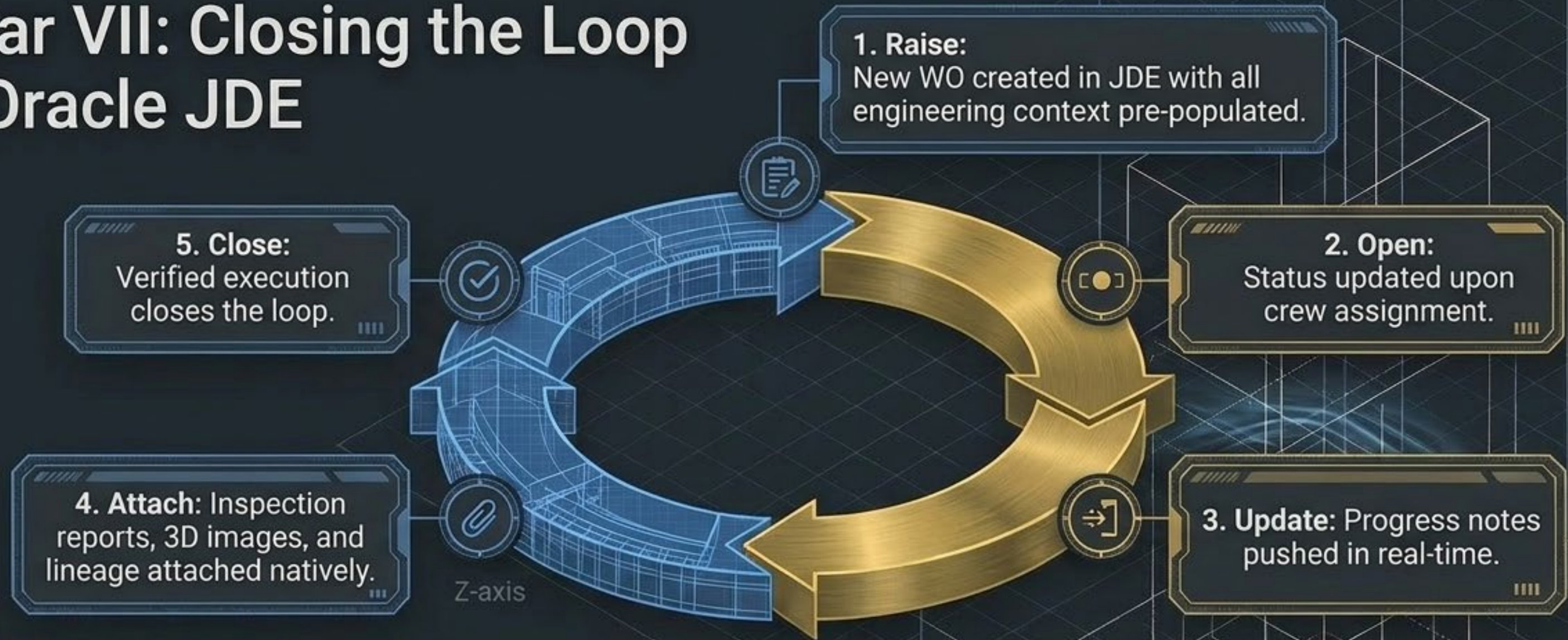
Every step is tagged and hashed, linking source metadata directly to the final action taken.

Compliance Readiness:

The 'why' behind any work order is never reconstructed; it is captured cryptographically at execution time.

Xenese shows the provenance of data freshness control by tagging datasets by source and time preventing silent data mixing and ensures that the system can always prove the data used for the computations, models, work orders, and analytics

Pillar VII: Closing the Loop in Oracle JDE



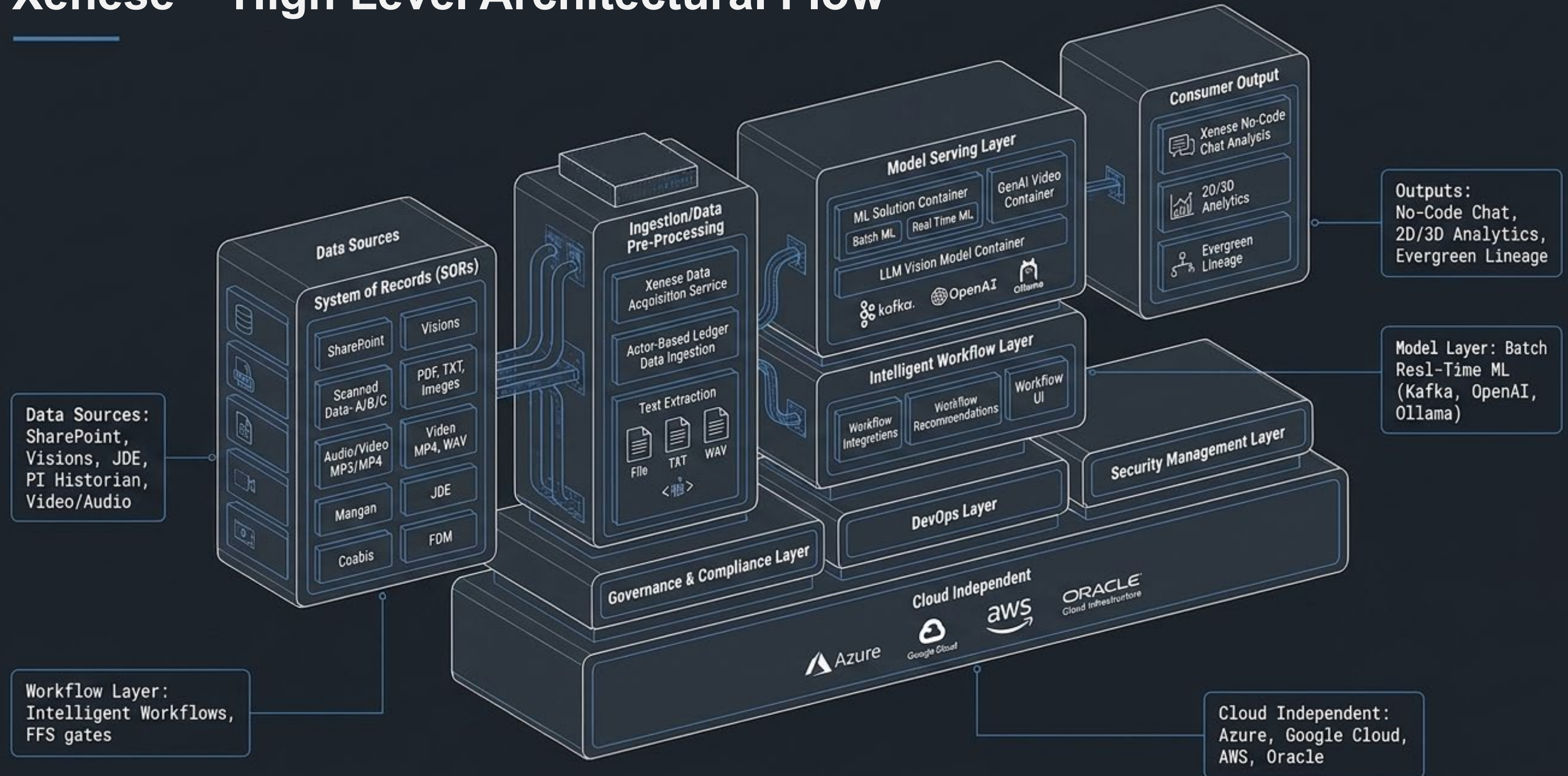
The Last Mile:

Recommendations have no value unless they result in documented action. Xenese manages the complete lifecycle within JDE via robust API integration.

The Impact:

JDE remains the system of record. Zero manual data re-entry.

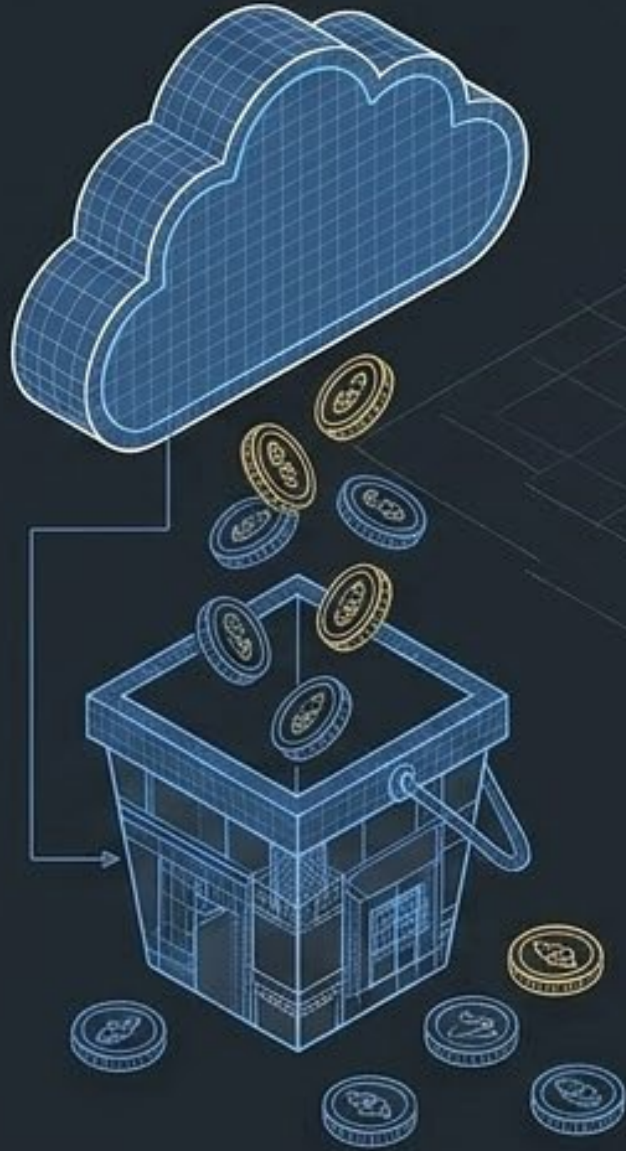
Xenese™ High Level Architectural Flow



General-Purpose AI vs Native-Built Asset Integrity Intelligence Infrastructure

AI Cloud Tool Limitations

(e.g., ChatGPT)



- No native SOR connectivity and inspection data must be manually uploaded session by session, with no persistent memory
- Not architected for industrial-scale corrosion modeling and no physics computation layer and no long-term data retention for evergreen.

The Xenese Advantage



- Native SOR connectivity with automated ingestion and inspection data flows continuously from JDE, Visions, and PI Historian with full persistent memory across every run
- Purpose-built physics computation layer with long-term data retention and Evergreen Lineage for every corrosion model, every decision, permanently traceable

We look forward to advancing the conversation.



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