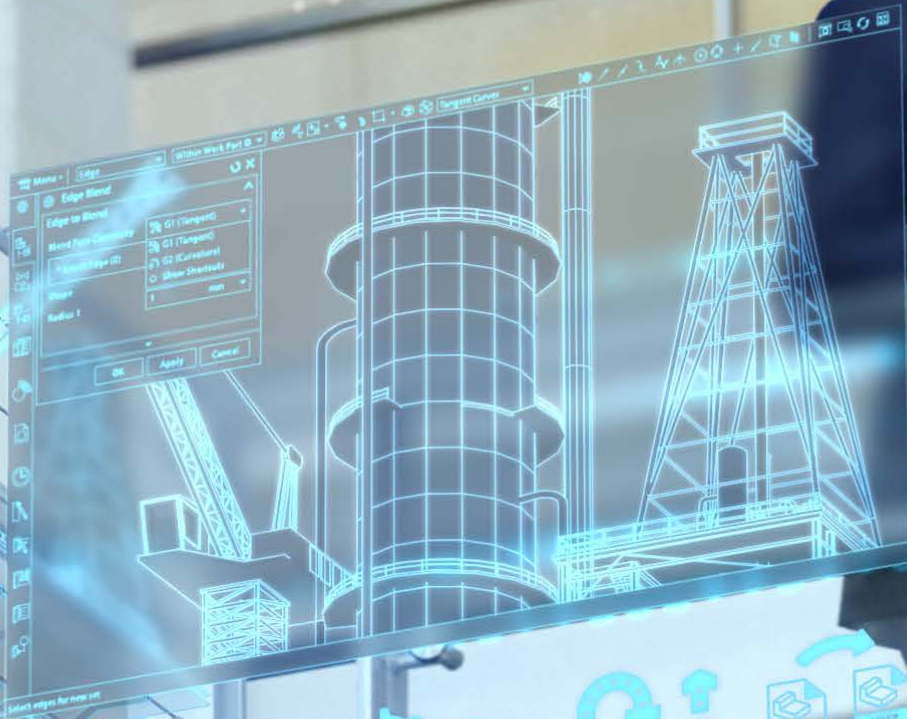


**SIEMENS**  
*Ingenuity for life*



Siemens PLM Software

# Transforming the Digital Enterprise

[siemens.com/plm](https://www.siemens.com/plm)



*“To survive disruption and thrive in the digital era, incumbents need to become digital enterprises, rethinking every element of their business.”*

The World Economic Forum 2016

# Digitalization is changing everything



All industries are feeling the pressure of digital transformation. For some, the risk of market disruption is threatening their very existence, and for others it is creating unparalleled opportunities for growth.

Many companies are not as impregnable as they may seem. Consider that since 2000, 50 percent of the Fortune 500 has vanished. It is expected that an additional 40 percent will disappear in the next 10 years if they don't adapt to change.

The impact of Moore's Law and rapidly advancing technology means the relative cost of technology is dropping precipitously, thus accelerating this digital industrial revolution.

Products and the factories that produce them continue to become smarter and more complex. Rapidly advancing digital technology is driving innovation everywhere, especially in electronics and software. Next-generation smart products are complex system of systems and require a new approach to development.

The key to being able to innovate and remain competitive is to take advantage of the technology trends transforming industry and shaping the Digital Enterprise.

# Disrupting and transforming manufacturing

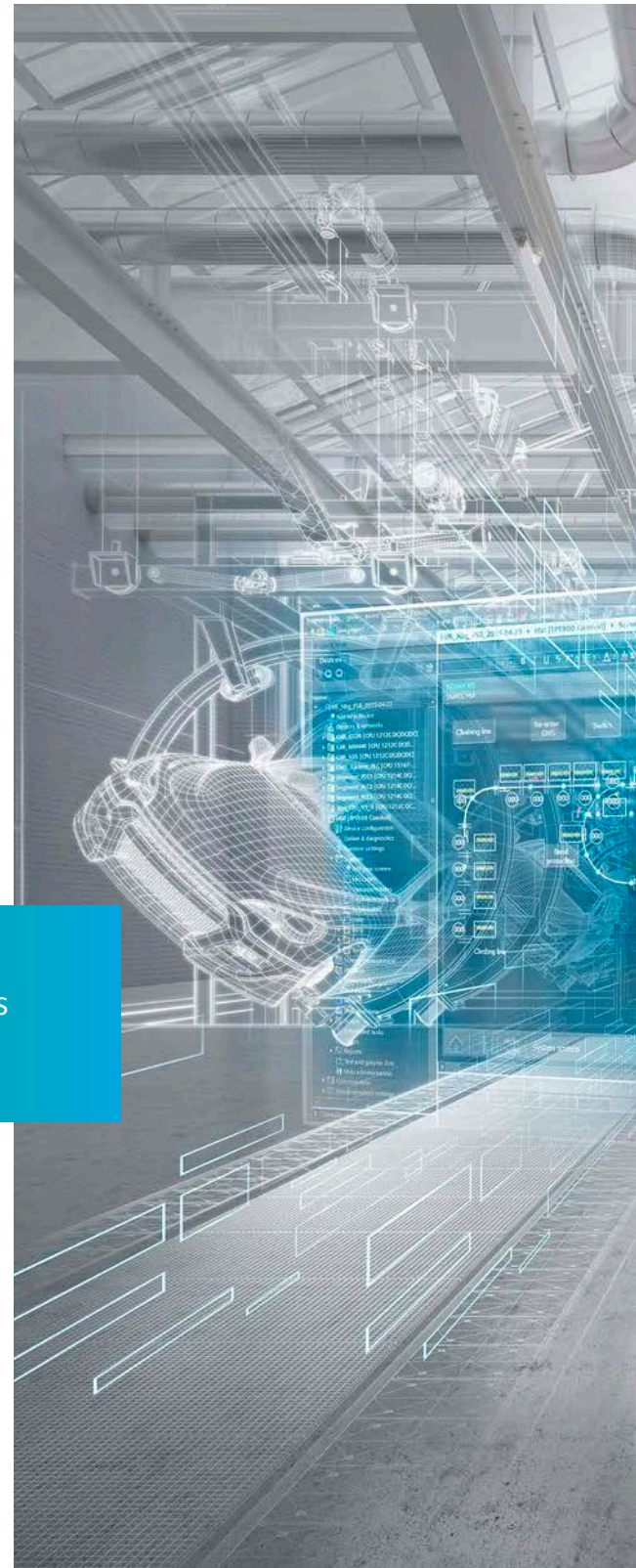
Only a fully digitalized business model with a consistent digital thread has the power and flexibility to speed up processes and optimize production operations.

More data is being produced than ever before. Hidden in this digital gold mine are insights that will lead to the next great idea, insights into optimizing production operations or even insights into how products and plants can be used for new business opportunities.

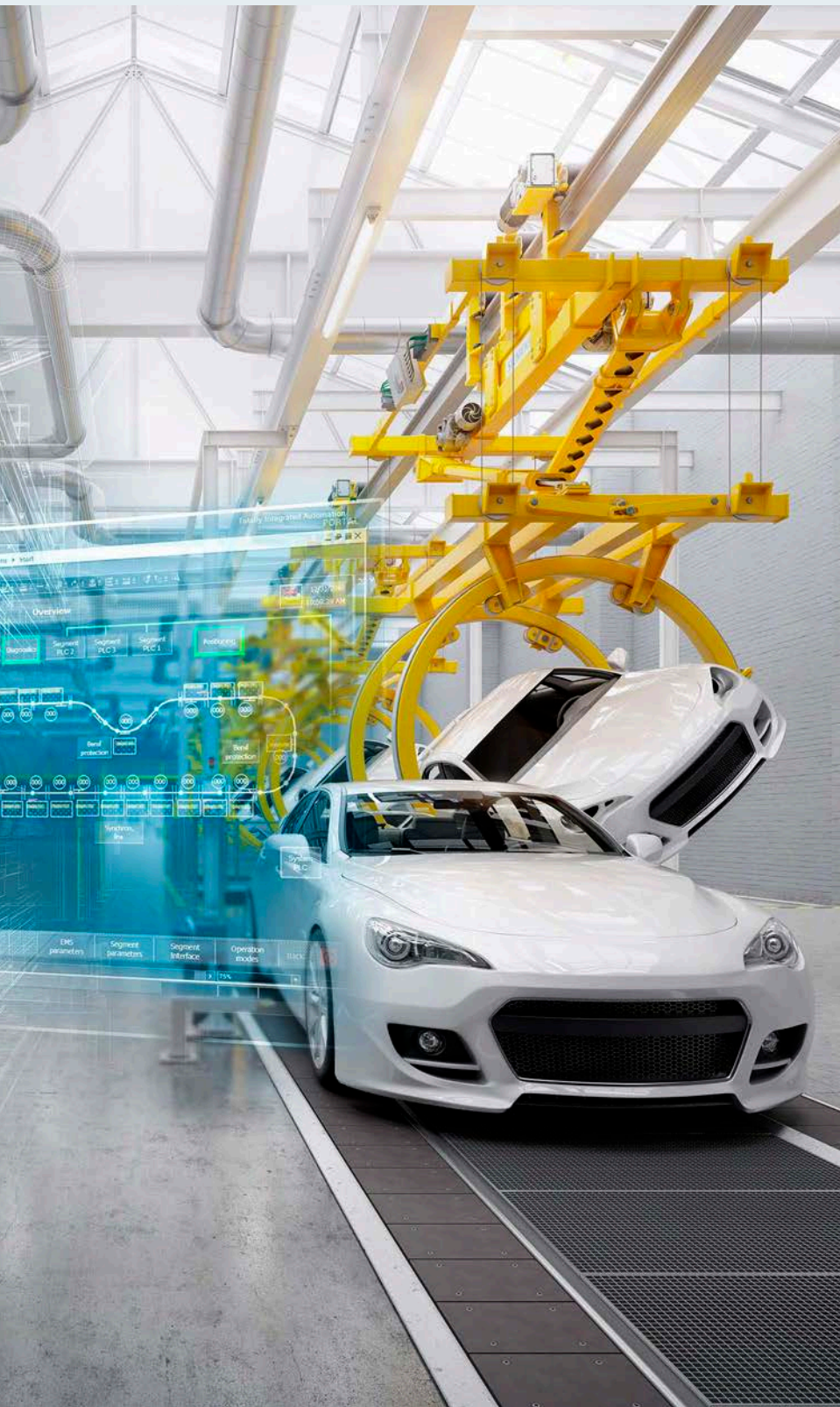
Smart factories with smarter, faster and cheaper robots and additive manufacturing processes are disrupting and transforming the manufacturing industry. In this expanding global economy, these smart products and factories are connected through the Internet of Things (IoT), and drive the explosive growth of big data that increases the value of delivering the right data at the right time, making the right business decisions and delivering the right level of personalization to the right consumer.

Manufacturers must rethink every aspect of their businesses and embrace digitalization. Only a fully digitalized business model with a consistent digital thread has the power and flexibility to speed up processes and optimize production operations.

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# Transforming the way ideas come to life



The key to being able to innovate in this way is the ability to take advantage of the technology trends transforming industry and shaping the Digital Enterprise. Next-generation smart products are complex systems of systems with electrical, mechanical and software elements.

The culture of mechanical design is changing through digitalization to support generative design principles, creating products aligned to natural design principles. Convergent Modeling™ technology is transforming the way advanced geometry models are supported with the creation of intelligent models from sources like 3D scanners that can be used in computer-aided design (CAD) without any modification or rework.

Siemens is delivering next-generation solutions to help manufacturers transform their operations into a Digital Enterprise. These solutions create a digital twin of products and allow engineers to accurately predict performance and define the language for how products communicate with us through the IoT.

# Siemens PLM Software delivers Digital Enterprise software

Our software provides the technical foundation for our customers' Digital Enterprise, supporting their transformation. Our software portfolio weaves a digital thread that creates a tapestry of information that connects people with data and applications for real-time, informed decision making. This digital thread enables our customers to intelligently connect smart virtual models (digital twins) and real-time production information across lifecycle phases of ideation, realization and utilization, and across value chain participants to form a smart innovation environment. This enables our customers to digitalize across their entire ecosystem of products and plants, making it possible for them to realize the enormous benefits of digitalization, including dramatically shortening time-to-market, providing much greater production flexibility and significantly reducing costs.

Siemens PLM Software provides a fully integrated software solution across our customers' entire value chains, from initial conceptual design, manufacturing planning and execution through service and support of both the products and plants that produce them.

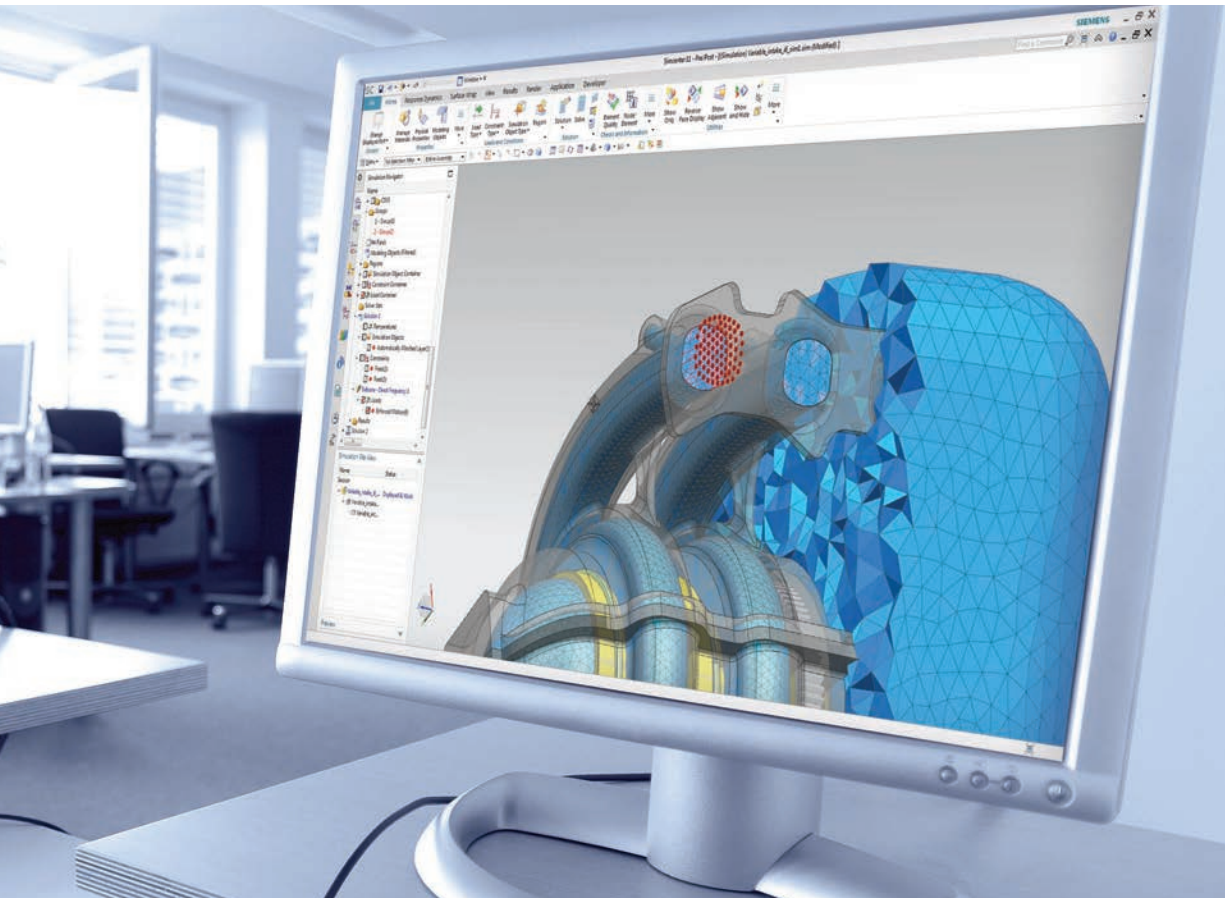
Siemens PLM Software provides a fully integrated software solution across our customers' entire value chains.



# The digital twin of the product provides virtual perfection

The increasing convergence of electronic, embedded and mechanical design brings new challenges for each discipline and facilitates ever-greater levels of interdisciplinary interaction. We create a consistent system framework that integrates all domains for an

evolving product definition. The digital twin includes simulation models that cover different types of behaviors with models that are relevant to different stages of the development process.



# The digital twin of production: where virtual meets real

The breakthrough strengths of the Smart Factory, including shop floor connectivity, advanced robotics, flexible automation, automation standards, virtual reality and augmented reality, enable the creation of a precise virtual representation of the production environment.

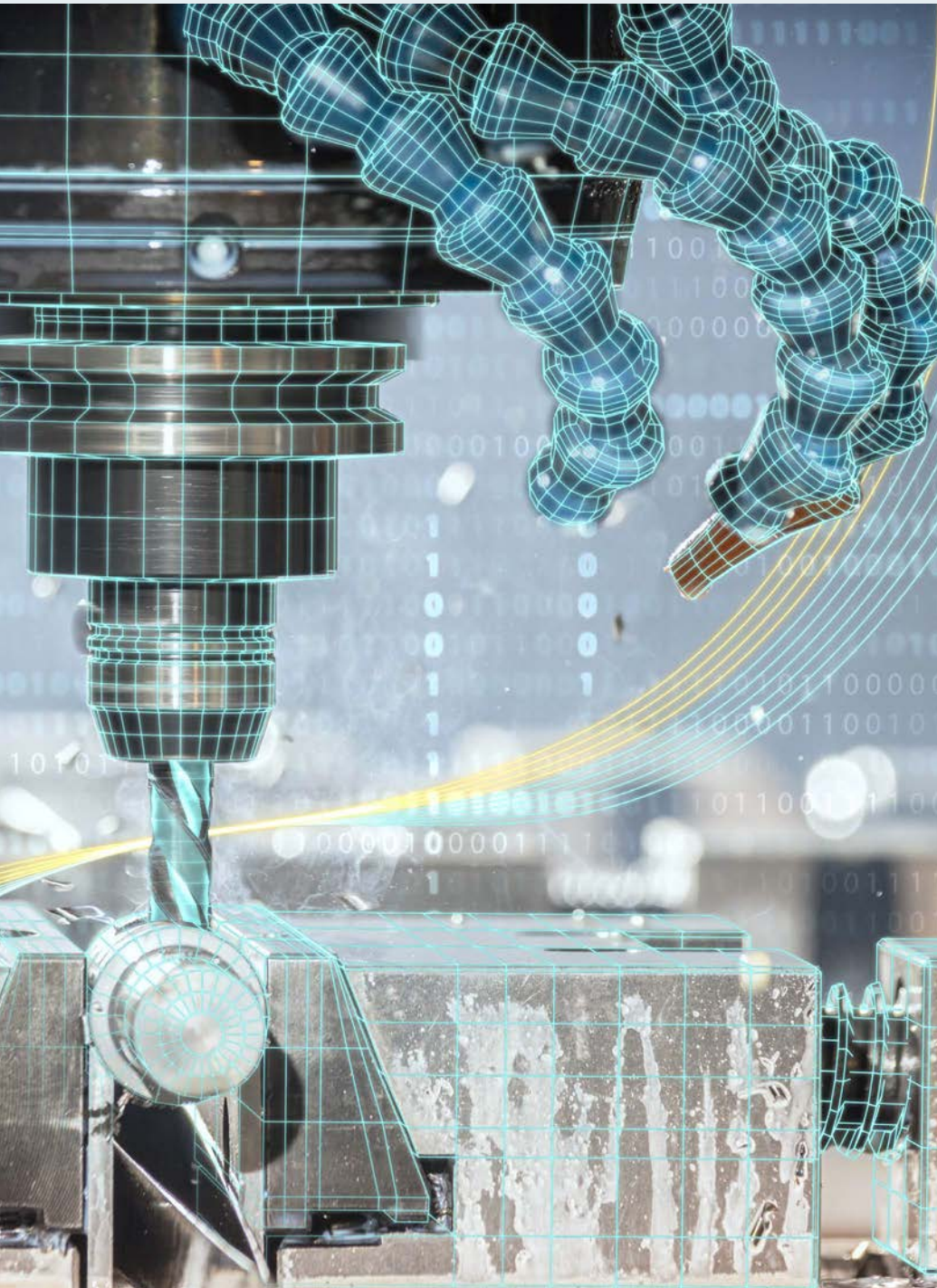
The digital twin of the product accurately simulates behavior and provides the virtual definition of what must be produced. The manufacturing environment that creates the product can now be simulated. Manufacturers can predict the future by showing much greater flexibility in reacting to continually changing consumer demands and future orders.

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# The digital twin of utilization delivers the language of products and plants



Smart products and smart plants are creating volumes of data, which if properly understood, represents the language of the product and/or the plant. By understanding which data elements are important, we can expand and enhance the digital twin with the insight gained from operational performance. This digital twin provides the language for what products and factories can tell us in operation. We can collect and identify the valuable data elements and take advantage of what the products and machines can tell us to provide insight so we can optimize performance and create new business value. With plant data and product performance analytics, we bring together all the elements necessary to fulfill the vision of the Digital Enterprise and close the loop between the virtual world of development and the real world of operation.

# Creating the product digital twin

## Siemens PLM Software Digital Enterprise software

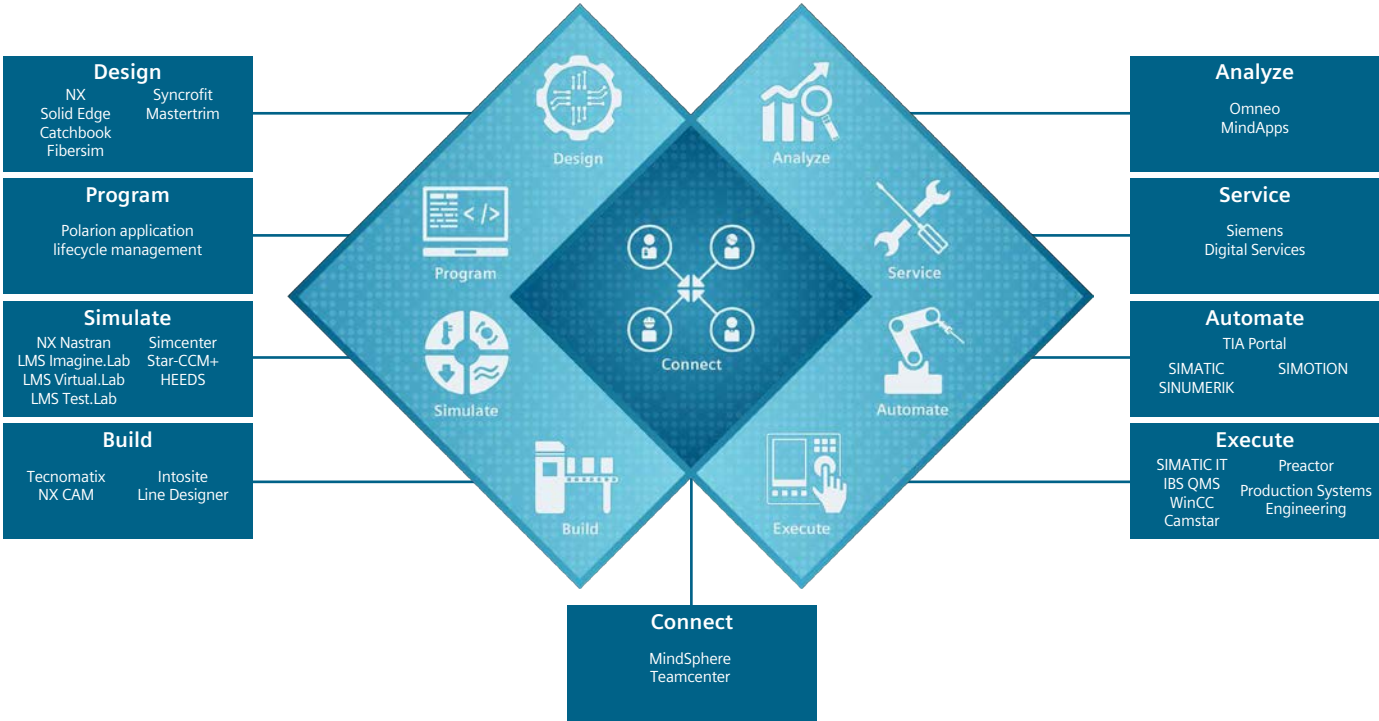
Siemens PLM Software features the enterprise software industry's most complete portfolio, establishing the technical foundation for the Digital Enterprise.

Using Siemens PLM Software's Teamcenter® software provides a collaborative, closed-loop environment for the model-based systems engineering (MBSE) environment. System architecture, modeling, simulation and requirements management tools establish the digital thread of product and process knowledge, so you can fully understand your products as a cross-domain systems definition. Teamcenter provides cross-domain design data management through integrations with mechanical computer-aided design (MCAD), electronic computer-aided design (ECAD), software development and simulation tools and processes.

You can manage, find, share and re-use multi-domain data across geographically distributed design centers through a single, secure source

of product design and simulation data. Teamcenter provides software design management by integrating software engineering data and processes with product lifecycle management (PLM). Leveraging a multi-domain lifecycle integration framework, Teamcenter enables the seamless integration of application lifecycle management (ALM) tools, data and processes.

The Polarion application lifecycle management solution brings software engineers into the loop with their electrical and mechanical counterparts, delivering unprecedented productivity gains. By using the latest technology and unified by design, Polarion ALM supports software development with full traceability and transparency.



# Deliver better products faster and more efficiently



NX™ software is a highly flexible and efficient solution for product design, engineering and manufacturing, integrating mechanical, electronic and electrical components. Siemens PLM Software is delivering the next big breakthrough in digital product development with Convergent Modeling, a new modeling paradigm that greatly simplifies the ability to work with geometry consisting of a combination of facets, surfaces and solids, without the need for time-consuming data conversion.

Convergent Modeling is the first technology of its kind, and optimizes part design for 3D printing, speeds up the overall design process and makes reverse engineering a far more

common and efficient practice in product design. Next-generation advanced composite materials offer significant opportunities for lightweighting, cost reduction and performance enhancements.

The Fibersim™ portfolio for composites engineering provides a specialized engineering environment that brings together all the aspects for realizing the successful development and manufacture of composite parts.

# Digital enterprises come in all sizes

Small and medium-size businesses (SMBs) are driving innovation and even disruption by harnessing digital technologies and tools. They correctly view digital as leveling the playing field, putting them in a unique position to take advantage of it. Siemens is focused on empowering SMBs with solutions that address their unique needs and constraints. Our strategy is to provide value, flexibility and choice for SMBs.

Solid Edge® software provides a great design experience with the simplicity of direct modeling and the control of parametric design. Teamcenter provides scalable data management on the cloud or on the premises and weaves the digital thread powering the digital twin, streamlining design development and connecting all stakeholders for faster, more accurate decisions. Femap™ software delivers efficient simulation for verifying structures and validating parts and assemblies.



# Making decisions with more confidence and delivering innovations sooner

Siemens PLM Software's Simcenter™ software creates a multi-fidelity model that reflects reality and continually evolves throughout the product lifecycle to accurately simulate performance from concept through use. Using Simcenter enables you to go beyond simple verification to performance prediction by combining simulation, physical testing and data analytics to spot unforeseen trends, creating a precise digital twin of products.

## Creating the production digital twin

The breakthrough strengths of the Smart Factory, including shop floor connectivity, advanced robotics, flexible automation, automation standards, virtual reality and augmented reality, enable the creation of a precise virtual representation of the production environment.

## Drastically improve profitability, time-to-market and quality

Combining Teamcenter with the Tecnomatix® portfolio extends the digital thread into manufacturing, providing a scalable and secure source of manufacturing data that supports lifecycle processes from engineering through production. Tecnomatix is a comprehensive portfolio of digital manufacturing solutions that enable you to realize innovation by synchronizing product engineering, manufacturing engineering and production.



Siemens is focused on empowering SMBs with solutions that address their unique needs and constraints.

# Optimize asset utilization, reduce time-to-market and increase production visibility

Siemens' manufacturing operations management (MOM) extends the digital thread to the shop floor, collecting information from resources, enabling a much better and more adaptive factory operation. Execute production with SIMATIC IT. Optimize planning and scheduling with SIMATIC IT Preactor. Enforce quality with IBS QMS and ensure transparency in production with SIMATIC WinCC SCADA.

From the top floor to the shop floor, our MOM solutions enable you to integrate business planning, technical planning and logistics with shop floor control and automation through a common solution platform, supporting all aspects of manufacturing operations.

## Creating the performance digital twin

MindSphere, Siemens' cloud-based, open IoT operating system, connects products, plants, systems and machines to the digital world. It is the centerpiece of a powerful ecosystem with data analytics and connectivity capabilities, and tools for developers, applications and services. MindSphere closes the loop with the product and production digital twins with applications called MindApps, which are used to analyze unstructured data so you can understand the language of products and assets in operation, deliver valuable insight and optimize product performance and asset utilization.



# Delivering value with industry solutions

We are addressing the real challenges our customers face through deep, process-centric solutions built on best practices.



We provide a broad set of industry-specific solutions that are delivered on top of our Digital Enterprise software portfolio. By working closely with our customers as they implement their PLM solutions in real-world settings, we have gained an unsurpassed level of industry expertise. As a result, we are addressing the real challenges customers face through deep, process-centric solutions built on best practices.

### **About Siemens PLM Software**

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of product lifecycle management (PLM) and manufacturing operations management (MOM) software, systems and services with over 15 million licensed seats and more than 140,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with its customers to provide industry software solutions that help companies everywhere achieve a sustainable competitive advantage by making real the innovations that matter. For more information on Siemens PLM Software products and services, visit [www.siemens.com/plm](http://www.siemens.com/plm).

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