AI Changes Everything — Except What Matters Most

The Role of the Digital Thread in an AI-Enabled Engineering Environment

PLM Road Map™ & PDT North America 2026

AI in PLM: A Disruptive Opportunity and Challenge

Turning AI disruption into enterprise value:
Strategic insights for the PLM professional

6-7 May 2026

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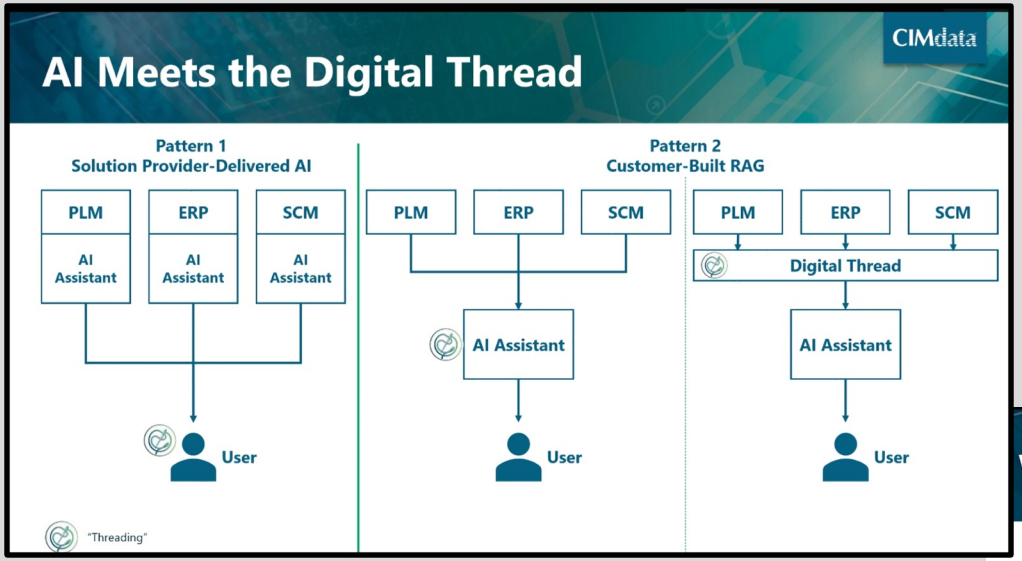
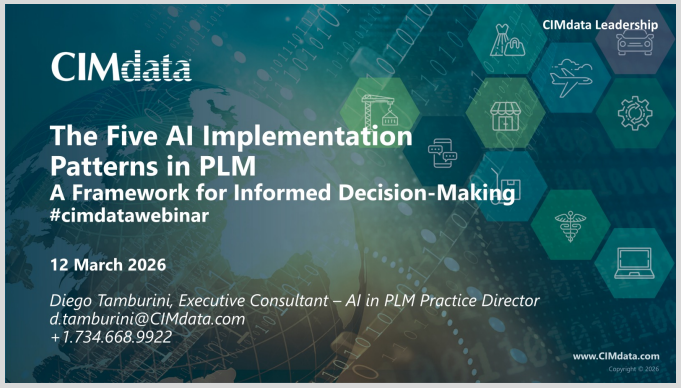
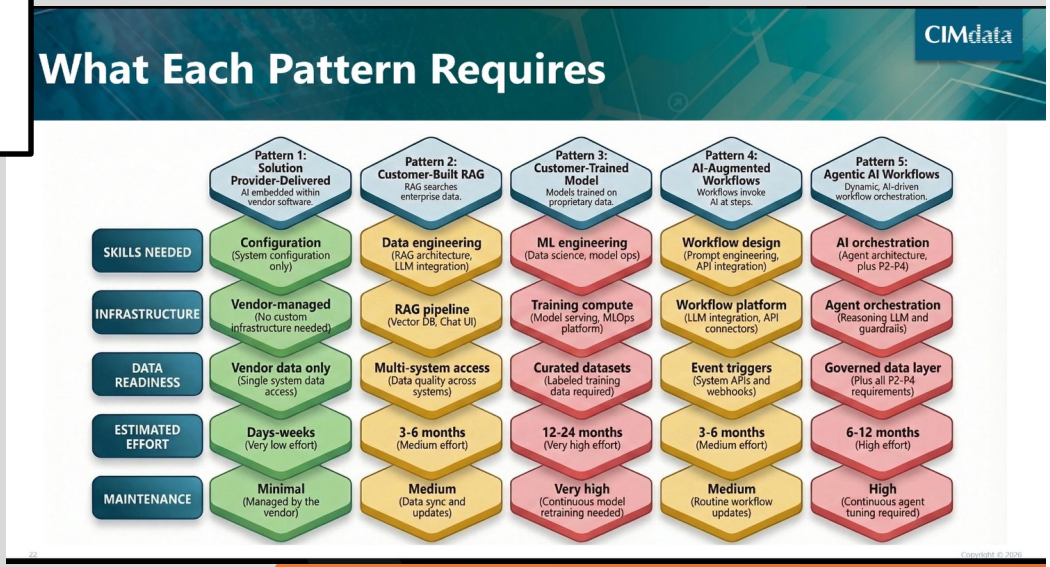


AI → Enterprise → Agentic





Industry Direction

AI Is Expanding Across Engineering

01

Silo AI

AI inside each tool

Embedded in CAD, PLM, simulation, ERP — each system smarter on its own.

02

Enterprise AI

AI across systems

Reasoning spans domains — requirements, BOM, simulation, and testing.

03

Agentic AI

AI that acts

Autonomous agents coordinate work and make cross-domain decisions.

Increasing capability — increasing autonomy

The Hidden Assumption

AI Assumes Systems Agree

AI assumes…

Data works together	Cross-system reasoning	Semantic equivalence	Context persists
Across every system	Reliable and coherent	Aligned by default	Across all domains

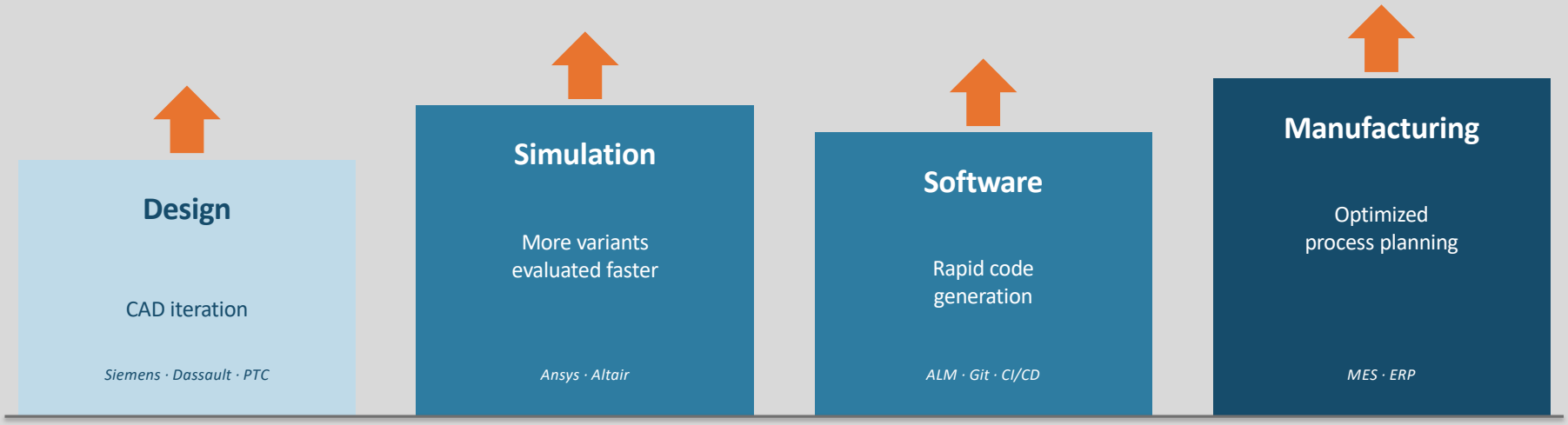
IN PRACTICE

These assumptions frequently break down — systems disagree silently.

AI Accelerates Silos

AI Is Accelerating Engineering Inside Each System

As AI is embedded directly into engineering tools — each system gets faster

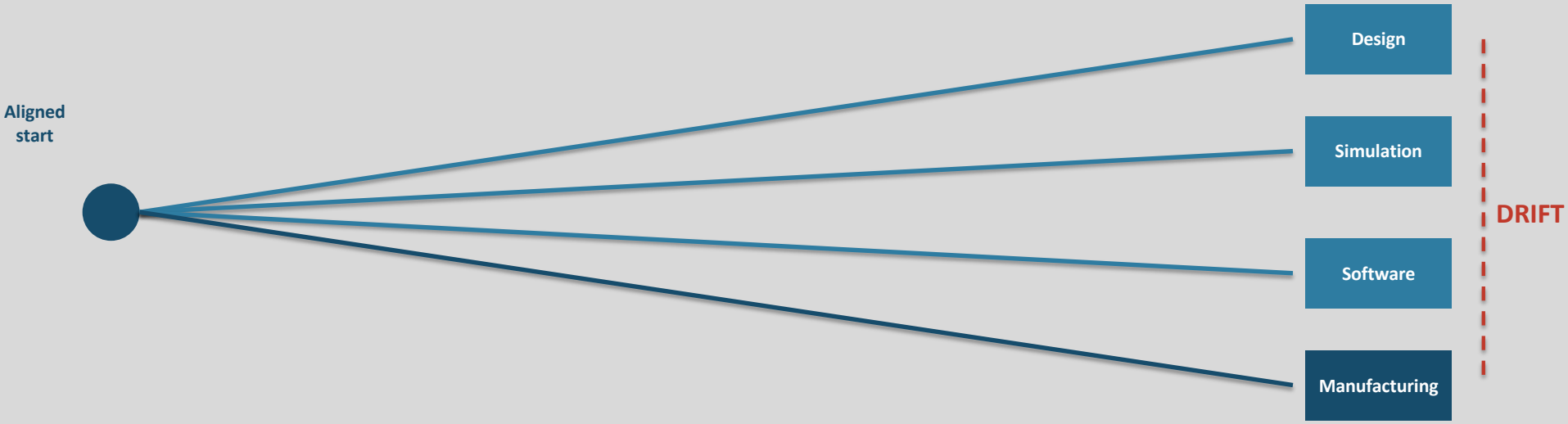


Local gains improve each silo — but not the alignment between them.

Drift

Velocity Without Alignment Creates Drift

Systems evolve independently — at increasing speed



time →

Data moves
easy to transfer

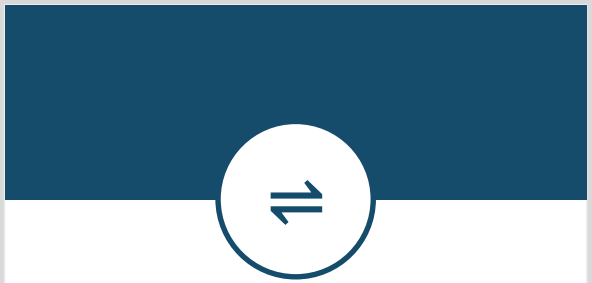
Meaning does not
hard to preserve

Divergence is continuous
without alignment

The Goal

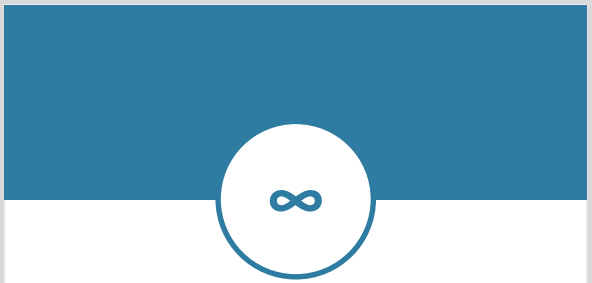
The Goal Is Coordination, Not Replacement

Don't eliminate silos — coordinate them.



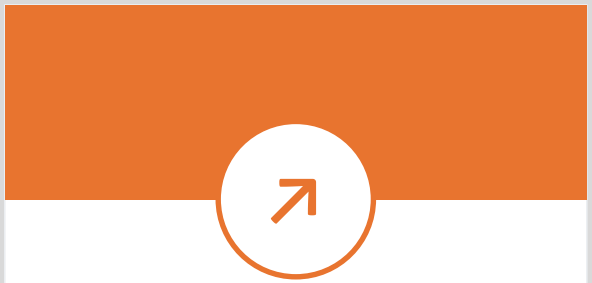
Align Results

Across systems so outputs stay consistent when domains diverge.



Preserve Relationships

Traceability that survives change — requirements to parts to tests.



Enable Independent Evolution

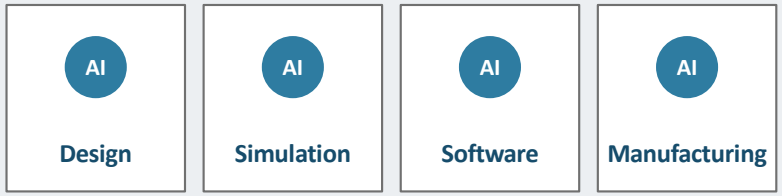
Systems advance at their own pace — without drifting apart.

Coordination — not centralization — is the path forward.

AI Needs Context

AI Requires Cross-System Context

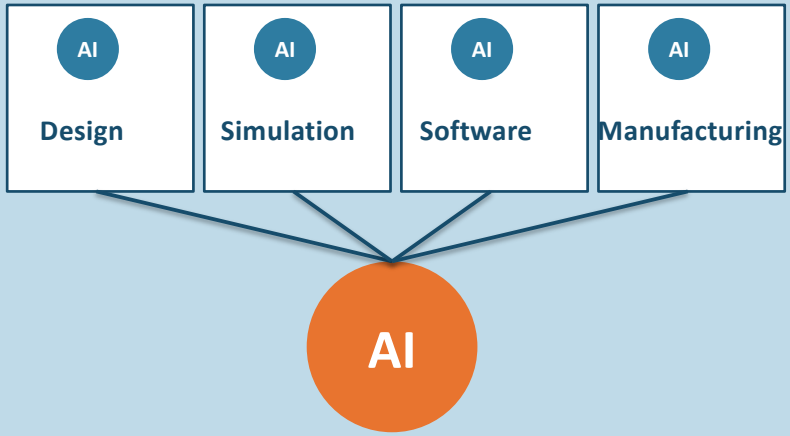
SILOED AI



Siloed AI = siloed outcomes

AI only accelerates what's already inside each system.

AI WITH CROSS-SYSTEM CONTEXT

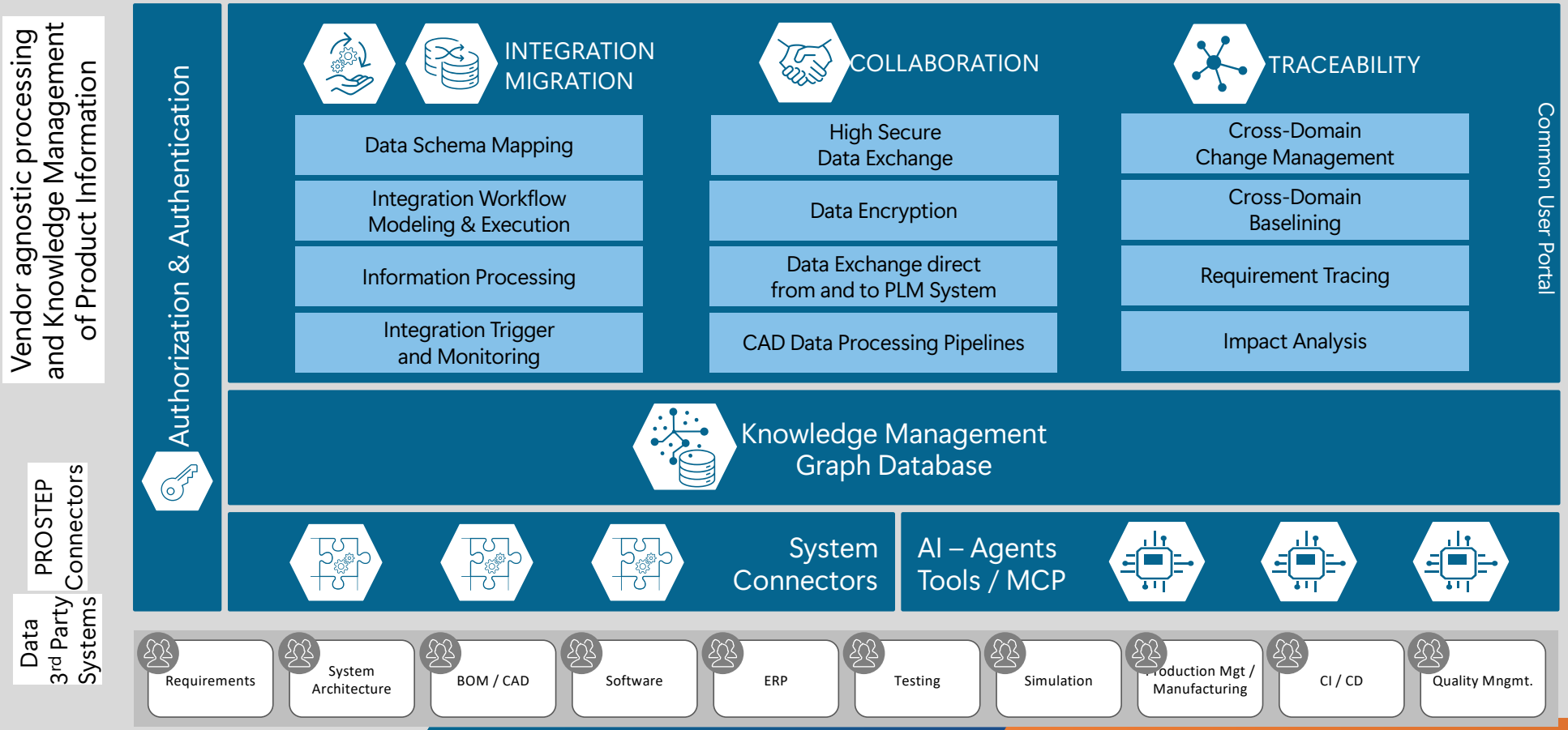


Aligned outcomes across systems

The value of AI isn't inside the silo — it's in how results align across silos.

PROSTEP Digital Thread Platform - Evolution

Heterogenous Information Processing with central Knowledge Graph Management



What Still Matters

AI doesn't change these — it makes them more important

01	02	03	04
Integration	**Traceability**	**Controlled Exchange**	**Continuous Alignment**
Reliable data exchange across systems	Relationships preserved across lifecycle artifacts	Governance, security, and data integrity	Systems evolve without drifting apart
Schema mapping · workflow execution	*Requirement → part → test → build*	*Authentication · encryption · audit*	*Event-driven synchronization*

AI removes the time you had to ignore alignment.

Product Memory

From Integration to Product Memory

Three layers that turn integration into durable knowledge

THE HOW

Digital Thread

Continuous alignment, traceability, and interoperability across evolving silos.

THE STRUCTURE

Knowledge Graph

Explicit, verifiable relationships, ontology, and provenance — grounding AI in engineering truth.

THE EMERGENT VALUE

Product Memory

Living contextual knowledge of decisions, trade-offs, rationale, and intent — persisted over time.

Combined: AI moves from probabilistic guessing → reliable cross-silo reasoning without drift.

Possible AI Risks Without a Knowledge Graph

Why fragmented data makes AI agents unreliable

Fragmented Data

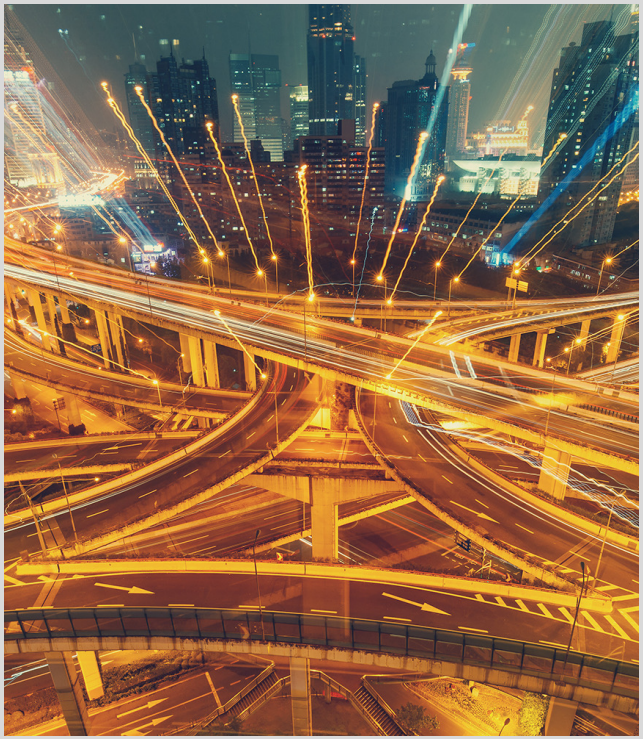
Requirements, BOM, simulation, and testing across separate systems.
No shared semantic context.

AI without Grounding

LLMs without verified context hallucinate.
In product development processes, inconsistent conclusions are critical.

“Drift” as the Default State

Without explicit relationship management, system states drift apart.
AI scales this error rather than reducing it.



The Three Pillars of AI-Ready Infrastructure

AI moves from probabilistic guessing to reliable cross-silo reasoning without drift.

Digital Thread

The How

Interoperability across silos

Traceability

Continuous alignment

Knowledge Graph

The Structure

Explicit, verifiable relationships

Ontology & Ownership

Anchoring AI inference in engineering truth

Product Memory

The Value

Living contextual knowledge

Decisions, trade-offs, and intent persisted over time

Knowledge Graph Architecture

Design principles and core properties

Design Principles

Expert systems remain authoritative.

The platform stores relationships, not copies.

Every connection is typed and assigned ownership (ontology: prostep ivip Top-Level Ontology + CASCaDE).

Baselines as snapshot nodes: historical states and decision rationale are retrievable.

Event-driven synchronization and updating incl. polling.

Semantic Integrity

Ontology-based consistencyacross domains

Historical Records

Baseline Snapshots for status, audit, change impact, and compliance

AI-ready Context

Structured graph as a foundation for LLM inference

Governance by Design

Ownership of all information is traceable

Example AI Agent Use Cases

Automated analyses and governance supported by AI Agents

Cross-Domain Impact Analysis

Agent automatically determines which requirements, components, and tests are affected by an architecture change

Traceability Assistant

Identifies gaps in the requirement-to-test chain. Generates reports on missing or outdated links with context information

Change-Impact Reasoning

An EBOM change triggers a cross-silo analysis across requirements, simulation setups, and production planning in a single step

Ontology-Driven Retrieval

Ontology-anchored indexing normalizes queries and data before LLM handoff. Significantly reduces false positives.

Governance and Audit

Agents automatically run compliance checks against defined baseline states. Integrity and provenance of every data point.

Proactive Consistency Warning

Continuous graph monitoring detects drift between system states and escalates before manual discovery.

THANK YOU!

SCAN THE QR CODE!
Please give me feedback on my presentation!

James (Jim) Markwalder

US Federal Sales and Key Account Mgr.

PROSTEP INC

James.markwalder@prostep.com

100 W. Big Beaver Rd, Suite 200 Troy, MI 48084

Troy, MI 48084

US Company Voice: 8-PROSTEP-01 (877-678-3701)

US Company Fax: 8-PROSTEP-02 (877-678-3702)