COMMENTARY

Siemens Realize LIVE 2024

Enabling digital transformation to drive user, organizational, and business value

Key Takeaways

Siemens strategic partnerships are delivering significant new value-added capabilities to both Siemens and their partners' customers, e.g., an expanded relationship with Microsoft around Artificial Intelligence.

Siemens is continuing its move to SaaS and cloud delivery of its Siemens Xcelerator industrial software portfolio and platform – with an expanding adoption by small- to medium-size businesses.

Teamcenter's multi-domain enterprise BOM functionality provides full lifecycle structure and configuration management across mechanical, electrical, electronic, software, simulation and service design, development, validation, production, and in-service use.

The use of Mendix throughout the Siemens Xcelerator portfolio is expanding rapidly. This low-code solution is being used to extend each of the portfolio solutions' capabilities, enable integration with in-house and third-party applications, and more and more enabling a common user interface for components of the portfolio and the environments being created by Siemens' customers.

CIMdata attended Siemens Digital Industries Software Realize LIVE Americas 2024, held in Las Vegas, NV, on May 13 through 15, 2024.[1] As part of Realize LIVE, Siemens included a curated experience with special sessions for media and analysts. Hearing about and discussing Siemens' announcements, technologies, and solutions with customer attendees, event sponsors, and Siemens' leadership was exciting and highly informative as Siemens continues to push the boundaries of multi-disciplinary lifecycle product information management, development, production, and service.

Mr. Tony Hemmelgarn, President and CEO of Siemens Digital Industries Software (Siemens), kicked off the event discussing how Artificial Intelligence (AI) could be used to accelerate business and deliver immediate business value. He stated that AI has significant potential in many areas but to get the benefits AI could deliver, everyone must think differently about how to use it. Mr. Hemmelgarn noted that there are three primary functions that AI can accelerate: Analysis, Optimization, and Generation. He then provided examples of those areas and how Siemens was using AI in each. He stated that with Teamcenter,

[1] Travel and/or other expenses related to this commentary were provided by Siemens Digital Industries Software.

companies can gather large amounts of data required to support AI from across their enterprise. Mr. Hemmelgarn then introduced the results of two strategic partnerships.

Mr. Hemmelgarn announced an expanded relationship with Microsoft to deliver AI-enhanced solutions for comprehensive product lifecycle management (PLM). He stated that Siemens would make Siemens Xcelerator portfolio of industry software available as a service through Microsoft's cloud and AI platform Azure, as well as integrate it with generative AI and Copilot features. He stated that this will increase flexibility and choice for Siemens' customers and make Microsoft's AI solutions more accessible to them. As an example, Mr. Hemmelgarn said Siemens is developing a Copilot for the Siemens Teamcenter app on Teams based on Microsoft Azure AI, enabling workers across the entire product lifecycle and value chain to better track and prioritize their workloads. They will be able to ask the Copilot for help with summarizing outstanding tasks and workflows from inside the comfort of their Teams app.

Mr. Hemmelgarn also announced that Siemens and the Sony Corporation are partnering to introduce a new solution that will enable Siemens' Xcelerator portfolio of industry software with Sony's new extended reality (XR) head-mounted display (HMD), SRH-S1, which was designed using Siemens' NX software.

Mr. Joe Bohman, Executive Vice President, PLM Products, followed Mr. Hemmelgarn and discussed several Siemens initiatives including the digital thread, cloud, and AI. Mr. Bohman stated that Siemens has developed a tool, Xplore, for visualizing digital threads. He noted a feature of Xplore is Infinite Zoom, which provides the ability to zoom into any business process to any level of detail and review and analyze it. Mr. Bohman stated that today, Siemens is servicing nine industries with over 50 digital threads, and they are using Xplore to develop out-of-the-box business processes. He said all the data coming out of these digital threads is being managed by a digital backbone, Siemens Xcelerator.

Mr. Bohman then discussed Siemens cloud strategy. He started by stating that the cloud market will surpass $1 trillion in 2026. He said that Siemens will be offering their full Xcelerator portfolio as SaaS solutions using the digital thread approach. Mr. Bohman then noted that NX X (the SaaS version of NX) can be fully deployed, including data management and full part notification, with just five clicks. He then announced the release of Teamcenter X Essentials. This solution is focused on CAD data management and is included as part of NX X. Mr. Bohman showed the SaaS release roadmap, see Figure 1. Released products are shown in green and products shown in white are scheduled for release with the next 6- to 12-months.

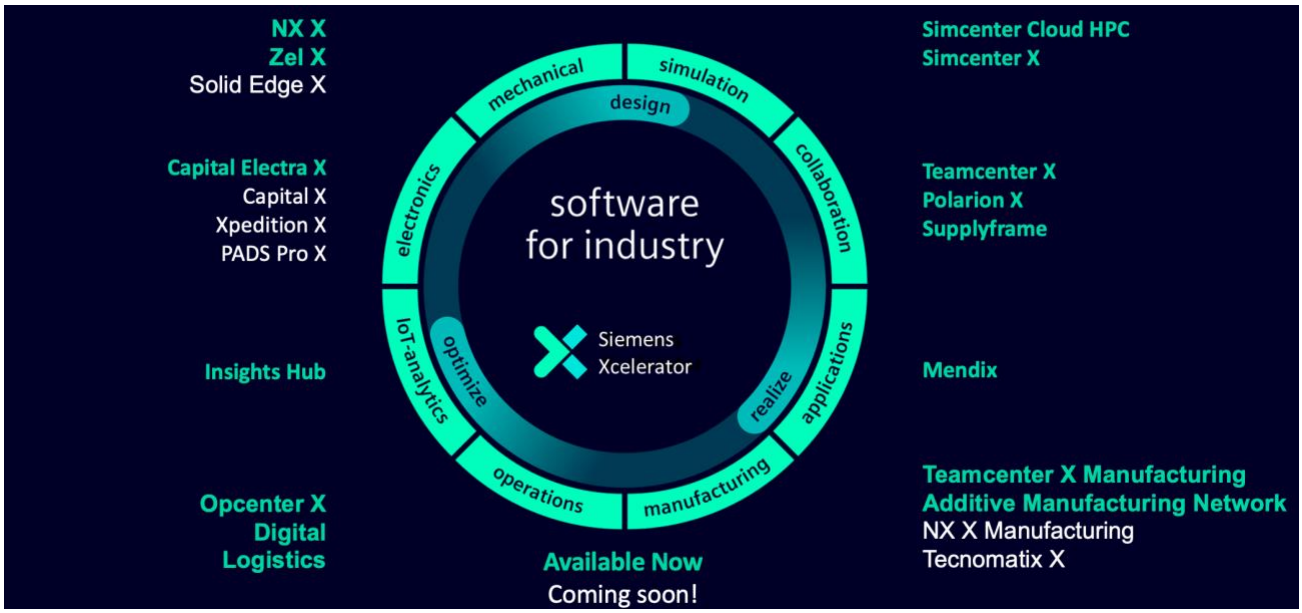

Figure 1: Presenting Siemens Xcelerator SaaS Roadmap
(Courtesy of Siemens)

Mr. Bohman then described how Siemens is using AI to enable natural language queries that use a combination of text and graphics. He stated Siemens is using a methodology that combines their intellectual property (IP) (e.g., documents and best practices), their customers' IP (e.g., models and specifications—all securely protected), and public IP (e.g., internet text and graphics) and then apply these to a large language model. This enables conversations with a company's Siemens Xcelerator data just as if it were in ChatGPT. Through this process, Mr. Bohman stated that they are training large language models on the language of engineering and manufacturing. CIMdata believes that such natural language conversation capabilities could deliver significant value in working more efficiently across all phases of the product lifecycle.

Joining Mr. Bohman on-stage was Mr. Seiya Amatatsu, Head of Sony's XR Technology Development Division, who described the SRH-S1 product, which includes an XR head-mounted display with high-quality 4K OLED microdisplays and controllers for intuitive interaction with 3D objects. Sony's XR head-mounted display is a fundamental part of the forthcoming NX Immersive Designer, an integrated solution that combines immersive design and collaborative product engineering capabilities. The objective of this tight integration of hardware and software is to give designers and engineers all new, natural ways to interact with the digital twin. It is not just viewing designs; the headset is designed to enable user to do real, meaningful engineering without ever having to build a physical prototype. CIMdata believes that creating an immersive environment will enable designers to more easily define and investigate more design options faster, significantly improve design process productivity, and result in better, more innovative products.

During the Simcenter keynote held on the first day, Mr. Jean-Claude Ercolanelli, Senior Vice President, Simulation and Test Solutions and Ms. Lisa Mesaros, Vice President, Simcenter Solution Domains Product Management, presented an overview of new Simcenter capabilities. The focus of the presentation was on improvements to Siemens Simcenter STAR-CCM+ software, applying AI capabilities throughout the solution, and the ability to create and leverage reduced-order models (ROM). Many use cases of the Teamcenter for Simulation (simulation process and data management) solution and a new feature that will recommend the next simulation to be conducted based on historical data were also presented. Later in the agenda, unique capabilities of the Simcenter Reduced Order Modeling software product and ability to develop an executable digital twin were also demonstrated. This included some use cases developed in conjunction with the Siemens' control and hardware business unit. This technology can be utilized to impact the operation of a device or process in real-time to improve quality and efficiency.

On day 2 of the conference, Ms. Frances Evans, SVP Lifecycle Collaboration Software, and Mr. Bill Lewis, Director of Marketing, Lifecycle Collaboration Software, led a session titled "PLM of the Future." This session was primarily a Teamcenter update, including demonstrations of new capabilities. Ms. Evans stated that there are now more than 100 applications running on Teamcenter including integrations with multiple modeling tools. The following bullets describe many of the new capabilities across Teamcenter, including those in Teamcenter Change Management, Teamcenter Product Configurator, and the new multi-domain enterprise BOM solution.

- Change management supports active change with redlining, initiate a change and then be able to revert ("back out"), and merge BOM edits.
- Cost and Carbon Calculator integrated transport estimates (land, air, sea, rail) so users can simulate the cost and carbon footprint emissions of products during development and manufacturing. It is a Global Logistics Emissions Council (GLEC) certified solution.
- Requirement reconciliation with Polarian supporting parallel requirements development, automatic merge of requirements, and conflict resolution.

- Import BOM structures from Microsoft Excel into Teamcenter and bulk edit structures using inline authoring tools.
- DevOps software development, verification, and release.
- Multi-domain software/hardware compatibility management, validation, and verification, supporting over-the-air (OTA) compatibility assurance and version upgrades.
- Bill of Material (BOM) build combination capability to analyze possible combinations, bound the number of build combinations, validate the parts list is fully defined.
- Structure editing within an Engineering Change Notice (ECN); update BOM content directly within an ECN; perform BOM edits across multiple assemblies, including add, remove, replace, occurrence properties, substitutes; support integrated change impact analysis, execution and review.
- Introducing Teamcenter AI Chat, a large language model (LLM) powered chatbot that enables users to query document-based product knowledge managed in the PLM environment.
- New Visual Innovation Advanced (VIA) thin client UX, a browser-based frontend for Rulestream designed for use with sales channels, partners, and end customers.

Siemens continued investment in Teamcenter significantly increases its usefulness across the enterprise and extended value chain.

Siemens held a special session for media and analysts the afternoon of the second day of the event. Ms. Brenda Discher, Chief Marketing Officer, Siemens Digital Industries Software, opened the Media and Analyst session with an overview of the Siemens Xcelerator platform strategy.

Mr. Hemmelgarn followed Ms. Discher and described the rapid adoption of SaaS by Siemens' customers and noted that 74% of the approximately 14,000 new 2023 cloud orders were from the Small- to Medium-Business (SMB) sector. He stated that in 2024 approximately 40% of their business will be cloud based. He also noted that Siemens continues to introduce SaaS versions of their Siemens Xcelerator portfolio with the release of NX X, Zel X, Simcenter X, and Opcenter X.

In what is a very positive development, Mr. Hemmelgarn announced that Siemens will pilot the first ABET-recognized industry micro-credentials. The first credential is a strategic collaboration focused on sustainability with the University of Colorado Boulder. This program will enable learners to establish credentials in specific skills and engineering domains in addition to or outside of a general collegiate engineering degree. CIMdata thinks that the ability of graduates to obtain certifications in specific areas will enable them to become more productive faster and give them more employment options as they move forward throughout their careers.

Mr. Hemmelgarn then described how Siemens was working with strategic partners to deliver an expanding suite of capabilities and solutions. Those mentioned included:

- Accenture—implement digital threads through product requirements, formulation, design, production planning, manufacturing, and launch.
- AWS—build enterprise-grade AI-infused applications with AWS and Mendix.
- CapGemini—deliver an IT/OT platform and standardized data model that ensures interoperability from different sources.
- Deloitte—accelerate the future of smart manufacturing IBM—collaborative solutions for system engineering, service lifecycle management and asset management.
- NVIDIA—support the industrial metaverse with visualization and AI.
- Salesforce—bring together PLM and CRM in a seamless user experience for the service lifecycle.
- SAP—deliver a new paradigm unifying data and processes to engineer and improve business performance.

Mr. Hemmelgarn restated the work Siemens has performed to create one platform that manages BOMs covering both discrete and process industries. It delivers unified change, unified configuration, and unified digital mockup (DMU) across the multi-discipline landscape of mechanical, electrical, electronic, software, manufacturing planning and execution, simulation, as built, and service. It provides a common enterprise BOM that can be viewed and used by all domains of a business. These capabilities will allow small to very large organizations to replace their many reasonably complex engineering BOM-focused business systems, thereby increasing Teamcenter's applicability and use within organizations significantly. In some cases, this will expand Teamcenter's footprint by thousands of users.

Mr. Joe Bohman followed Mr. Hemmelgarn and described how the multi-domain enterprise BOM helps create a comprehensive digital thread with no boundaries. He noted that it supports a reusable system architecture that enables users to arrange structured data in multiple ways, e.g., system and requirements, features and families, products and product lines, etc. They can be grouped and viewed by function, by market, by system, or any other way the enterprise needs. It supports alternate views without duplication, enabling users to have multiple ways to view, select, and understand structures and configurations. The multi-domain enterprise BOM provides a single system across engineering and manufacturing, revision-driven in engineering and effectivity-driven in manufacturing.

Mr. Bohman described improvements to the Teamcenter Configurator to support a common definition of variability across the lifecycle. He said that the Teamcenter Product Configurator does not just incorporate mechanical, electronics, and software, but also supports simulation and service BOMs (SBOMs), as well as combination products which incorporate both discrete and formulated elements. Their multi-domain enterprise solution can now model all domain information together, keeping it aligned with design and enabling it to scale. Mr. Bohman announced that as part of their SAP partnership, the two companies have now achieved fidelity between the Teamcenter Product Configurator and the SAP Product Configurator—a capability that CIMdata believes will deliver significant value to their joint customers.

Mr. Bohman introduced two solutions for supplier integration. Supplier Connect is a portal-based exchange platform and Partner Connect supports contract-driven direct and secure collaboration.

Next was Mr. Dale Tutt, Vice President of Industry Strategy, and Mr. Michael Munsey, Vice President Semiconductor Industry. They discussed the rapidly increasing complexity of smart, connected, and sustainable products that are being software-driven and silicon-enabled. Mr. Tutt stated that semiconductors are now being purpose-designed and that the software must be designed to run on the chips—a new design/development paradigm that requires new skills for designers who must be able to do continuous multi-domain product simulation and optimization with ECAD-MCAD co-design. Mr. Munsey added that this means designers must be able to specify both the product and the software at the same time and be able to verify in advance that the software will be able to run on the hardware. He noted that Teamcenter is at the core of managing this software-defined, semiconductor-enabled -design.

Mr. Ray Kok, CEO Mendix, discussed the increasing use of Mendix within the manufacturing industry and the Siemens Xcelerator portfolio. He stated that Mendix is being used to personalize and expand Siemens Xcelerator, enabling customers to extend or add new capabilities while keeping the core solutions "clean" and also creating net-new solutions that help drive digital transformation. He described how Mendix is being used with Siemens Opcenter to create adaptable MES solutions tailored to role, industry, and process-specific experiences. As a result, Mendix is extending the reach of PLM data for operational needs and non-PLM business users.

Ms. Discher closed the Media/Analyst session with an overview of how Siemens Xcelerator portfolio is being harmonized and used across both Siemens Digital Industries Software and Siemens AG. She

described how the portfolio solutions will be offered in multiple levels of functional capability—good (e.g., Essentials), better (e.g., Standard), extended (e.g., Advanced), best (e.g., Premium), so that customers can start at any level and seamlessly scale in size and scope as their business needs dictate. Ms. Discher noted that this concept applied to both data management (e.g., Teamcenter) and CAD (e.g., Zel X to NX to NX X). CIMdata thinks this integrated and layered approach will provide the licensing and functional flexibility for customers as their business and technology needs evolve over time. She also noted that other Siemens solutions (offered by other Siemens business units) are using the Xcelerator foundation as part of their solutions, including Gridscale X, Building X, Electrification X, and Industrial Operations X.

Concluding Remarks

Siemens Realize LIVE 2024 and the Media/Analyst session showcased Siemens' solutions and vision. Siemens continues to push the boundaries of PLM and ET/IT/OT integration and expanding the use of PLM managed data across the extended enterprise. Their strategic relationships are delivering new capabilities that neither partner could deliver alone, and these new capabilities can provide significant value to each partner's customers. Siemens Xcelerator has evolved into a broad and integrated suite of solutions, as well as a platform upon which customers can incorporate non-Siemens technology and applications.

Siemens continues to move rapidly to deliver its broad solution portfolio fully via SaaS, as well as continuing to support on-premises implementations. Their hybrid approach enables customers to move to the cloud, when, how far, and how fast, as best fits each company's needs. Siemens' commitment to supporting open ecosystems (implemented with cloud-based and open tools) gives their customers the freedom to implement what they prefer and not require a Siemens "lock-in."

CIMdata believes that Siemens' strategic partnerships, new solutions, and significant updates of current solutions, particularly the multi-domain enterprise BOM and Teamcenter Configurator, will enable it to maintain its position as a leading provider of business transformation and product lifecycle capabilities for customers across all industries.

About CIMdata

CIMdata, a global, independent 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.