September 2024 | Release 1.0

Is PLM Becoming Digital Engineering?

AD PAG Insight

Key takeaways:

- *Digital engineering is the methodological digital transformation of systems engineering (SE).*
- *Digital engineering is the evolving digitalization of Industry 4.0 capabilities inclusive of Model-Based Systems Engineering (MBSE), digital twin, and digital thread.*
- *The US DoD (U.S. Department of Defense) has promoted and systemically adopted digital engineering practices to modernize systems engineering and MBSE practices.*
- *Product Lifecycle Management (PLM) complements and enables the increasingly complex and trusted data management requirements of digital engineering.*
- *PLM definitional concepts, standards, and the enabling capabilities of the PLM software solutions will require the adaptation of digital engineering constructs.*
- *Digital engineering challenges include unprecedented complex data structures, dependency on standardization, systems and models integrity, and insufficient knowledge in the workforce.*
- *Technology considerations for digital engineering PLM solutions include artificial intelligence (AI) and machine learning (ML), trust management, multi-cloud computing environments, and semantic technology.*
- *While PLM contains the necessary concepts and foundational principles, historical implementations of PLM that have a core of PDM capabilities are not positioned well for the future due to their client – server architecture and centralized data structure controls.*
- *The next evolution of PLM must address PLM as a business strategy, which will include transforming the enterprise culture and policies to support sharing all digital engineering artifacts across the product lifecycle.*

With the adoption of digital twin, digital thread, and other concepts of connected engineering systems, the fundamental capabilities of PLM are in high demand. Significant interest exists in the extended capabilities of PLM beyond product data management (PDM) and lifecycle state design. With the inclusion of MBSE, Internet of Things (IoT), and emergent technologies, the role of product data relationship management is becoming more critical. The aerospace and defense (A&D) industry is beginning to refer to these expanded constructs as *digital engineering*. Is this the future of PLM?

Introduction

Digital engineering is the incorporation of Model-Based Engineering (MBE) and transformational technology to facilitate the methodological transformation of system engineering. In systems engineering, conceptualization has an essential but implicit foundation – logic. Formal logic, together with computer science, is considered to be one of the scientific foundations for digital engineering (Huang, 2020). The core of the digital engineering strategy is digital transformation (Huang, 2020) consisting of a digital representation of the system of interest, utilization of an authoritative sources of truth (ASoT), and the formalization of model creation, curation, sharing, integration, and use across boundaries of disciplinary teams, and organizations across all product lifecycle phases.

Digital engineering is simply another way to say engineering with technology. The fundamentals of engineering remain the same. The means of performing the engineering function are changing. PLM

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

continues to be relevant and indeed are poised to support adjacent engineering spaces beyond BOM, Configuration, Change and Product Data. A digitalized item should be not only computerized but also in a standard form and annotated with necessary metadata to enable machines of different types to access and operate upon it automatically.

PLM remains a distinct and critical capability that is core to enabling digital engineering. The PLM system and functional capabilities will need to be evolved to incorporate model-based system engineering; unique digital twin engineering characteristics; and the complex management of data, information, and knowledge associated with digital threads.

In November 2023, executives from the Aerospace & Defense PLM Action Group (AD PAG) member companies—Airbus, Boeing, GE Aerospace, Gulfstream, Pratt & Whitney Canada (PWC)/RTX, Rolls-Royce, and SAFRAN—chartered a team of thought leaders from within their companies to formulate a shared view of the interrelationship between digital engineering and PLM.

Digital Engineering Background and Definitions

The term *digital engineering* is used in several contexts within the A&D industry. Three prominent uses include 1) the alignment of engineering with digital transformation, 2) a concept and methodology defined by the US DoD, and 3) the use of digital engineering as a marketing term utilized by many PLM and other system solution providers. In this *Insight* document, the US DoD definition of digital engineering and the alignment of engineering with digital transformation are addressed. Supporting references are provided in the *References* section.

US DoD Digital Engineering – Digital Models Perspective

According to DoD Instruction 5000.97 published in December 2023 by Under Secretary of Defense for Research and Engineering, the term *digital engineering* is defined as “a means of using and integrating digital models and the underlying data to support the development, testing and evaluation, and sustainment of a system.” (Shyu, 2023). Digital engineering is “a critical practice necessary to support acquisition and sustainment in an environment of increasing global challenges, complexity, dynamic threats, rapidly evolving technologies, supply instability, and increasing life expectancy of DoD systems currently in operation.” (Shyu, 2023). This goal of digital engineering is to enable data transparency and traceability across product lifecycle functions and systems. It is to be achieved by “expanding on engineering practices to take full advantage of computation, visualization, and collaboration to enable faster, smarter, data-driven decisions throughout the system lifecycle.”

The intended results include the use of computer systems for the development, verification, validation, use, curation, configuration management, and maintenance of technically accurate digital models in support of all system lifecycle activities from idea conceptualization to final product disposition. The models capture system representations and, together with their underlying data, provide an authoritative source of truth (ASoT) to stakeholders. (Shyu, 2023). This moves the primary means of communicating system information from documents to digital models and their underlying data sources. These digital models become ubiquitous and central to how engineering activities are performed.

The incorporation and use of digital engineering formulate and establish the digital engineering ecosystem. This digital engineering ecosystem is defined as an “ecosystem that may include, but is not limited to, government-to-government, contractor-to-government, and contractor-to-supplier digital collaboration. Contrary to today’s vertical and hierarchical organizations, these collaborative digital environments are key to involving all stakeholders in developing models, executing simulations, and performing analysis and optimization for the digital models or digital twins. In some instances, customers, regulators, contractors, suppliers, or operators must be integrated into the digital engineering ecosystem to complete the digital thread. Figure 1 (from DoD Instruction 5000.97 Digital Engineering) provides a visual representation of the

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

DoD Digital Engineering framework. The three main components of digital engineering—digital models, digital twin, and digital thread—are illustrated.

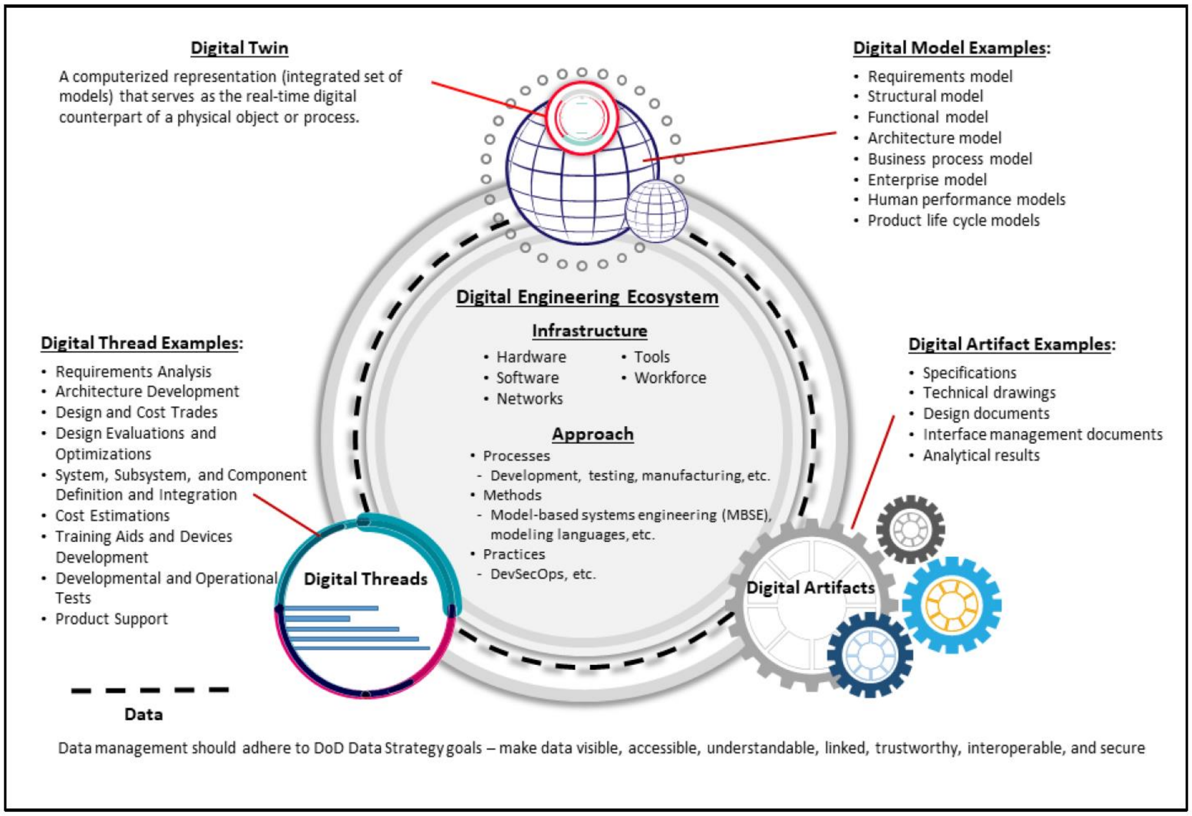

Figure 1 - DoD Digital Engineering Framework (Shyu, 2023)

Digital Engineering – Transformation Perspective

According to Huang et al. (2020) digital engineering is the destination of engineering's digital transformation. This is characterized by the digitalization of engineering artifacts and engineering in a digital and connected environment. Two principal disciplines—formal logic and computer science—define the digital engineering foundation. This foundation is needed to facilitate the digitalization or transformation of the analog form to the digital form. According to Gartner, "Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business."

The characteristics of digital engineering include the computerization of the analog form. In addition, the digitalized artifact must be in a standard form and annotated with necessary metadata to enable machines of different types to access and automatically utilize the digital artifact. Digitalization is at the core of digital engineering. The immediate targets of digital systems engineering are the digitalization of engineering artifacts, information and model sharing, and the associated matters of digital trust, big data, automatic machine processing, and ML. Figure 2 represents the relationship between systems engineering (SE), model-based system engineering (MBSE), and digital engineering.

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

The System Engineering Body of Knowledge (SEBOK) (INCOSE, 2023) defines digital engineering as a composition of MBSE and the digital twin. The digital twin is a high-fidelity model of the system that can be used to emulate the actual system and analyze design changes prior to incorporating them into the actual system.

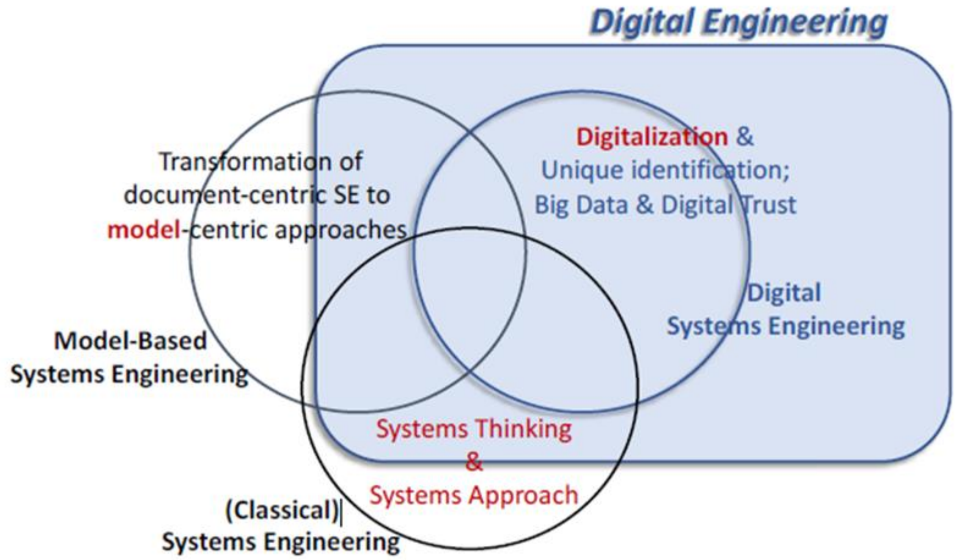

Figure 2 - Relationship of Digital Engineering to SE and MBSE (Huang, et al. 2022, p. 14)

The broader overarching goal of digital engineering is to develop and implement the principles, theories, methodologies, methods, models, and technologies for the digitalization of engineering and for systems engineering in the digitalized and connected engineering and operating environments. In addition to the standard engineering skill types, the skills required to reach this goal include mathematics, data analytics, and communication.

Alignment of Digital Engineering Definitions

The uses of the term *digital engineering* presented in this document complement one another. The differences in terminology, definition, and use objective can be attributed to the varying perspectives of the authoring organization.

The US DoD definition facilitates the specific objective of using and integrating digital models. The digital transformation perspective of digital engineering is less specific and facilitates a broader enterprise ecosystem perspective. Unique to the US DoD perspective is the explicit identification of MBSE, digital twin, and digital thread as the foundation for digital engineering. These capabilities are not specifically identified in the digital engineering transformation perspective.

The digital engineering transformation definition incorporates the concept of a digital systems engineering and system thinking approach, which is not defined in the US DoD definition. Digital systems engineering is a new development of systems engineering by leveraging digital technologies; as a subfield of SE, digital systems engineering is guided by systems thinking, systems approach, and SE principles and methodologies (Huang, 2020). This may not be a significant issue because the concept of digital twins and digital threads already requires a systems-thinking approach.

The complementary alignment of the two approaches produces a third approach that enriches each perspective and provides a balanced perspective that may be more easily adopted than emphasizing one approach over the other (see Figure 2 above).

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

PLM Background and Definition

In 2002, CIMdata released a whitepaper titled *Product Lifecycle Management "Empowering the Future of Business*." At the time, computing technology had made progress in both computer-aided design (CAD) and PDM. Anchored in the design processes of engineering, these two capabilities established a foundation for the digital definition of the product. Yet, they did not account for the lifecycle aspects of the design data. PLM emerged as a term to encompass this additional scope. CIMdata defined PLM as:

> "A strategic business approach that applies a consistent set of business solutions in support of the collaborative creation, management, dissemination, and use of product definition information across the extended enterprise from concept to end of life—integrating people, processes, business systems, and information."

Notable in this definition is the focus on a holistic approach to managing the product through life rather than anchoring it to a specific technological solution. CIMdata envisioned the product lifecycle as three intertwined transformational flows as shown in Figure 3.

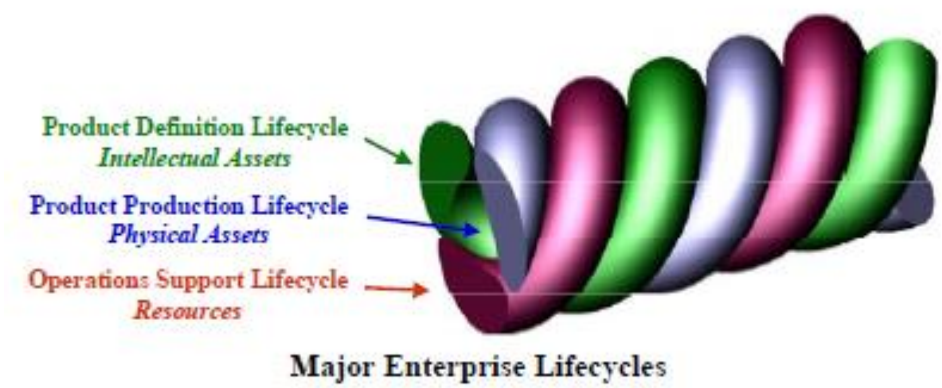

Figure 3 - Enterprise Lifecycles (Courtesy of CIMdata)

This representation characterizes the relationships between the intellectual property (IP) of the design, its physical manifestation, and the operational resources for the product in service. Using this concept model and the definition, CIMdata proposed the core concepts of PLM:

1. Ensuring universal, secure, and managed access and use of product definition information
2. Maintaining the integrity of that product definition and related information throughout the life of the product or plant
3. Managing and maintaining business processes used to create, manage, disseminate, share, and use the information.

Based on these three core concepts, the model shown as Figure 4 was proposed and adopted.

Taking this representation into account and noting the engineering products typically developed, the model recognizes the multi-layer structure of the ecosystem necessary to support the PLM definition. Based on a set of technologies, the core functionality of PLM is established and represented through an application layer and utilized in business solutions.

CIMdata's World-Class PLM Model

Figure 4 - World Class PLM Model (Courtesy of CIMdata)

> "CIMdata believes that PLM is much more than a technology or software product. PLM is a strategic business approach to empower the business, to enable product and process innovation, and to enhance both top- and bottom-line business performance. It includes technology, processes, best practices, and other elements that provide a complete solution to business problems."

Digital Engineering Objectives

According to Harper (2024), the US Army has embraced digital engineering to address immediate and near future critical issues of modernizing existing systems and to adapt a methodology that is responsive to an ever-evolving threat landscape. The decision to embrace the digital engineering directive is combined with technology-agnostic open integration. This eliminates the legacy challenge of inefficiencies and limited interoperability between systems. This also allows the Army to break from vendor lock-in and proprietary solutions, enabling the use of open standards and interoperable architectures to seamlessly integrate components from multiple sources. Daniel Hettema, Director of Directorate for Digital Engineering, Modeling & Simulation stated, "My job from the Enterprise perspective is how do I make sure the engineer 20 years from now has a model of a submarine they can actually do something with, and if it's locked in a tool of proprietary format that doesn't help us" (Tides of Triumph, 2024). The use of enabling technologies, such as AI and multi-cloud environments, will help drive innovation, modernize legacy systems, and maintain the military's technological edge on the battlefield.

Digital Engineering Strategy

During her confirmation hearings in May 2021, Heidi Shyu, the current Under Secretary of Defense for Research and Engineering, reflected on adversarial pacing threats to the USA and the need for the DoD to counter these threats by modernizing systems engineering processes using current digital engineering and MBSE practices (Shyu, 2023). Leveraging DoD Directive 5137.02, Ms. Shyu's office then put forth priorities within the National Defense Science & Technology Strategy for 2023 publication. "This Strategy helps us make carefully crafted decisions that bolster our comparative advantages rather than engaging in wasteful technology races. We will emphasize developing asymmetric capabilities that will help ensure our national security over the long term" (Tides of Triumph, 2024).

Many software tools are produced by PLM vendors to meet the goals of an A&D digital engineering strategy. Some tools are providing a means to address distinct challenges and to address several gaps within digital engineering by taking advantage of various advanced technologies and methodologies. Areas with gaps include, but are not limited to, digital twins, data integration and analytics, innovation and technology adoption, AI/ML, and additive manufacturing.

The DoD Digital Engineering strategy originated with the Modeling and Simulation Coordination Office (M&SCO) in the early 2000s. A Digital Engineering Working Group (DEWG) was formed in the mid-2010s. In 2022 the M&SCO and the DEWG merged into what is now known as the *Digital Engineering Modeling & Simulation (DEM&S) Community of Practice* (CoP). Figure 5 illustrates the progression of the DoD strategy.

Figure 5 - Origins of DoD Digital Engineering Strategy (DOPSR Case #24-T-0964)

Standardization and being technology-agnostic promote interoperability, collaboration, and consistency, and are a value add to the DoD's promoted goals related to a digital engineering strategy. Yet, PLM software tools are highly proprietary, lead to vendor lock-in, and fail to adhere to common standards. To achieve any type of measured success, PLM software product vendors ultimately need to enable data transparency and traceability, and unite and collectively decide, develop, and implement technologically-agnostic, mutually-agreed-upon, interoperability standards to fulfill any type of A&D digital engineering-implemented strategy as expressed in the 5000.97 directive.

Digital Engineering Challenges and Risks

Transitioning to digital engineering comes with cultural, technological, and organizational challenges. The digital engineering transformation approach discussed earlier aligns with the digital transformation many organizations are attempting. The DoD digital engineering perspective identifies the technological and data

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

management challenges organizations will need to address. An effective approach to addressing these challenges is to obtain a thorough understanding of the DoD digital engineering objectives and incorporate these objectives into the digital transformation strategy. Common digital engineering challenges are described below.

Data Issues in Digital Engineering

Digital engineering staff operating in a digital and connected environment will encounter an unprecedented number of data structures from upstream engineering processes, engineering partners, previous engineering systems, and from interacting external systems (supply chain, manufacturing environment, partners, and stakeholders. (Huang, 2020).

Centralized Versus Distributed Standardization

Standardized or commonly shared digital representation forms, semantics, and vocabulary are critical for sharing digitalized engineering artifacts (particularly models). In a centralized standardization approach, a standard form is defined for digital representation, and the whole community stays with the standard. In a distributed evolutionary approach, ontologies are developed in a crowdsourcing, fine-grained, evolving process in which many working groups develop their own variant of the standard form.

Balancing Access and Authorization Control

Delivering the right data to the right person for the right use at the right time is difficult. The access control challenge still stands in digital engineering. Many entities involved in engineering workflows may use different access control models and policies applied to their own domains. This will be a challenge to create access control policies to work seamlessly with each entity's access control system and to reach the targeted goal, especially when the models and product data ownership lead to major concerns about IP protection and business competitivity (Huang, 2020).

Digital System and Models Integrity

Digital System Integrity (DSI) is defined as “the ability to have high confidence that the scientific data generated, processed, stored, or transmitted by computers and computer-connected devices has a process, provenance, and correctness that is understood.” DSI requires correct and accurate system models, a challenge to digital engineering. Given the high complexity of engineering workflows across lifecycle phases, organizational boundaries, and countries, many models and the data produced by different entities in those complex engineering workflows are going to be curated, streamed, and reused later.

Reproducibility, Replicability, and Generalizability

Reproducibility is the extent to allow an engineer to independently duplicate the results of a prior study with the same procedures and the same data. This will require extended traceability and data collection regarding the tools, data sources, and methodology utilized by the engineer. Replicability is to independently duplicate the results with the same procedures but different data. This too will require release of a broader set of intellectual property (i.e., methodology, data sources, and tools) utilized by the engineer. Generalizability is the extent to which the results of a study apply to other contexts different from the original one (Huang, 2020). This will require the formalization of an approach to establish contextual traceability of engineering results.

Insufficient Knowledge in the Workforce

A knowledgeable workforce is essential for the realization of digital engineering. The knowledge and skills required for the digital engineering practice are beyond those of the traditional engineering workforce and beyond traditional engineering education and training programs. Multi-skilled product lifecycle teams will foster and improve collaboration between business users (focus on value creation), information technologists (focus on the technology resiliency, knowledge, and maturity), and data managers (data architects, data analysts, data custodians, etc.).

Enterprise Adoption and Transformation

Digital engineering amplifies the need of the digital transformation organization to collaborate more efficiently. The digital communication culture within the enterprise and with the extended supply chain requires a culture and policies that will facilitate sharing engineering artifacts across engineering stages and across multiple organizations. Inclusive of this communication transformation is the digitalized and connected engineering environment's impact on human–machine interactions. Ultimately, efficient and timely collaboration between individuals, organizations, and the digital environment will be the defining enabler of digital engineering.

New Risks

In addition to the digital engineering challenges addressed, several new risks exist as well. These include the following:

- How does an enterprise transform its culture and policies with regard to sharing engineering artifacts across engineering stages and across multiple organizations?
- How does the digitalized and connected engineering environment impact human–machine interactions?
- How can teams collaborate more efficiently?

Digital Engineering Technology Considerations for PLM Solutions

Emergent technology plays a key role in enabling digital engineering. These new technologies will also influence and transform PLM systems and capabilities in support of methods and data facilitated by the new technologies. The following sections describe key technologies that will influence and transform PLM solutions.

Artificial Intelligence and Machine Learning

AI and ML will enable the following:

- Establishment of a foundation for continued automation exploration in digital engineering
- Digital representation of the system of interest
- Model building (through ML)
- Intelligent reasoning, control, scheduling, planning, and decision-making for digital enterprises.

Shilovitsky, (2023) suggests that data reusability can be supported by AI-powered data management systems analyzing vast amounts of data from various sources to identify patterns and relationships and suggest what can be reused in the context of a new project. Configurable design, BOM, and re-use of suppliers are potential re-use patterns that can streamline the process and help companies make more informed decisions based on historical data.

Ontologies and Semantics Technologies

Data is the lifeblood of the digital engineering system. In the context of PLM, data from various sources such as design, manufacturing, and customer feedback serve as the foundation for AI-driven decision-making. This data not only enables AI to identify patterns, trends, and opportunities for improvement, but it also empowers organizations to make informed decisions throughout the product lifecycle (Shilovitsky, 2023). The data enables a semantic ontological representation of the general properties of models and their relations; enables model sharing and integration across boundaries of enterprises, disciplines, and engineering stages; and enables digital representation of enterprise-related concepts and processes.

A critical aspect of PLM's digital engineering future is the integration of multiple technologies to create a comprehensive information model. Combining different types of data, such as structured and unstructured, can provide a more holistic view of the product lifecycle. Additionally, incorporating technologies such as IoT, ML, and natural language processing can further enhance the capabilities of AI-driven PLM systems (Shilovitsky, 2023).

Trust Management Technology

The purpose of trust management technology is to help build an AST with proper trust mechanisms that enable access control of digital engineering artifacts stored in the AST. Activating trust judgment of digital models and artifacts requires system trustworthiness, which is the assurance that a system will perform as expected. Trustworthiness is a relative concept and is dependent on what is expected.

Trustworthiness for digital engineering systems involves concerns with trustworthy AI, pervasive security, and technical dependability. Issues in an AI system could trigger security ramifications and systems dependability concerns. Of course, security ramifications could also trigger systems dependability concerns. Complex systems typically exhibit strong emergence (i.e., unexpected emergent system behavior and properties that were not anticipated in design and development) (Huang, 2020).

Multi-Cloud Computing Environments

Multi-cloud computing environments enable the storage, management, query, processing, mining, analysis, and use of a vast number of digital models and engineering artifacts in a manner of scalable, elastic, timely, and ubiquitous access. These environments enable large-scale collaborative research and development across boundaries of disciplines and organizations. According to Harper (2024), embracing multi-cloud environments allows solution providers to take advantage of the scalability, flexibility, and resilience offered by cloud computing without concern over provider-switching costs. This might lead to a change of their business model. Distributing workloads across multiple cloud providers helps avoid vendor lock-in and ensures redundancy and availability in systems. Industry can leverage best-of-breed services from different cloud providers, maximizing innovation and cost-effectiveness.

Summary and Conclusion

The proposition is that PLM, as defined in 2002 and implemented in technology over the course of the past 20 years, has largely addressed the digital engineering domain space. However, notable gaps exist between PLM and digital engineering. Those gaps are in the general areas of IP protection, data sovereignty, and data ownership rather than in the functional aspects of engineering design. In this sense, there is a more fundamental than functional gap in our PLM solutions that needs to be addressed. The next evolution of PLM must address PLM as a business strategy, which will include transforming the enterprise culture and policies to support sharing of all digital engineering artifacts across product lifecycle stages and across multiple organizations with a diversity of business goals.

In almost every case, currently deployed PLM solutions are incremental adaptations of the previous generation PDM system solutions anchored in the bedrock principles of configuration management, product structure definition, and change control. These systems have evolved to be highly effective solutions for managing the physical design space and, to a lesser extent, for consuming the physical design across an extended collaboration community and along the product lifecycle. In fact, most engineering firms have a PDM or PLM system at the core of their product design processes, and these tools provide the control structure for products and the services that connect to those products. This is done through management of data objects in an internally coherent data management system. The relationships of the digital artifacts are managed within the PLM system itself. But what happens when the artifact is not in the PLM system?

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

Today's PLM solutions already struggle to expand the PDM solution to the adjacent area of systems engineering requirements models and architecture models. In addition, these systems are anchored in a legacy architecture that has foundations going back to the earliest client – server designs of the 1990s where centralized data management was the prevailing business need.

That final thought raises the notion that today's PLM systems are inadequate to address the needs of digital engineering. The centralized data model that has served the industry so well has reached its limit of expansion. New paradigms of federated data management are needed where the relationships of data structures are exposed through standard methods and those open models of data structures are interoperable across company boundaries and technical domains. The open question is, How will the current PLM solutions alternatives adapt and evolve to systematically incorporate digital engineering capabilities, and what new, enhanced PLM solutions will emerge?

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.

References

Fundamentals for Digital Engineering - SEBOK. (2023). https://sebokwiki.org/wiki/Fundamentals_for_Digital_Engineering

Gartner, https://www.gartner.com/en/information-technology/glossary/digitization

Harper, J. (2024) Leading the charge: Transforming US army systems through digital engineering. DefenseScoop. https://defensescoop.com/2024/04/02/leading-charge-transforming-us-army-systems-digital-engineering/

Huang, J. (2022). Digital Engineering transformation with trustworthy AI towards industry 4.0: emerging paradigm shifts. Journal of Integrated Design and Process Science, 26, 267–290. https://doi.org/10.3233/JID-229010

Huang, J., Gheorghe, A., Handley, H., Pazos, P., Pinto, A., Kovacic, S., Collins, A., Keating, C., Sousa-Poza, A., Rabid, G., Unal, R., Cotter, T., Landaeta, R. and Daniels, C. (2020). 'Towards digital engineering: the advent of digital systems engineering', Int. J. System of Systems Engineering, (forthcoming), DOI: 10.1504/IJSSE.2020.10031364. arXiv:2002.11672.

INCOSE, Digital Engineering, SEBoK v. 2.9, released 20 November 2023. https://sebokwiki.org/wiki/Digital_Engineering

Peisert, S., Cybenko, G., & Jajodia, S. (2015). ASCR Cybersecurity for Scientific Computing Integrity, DOE Workshop Report, January 7-9, 2015, Rockville, MD. DOE Office of Science.

Shilovitsky, O. (2023). How AI can improve PLM. Engineering.com. https://www.engineering.com/story/how-ai-can-improve-plShyu, H. (n.d.). Honorable Heidi Shyu opening statement for Senate confirmation hearing. https://www.armed-services.senate.gov/imo/media/doc/Shyu%20Opening%20Statement%20to%20SASC.pdf

Shyu, H. S. (2023). DOD INSTRUCTION 5000.97 DIGITAL ENGINEERING (DOD INSTRUCTION 5000.97). Retrieved June 11, 2024, from https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/500097p.PDF?ver=bePIqKXaLUTK_Iu5iTNREw%3D%3D

Tides of Triumph: A celebration of Digital Engineering success — INCOSE Chesapeake Chapter. (2024, April 17). INCOSE Chesapeake Chapter. https://www.incose-cc.org/events/digital-engineering-modeling-amp-simulation-initiatives-within-dod.

About the A&D PLM Action Group

The Aerospace & Defense PLM Action Group (www.ad-pag.com) is an association of aerospace and defense companies within CIMdata's globally recognized PLM Community Program, which functions as a ***PLM advocacy group*** to:

- Set the direction for the aerospace & defense industry on PLM-related topics that matter to members (*including promoting, not duplicating, the work of standards bodies*).
- Promote common industry PLM processes and practices.
- Define requirements for common interest PLM-related capabilities.
- Communicate with a unified voice to PLM solution providers.
- Sponsor collaborative PLM research on prioritized industry and technology topics.

CIMdata administers Group operations, coordinates research, and manages the progression of policy formulation.

About CIMdata

CIMdata, a global strategic management consulting firm, provides services designed to maximize an enterprise's ability to design, deliver, and support innovative products and services. For more than forty years, CIMdata has provided industrial organizations, providers of digital technologies and services, and investment firms with world-class insight, expertise, and best-practice methods on a broad set of product lifecycle management (PLM) topics and the digital transformation they enable. CIMdata also offers research, subscription services, publications, and education through certificate programs and international conferences. To learn more, visit www.CIMdata.com or email info@CIMdata.com.

© 2024 copyright CIMdata, Inc. | Other trademarks belong to their respective owners.