



AI in PLM: The Role of SAE EIA649 CM and Meta-Governance

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

CIMdata®

6-7 May 2026

www.CIMdata.com



I-INFUSION®
INTELLIGENT PROCESS SOLUTIONS

A. Larry Gurule, lgurule@i-infusion.com +1 904-215-2044

Copyright © i-infusion, Inc. 2026

A. Larry Gurule



President, CMPIC, LLC-Configuration Management Improvement Center

Providing Globally Recognized, High Quality, Cost Effective, and the Most Up-to-Date Configuration Management Training & Certification
Founded in 2008, Over 7000 students

Awarded 1k+ CM Masters Certifications, Certified 350+ CM Subject Matter Experts (SME)



President, i-infusion, Inc.

Helping clients achieve their **enterprise operational and financial goals** by assisting them with **institutionalizing 649 Configuration Management, Process Lifecycle Management, and Meta-Governance best practices and principals.**



I-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS

Chairman, SAE/G-33 Configuration Management Committee

Publications: SAE/EIA-649C, EIA649-1A, EIA649-2A, GEIAHB649A (UR)

480+ Global members

CM Standards Role – Project Sponsor,

Principal Author of SAE/EIA-649 rev “C”

- Project sponsor and principal author of the “C” revision of the [global consensus CM Standard, SAE/EIA-649](#), adopted and adapted for use and benefit by both governments and commercial enterprises.

Project sponsor for SAE EIA649D revision now in work.



I-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS

A. Larry Gurule, Standards Development Work

Addition Committee Work:

- ASME MBE Steering Committee (L/VM),
- IEEE 828 System and Software (L/VM),
- INCOSE CM WG(L/VM),
- ISO/TC 176/SC2&SC3 Quality Systems Committee (ISO10007 & ISO9001) (L/VM),
- NDIA Trust & Assurance Committee (VM),
- NIST JTF Cyber security Special Publications (L),
- SAE G-11 - Maintainability, Supportability and Logistics (L)
- SAE G-14/IAQG-1 – AS9100(L),
- SAE G-32 - Cyber Physical Systems Security (VM),
- SAE G-34 – Artificial Intelligence in Aviation(L/VM),
- SAE G-41 – Reliability (L),
- SAE SMC/G-47 – SAE1001 SE Std.(L),
- SAE SMC/EIDM (L),
- SAE SMC/LCLS – Lifecycle Logistic (L /VM),
- SAE/S-18 - Aircraft and Sys Dev & Safety Assessment(L /VM),
- SAE/S-19 – Digital Engineering Committee (L),
- SAE Systems Management Council (VM).



i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS

CONFIGURATION MANAGEMENT AS A FOUNDATION HAS CHANGED

The Old Bar:

- Identifiers
- Baselines
- Change Management/Control

The New (649C+) Bar:

- Identification
- Structuring
- Validation & Release
- Baselining/Current Approved
- Interface Management/Control
- Configuration Item Control
- Configuration Change/Variance Management/Control
- Configuration Verification & Audit
- CM Planning and Management
- Configuration Status, Performance, Integrity Accounting & Reporting



SO, WHAT IS CM AND HOW DOES IT WORK?



Functions and Principles, When appropriately and effectively applied, CM provides a positive impact on every aspect of the product life cycle.

Principle CM-1. Configuration Management implementation requires a balanced and continuous application of CM functions and their underlying principles throughout the product life cycle.

<p>Pl CM Planning & Management 5.1</p>	<p>Id Configuration Identification 5.2</p>	<p>Ch Configuration Change Management 5.3</p>	<p>St Configuration Status Accounting 5.4</p>	<p>Va Configuration Verification & Audit 5.5</p>
--	--	---	---	--

Principle CM-1.1. The foundation for CM planning, which estimates the specific CM application methods and their levels of emphasis, is an understanding of the context and environment of the product to which the CM process is to be applied.

Revised Principle CM-1.2. CM Planning documents how the organization will implement CM throughout the applicable phases of the product life cycle to provide consistency between the product configuration, development, and the product.

Principle CM-1.3. To implement planned CM functions, resources are identified and applied, and responsibilities to perform CM activities are assigned.

Revised Principle CM-1.4. The establishment and maintenance of CM performance are vital measurements necessary for products when compliance with the configuration management planning and continuous improvement is critical.

Principle CM-1.5. CM Procedures document how each CM function is implemented to accomplish the intent of the CM planning. Formerly CM-4.

Revised Principle CM-1.6. Provide CM training to assure that individuals understand their responsibility, authority, accountability, and the procedures for performing CM. Formerly CM-5.

Principle CM-1.7. Periodic assessment of the effectiveness of CM procedures and tools and compliance with the Configuration Management plan maintains the health of the CM process. Formerly CM-6.

Revised Principle CM-1.8. Performing configuration management includes responsibility for configuration management performance of the supply chain. Formerly CM-7.

Principle CM-1.9. Information processes, including collection and processing, controlling, storing, providing interoperability and exchange, and the secure preservation of essential elements of product CM planning and management. Formerly CM-8.

Principle CM-1.1. Configuration identification is the basis from which the configuration of products is defined and verified, products and their product configuration information are labeled, changes are managed, and traceability is maintained throughout the product life cycle.

Principle CM-1.2. Product configuration information serves as the basis for development, production, operation and maintenance/support of the product.

Principle CM-1.3. Designated identifiers originating from manufacturer, designer, manufacturer, or program provide uniqueness to the identifiers of products and product configuration information.

Principle CM-1.4. Product identifiers are assigned so that one product can be distinguished from other products, one configuration of a product can be distinguished from another and the control corresponding product information can be retrieved.

Principle CM-1.5. Individual units of a product are assigned a unique product unit identifier when there is a need to distinguish one unit of the product from another.

Principle CM-1.6. When a product is modified, it retains its original product unit identifier, even though a part identifying number is altered to reflect a new configuration.

Principle CM-1.7. A series of the units of a product is assigned a unique product group identifier when it is necessary or impractical to identify individual units, but necessary to correlate units to a process, date, event, or test.

Revised Principle CM-1.8. Product configuration information is uniquely identified so it can be referred to precisely and made accessible.

Revised Principle CM-1.9. Establishing product structure to organize product configuration information provides efficient application of the information over its life cycle.

New Principle CM-1.10. Product release provides the appropriate process(es) and evidence necessary to verify the integrity of the product for its intended use.

Revised Principle CM-1.1. A configuration baseline is established by agreeing to the definition of the attributes of a product at a point in time and identifies a known configuration to which changes are addressed.

Revised Principle CM-1.2. A baseline for any product, or any document, plus the approved changes, is the current approved configuration.

Principle CM-1.3. Interactions between products are managed by mutually agreed-to defined common product attributes, making them parts of the product configuration baseline for each product, and applying a process to maintain interface integrity.

Revised Principle CM-1.4. Configuration items are designated where distinct control is appropriate. Formerly CM-2.

Revised Principle CM-1.4. Changes to an approved configuration are accurately accounted using a system and, an accessible change process.

Principle CM-2. Identifying the need for a change provides the rationale to cost-benefit resources required to document process, and if approved, implement the change.

Principle CM-3. A unique change identifier enables tracking of the request for change and the status of implementation and verification of the approved change.

Principle CM-4. Classification of a requested change determines the appropriate level of review and the applicable change approval authority.

Principle CM-5. As the primary vehicle for referencing and managing a change, the request for change document must be clear and comprehensive from technical and scheduling perspectives.

Revised Principle CM-6. Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, interface, and cost, in and to the consequences of not approving the request.

Revised Principle CM-7. After considering all impacts and risk factors, change approval decisions are made by an appropriate authority who can commit resources to implement the change.

Principle CM-8. An approved change is implemented in accordance with documented directions approved by the appropriate level of authority.

Revised Principle CM-9. It is necessary to intentionally designate approved product configuration information, prevent its removal, deletion, classification, documentation, coordination, evaluation and disposition.

Principle CM-1. Configuration status accounting (CSA) provides an accurate, timely information base concerning a product and its product configuration information throughout the product life cycle.

Principle CM-2. Information about the product and the product configuration information as approved in CM tools are performed, reported to accessible to support program/project activities as needed.

Principle CM-3. Metrics derived from configuration status accounting information are used to evaluate and to process CM process effectiveness.

New Principle CM-4. Verify CM processes to ensure appropriate consistency is established and maintained in their execution.

Revised Principle CM-2. Verifying a product's compliance with the physical, functional, and interface requirements to approved product configuration information confirms the basis for managing product configuration. Formerly CM-4.

Revised Principle CM-3. Verify the implementation of each change to ensure consistency in maintenance between the product, its configuration information, and related support assets. Formerly CM-5.

Revised Principle CM-4. Configuration audits are a summation of the configuration verification process, where necessary to establish approved configurations at key points in the product life cycle. Formerly CM-6.

Everything = documents, facilities, firmware, hardware, software, tools, materials, processes, services, systems, and assets.

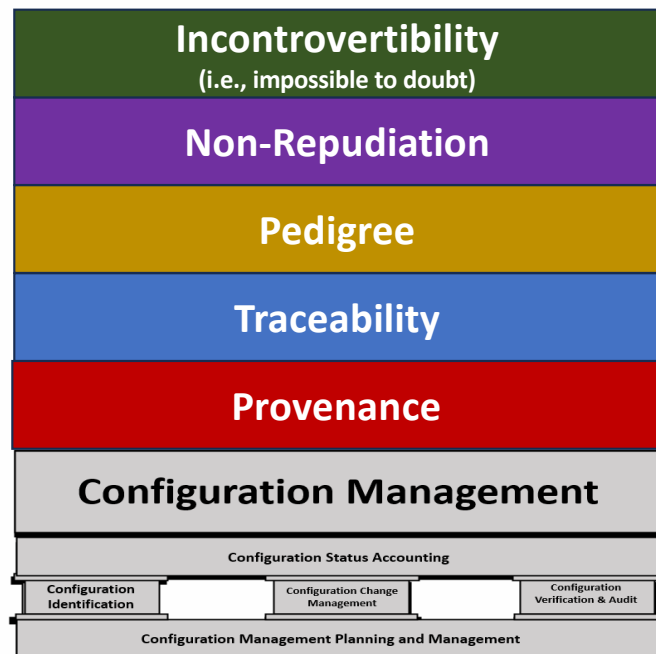


i-INFUSION
INTELLIGENT PROCESS SOLUTIONS

Information on this page is:
Copyright © SAE International 2026



LEVERAGING SAE EIA649 CONFIGURATION MANAGEMENT



Required for: AI, ML, MBE, SE MBSE, PLE, Digital Threads, Digital Twins, Dev(Sec)Ops.

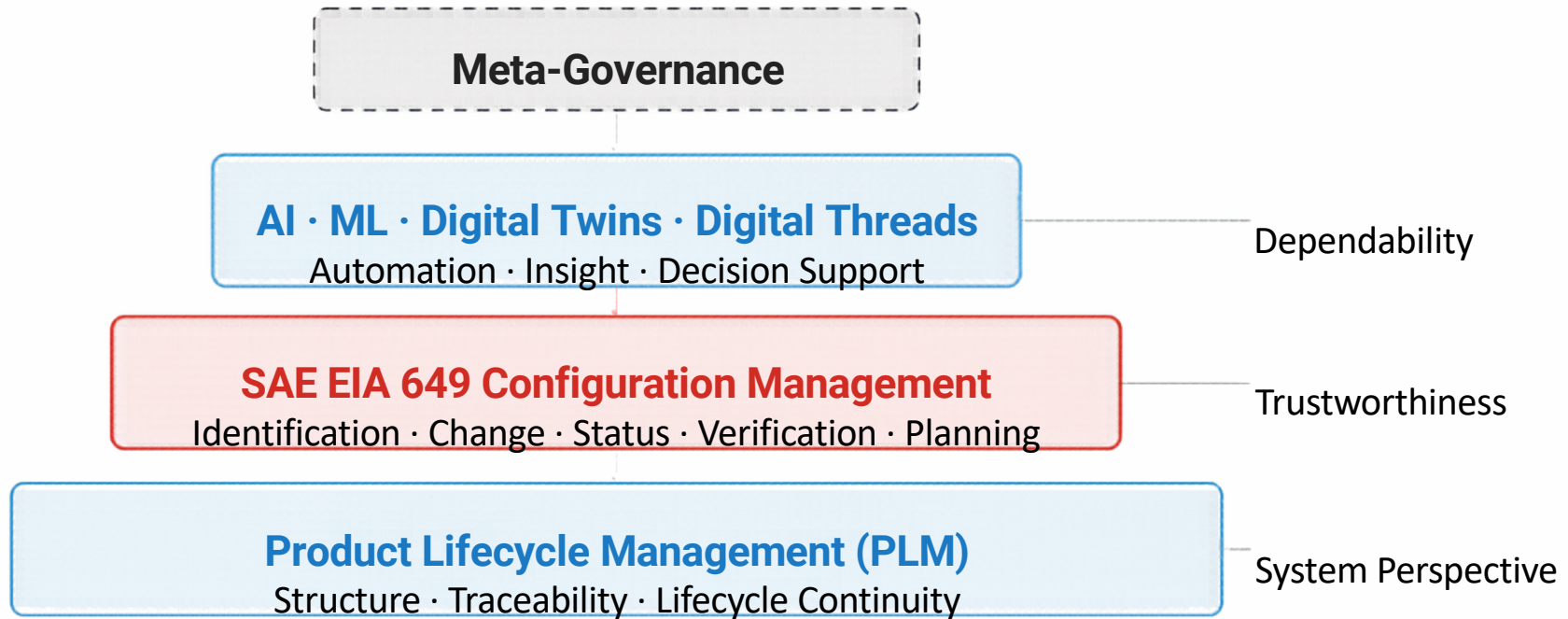
Supports iterative realization AGILE and SCRUM, as well as cyber, and physical meta-governance.



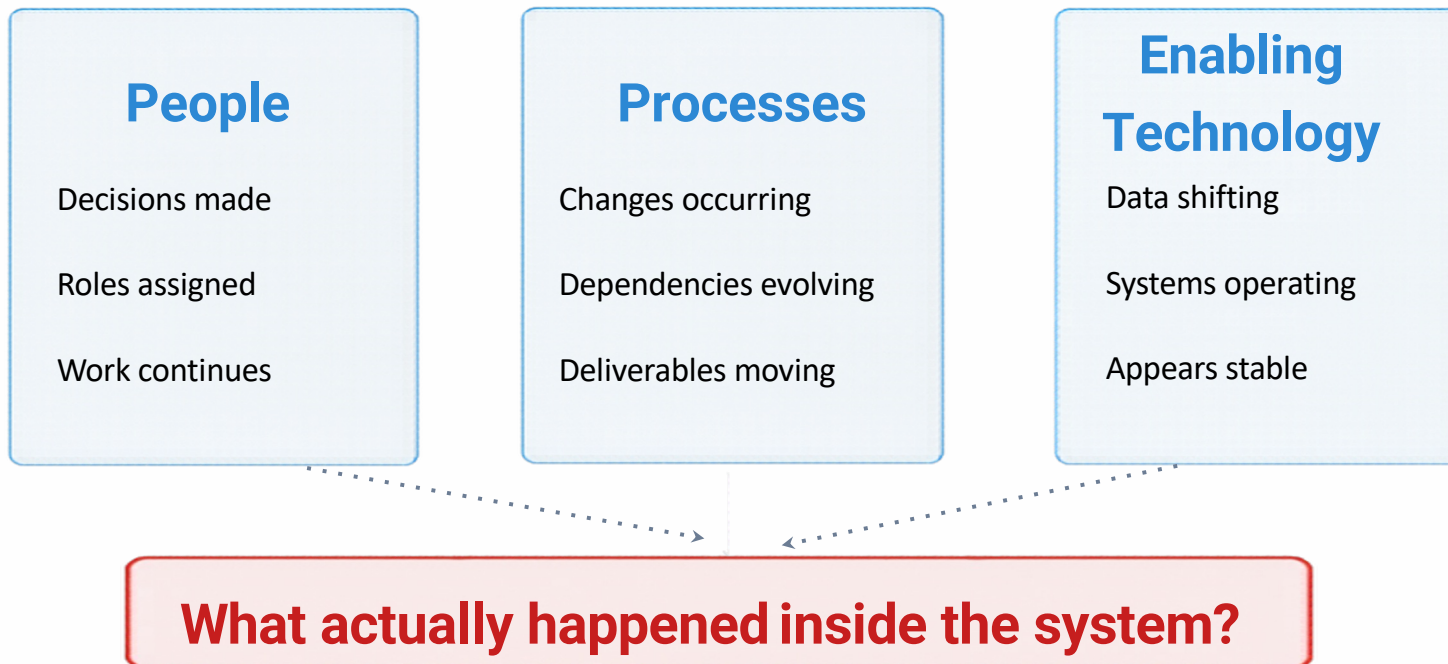
i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS



ROLE OF SAE EIA649 CM & META- GOVERNANCE IN AI & PLM



THE SYSTEM IS RUNNING → THE QUESTION

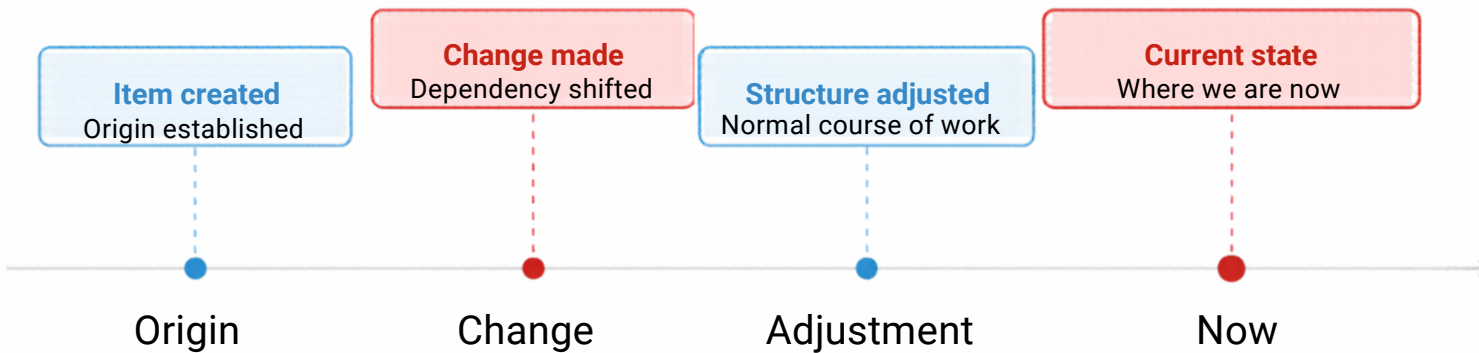


i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS

Activity ≠ Understanding



THE SYSTEM TELLS THE STORY → REALIZATION



Together these events tell a story - if a discipline is in place to capture and record it

Realization: the system isn't broken - it just isn't understood well enough to explain



SYSTEMIC INCOMPETENCE → NORMALIZATION



SYSTEMIC INCOMPETENCE



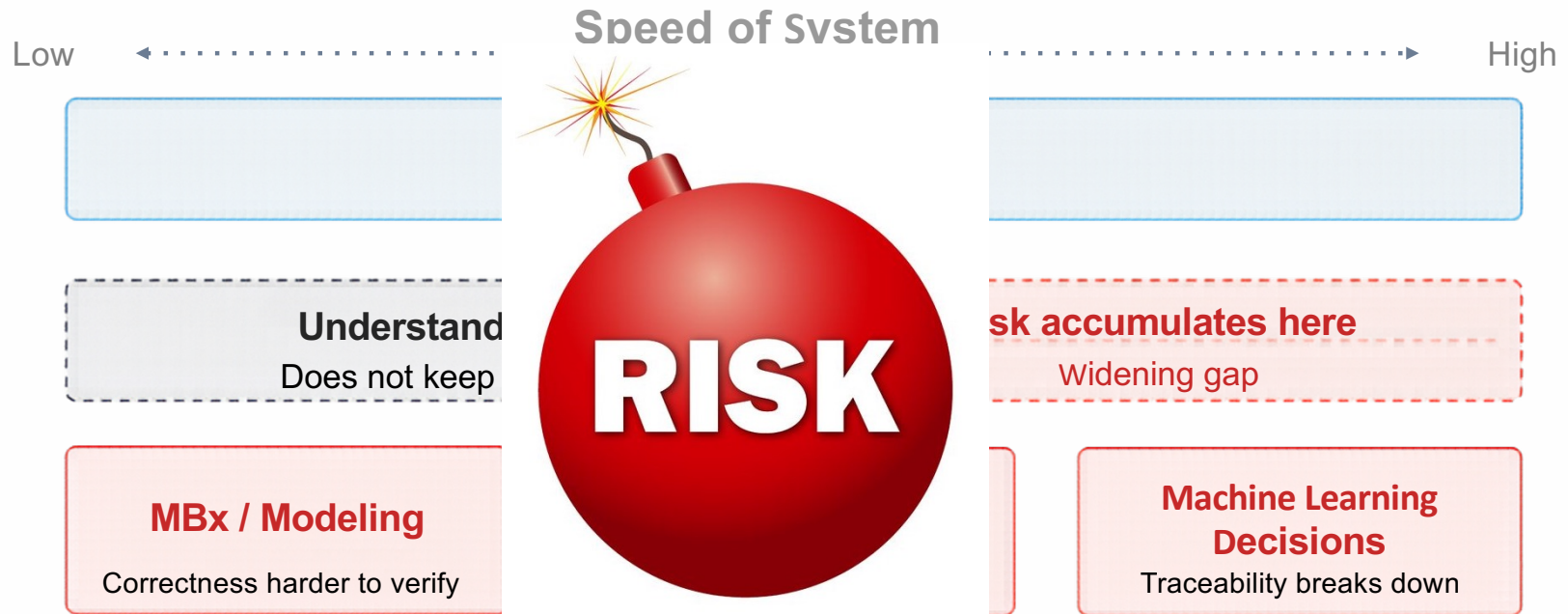
Not a failure of individuals, a pattern across environments



i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS



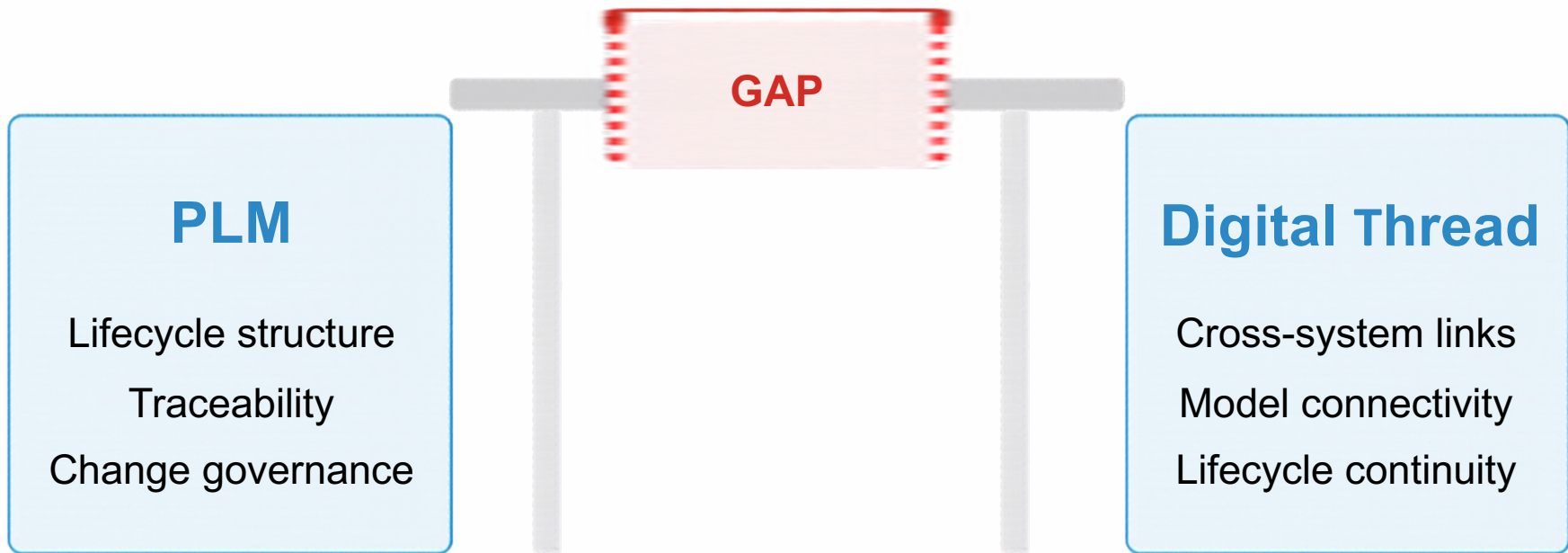
INCREASING THE SPEED → CONSEQUENCE



More Output ≠ More Clarity



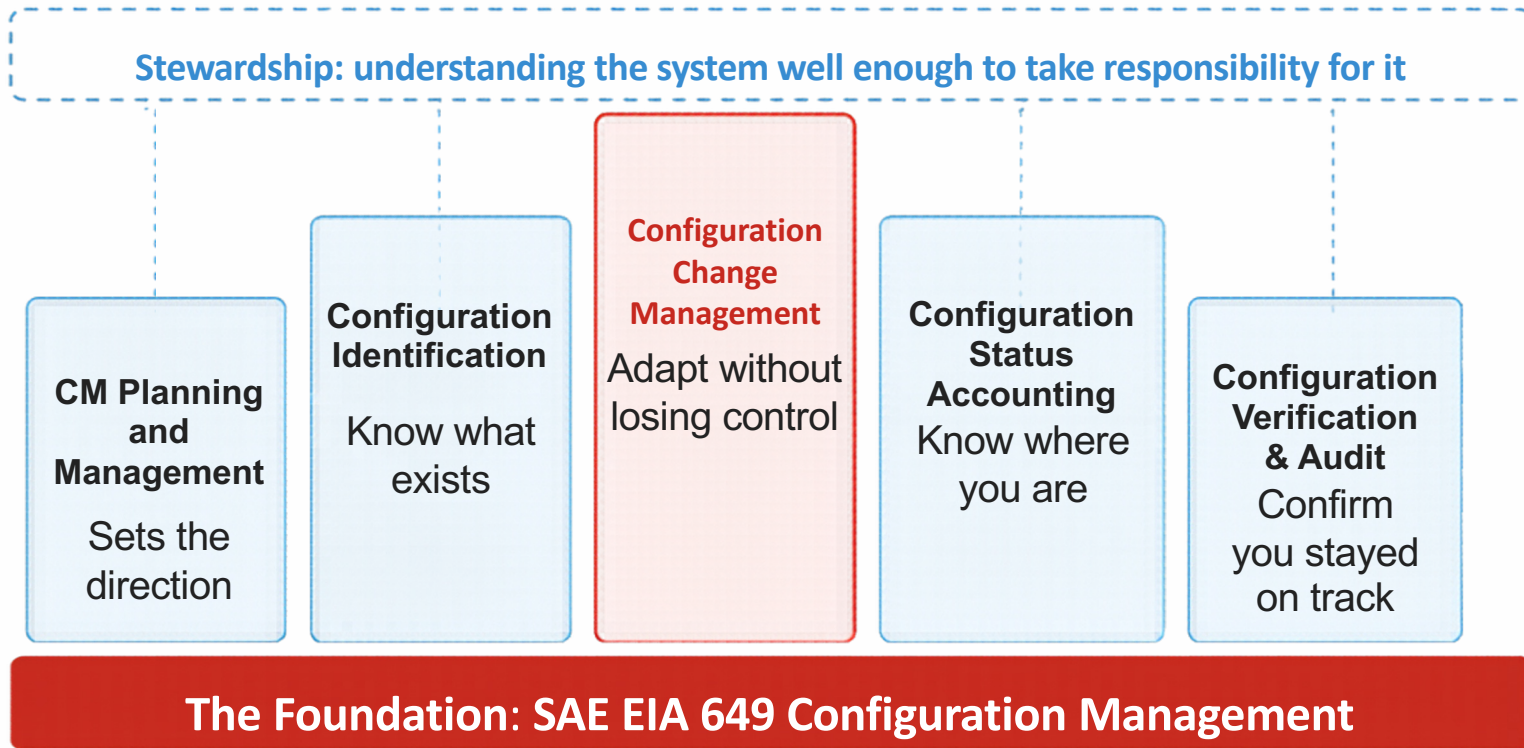
PLM to DIGITAL THREAD → GAP



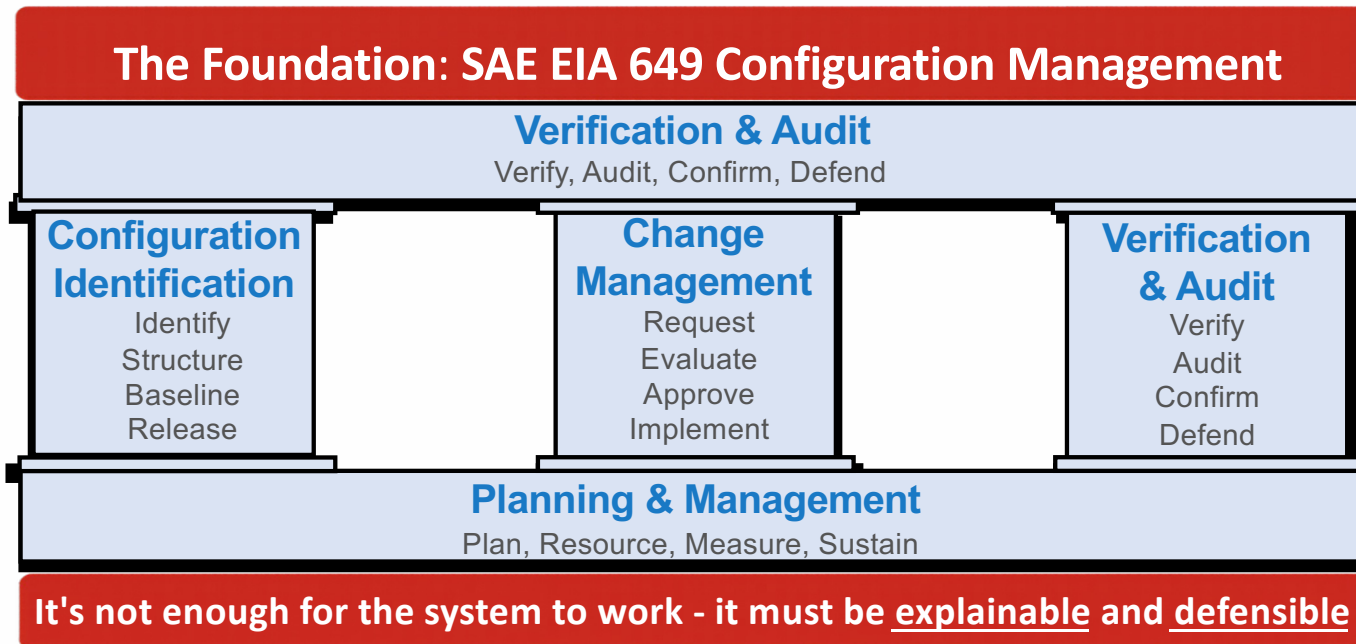
Connection alone ≠ Comprehension



FOUNDATION → STEWARDSHIP



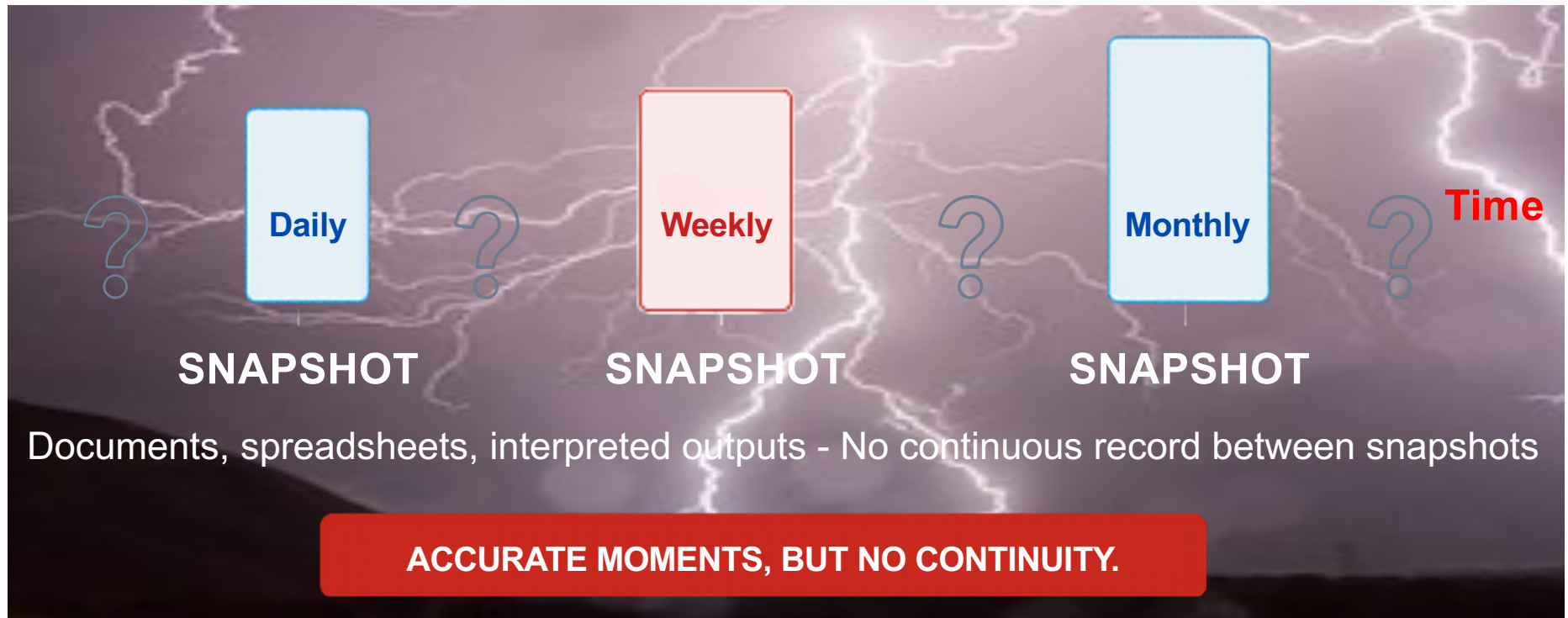
SAE EIA649 CM FUNCTIONS → FOUNDATION/ANCHOR



i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS



FRAGMENTATION → SNAPSHOTS , LIGHTNING FLASHES



THE REAL QUESTION



What did the system actually contain at that moment?

Not what it contains now - not what we believe
But what was true at that specific point in time

Compliance

Certification

Proving Value



i-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS



CONTINUITY LAYER → SIDE-CAR POSITION

PLM Systems

CM Tools

Analysis Tools

Continuity layer - guided execution & continuous record

Alongside existing systems • builds on them • does not replace them



ALONGSIDE, NOT INSTEAD OF



i-INFUSION®
INTELLIGENT PROCESS SOLUTIONS



RESULT → SHIFT IN HOW SYSTEMS ARE MANAGED

BEFORE

- Focused on activity
- Assuming correctness
- Fragmented snapshots
- Hard to explain
- Risk accumulates silently
- Workarounds normalized
- Cannot demonstrate state

Shift →

AFTER

- Focused on understanding
- Demonstrating correctness
- Continuous record
- Explainable at any point
- Risk visible and manageable
- System understandable
- State demonstrable on demand**

**With SAE EIA649 CM in place - we have Meta-Governance
Meta-Governance, a cohesive understanding of what the system is
actually doing!**





MORE CM BETTER CM

A. LARRY GURULE

www.i-infusion.com

www.cmpic.com

lgurule@i-infusion.com (all lower case)

[Phone: +1 \(904\)215-2044](tel:+19042152044) (No Text)

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



I-INFUSION[®]
INTELLIGENT PROCESS SOLUTIONS