

Siemens press conference prior to Hannover Messe 2017

Karlsruhe | March 14, 2017

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Karlsruhe, March 14

Discover the value of the Digital Enterprise

Eckard Eberle, CEO Process Automation Business Unit

Dr. Jan Mrosik, CEO Digital Factory Division

Dr. Jürgen Brandes, CEO Process Industries and Drives Division

Dr. Beatrix Natter, CEO Transformers Business Unit



Digital Enterprise

Welcome to Siemens in Karlsruhe

Eckard Eberle | CEO Process Automation Business Unit
Siemens press conference prior to Hannover Messe 2017

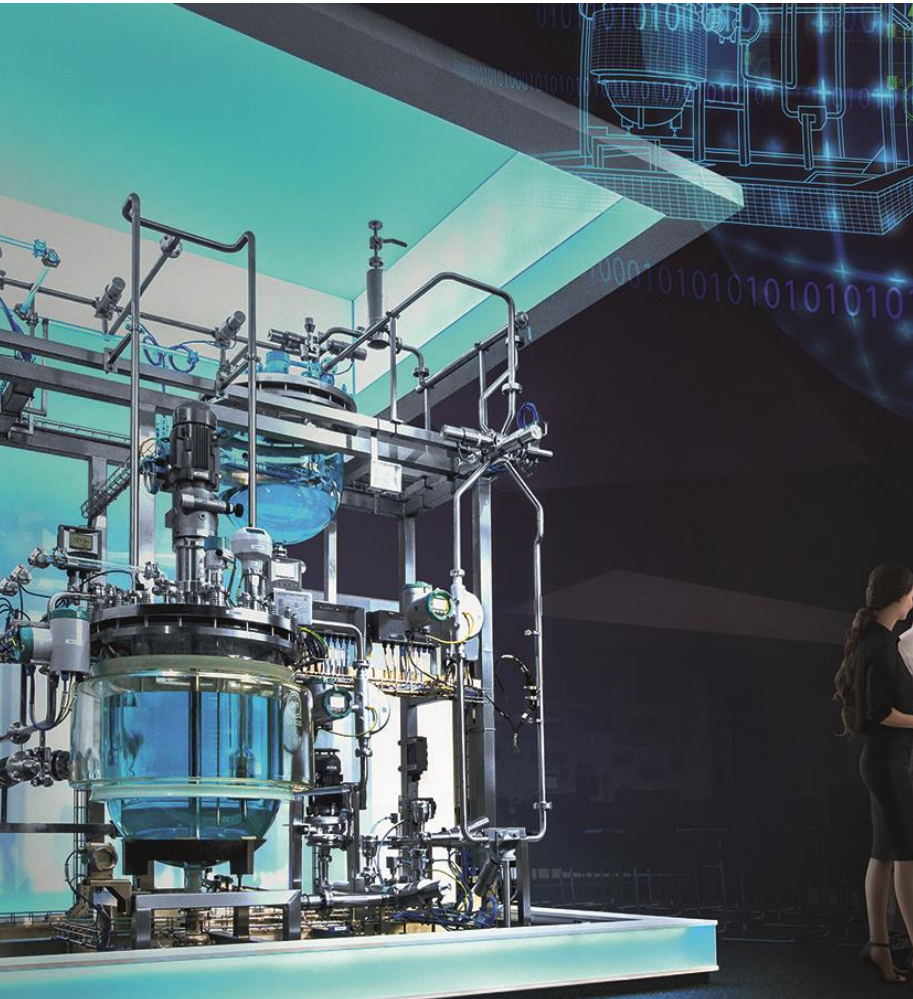


Process Automation Center

- Around 4500 employees work at the location in Development, Production, Sales, Servicing and Management (of which some 290 are trainees)
- A presence in Karlsruhe for over 115 years – both as one of the largest locations of the Siemens Group and the city's single biggest employer
- Site area: over 280,000 m²

Process Automation World

Experience practical examples of digitalization live on site

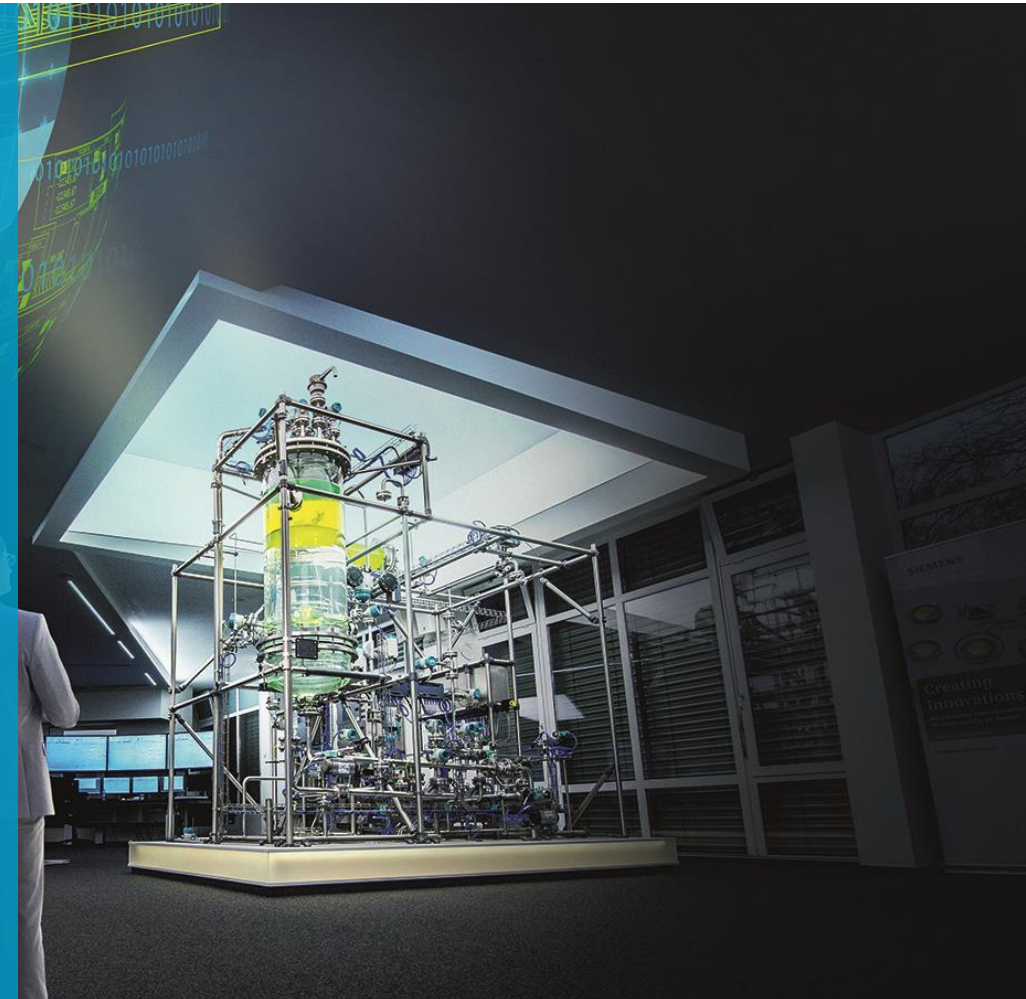


On an exhibition area encompassing over 700m², visitors experience the benefits of digitalization under real working conditions over the entire life cycle of an industrial plant

Two large-scale models of production lines from the chemical and pharmaceutical industry

Real control center displaying digital twin including MindSphere link

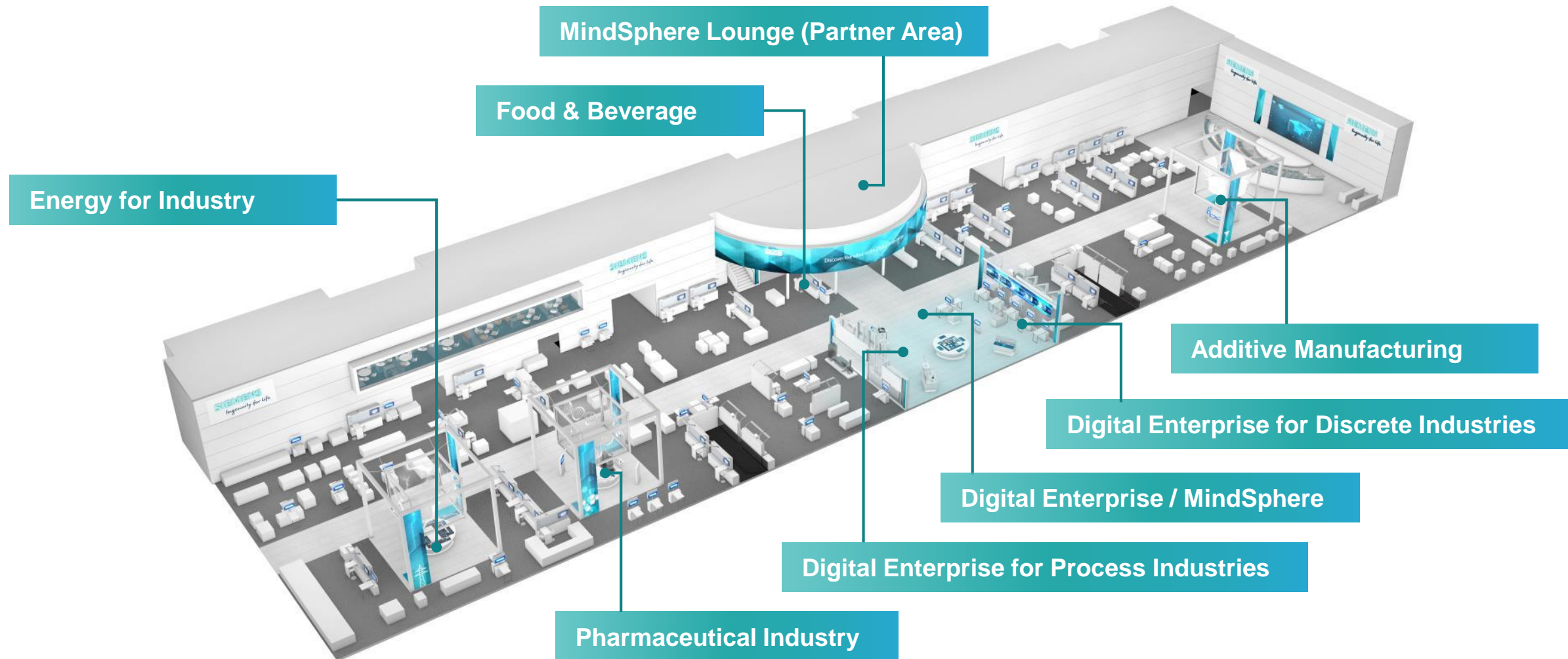
Around 6000 visitors since opening in October 2016



Siemens at Hannover Messe 2017

Discover the value of the Digital Enterprise on 3.500m²

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Ingenuity for life



Driving the Digital Enterprise for discrete industries

Dr. Jan Mrosik | CEO Digital Factory Division
Siemens press conference prior to Hannover Messe 2017



Digitalization
changes
everything

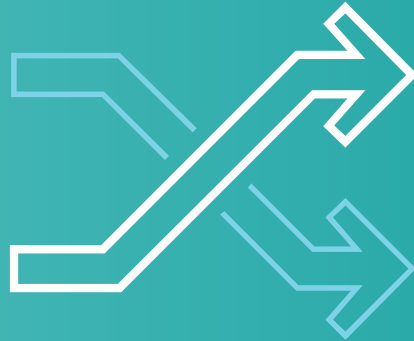
Our customers have essential requirements –
throughout the manufacturing industry

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Speed



Flexibility



Quality



Efficiency



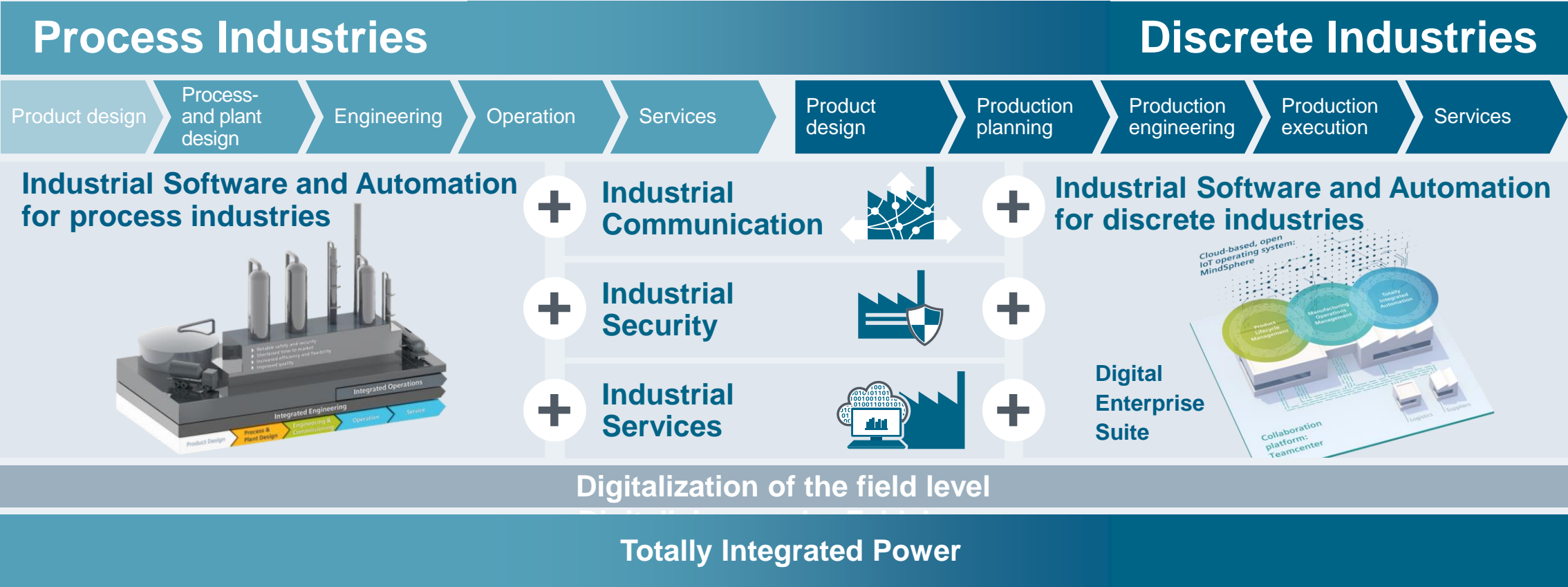
Security



Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry



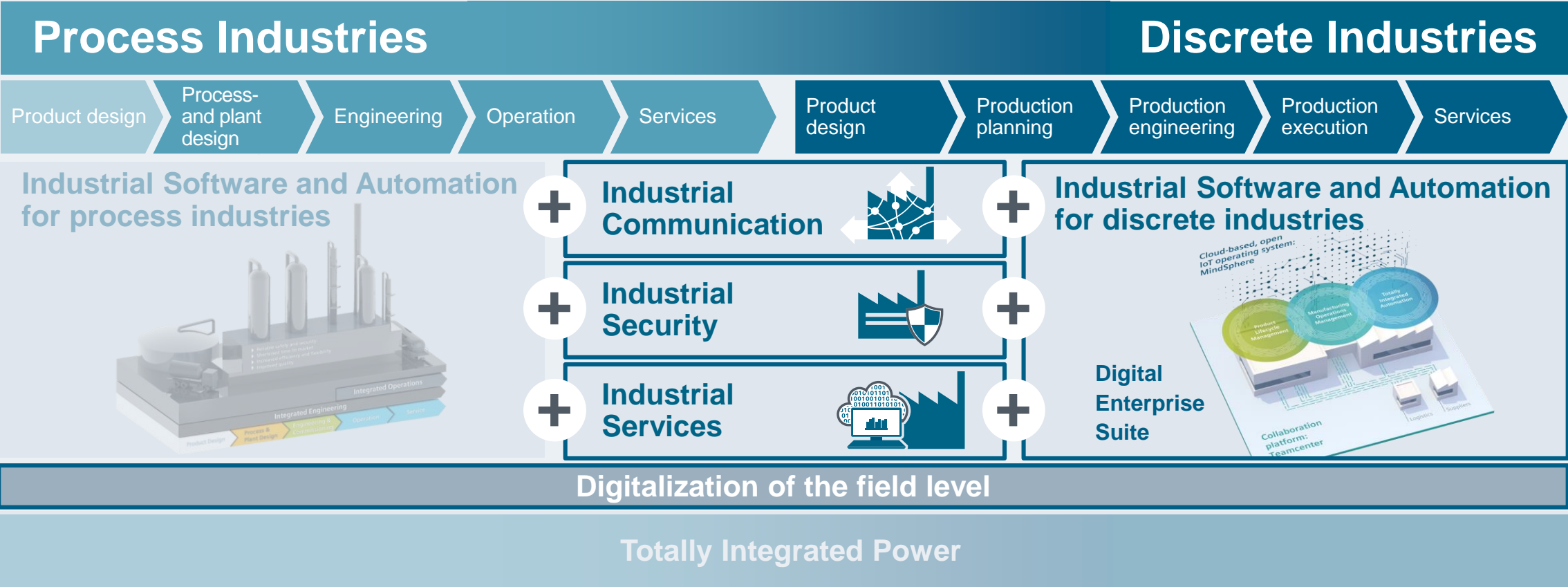
Digital Enterprise



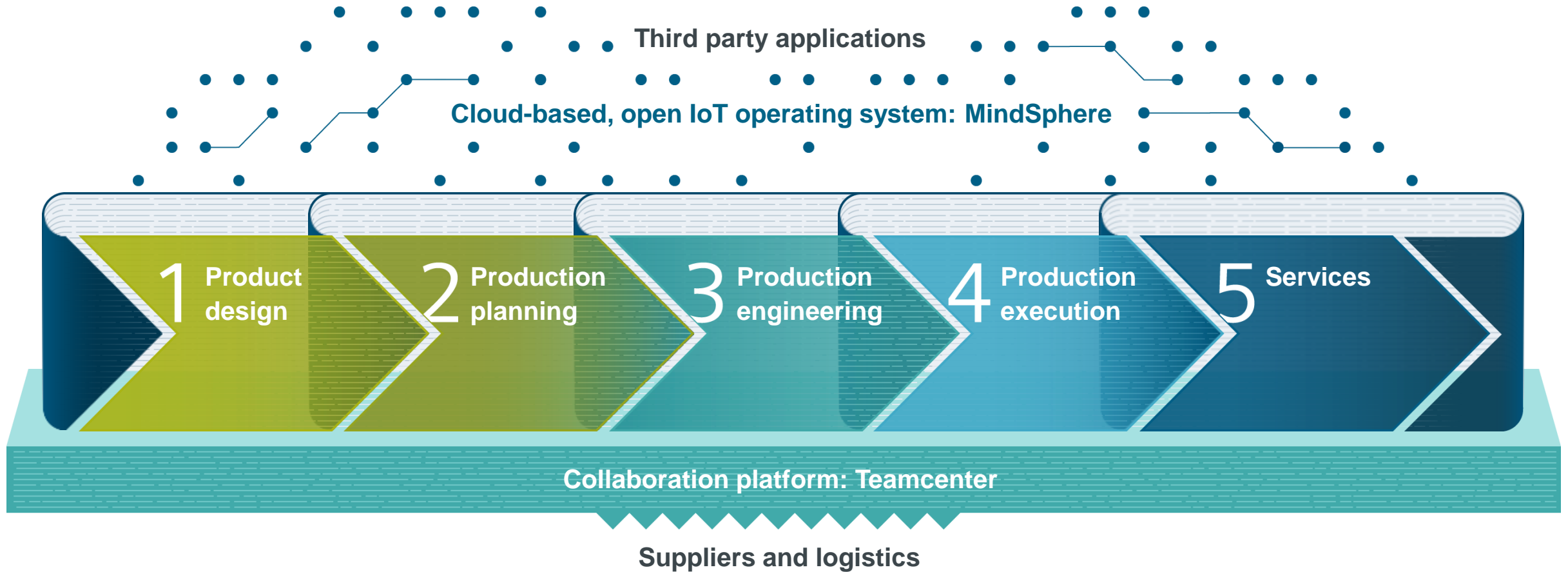
Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry



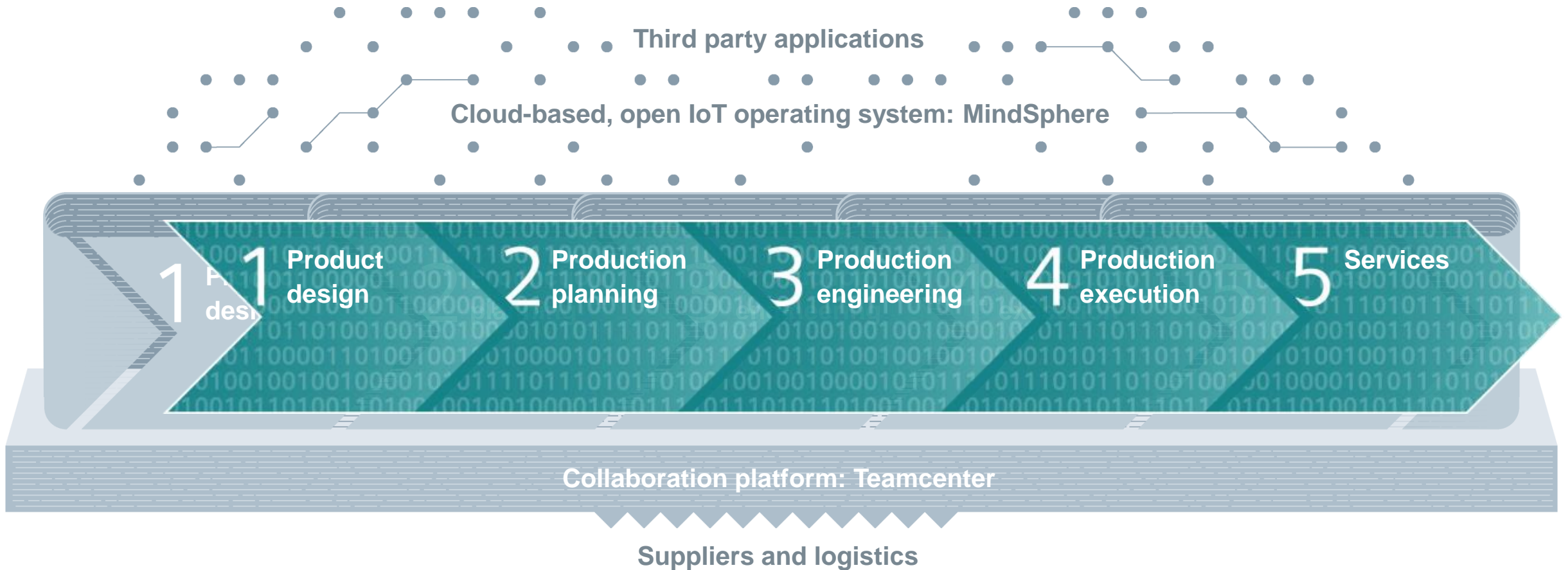
Digital Enterprise



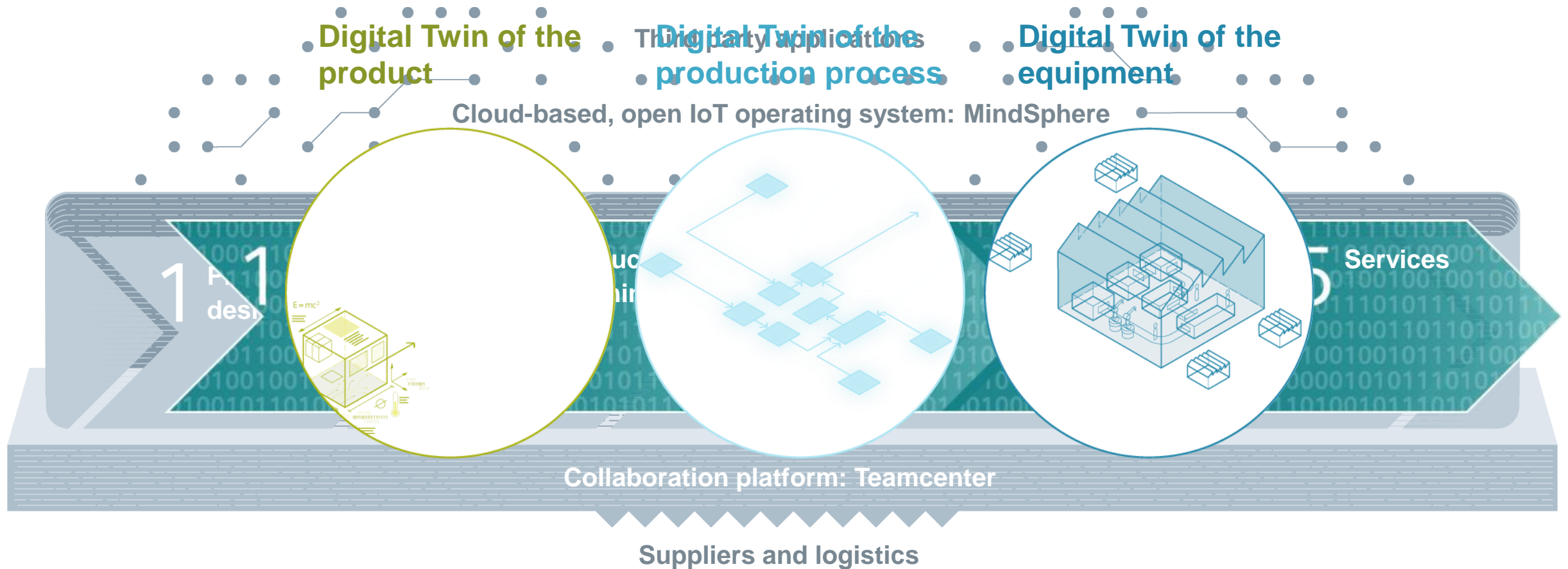
Integrating and digitalizing the entire value chain is key to staying competitive in the future



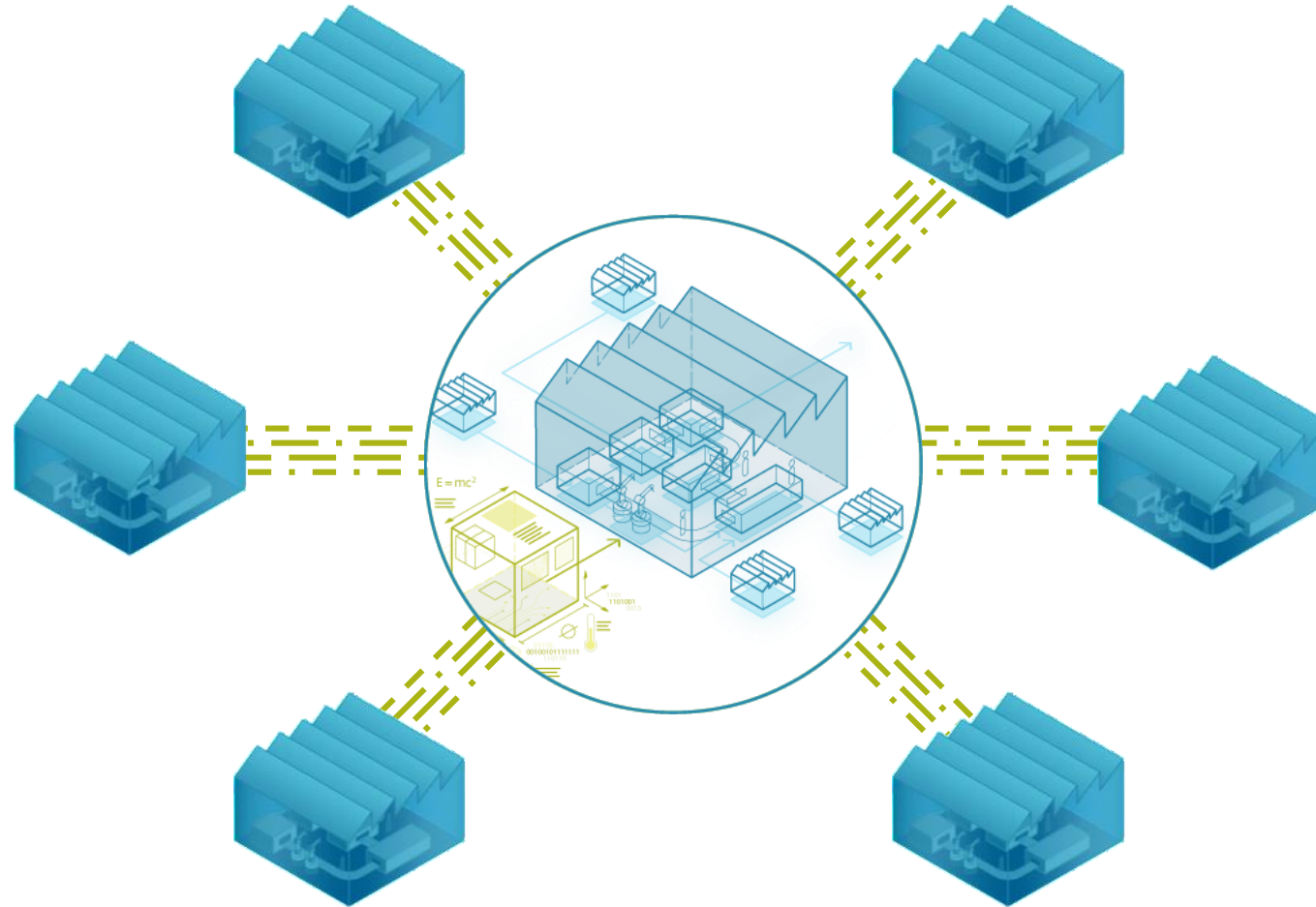
Integrating and digitalizing the entire value chain is key to staying competitive in the future



Integrating technical domains into ONE data model



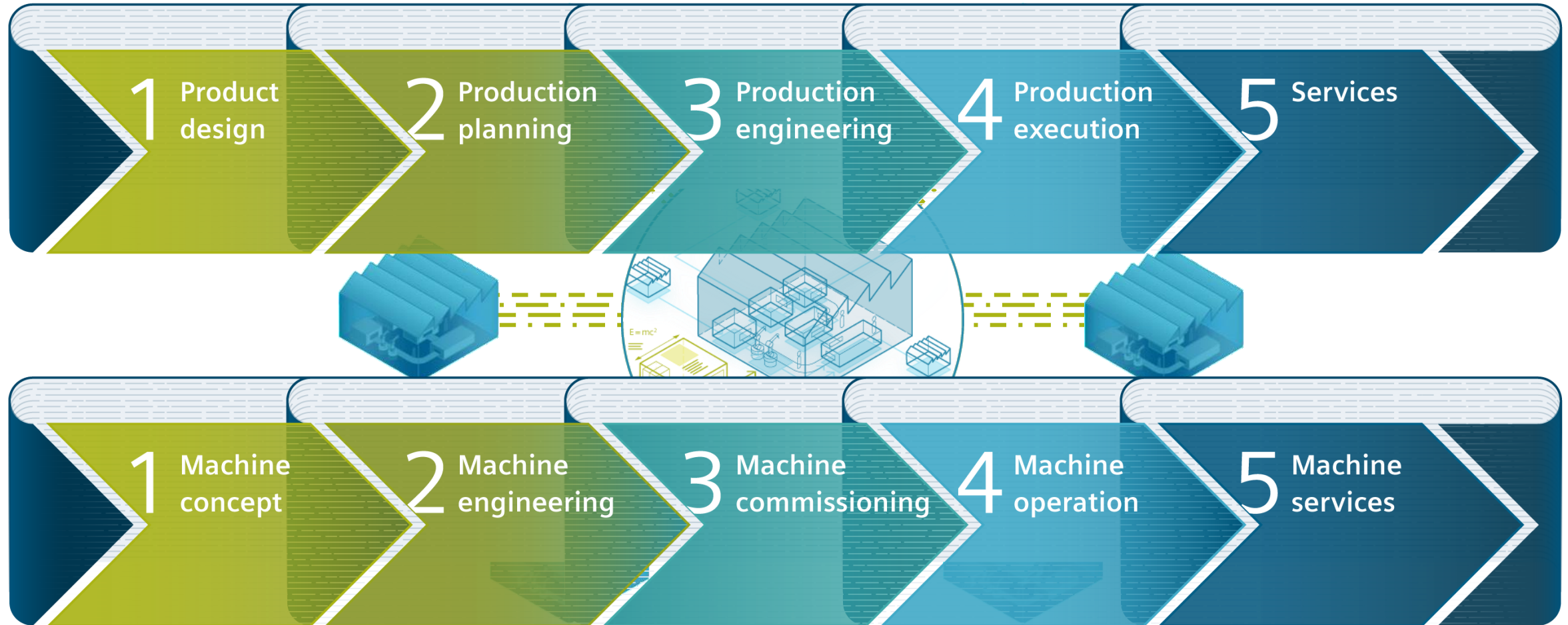
Publishing the optimized Digital Twin to all stakeholders, including suppliers, with the collaboration platform Teamcenter



Our holistic approach

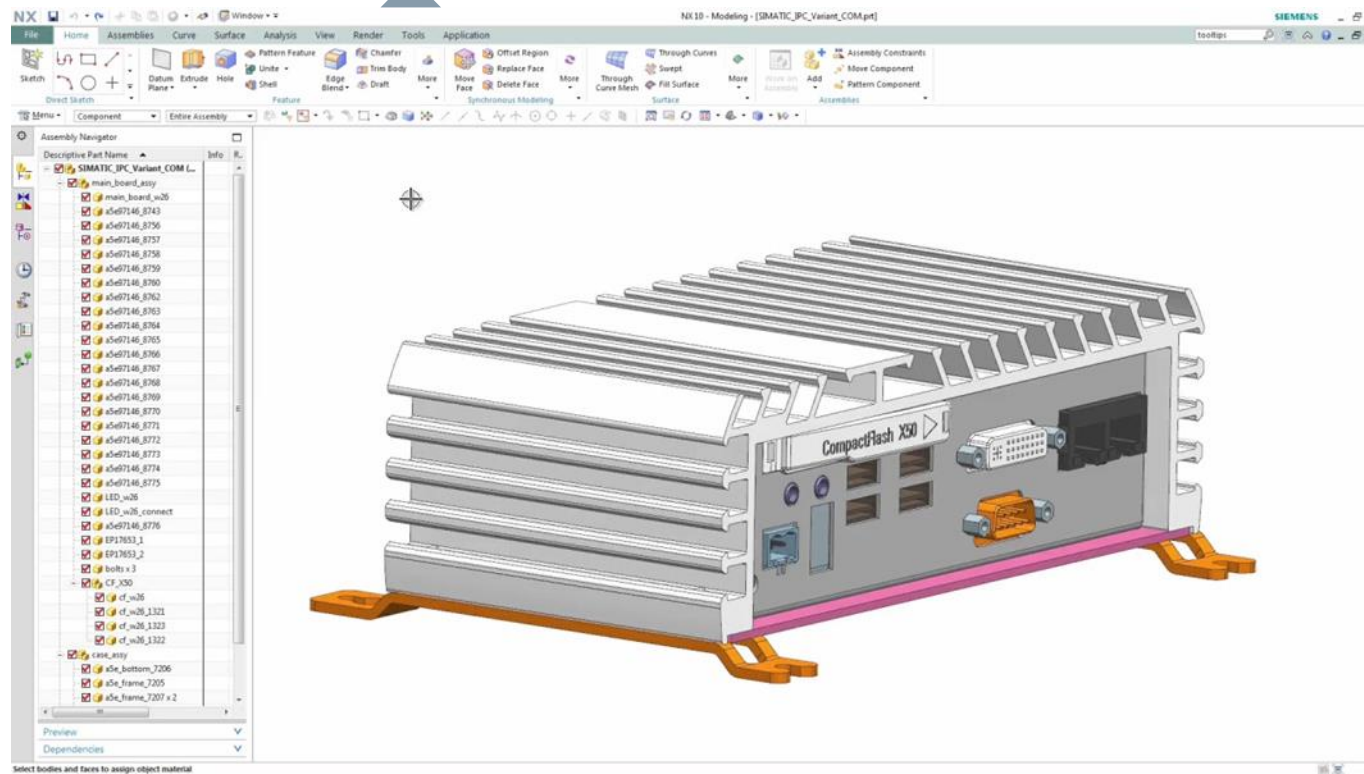
Specific for end customers and machine builders

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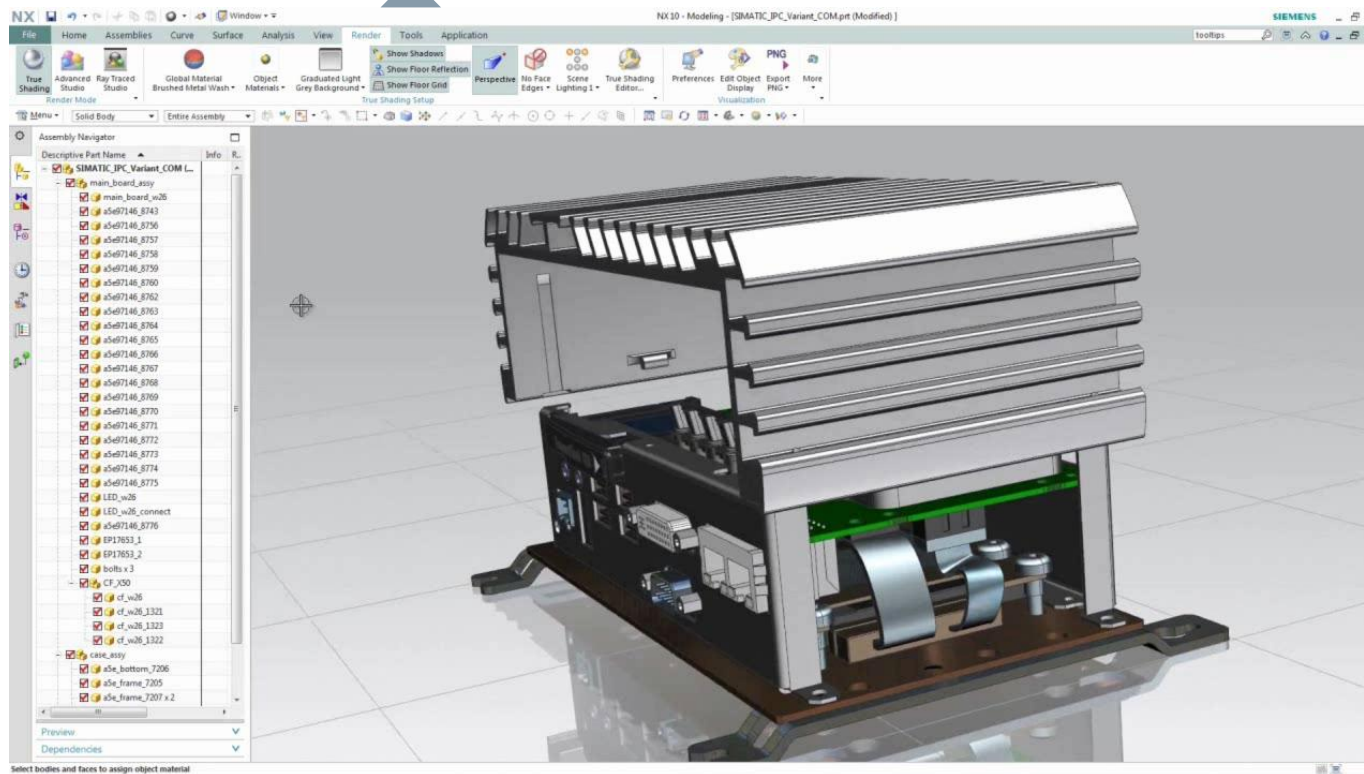
Holistic approach Specific for end customers

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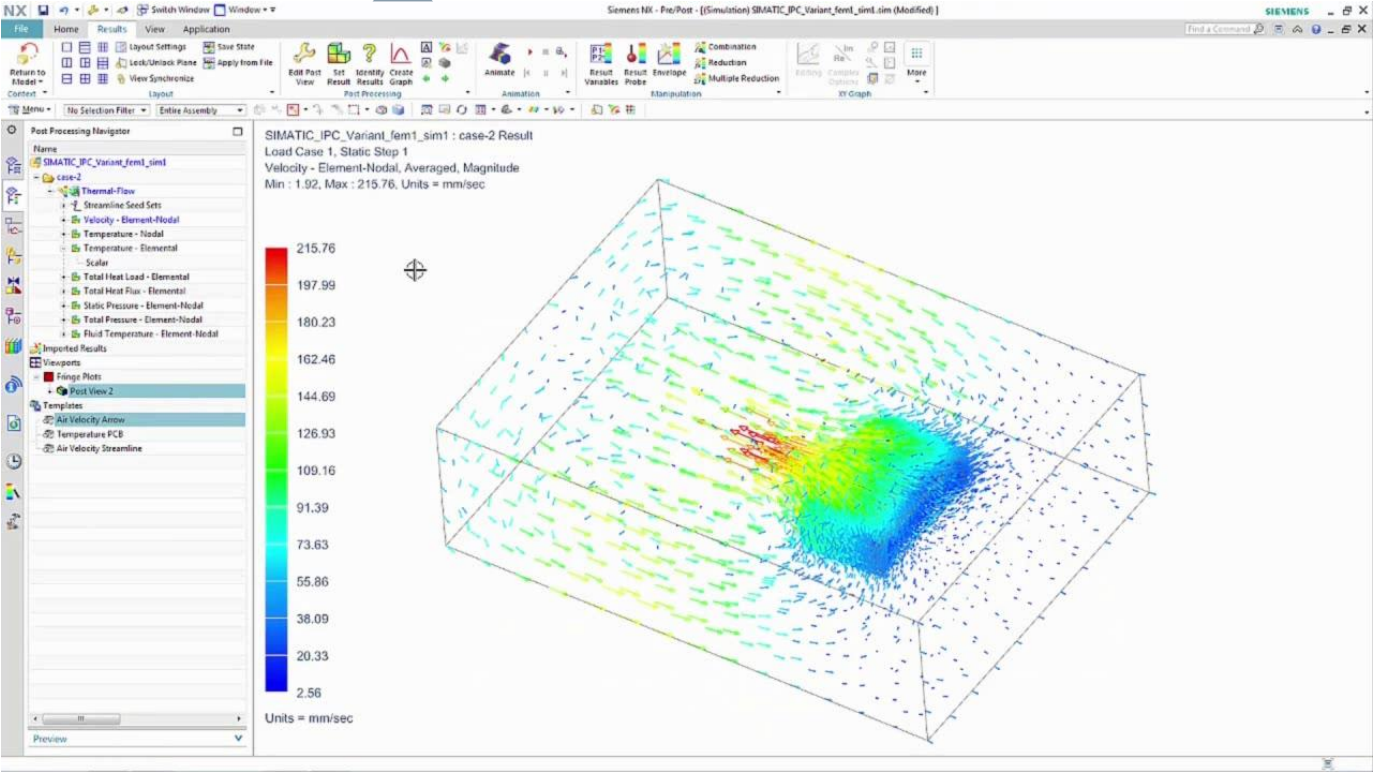


NX – Integrated CAD/CAE/CAM

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Realizing innovation with 3D simulation



Human simulation to simulate, analyze, and optimize assembly processes and ergonomics

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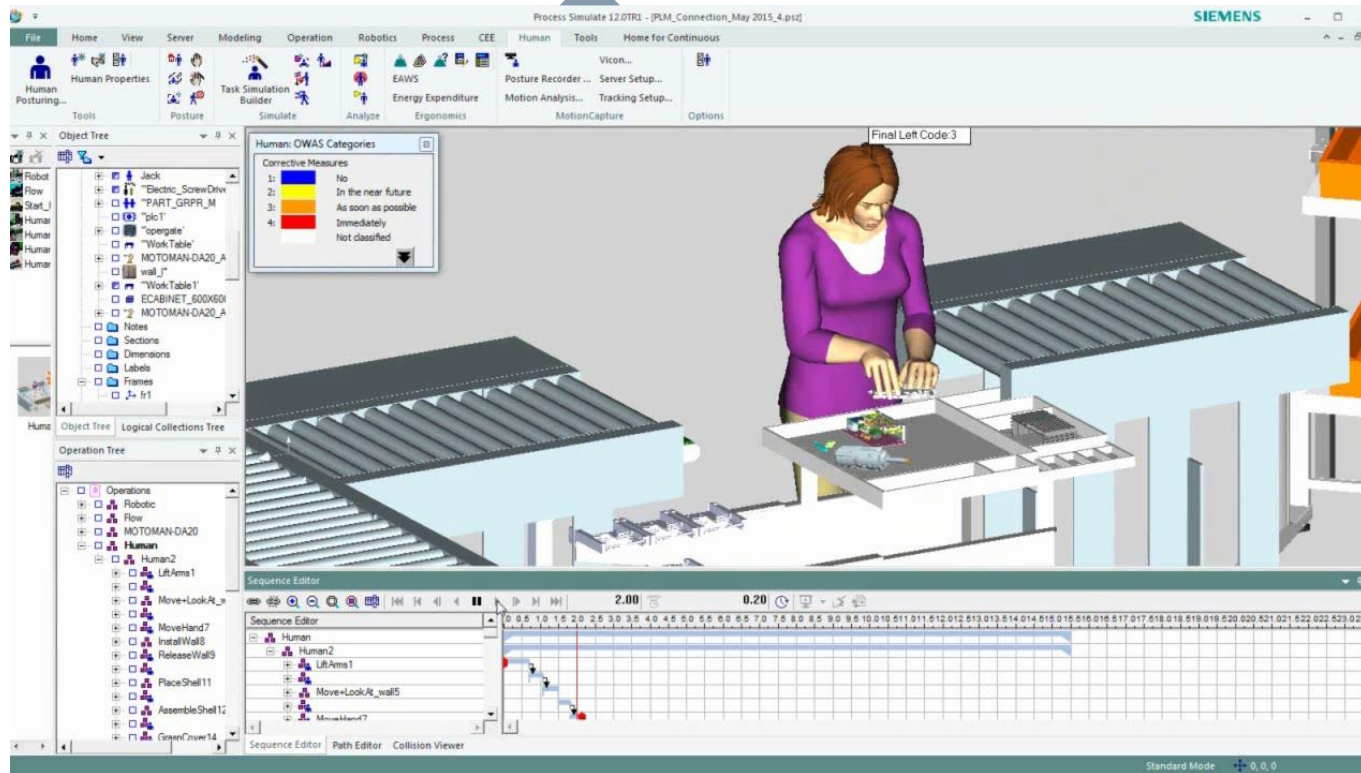
1 Product design

2 Production planning

3 Production engineering

4 Production execution

5 Services



Simulate, visualize, analyze, and optimize production systems and logistics processes

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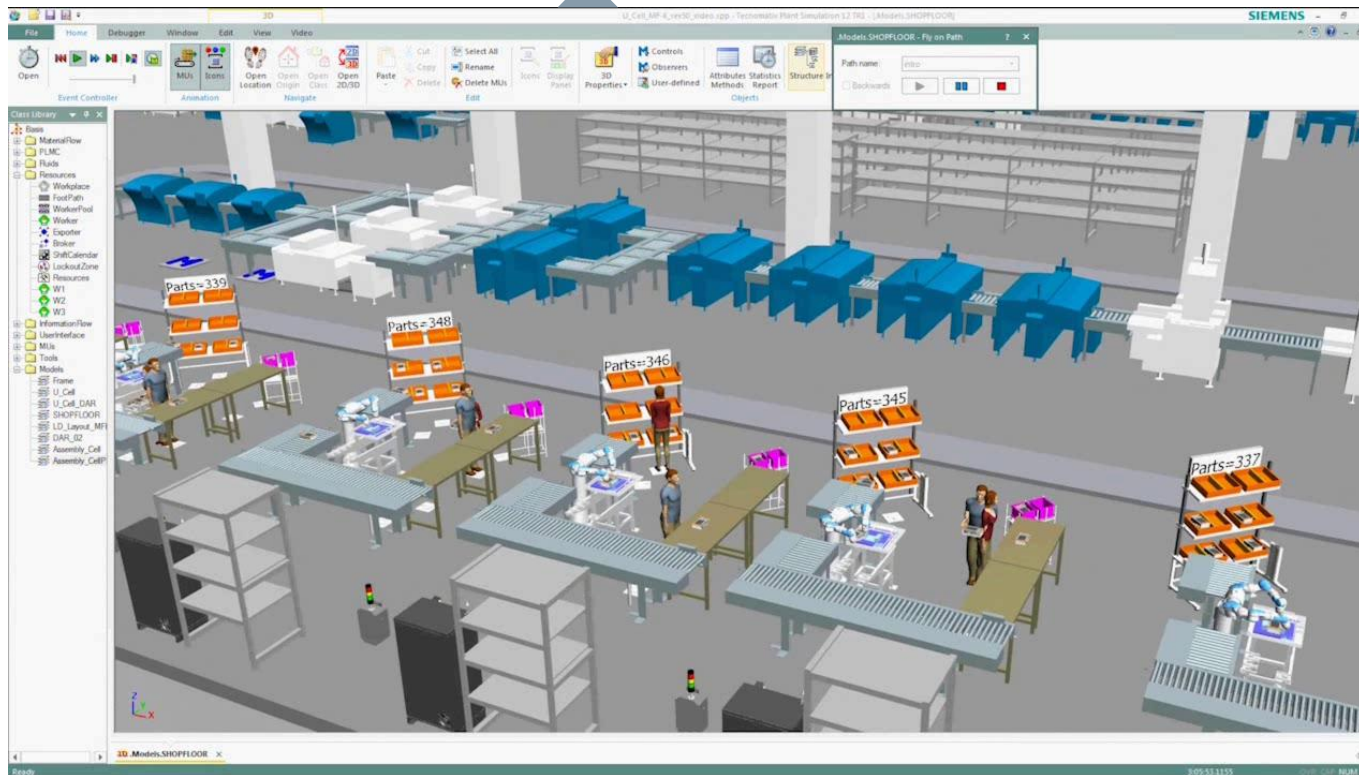
1 Product design

2 Production planning

3 Production engineering

4 Production execution

5 Services



Mechatronics Engineering and Virtual Commissioning

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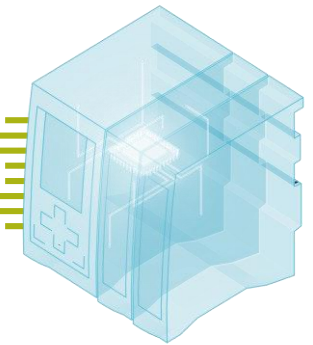
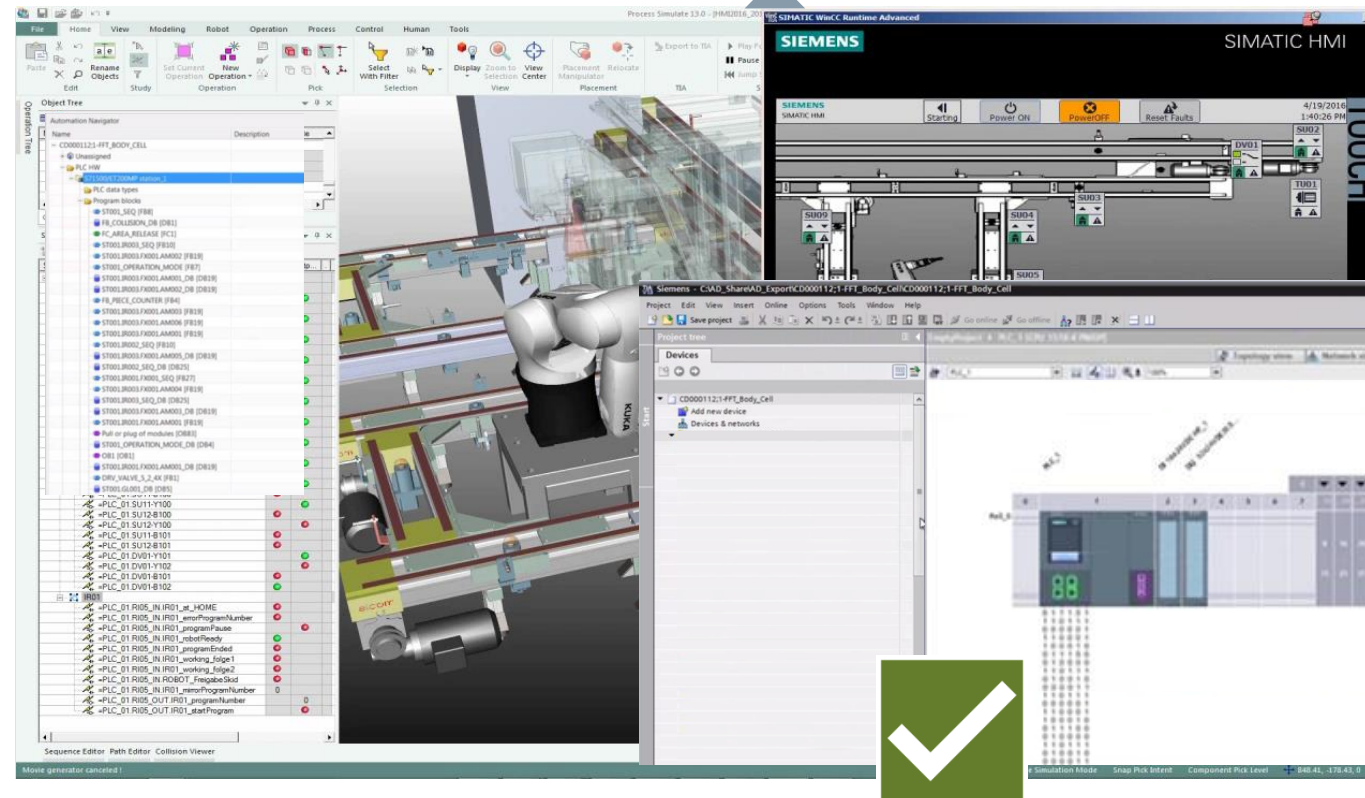
1 Product design

2 Production planning

3 Production engineering

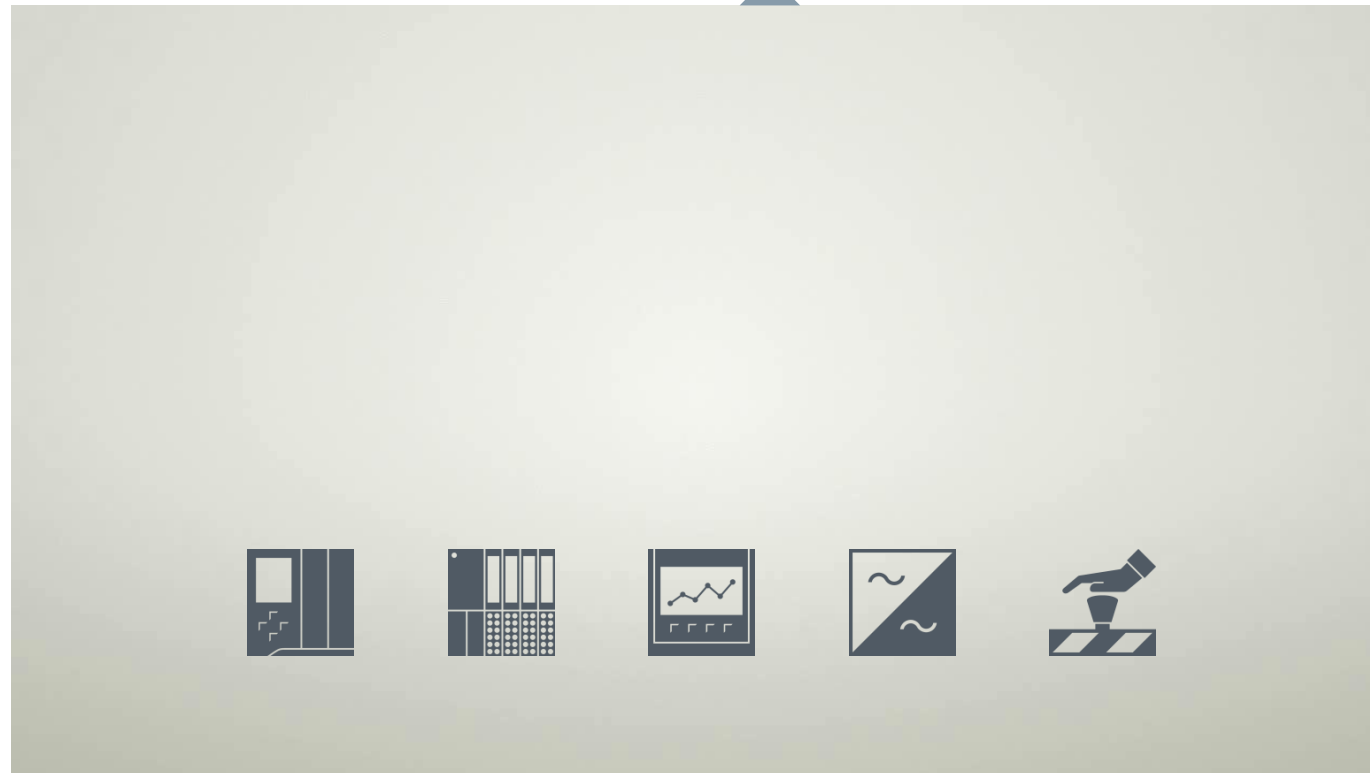
4 Production execution

5 Services

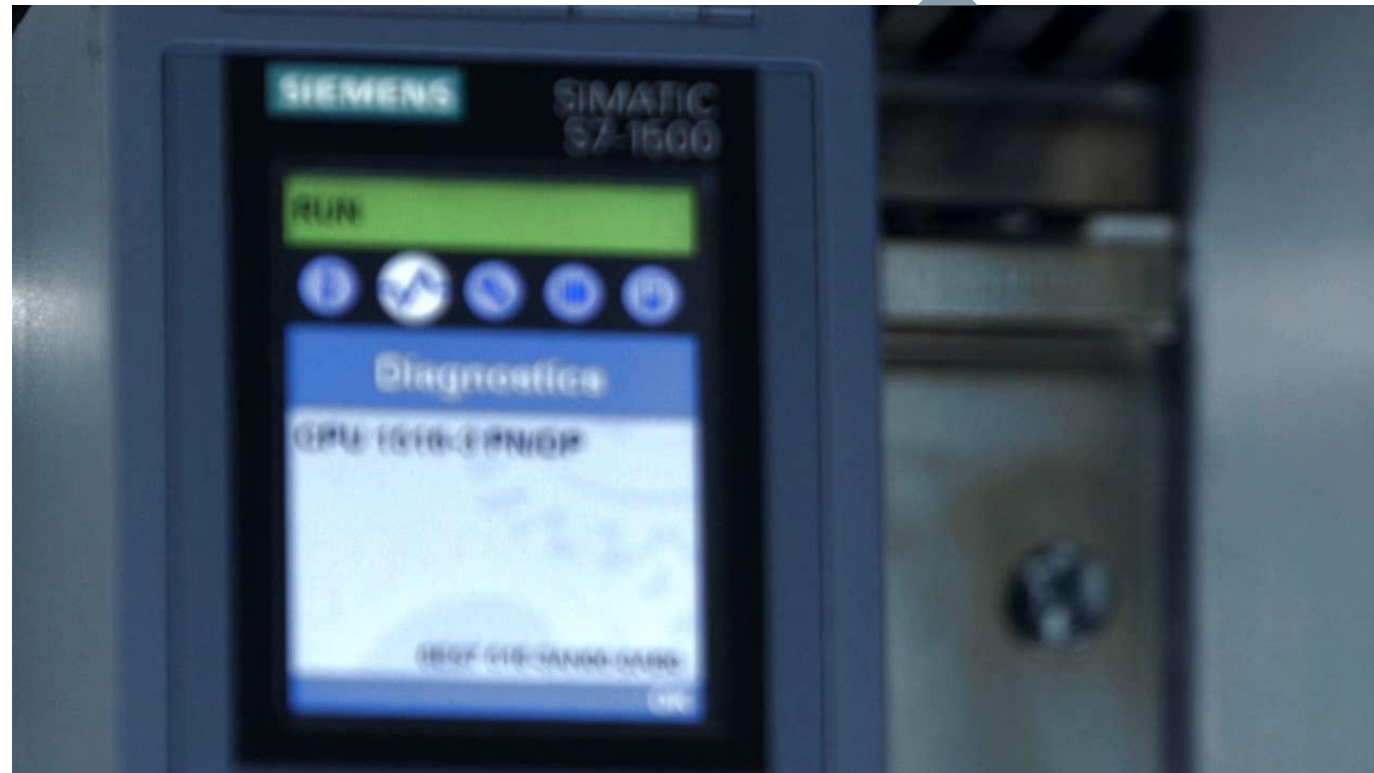


**Digital Twin of
SIMATIC S7-1500**

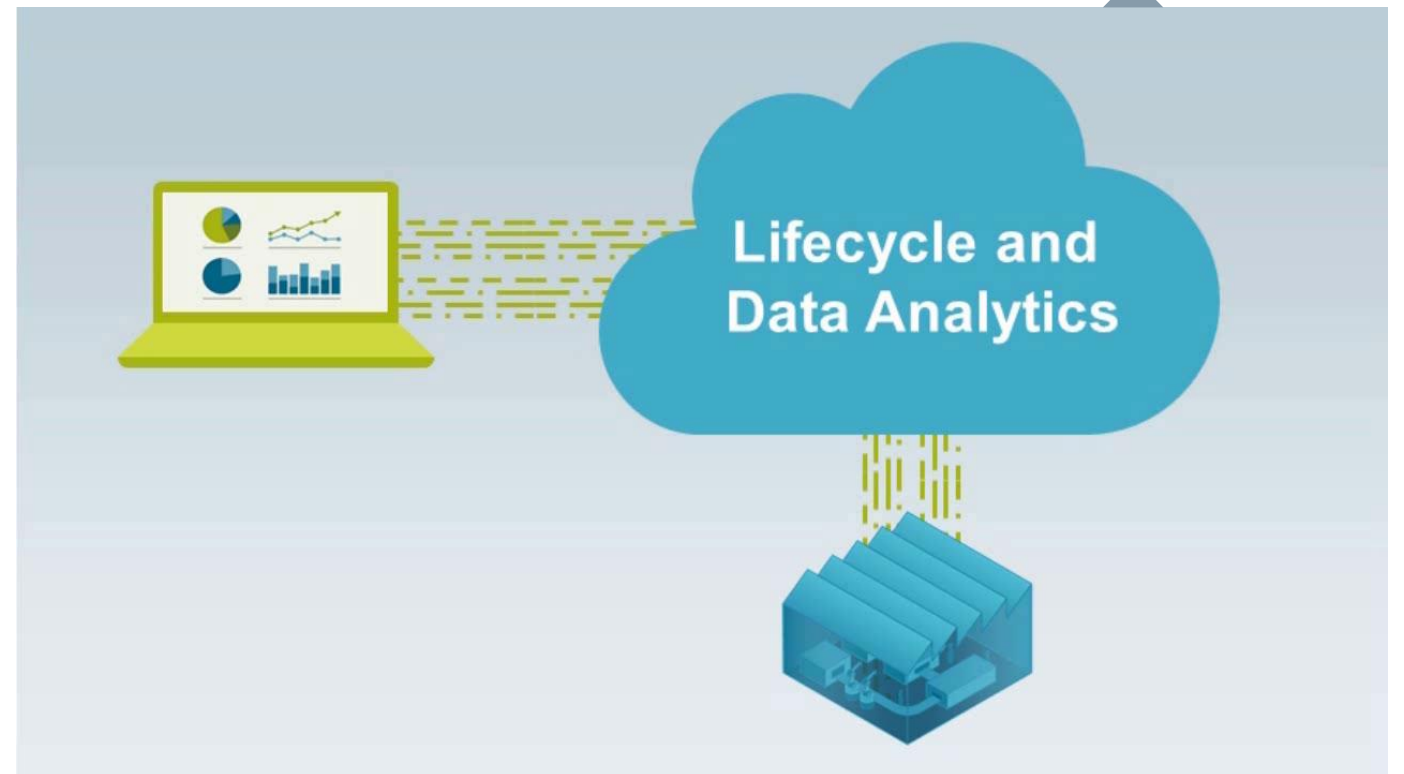
Efficient engineering of all automation components using the TIA Portal

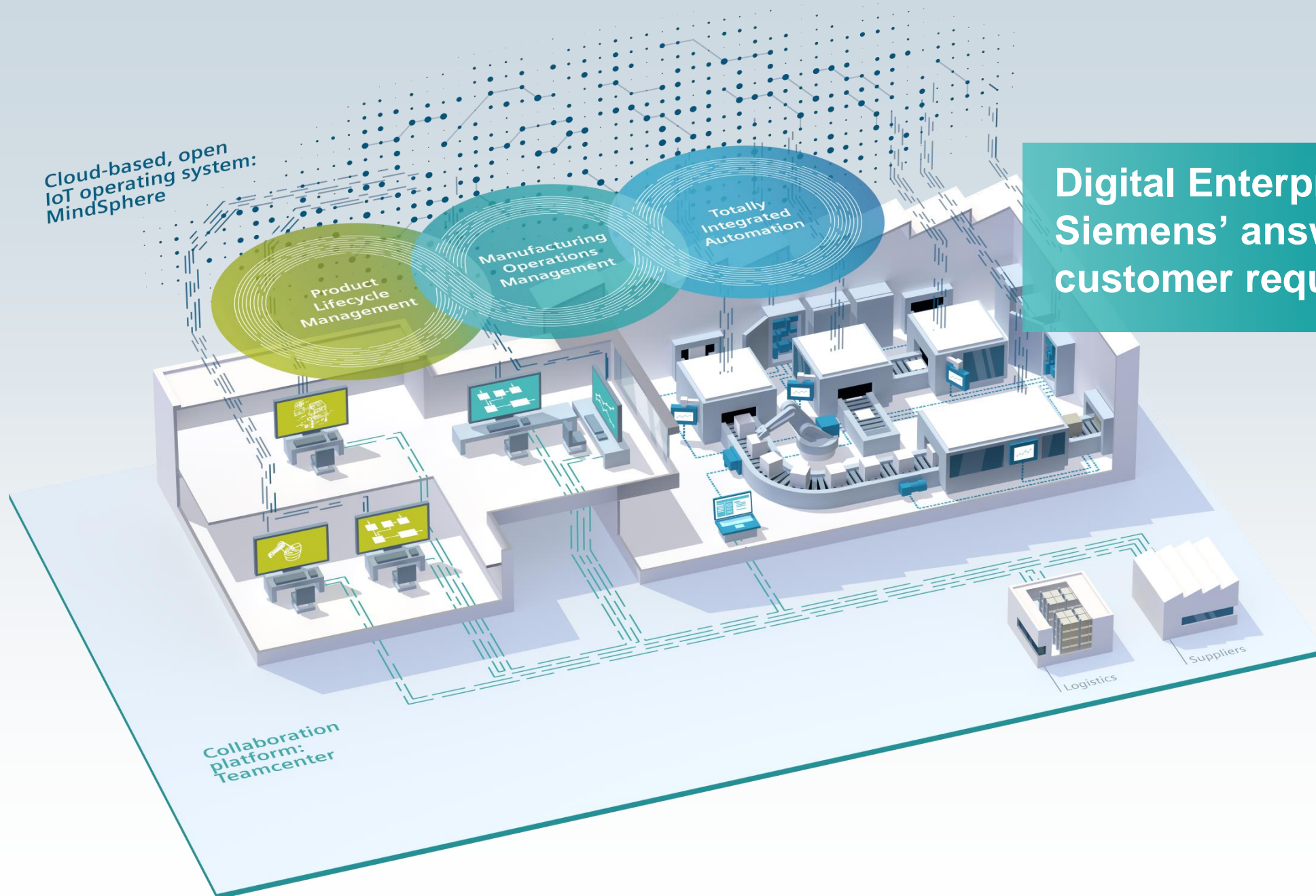


MES and TIA coordinate the manufacture of individualized products



MindSphere transforms data into knowledge

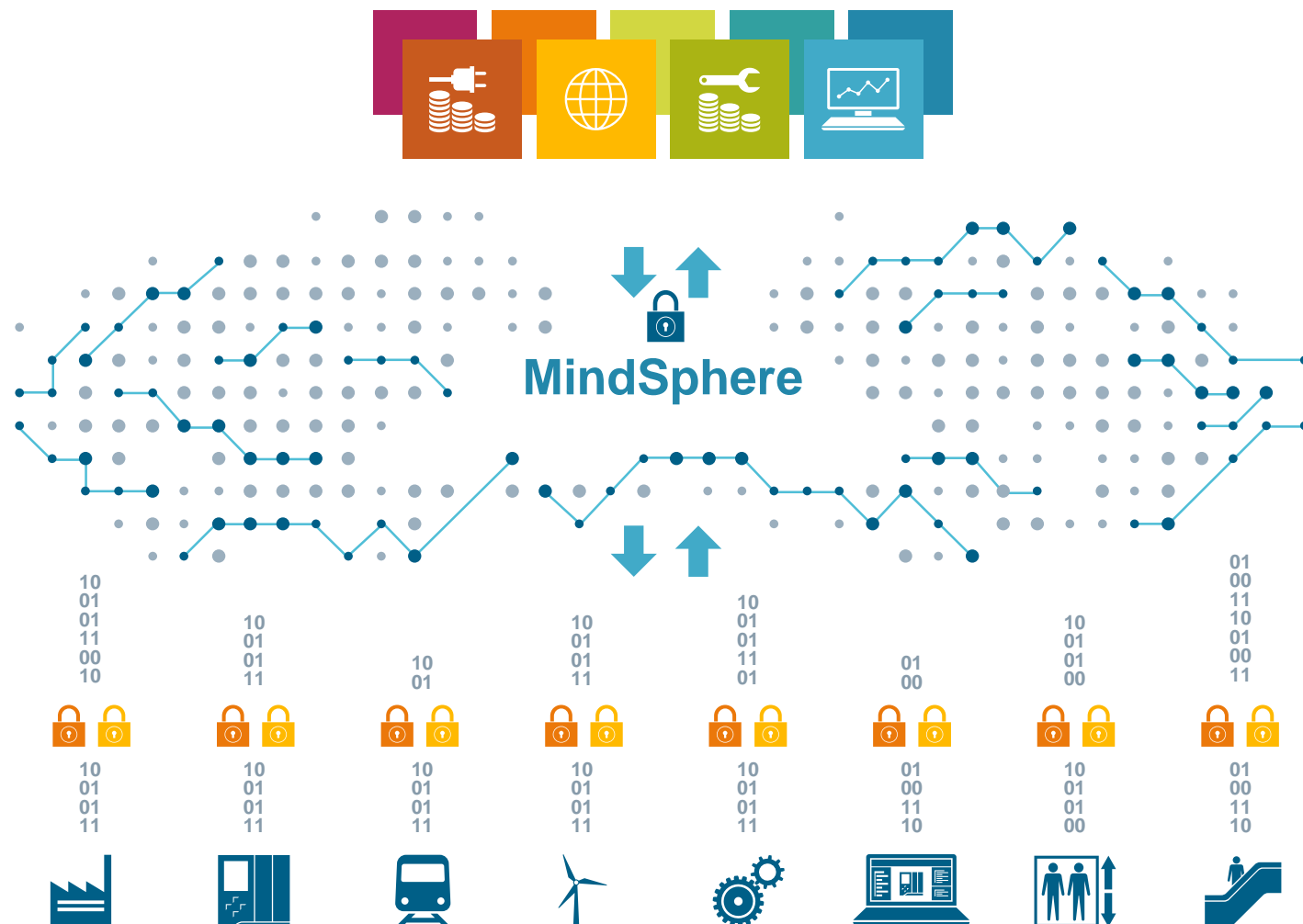




**Digital Enterprise Suite –
Siemens' answer to
customer requirements**

MindSphere – The cloud-based, open Internet of Things operating system

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MindApps

- Asset transparency and analytical insights into machines, plants, fleets and systems, e.g. predictive maintenance
- Subscription based pricing model

MindSphere

- Open interface for development of Siemens apps (MindApps) or customer-specific apps
- Various cloud infrastructures: Public, private or on-premise

MindConnect

- Open standards (e.g. OPC UA) for connectivity (also to 3rd party products)
- Plug and play connection of Siemens and third-party products

Expert Talk

MindSphere offers key strengths as cloud-based, open IoT operating system

MindSphere – The cloud-based, open IoT operating system

Ecosystem



Applications & Digital Services



MindSphere IoT operating system



Unique MindSphere strengths



Global Siemens **installed base** of millions of devices (30 million automation systems, 70 million contracted smart meters, 800 thousand connected products, e.g., trains)



Transfer of domain know-how into **vertical-specific analytical apps**



Integrated operational data with **Digital Twin to optimize simulation & engineering** (model-based analytics)




Plug & play connectivity for quick connection of assets without coding
























Ecosystem with **broad domain expertise and horizontal IT capabilities**

Ecosystem with strong partners being established...





**MindSphere –
The cloud-based,
open IoT operating
system**

	App developer	System integrator	Technology partner	Infrastructure provider
				
				
				
				
				
				
... and more to come!				

We are extending our MindSphere ecosystem with
BluVision and Amazon Web Services

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Innovation and Digitalization in machine building: Bausch + Ströbel Maschinenfabrik Ilshofen GmbH+Co. KG



1 Machine
concept

2 Machine
engineering

3 Machine
commissioning

4 Machine
operation

5 Machine
services

Digital twin of the machine

based on Teamcenter with
NX, MCD and TIA Portal

- Simulation and Validation from concept up to real machine
- Increase flexibility and reduces engineering time up to 30%

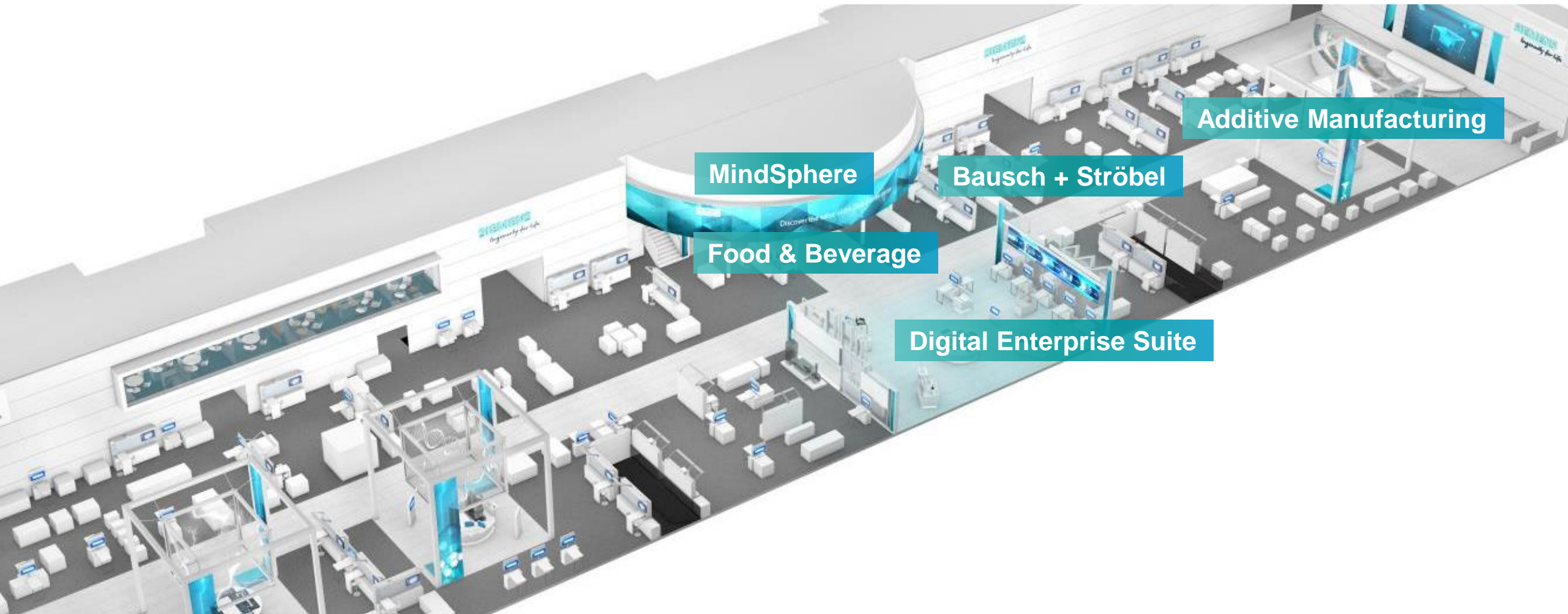
Innovative Hardware components

SIMATIC S7-1500 T-CPU
with Safety Integrated

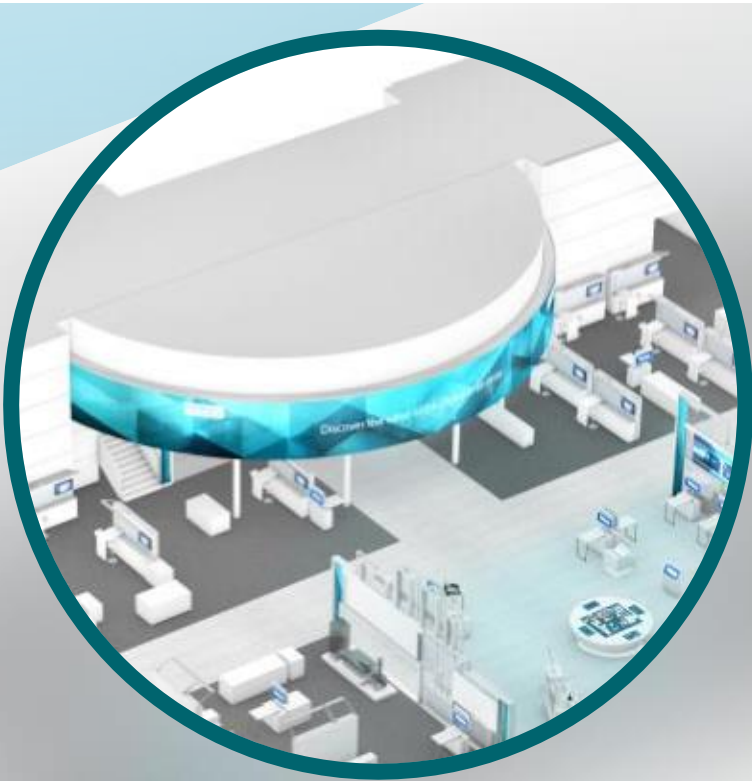
- Motion Control functionality incl. camming and gearing absolute and also failsafe on one platform
- Fully enclosed INOX HMI IFP1900 + ET200SP

Siemens at Hannover Messe 2017

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Flexibility in dairy production



Digitalization concept over the entire value chain of the dairy process

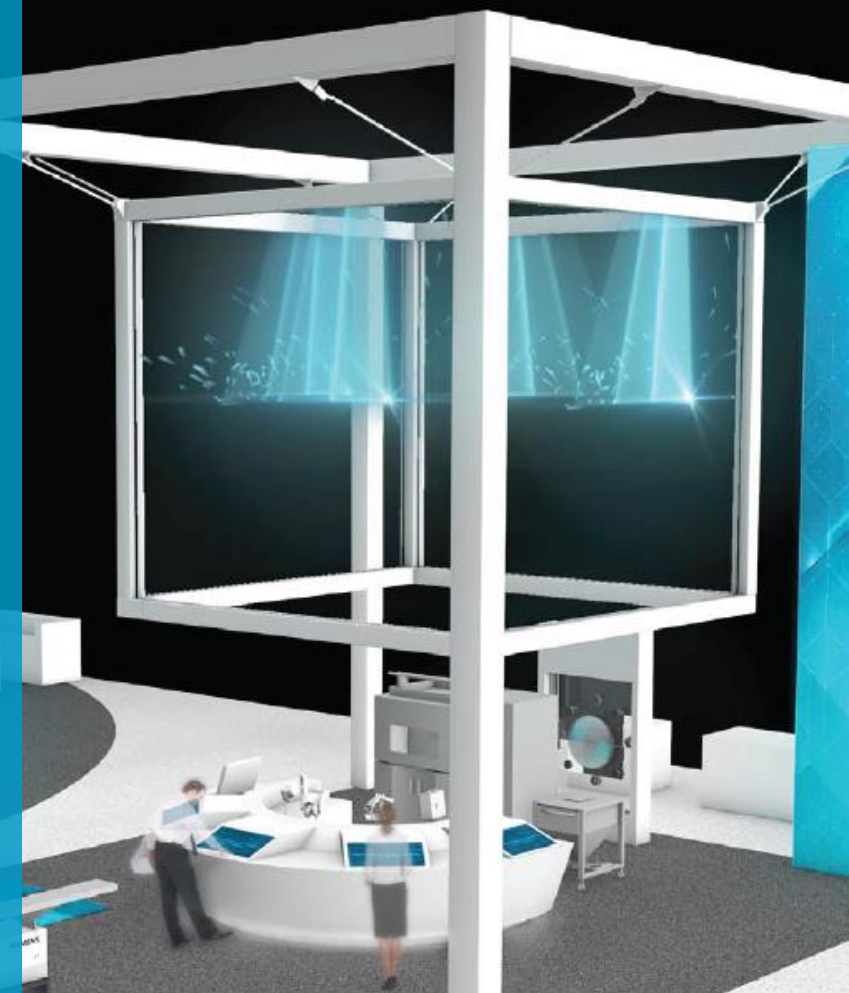
- Siemens digitalization concepts and solutions enable customers to react flexible on market changes – whether in the dairy process itself or in the downstream processes such as filling, packaging and labelling
- Interactive station to create individual milk drink and packaging
- Control room for the engineering and production execution with direct print



Additive Manufacturing Highlight Cube



- Additive manufacturing of individualized pin guide for knee reconstruction
- Technology: Powder Bed Fusion with EOS machine
- Solutions for complete product lifecycle: from design, construction and optimization of the workpiece through the complete automation with AM systems to integration into the line production
- Portfolio: seamlessly integrated software tools and automation systems



Integrated Control Panels



The easy way to optimized control panels

- Consistent, digital tool chain for the efficient engineering of the future
- Integration of product master data for the digital twin of the control panel
- Practice-oriented Expert Know-how for optimized and efficient planning and configuration
- Aligned product and system portfolio

Expert Talk

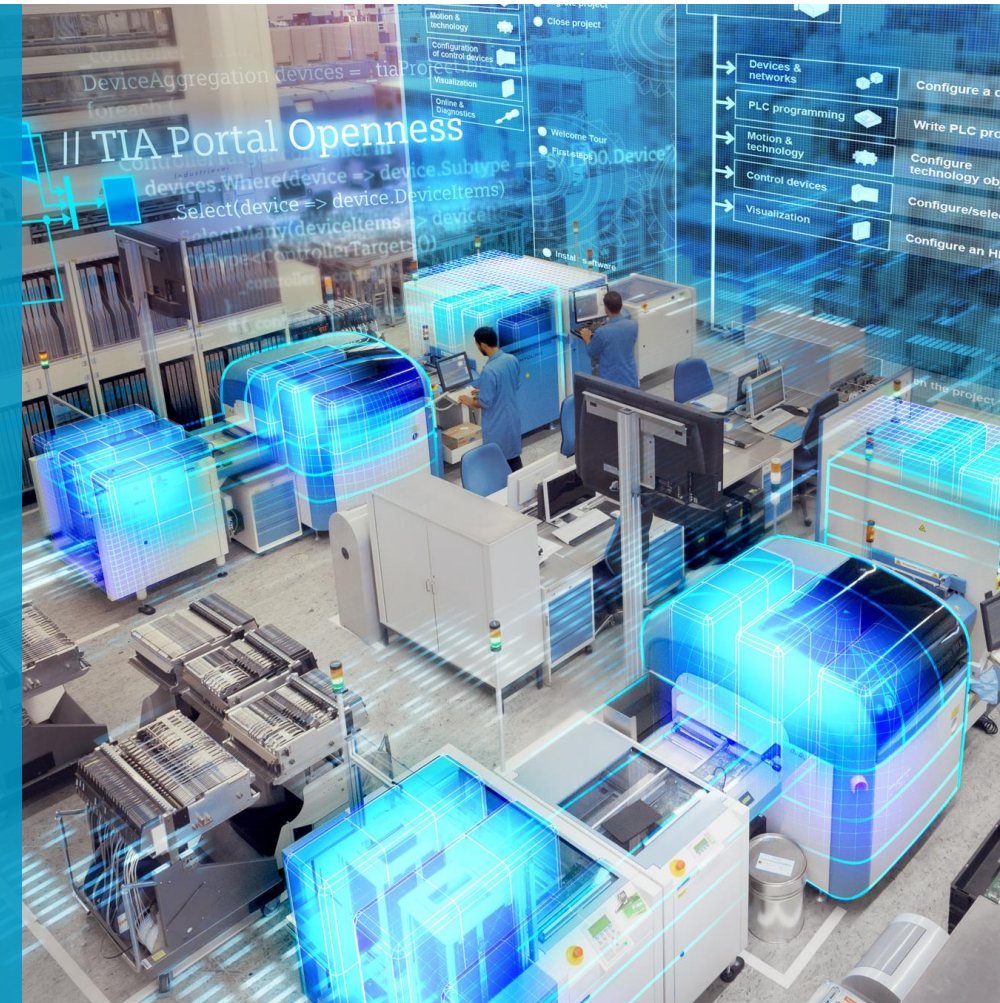


Service pack 1 for TIA Portal V14

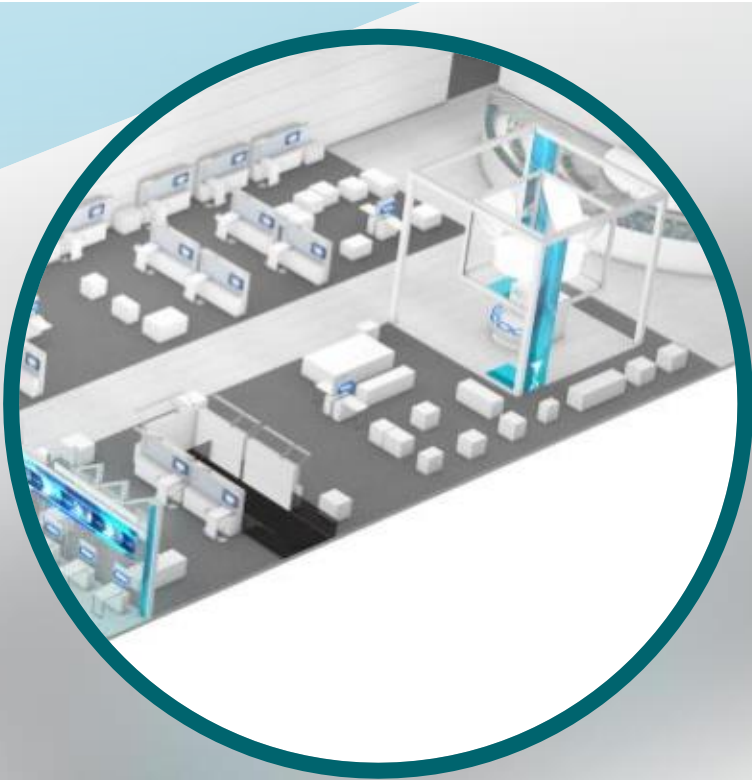


- Practically-oriented function upgrades for the TIA Portal V14 engineering framework
- Focus on openness and engineering efficiency
- AutomationML for standardized data exchange with planning software and CAE systems

Expert Talk



New servo drive system simplifies engineering for machine builders



- New drive system comprising Sinamics S210 and Simotics S-1FK2 motors
- High dynamic performance and precision, simple One Cable Connection (OCC)
- Integrated safety functions, rapid engineering and commissioning
- Servo drive system in five performance classes from 50 to 750 watts

Expert Talk



Siemens at Hannover Messe 2017

Exhibition hall 6

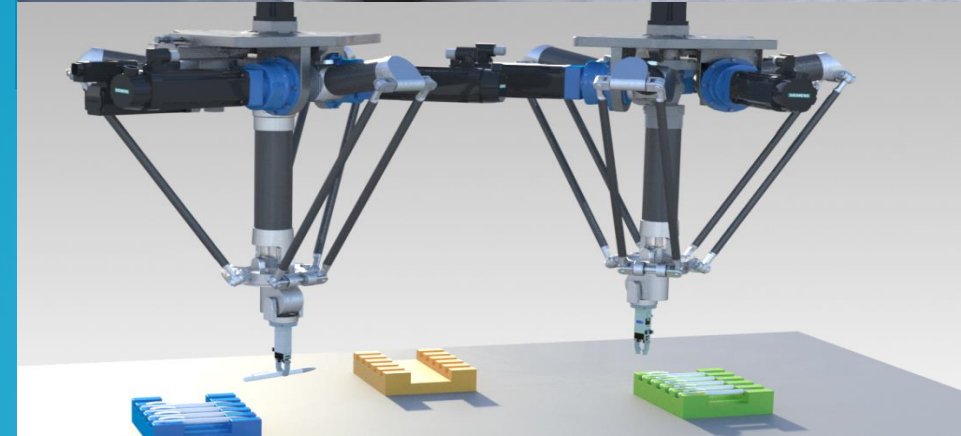


Use of digital twins for automotive industry and machine building



- Digital twin of complete value chain
- Digital Enterprise Suite with PLM, MES/MOM, TIA and Lifecycle und Data Analytics
- Complete digital models with high informative content
- Realistic simulation of automation behavior and completely virtual commissioning

Digital twin
of "Formula Student" race car



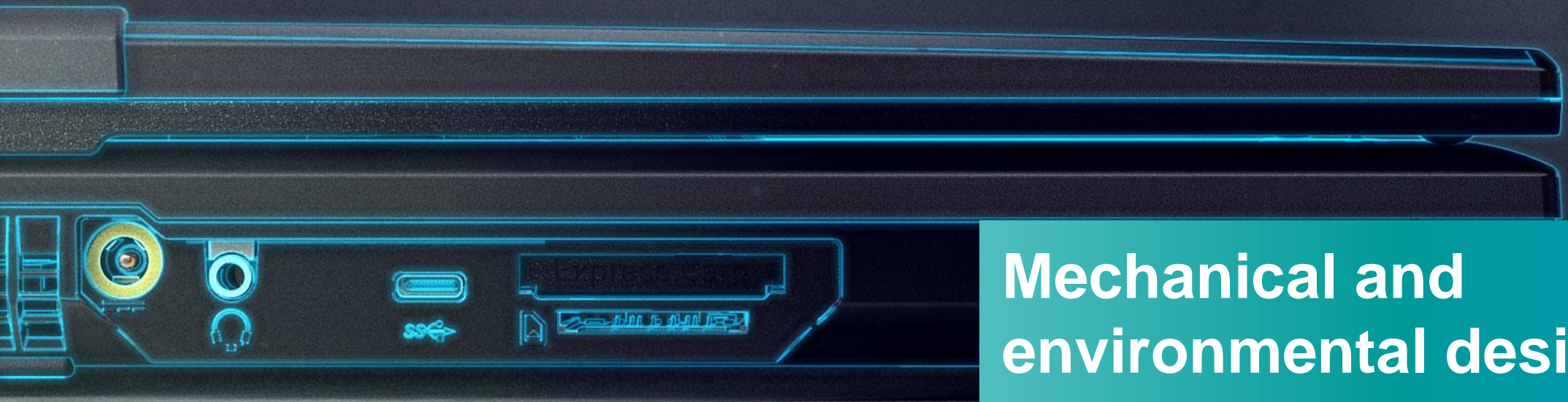
Digital twin
of pick & place machine



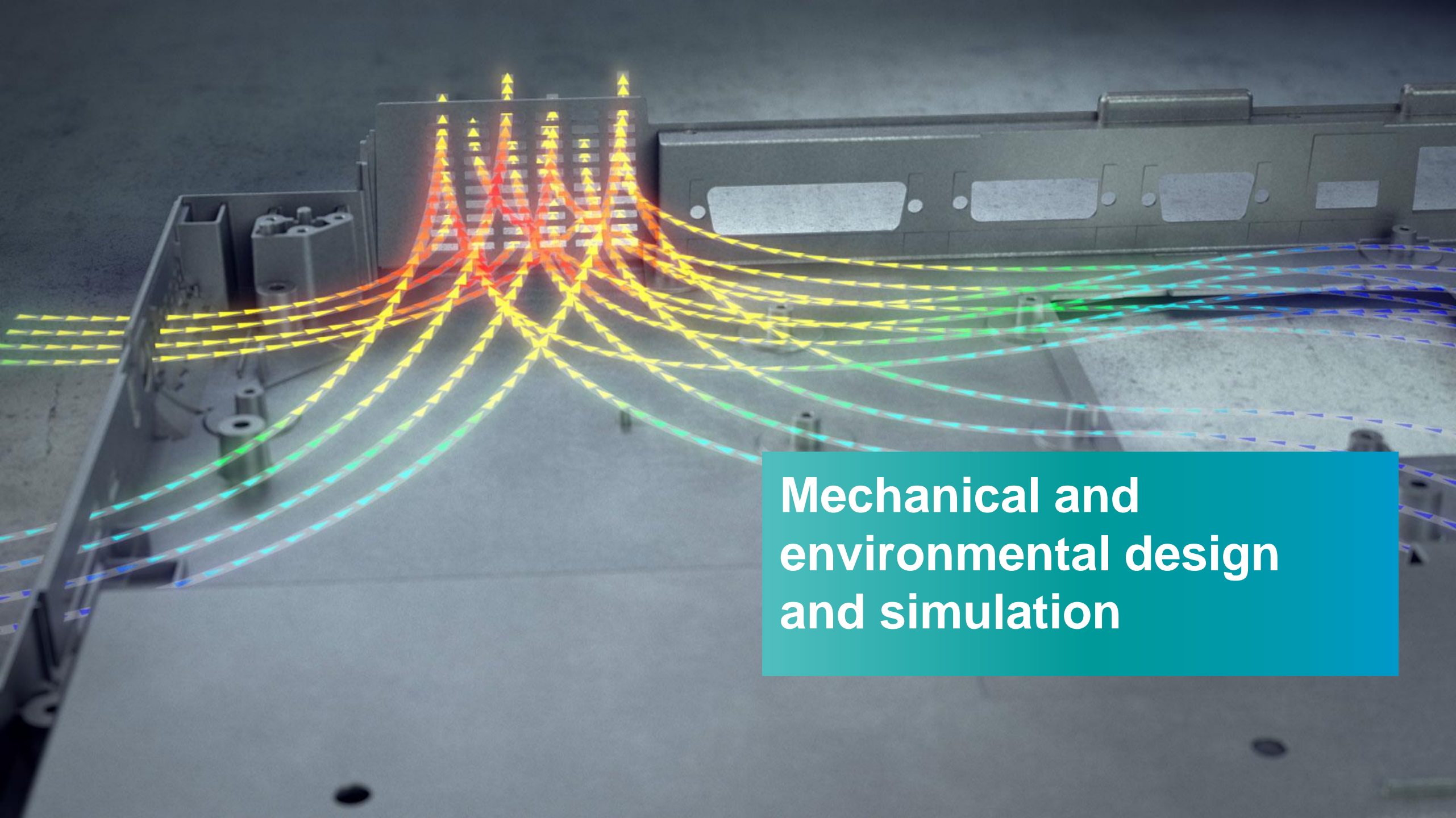
Mentor Graphics®

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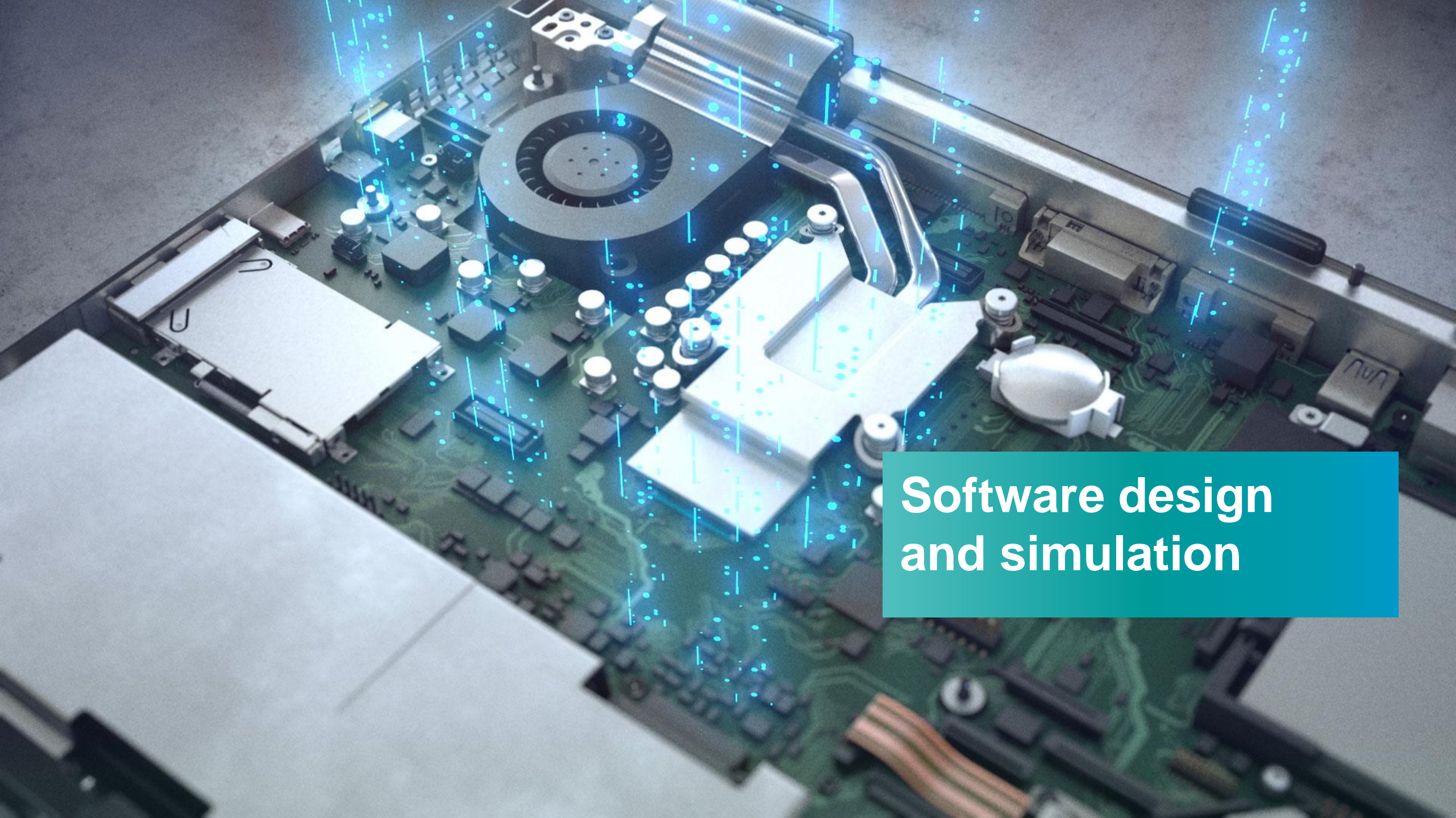
The perfect fit to
expand our leadership in
the Digital Enterprise



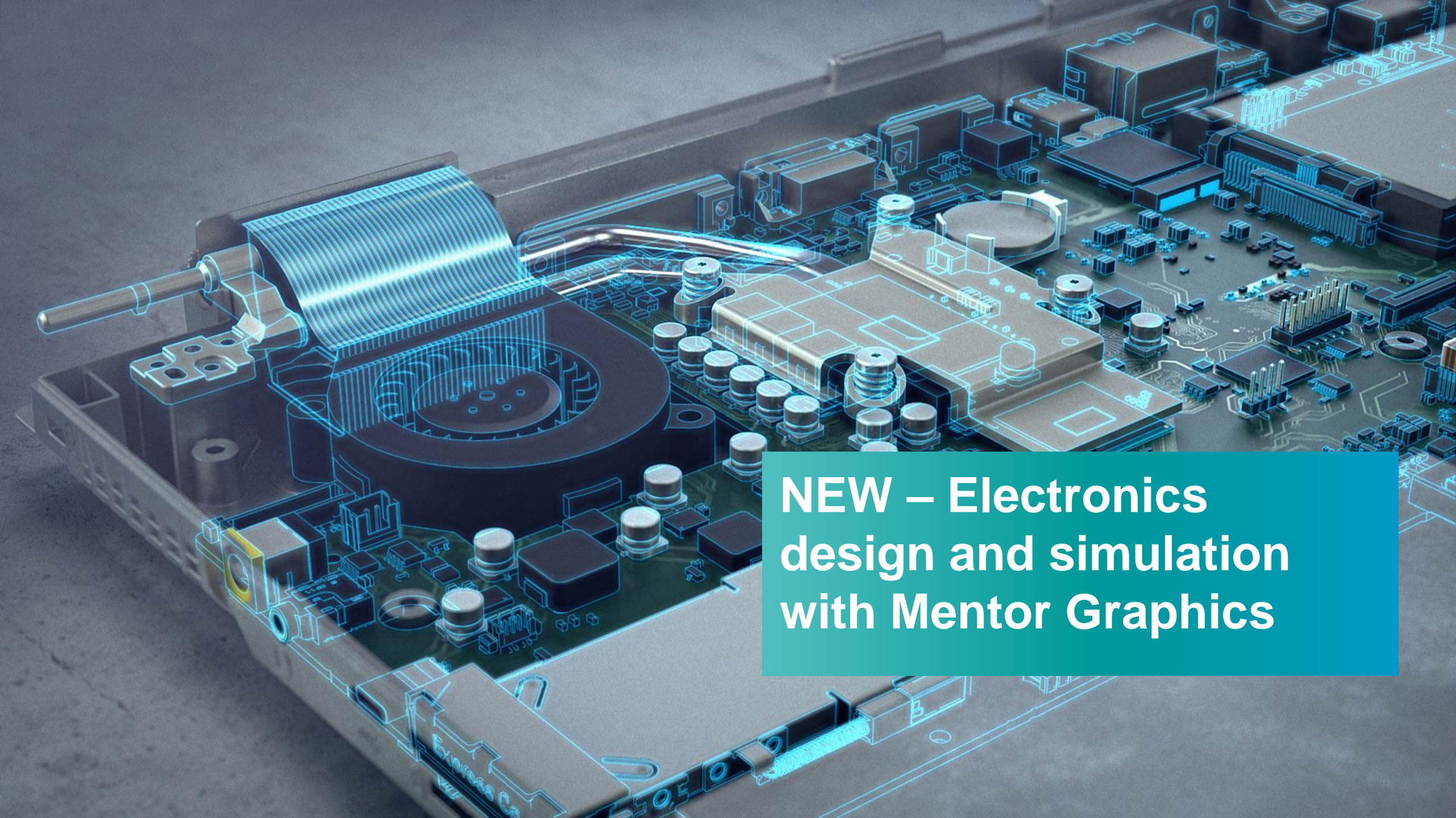
**Mechanical and
environmental design
and simulation**



**Mechanical and
environmental design
and simulation**



**Software design
and simulation**



**NEW – Electronics
design and simulation
with Mentor Graphics**



The most holistic Digital Twin

Design and simulation of mechanics,
electronics, software and environment on
a single collaboration platform

From Integrated Engineering to Integrated Operations

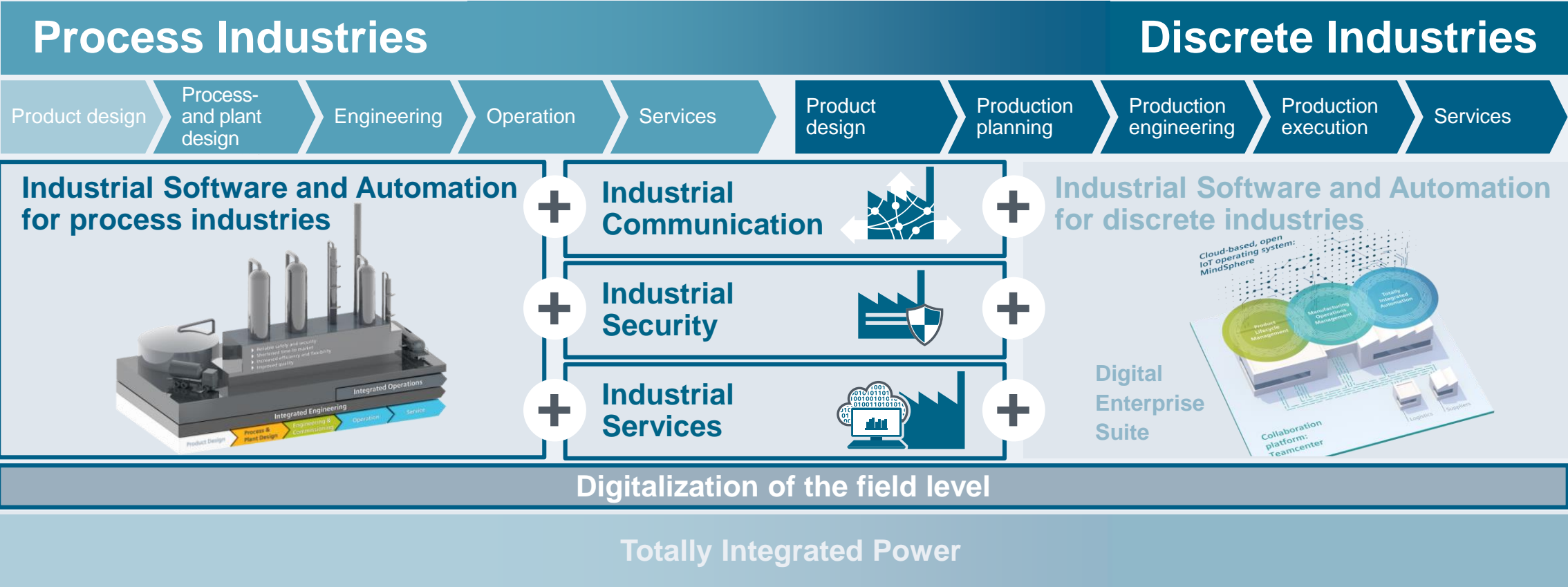
Driving the Digital Enterprise in the Process Industries

Dr. Jürgen Brandes | CEO Process Industries and Drives Division
Siemens press conference prior to Hannover Messe 2017

Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry



Digital Enterprise



The Digital Enterprise in the process industries with a focus on the specific requirements for brownfield plants



Integrated Engineering Digital Twin & Simulation

- Optimization during operations
- Integration of existing and new components and systems
- Maximum plant availability
- Efficient setup of powerful, open and secure communication networks

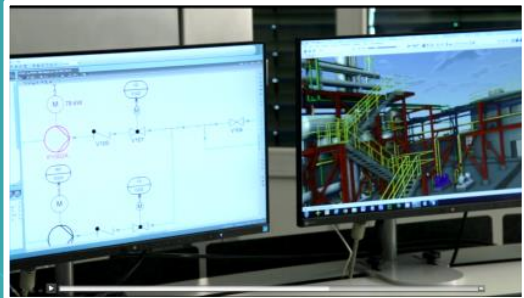
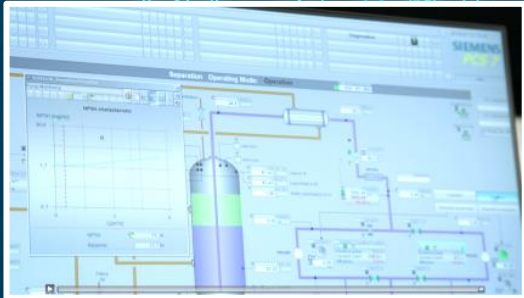


Asset Performance Management Integrated Operations



Optimized Performance Management thanks to digitalization

For all industries



- Efficient plant management through consistent data management, standardized data specification and cohesive documentation
- Increased reliability and fewer unscheduled outages
- Less time and costs for maintenance thanks to immediate access to all the relevant information

Pharmaceutical industry

Chemical industry

Fiber Industry

Oil and Gas

Glass industry

Mining

Cement

Water industry

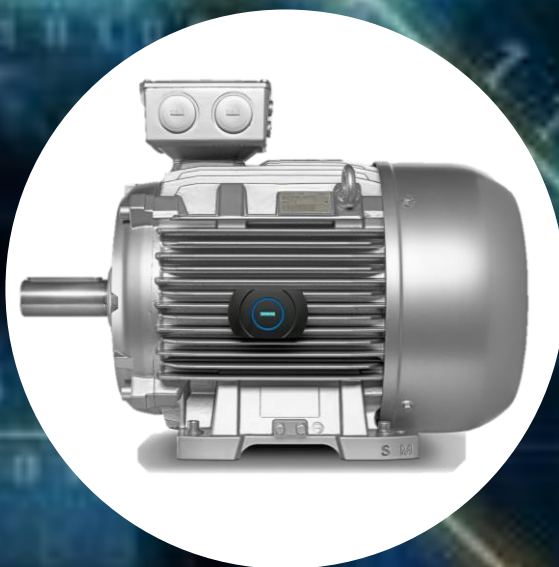
Cranes

Marine

Basis for digitalization Intelligent drive technology

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MindSphere



Smart Motor concept

- Maximum transparency
- Higher plant availability thanks to optimized maintenance and service activities
- Higher efficiency and productivity

SIMOTICS SD – the next generation



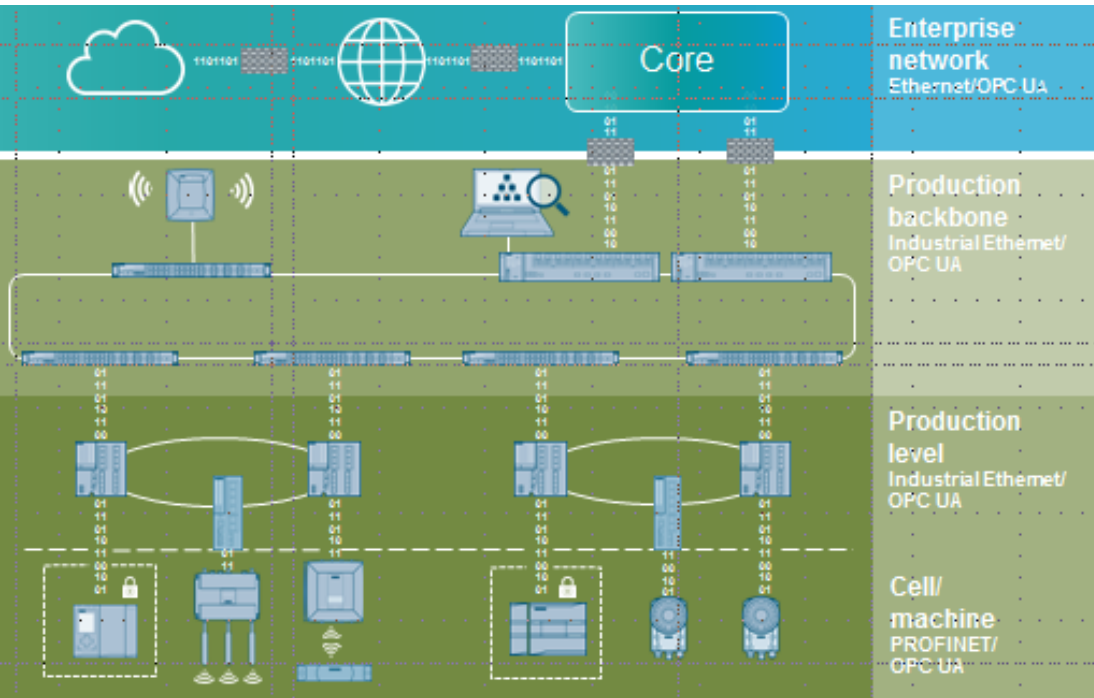
Low-voltage motors

Performance meets
digitalization:
Discover all the
benefits of the
next-generation
SIMOTICS SD at the
Hannover Messe
2017



Basis for digitalization

Open and secure communication networks



Vertical integration and remote operations enabled by **industrial identification** and **high performance, reliable communication**



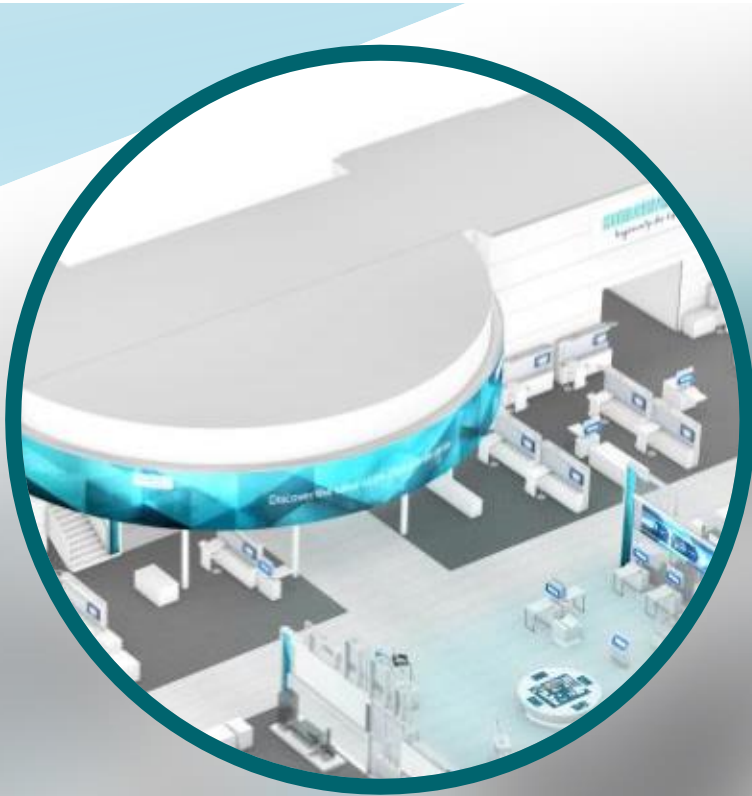
- Increased security
- Increased plant availability
- Higher cost efficiency
- Improved future safety

- IP-based communication
- Profinet / OPC UA with various diagnostic functions
- Universal connectivity (WAN, WLAN, LAN, wireless field buses, RFID)

Siemens at the Hannover Messe 2017 Highlight

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Industrial networks from Siemens



Consistent industrial networks

Perfectly matching
services

Comprehensive range
of training and
certification options

Large global
partner network

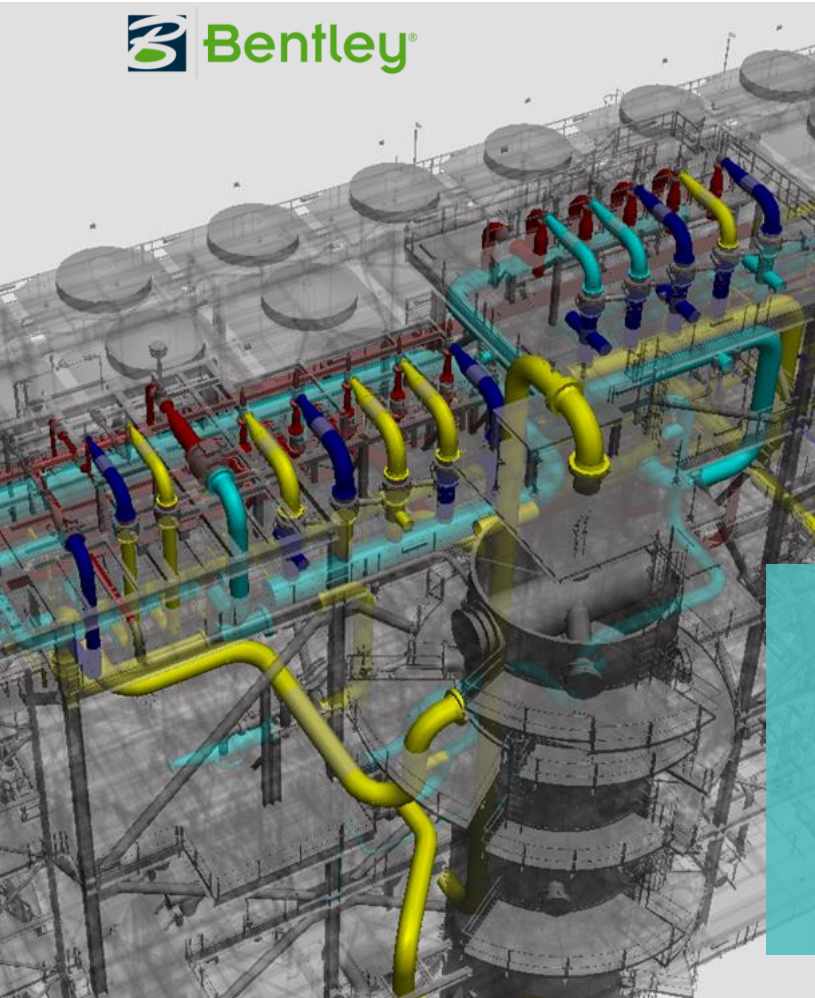
Expert Talk



Basis for digitalization

The digital plant image – the “twin”

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... transfers software solutions to a new dimension – from 2D to 3D

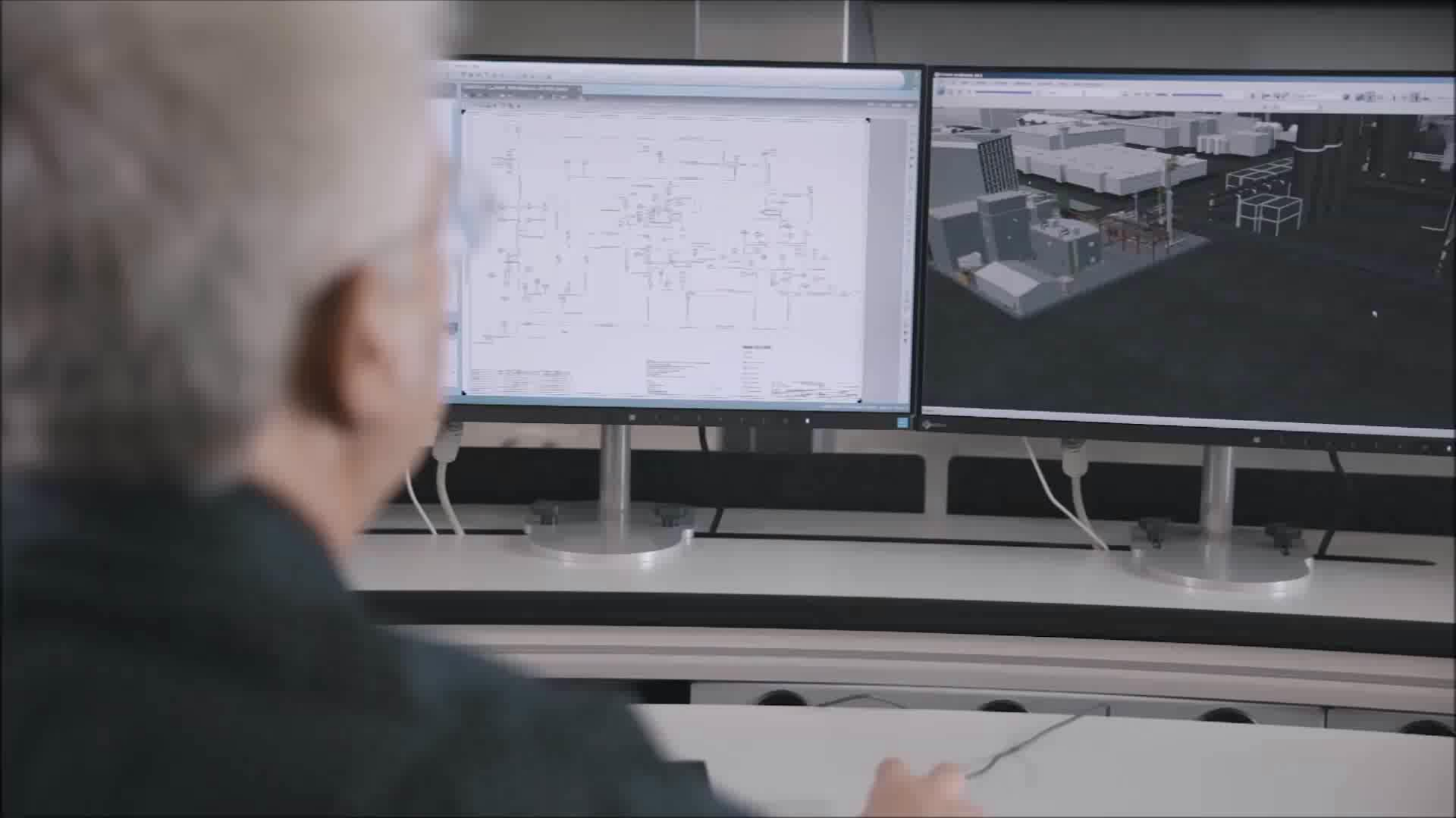
- Bidirectional data exchange between 3D design and COMOS
- Not restricted to P&ID documents
- All COMOS data can be transmitted

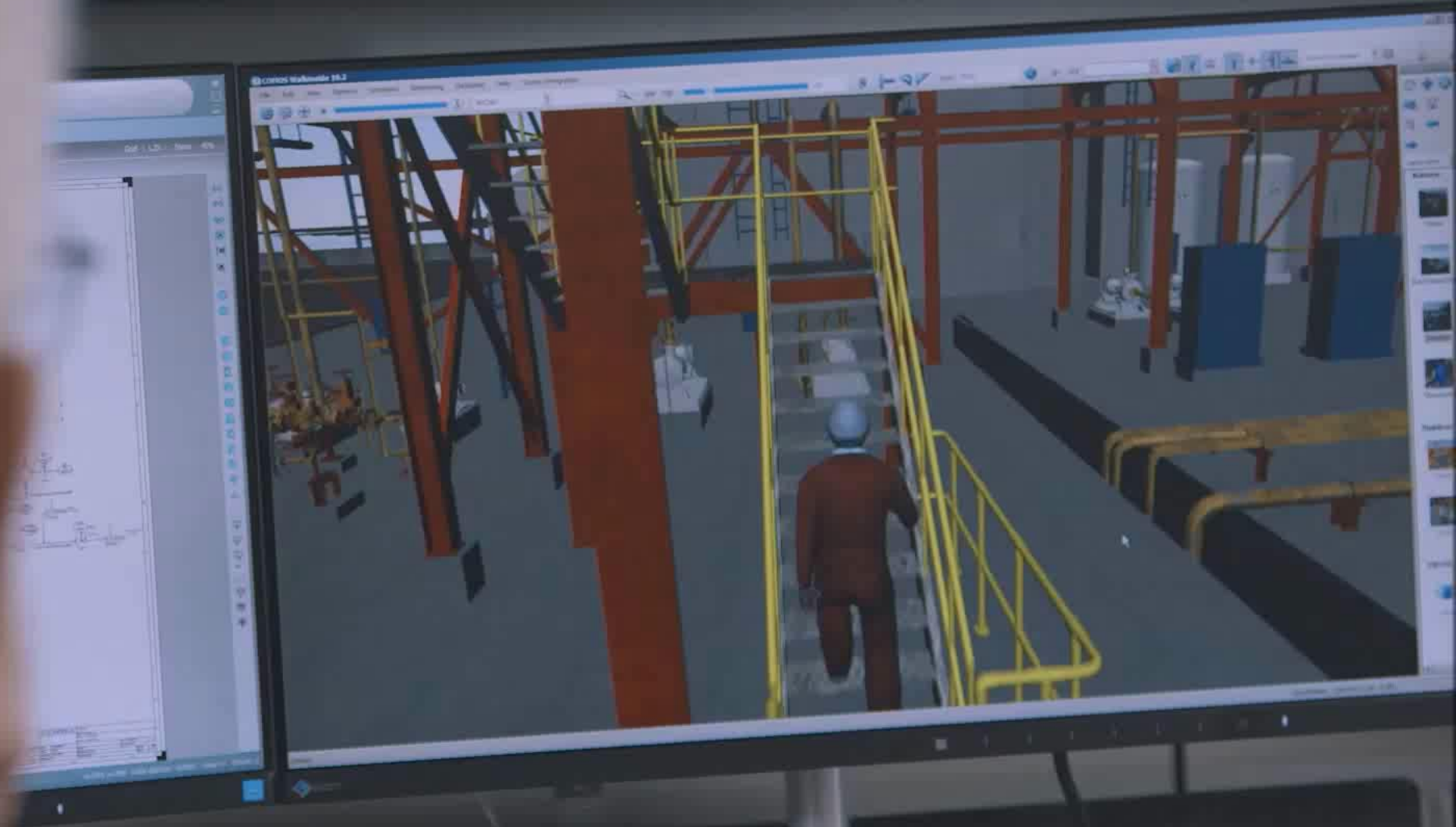


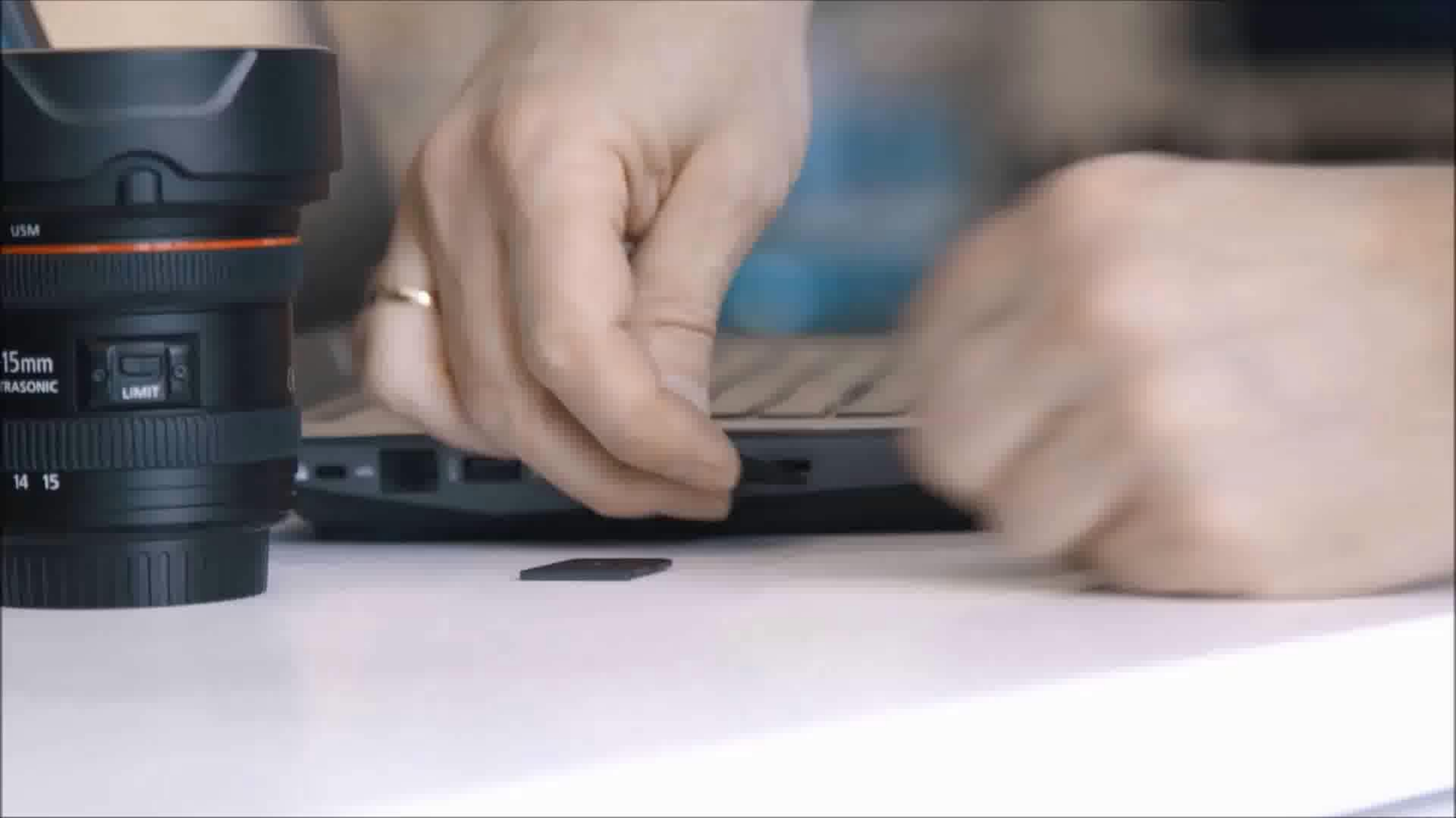
Strategic cooperation between Siemens and Bentley Systems

3D software solutions for design, construction and operations over a plant's entire life cycle

Expert Talk







Siemens-Projekt-1.dgn [3D - V8 DGN] - Bentley Descartes

File Home View Annotate Attach Analyze Constraints Utilities Drawing Aids Content

Search Ribbon (F4)

Attributes: None, Default, 0, 0, 0, 0

Primary: Explorer, Attach Tools, Models, Level Display

Selection: Element Selection, Fence Tools

Placement: Line Tools, Arc Tools, Ellipse Tools

Manipulate: Move, Copy, Rotate

Modify: Modify Element, Break Element, Trim Multiple

Groups: Create Region

View 1, 3D Metric Design

References (1 of 1 unique, 0 displayed)

Tools Properties

Hilite Mode: Boundaries

Slot	File Name	Model	Description	Logical	Orientation	Presentation
1	Production_1.3mx	Default	Aligned with Master ...		Coincident	Wireframe

Scale: 1.167763 : 1.000000 Rotation: 0°

Offset X: 0.271 Y: 0.309 Z: 0.213

Nested Attachments: No Nesting Nesting Depth: 1

Display Overrides: Allow New Level Display: Config Variable Georeferenced: No



3D Metric Design

1 2 3 4 5 6 7 8 X 2.859 Y 43.307 Z 1.919

Element Selection > Identify element to add to set

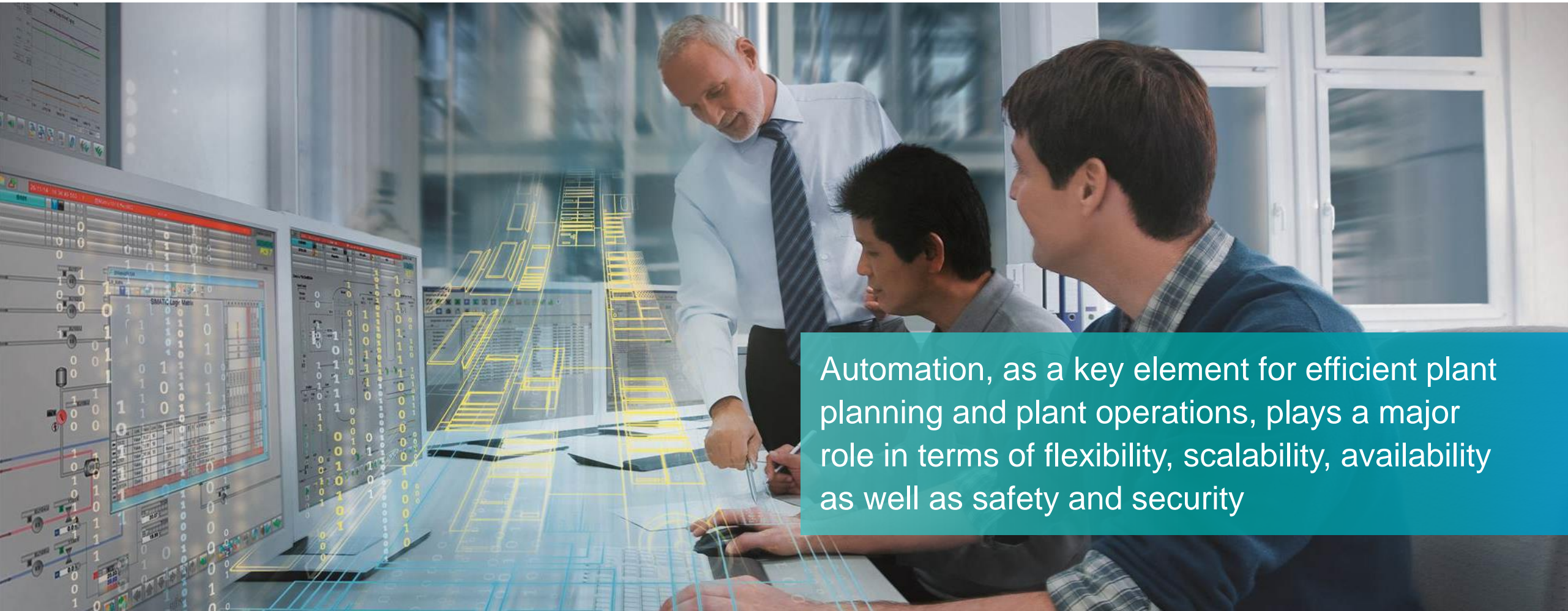
Default



Basis for digitalization

Powerful distributed control systems (DCS)

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Automation, as a key element for efficient plant planning and plant operations, plays a major role in terms of flexibility, scalability, availability as well as safety and security

Siemens at the Hannover Messe 2017

Innovations

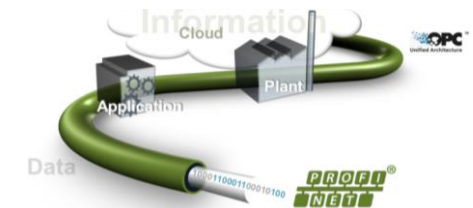
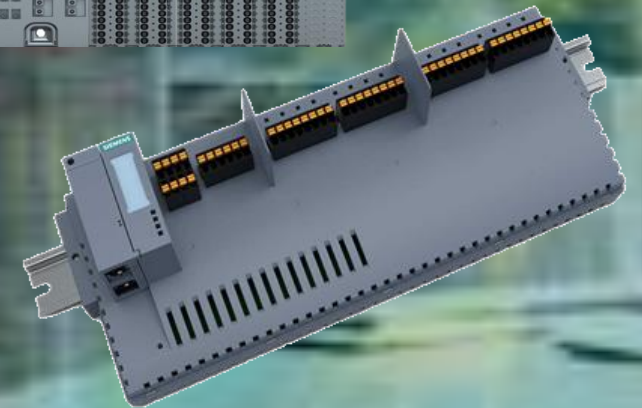
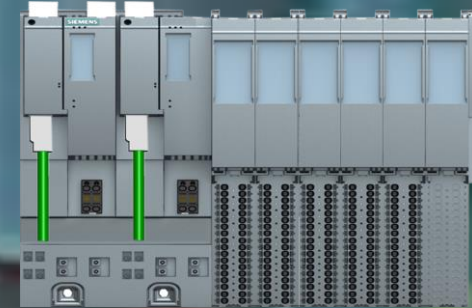
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SIMATIC PCS 7 V.9



- Focus on future-oriented possibilities provided by PROFINET
- Hardware portfolio extended by SIMATIC ET 200SP HA and SIMATIC CFU
- New software functions: faster project planning from engineering, commissioning up to operations
- Enhancing the productivity of both the operator and the maintenance personnel

Expert Talk



Sanofi-Aventis, Frankfurt-Höchst, Germany

Modernization of a proven plant



“The seamless interplay of Simatic Batch with the SIMATIC PCS 7 process control system enables the efficient planning, control and logging of batch processes.”

*Dr. Helmut Uhl, Head of Insulin Production
Frankfurt, Sanofi-Aventis Deutschland GmbH*

Migration to a new process control system within a short time

- Minimal plant downtimes to keep up the insulin production
- Implementing a state-of-the-art process control solution
- Data is recorded batch-specifically and managed automatically

Siemens at the Hannover Messe 2017 Highlight

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Pharmaceutical industry



How can
personalized
medicine be
seamlessly
combined with
increased
productivity of
high quantities?





“The production of individualized vaccines is based on a standardized process which enables the production of customized products that strongly differ from each other with regard to their composition.”

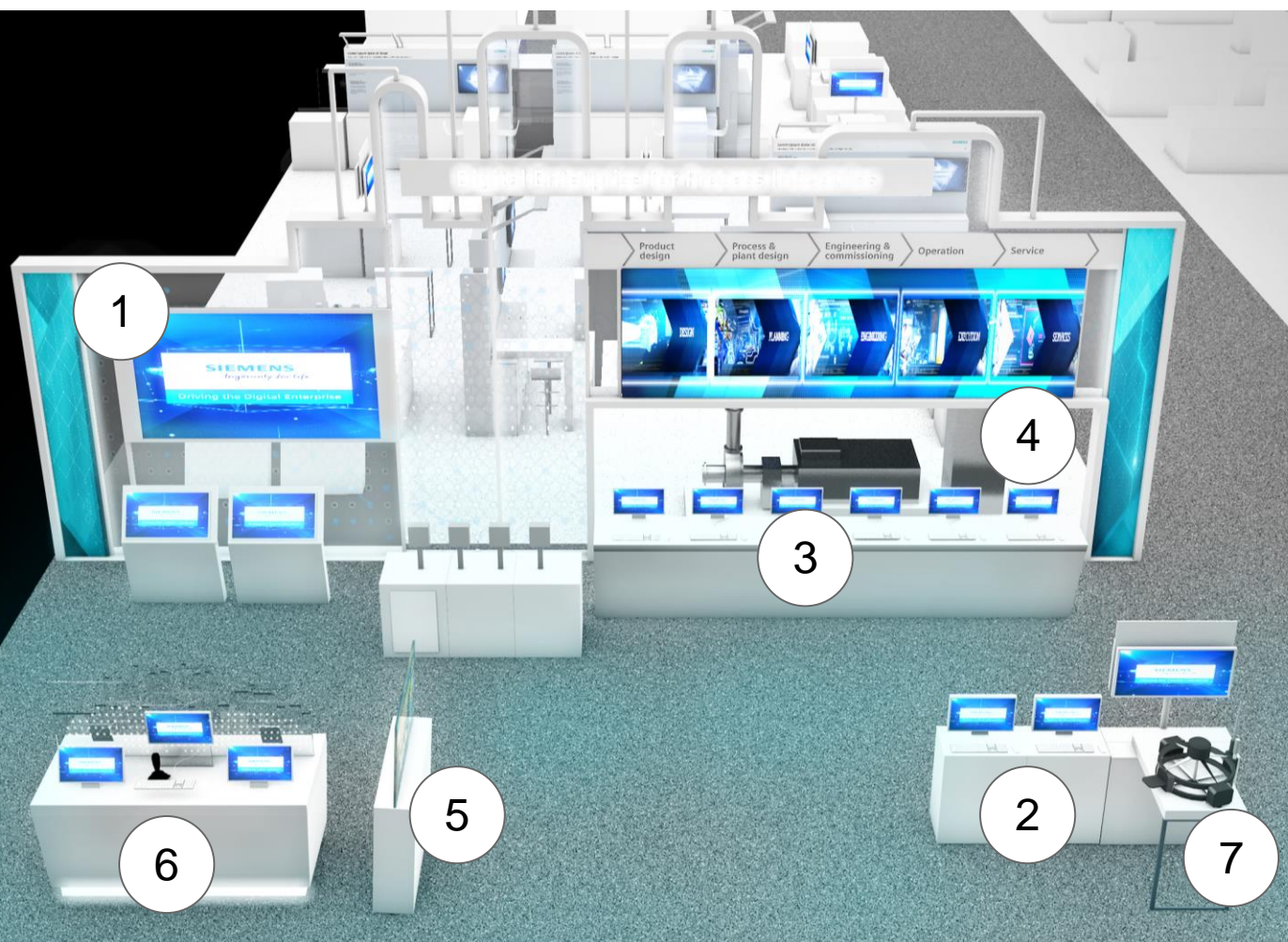
Prof. Dr. Ugur Sahin, Founder & CEO, BioNTech AG

Automation and digitalization provide the basis for the efficient utilization of personalized production

- **SIMATIC IT electronic Batch Record (eBR)** accelerates the complex documentation and release processes prescribed by law for pharmaceutical production.
- **The SIMATIC IT Preactor planning tool** enables automatic production scheduling with the necessary precision.

The Digital Enterprise in the process industries: The Process Automation World Karlsruhe – live in Hannover

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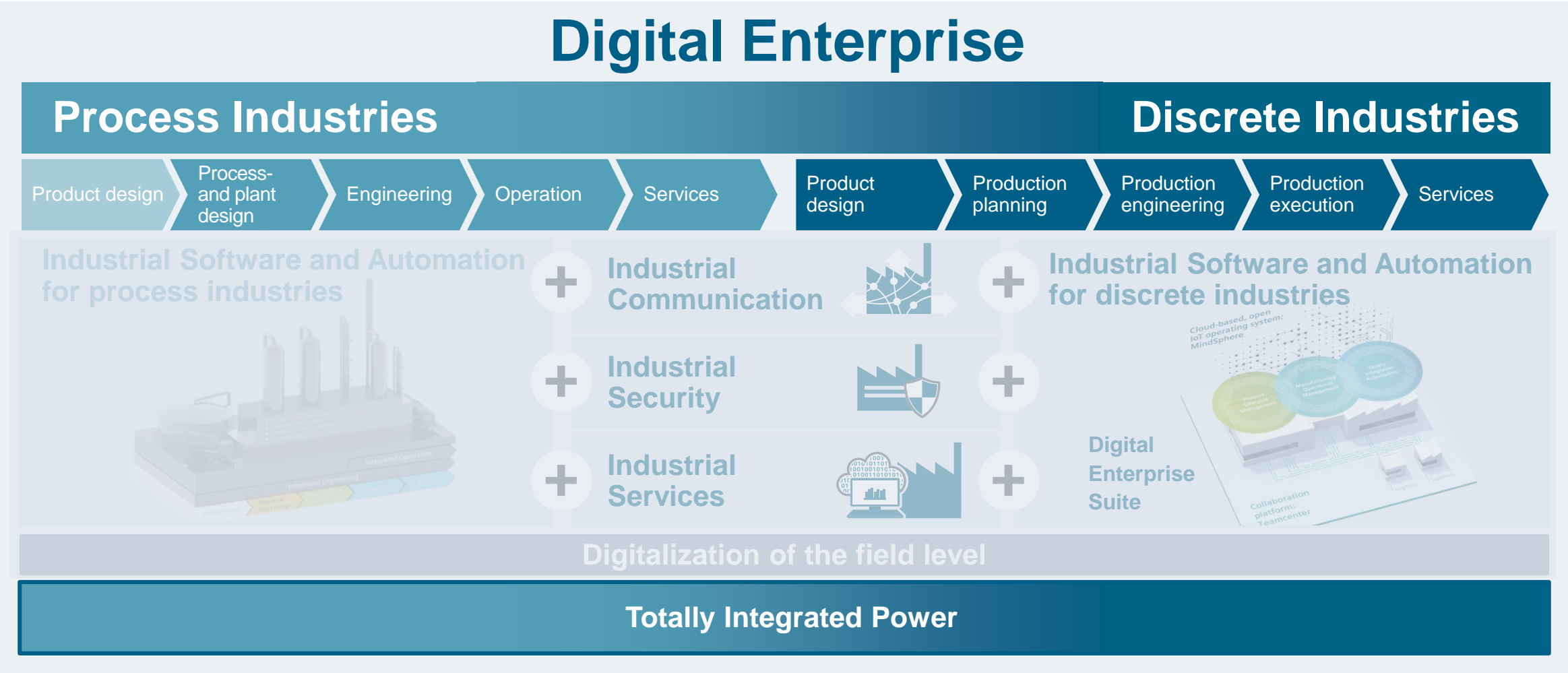


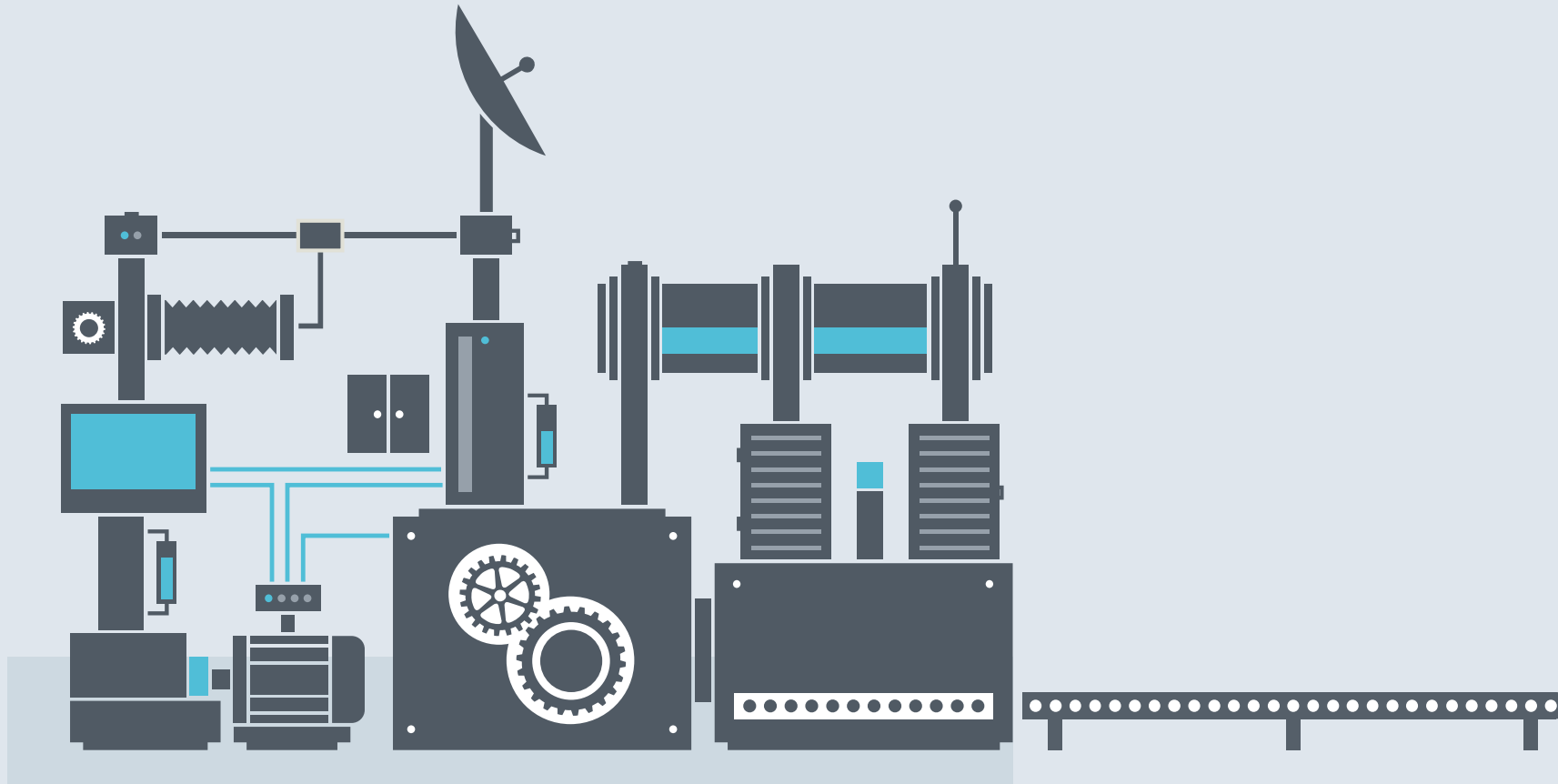
- 1 Overview of the Digital Enterprise in various process industries
- 2 Digital twin of the Process Automation World (PAW) "to go"
- 3 Control room with remote control to PAW in Karlsruhe
- 4 Pump drive train incl. MCC cabinet and instrumentation
- 5 Digital twin of a separation column at the PAW in Karlsruhe
- 6 Process Automation World live and MindSphere
- 7 Digitalization for brownfield: Bentley ContextCapture, COMOS

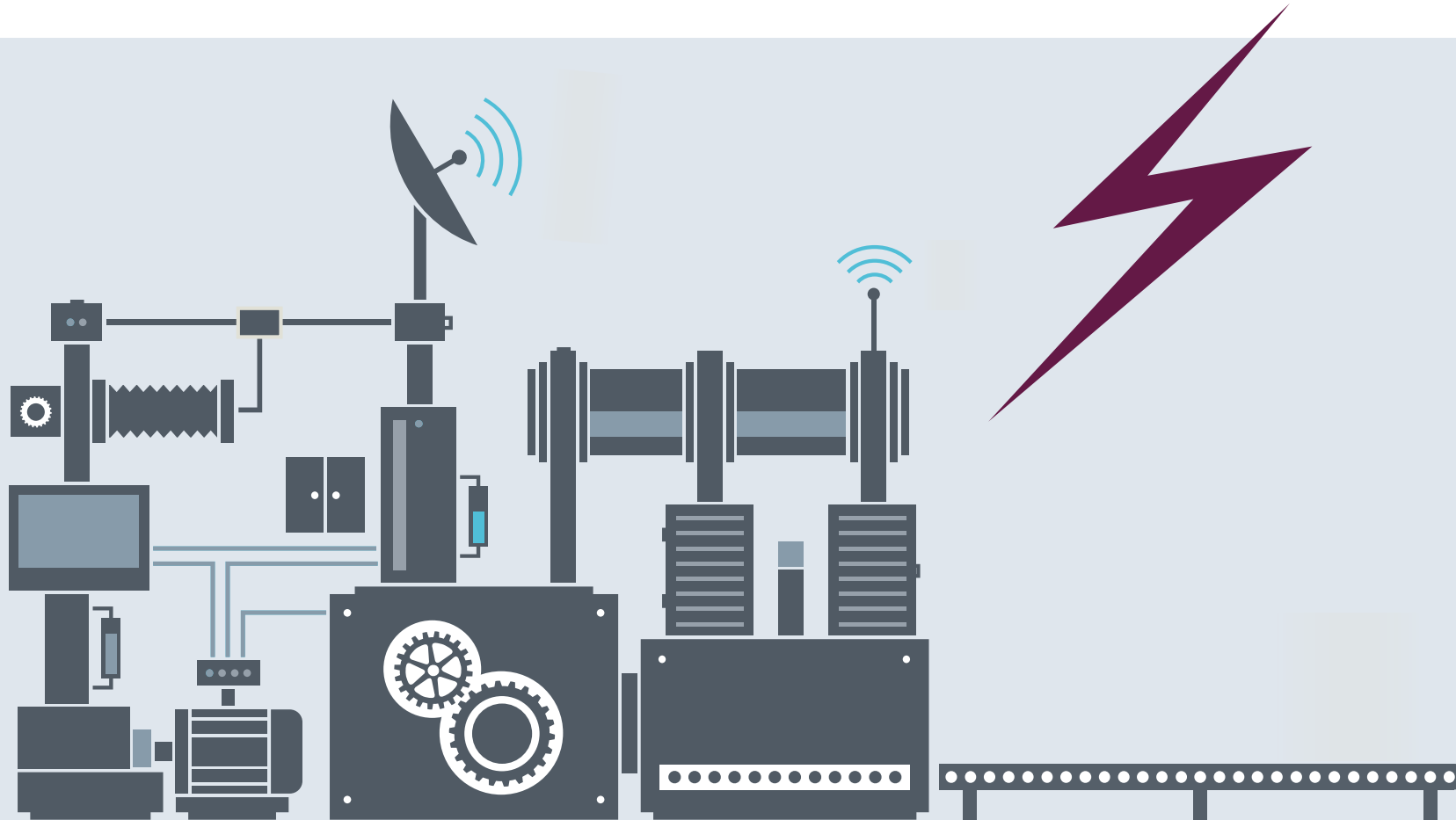
Power Matters

Dr. Beatrix Natter | CEO Transformers Business Unit
Siemens press conference prior to Hannover Messe 2017

Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry







Financial consequences of a possible power failure in industry



30 minutes with no power
cost a large industrial
consumer

~17,000 US\$¹⁾



Source: trinitypower.com

~20 m €

average value-added losses
per hour in the automotive and
mechanical engineering
sector ²⁾



Source: et-energie-online.de

every hour of a blackout in
Germany

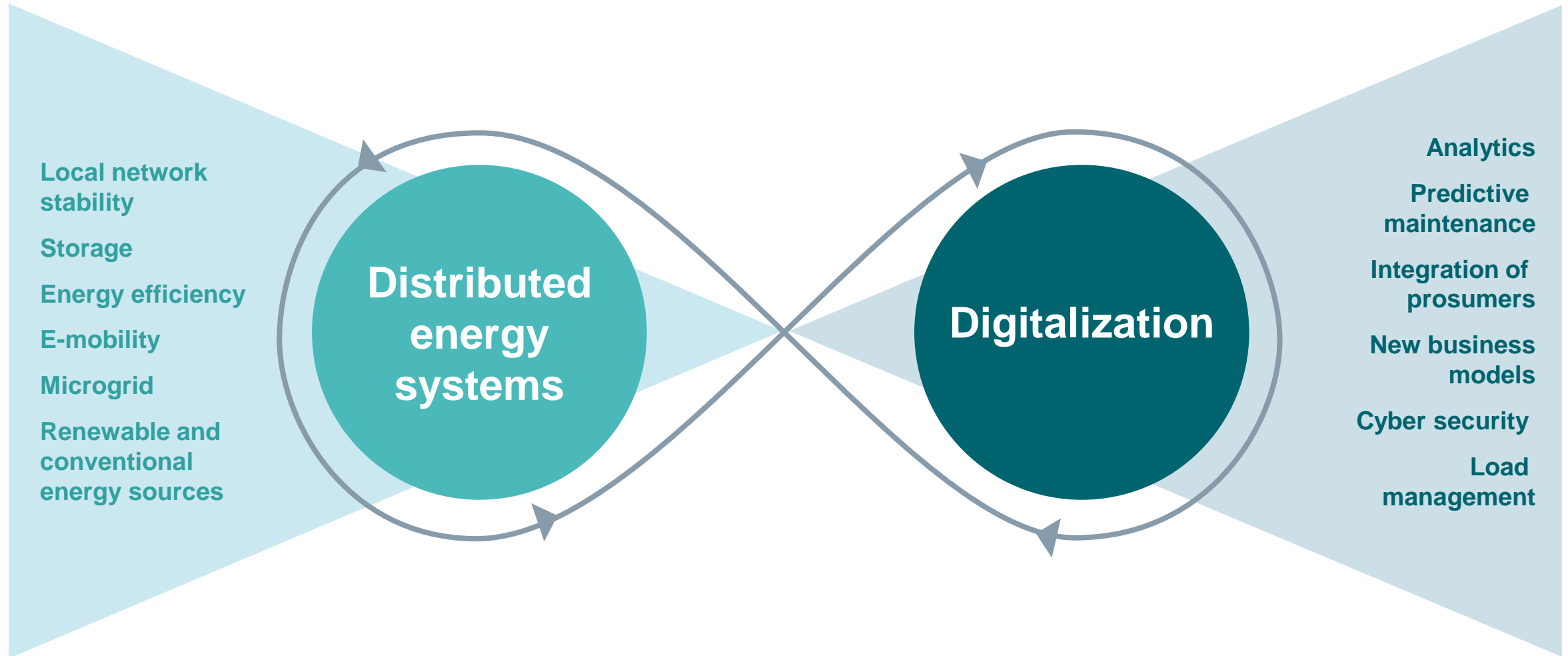
600.000.000 €



Source: welt.de, at noonday

1) Example Canada; 2) Example Germany

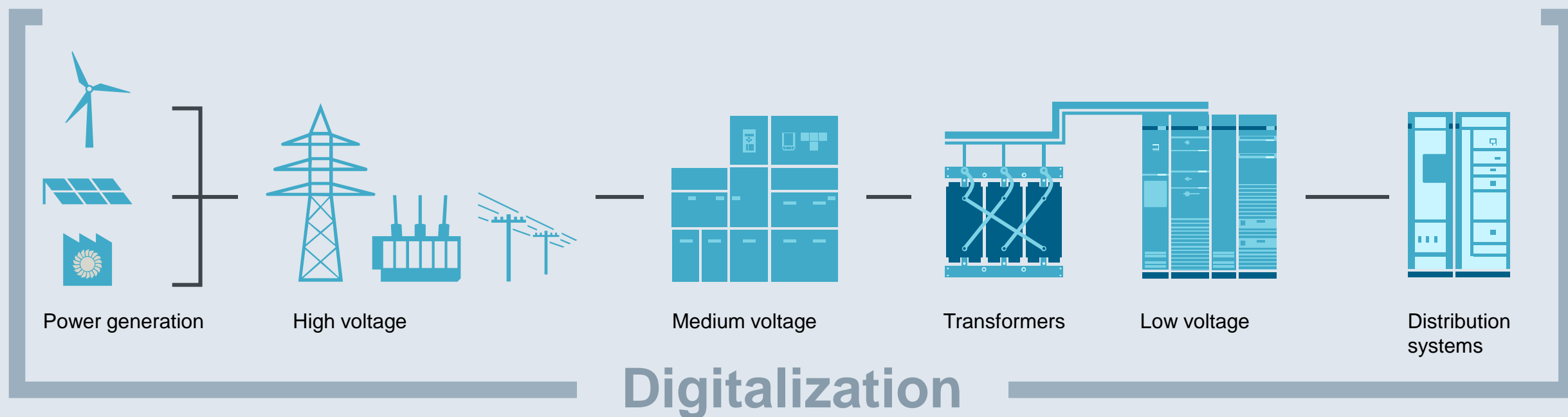
The transformation of the energy system is being driven by two main and mutually reinforcing trends



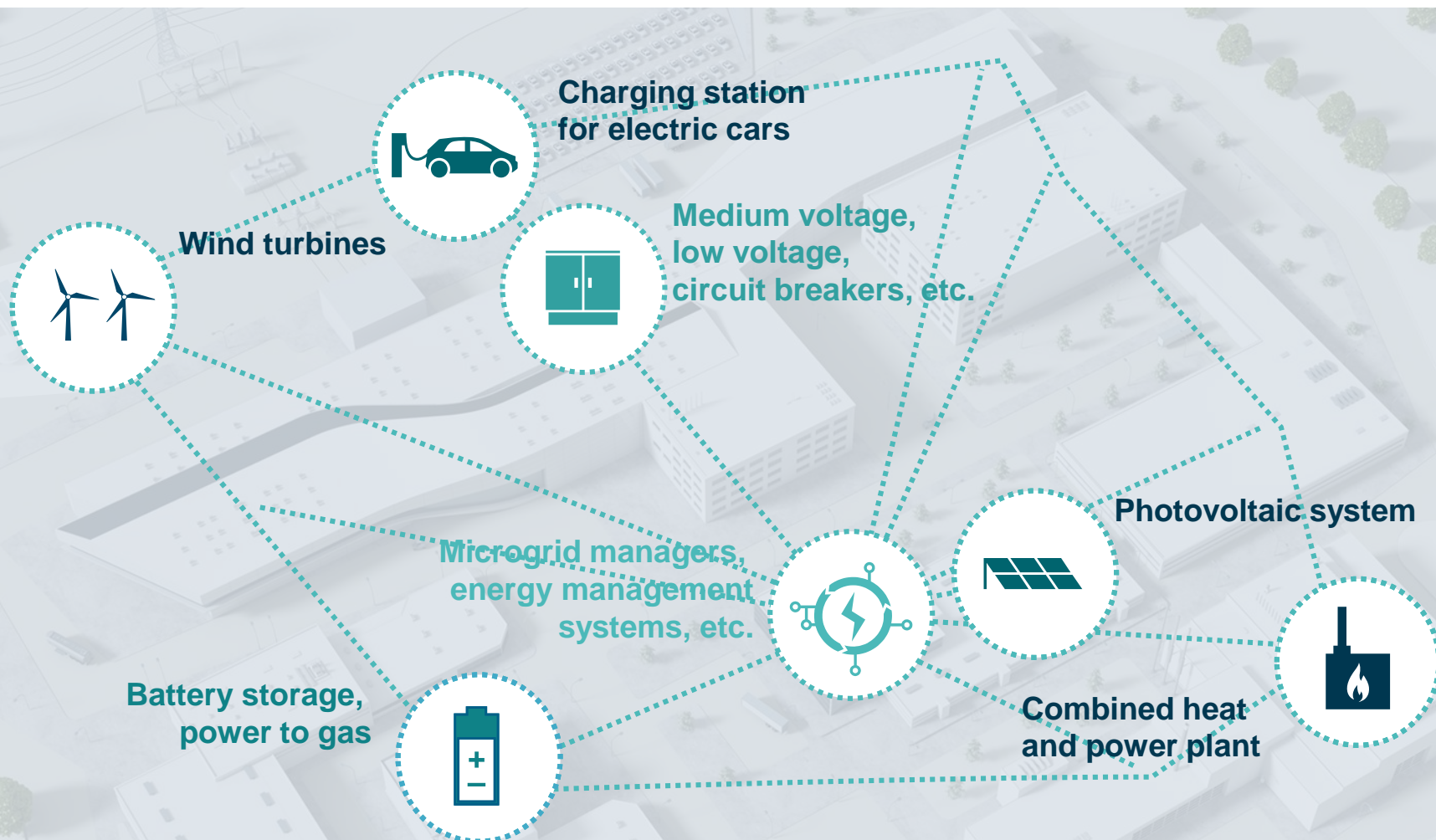
Totally Integrated Power – reliable, safe, efficient



A consistent power supply provides a firm foundation for the digital factory



Distributed energy systems for greater supply security – Example of an industrial campus



Distributed energy systems (DES)



Distributed power generation



Storage solutions



Electrical equipment and power electronics

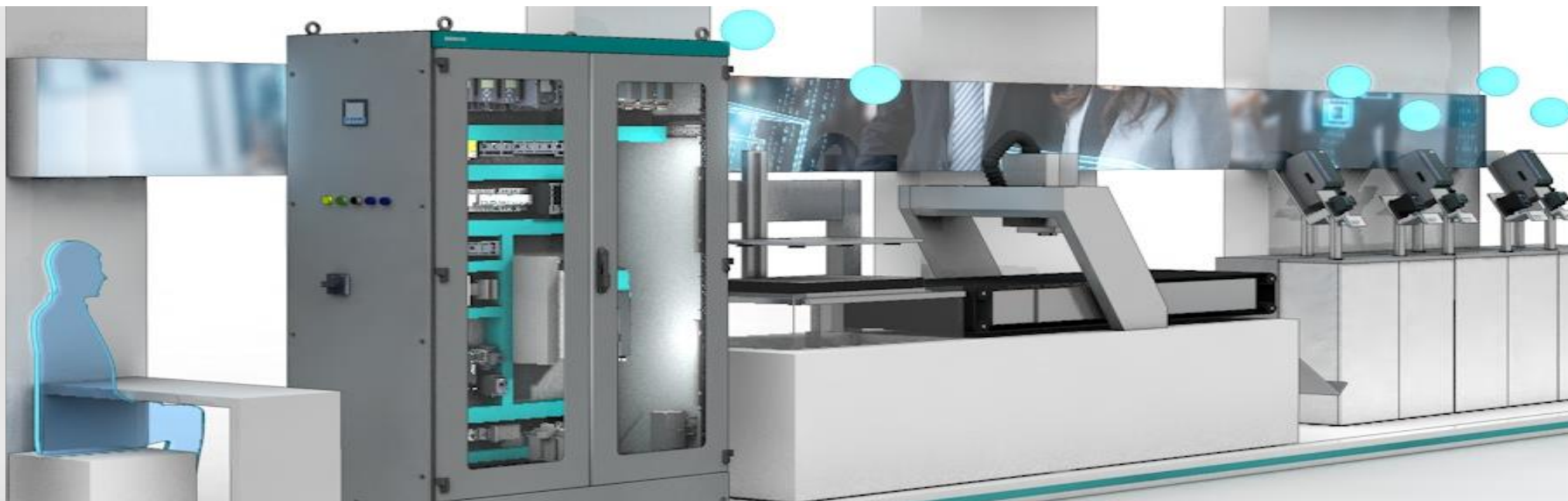


Energy automation and software

Expert Talk

Cohesive integration of power distribution into industrial automation – Electrification goes MindSphere

SIEMENS
Ingenuity for life



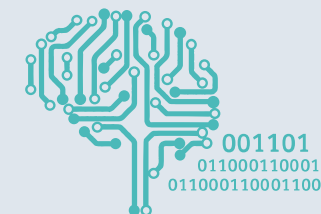
Expert Talk

Automated
engineering

Integration into
industrial
automation
(TIA Portal)

Capture of
energy data

Link to
MindSphere



Main benefits for industrial customers



Automated, efficient engineering

Faster



Increased plant availability

More reliable



Improved maintenance

More predictable



Optimized operation

More cost-
efficient



Improved energy efficiency of plants

More cost-
efficient



Storage, analysis and visualization of greater volumes of data

More transparent



Additional Highlights at Hannover Messe 2017



SITRAM TDCM



- Transformer diagnostics and condition monitoring
- Enables fault-free operation even during brief overload periods
- Early identification of faults
- Transfer of information to cloud-based solutions such as MindSphere

SIVACON S8



- Rapid troubleshooting
- Identification of savings potential due to transparent energy flows
- Transfer of information to cloud-based solutions such as MindSphere

SIESTORAGE



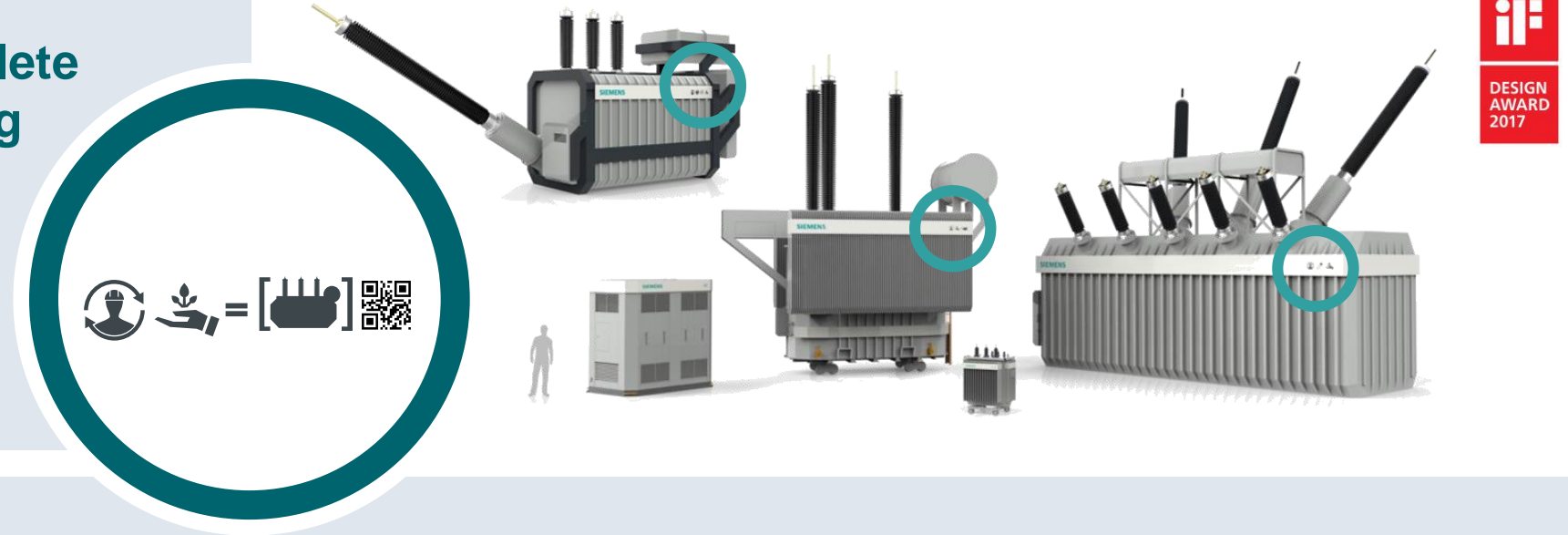
- Black start capability
- Keeps critical production processes operating
- Independence from the grid in the event of a blackout
- Modular system

It takes more than
technology ...

Transformer design initiative

Conversion of the complete portfolio to prize-winning transformer design

New toolbar indicates technical properties at a glance



Benefits

Transformer products immediately recognizable as belonging to the Siemens brand

Improved visibility of innovative features from the outside (e.g. ester or plug & play bushings)

Reflection of inner quality, innovative drive and “ingenuity” of products

Simplification of work steps in production, installation and maintenance



Thank you.

Siemens press conference prior to Hannover Messe 2017
Karlsruhe | March 14, 2017

Questions & Answers

Siemens press conference prior to Hannover Messe 2017
Karlsruhe | March 14, 2017