

# Siemens press conference prior to the Hannover Messe 2019

Herzogenaurach | February 18, 2019  
**Digital Enterprise – Thinking industry further!**



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**Digital Enterprise – Thinking industry further!**

Dr. Jan Mrosik, CEO Digital Factory Division

Eckard Eberle, CEO Business Unit Process Automation

Ralf-Michael Franke, CEO Business Unit Factory Automation

Dr. Wolfgang Heuring, CEO Business Unit Motion Control

Ralf Christian, CEO Energy Management Division

# Digital Enterprise – Thinking industry further!

 JanMrosik

Dr. Jan Mrosik,  
CEO Digital Factory Division  
Siemens press conference prior to Hannover Messe 2019





Our customers have essential requirements

## New business models



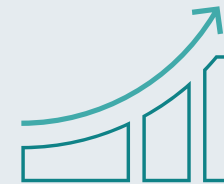
**Speed**



**Flexibility**



**Quality**



**Efficiency**

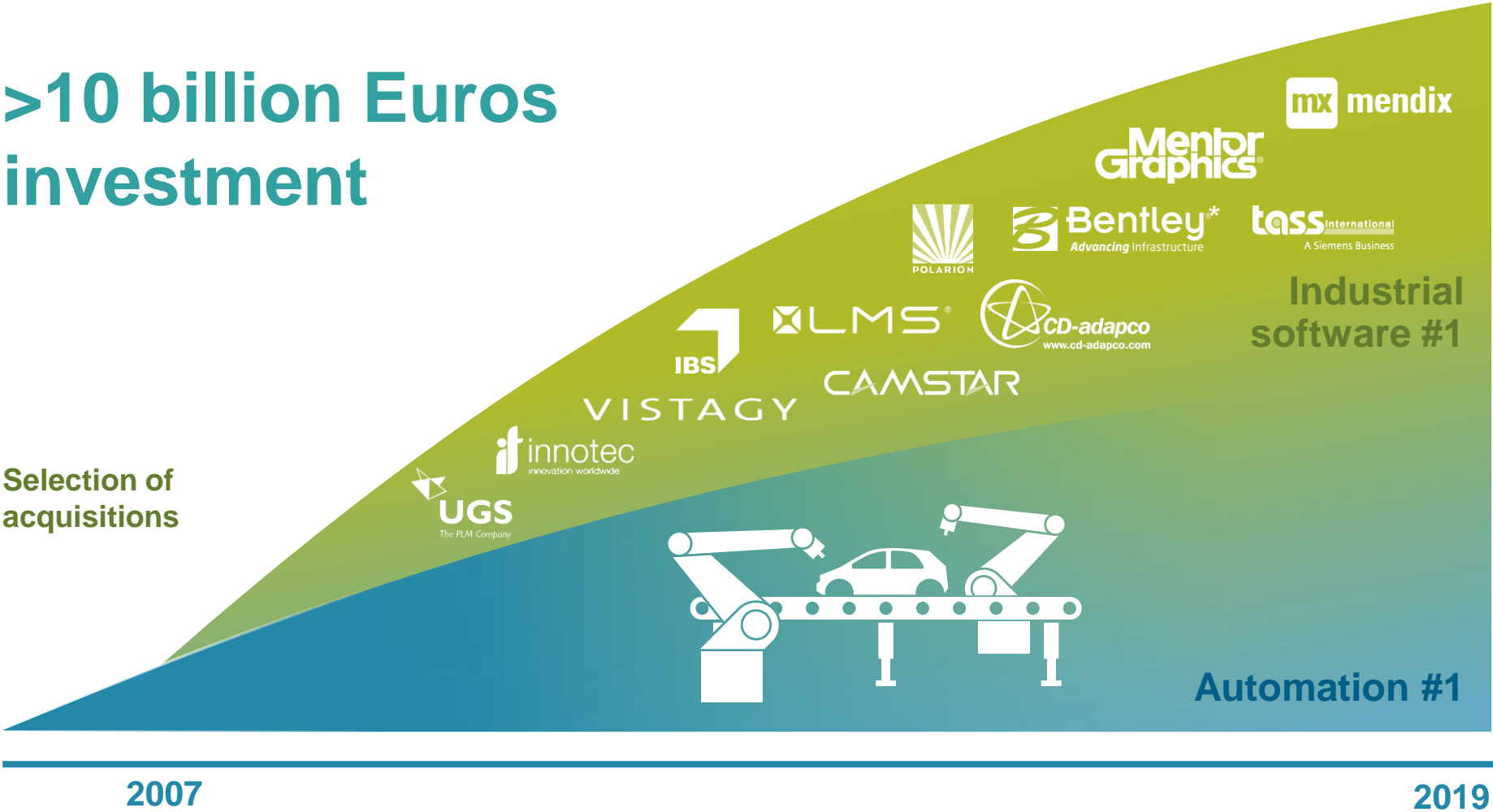


**Security**

# Digitalization is key to achieving next-level productivity



>10 billion Euros investment

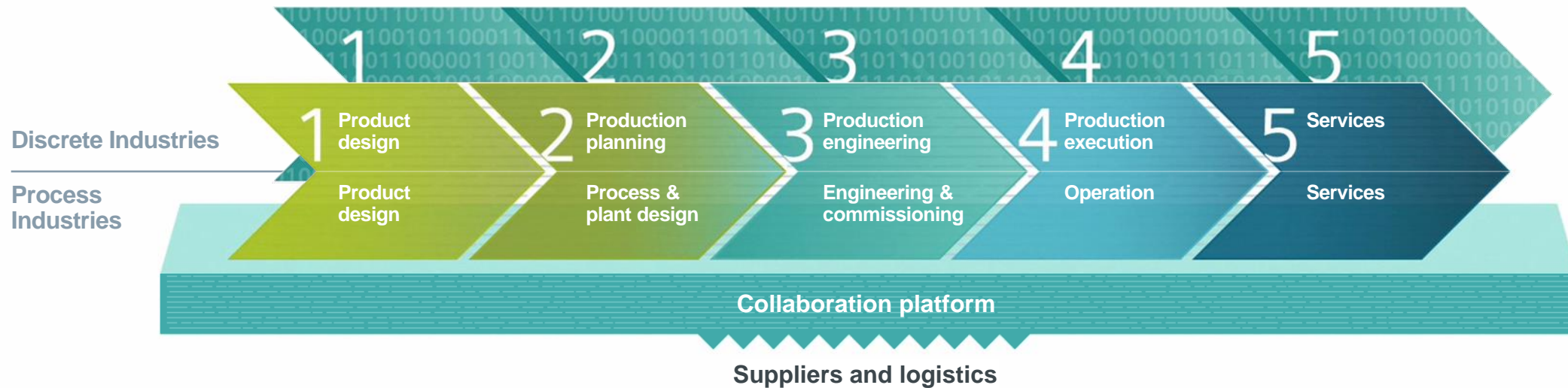


Virtual world:  
Software

Real world:  
Automation

\* Cooperation

# Integrating and digitalizing the entire value chain



**End-to-end solutions  
for all industries**

**Numerous starting  
possibilities**

**Brownfield or  
greenfield**

**Standardized and  
open interfaces**

# The Digital Twin of the product accelerates development



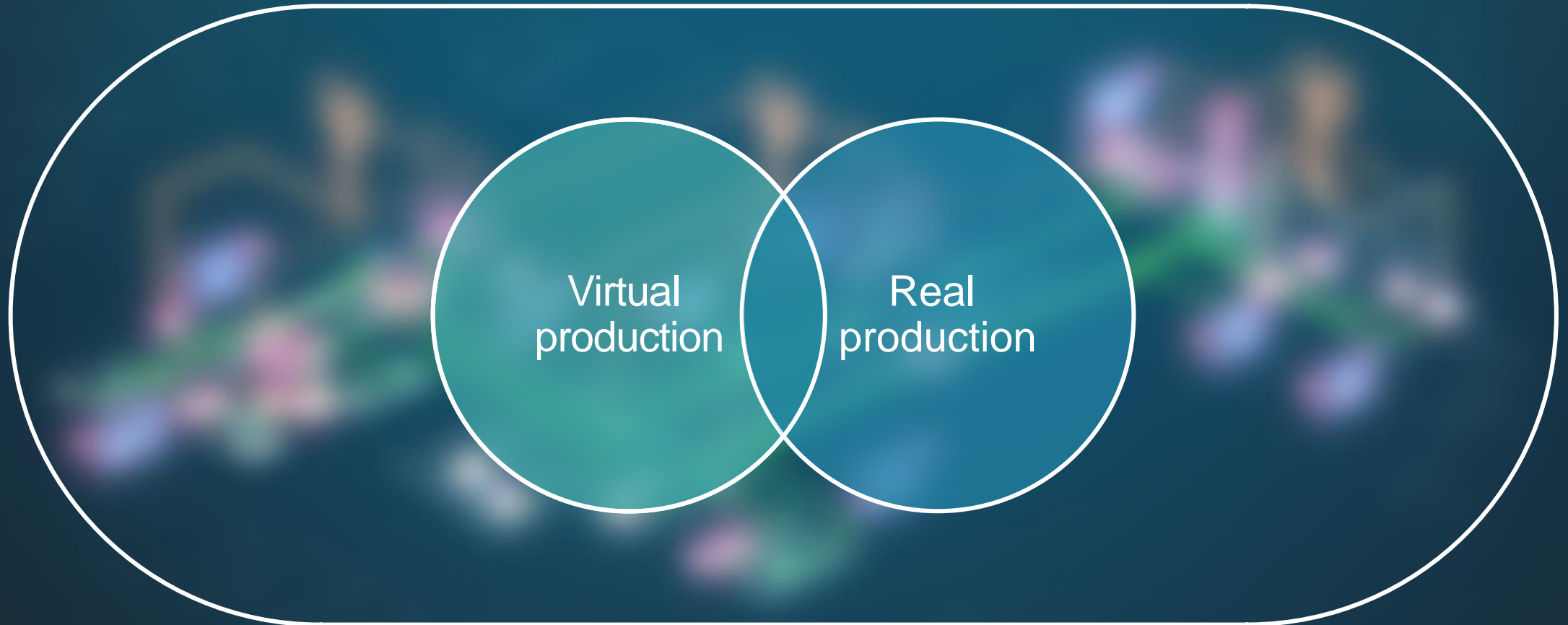


# The Digital Twin of the product accelerates development

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*Ingenuity for life*



# The digital twin of the production accelerates planning, setup and optimization





# The digital twin accelerates planning, setup and optimization of the production



The diagram illustrates the digital twin lifecycle. It features a large white circle on the left containing a 3D CAD model of a robotic arm and its base, rendered in yellow and blue. A smaller white circle on the right contains a photograph of the same physical robotic arm in a factory setting. These two circles are connected by a horizontal line. In the center, overlapping both circles, is a yellow circle containing the text "Planning and validation", "PLC code generation", and "Virtual Commissioning". To the right of this yellow circle, within the white circle containing the photo, is the text "Real production".

Planning and validation  
PLC code generation  
Virtual Commissioning

Real production



# The digital twin of the plant accelerates planning, setup and optimization

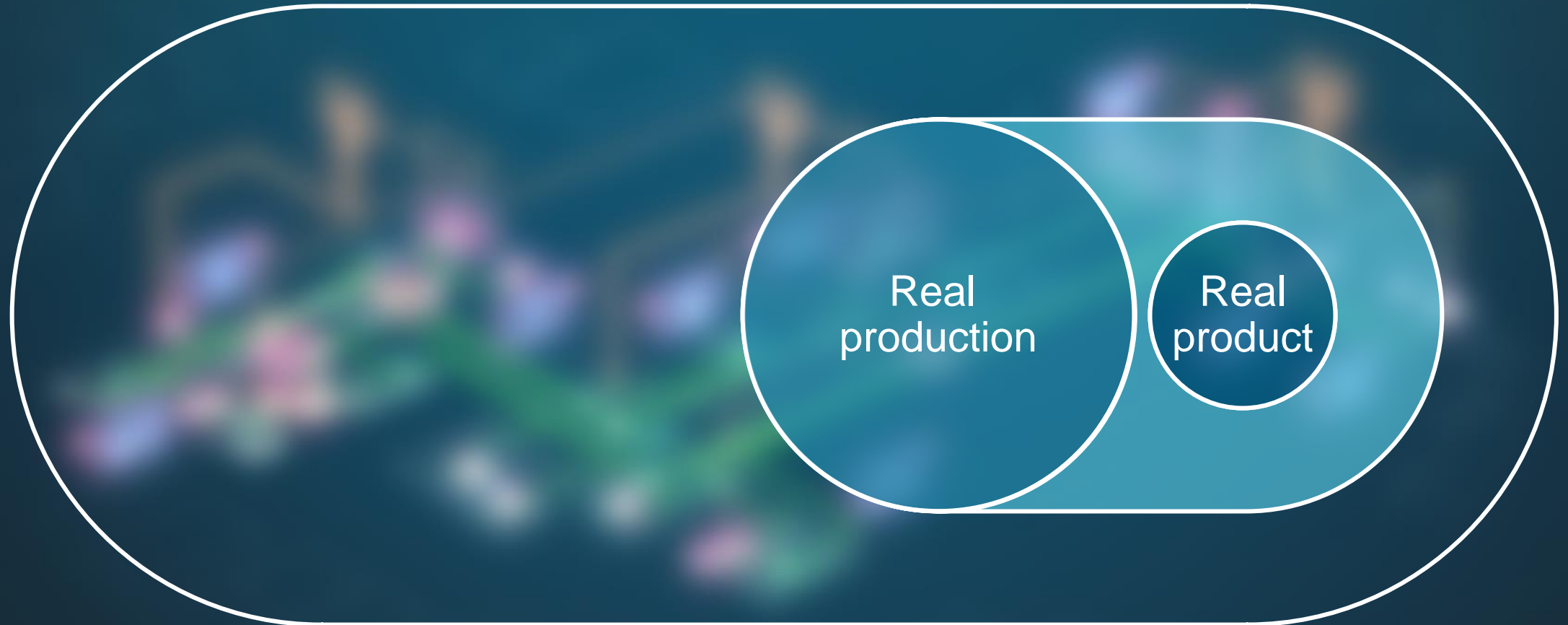
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R&D and  
validation  
Simulation and  
monitoring  
Operations  
intelligence

Real  
plant



# Digital Twin of the Performance enables continuous analysis of product and production

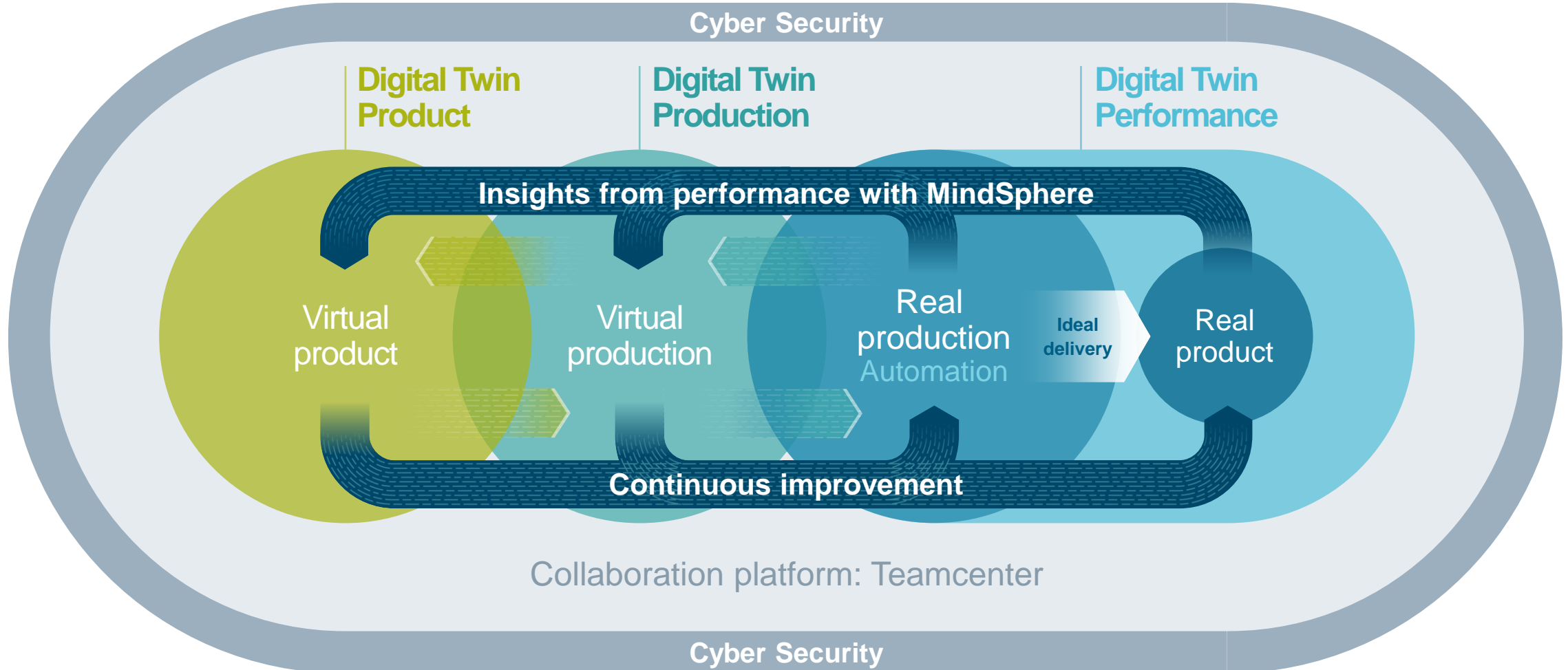


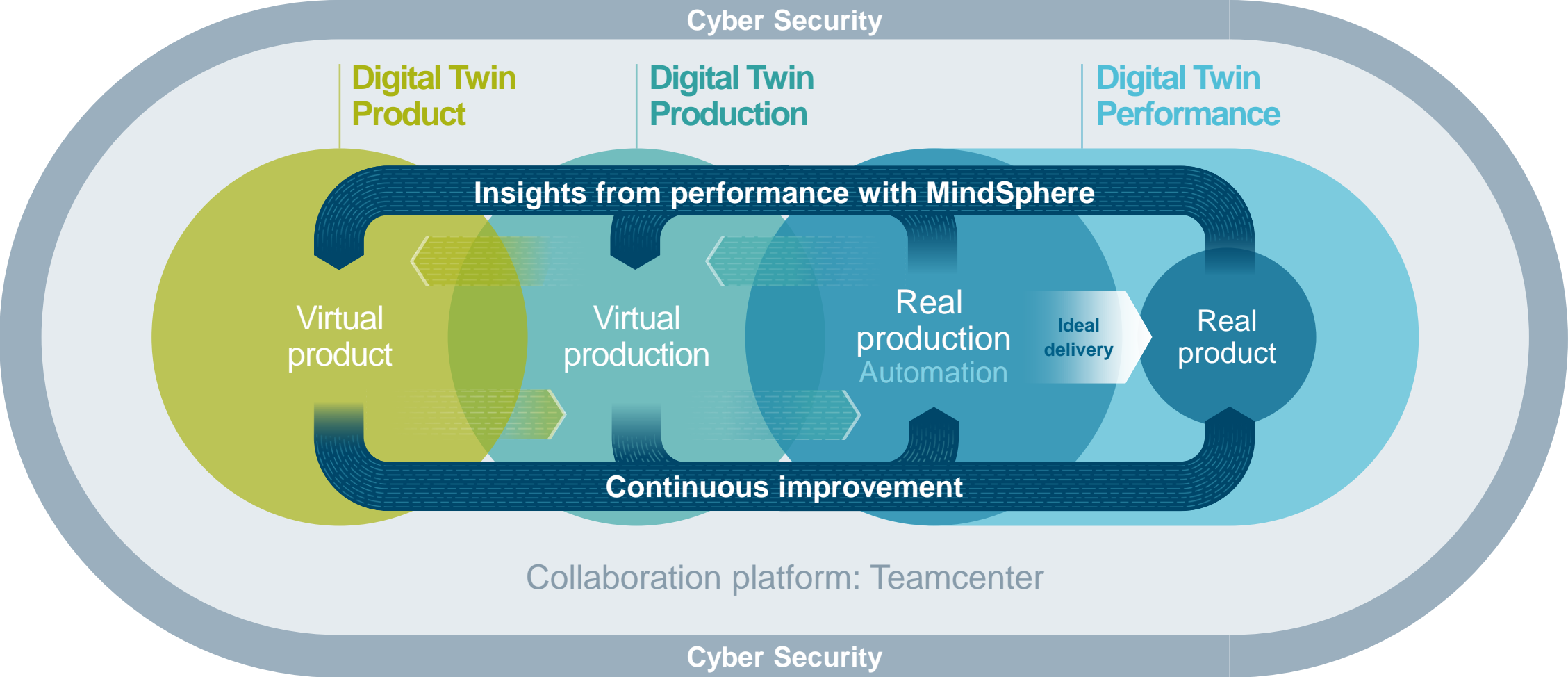


# Digital Twin of the Performance enables continuous analysis of product and production



# Feeding back insights from MindSphere for a closed-loop optimization environment







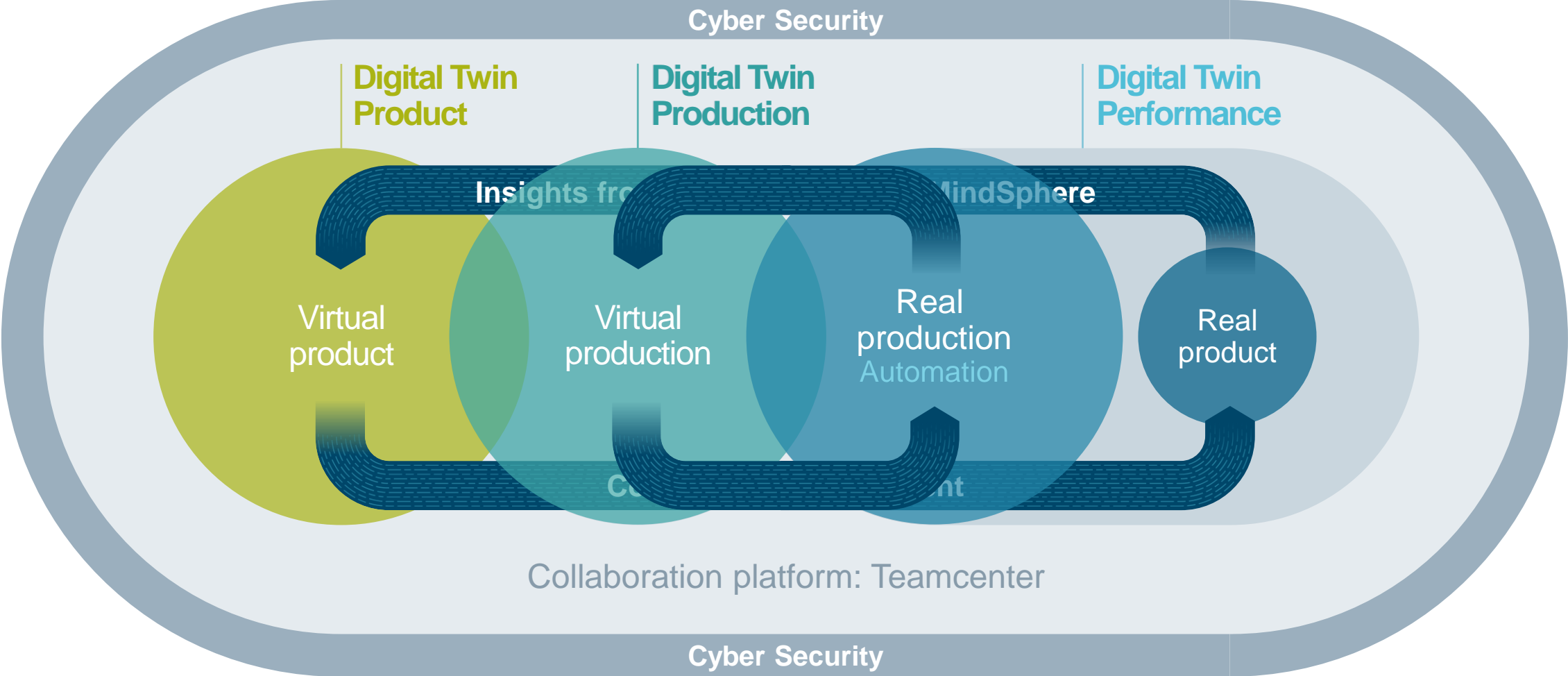
*“With an integrated digital twin platform, we see major potential in speeding up the product development process, reducing prototypes, increasing traceability and thus improving quality and reduce development cost.”*

Juha Pankakoski, Executive VP,  
Technology at Konecranes





# Optimization of the production







*“Together with Siemens we can realize the vision of Industrie 4.0 at an early date.”*

Wang Bin, VP of Guangzhou MINO Automotive Equipment Co.

- Reduced engineering time by  $>1/3$
- Reduced commissioning times from  $>2$  months to  $<1$  month





# Portfolio

Providing all the tools to overcome data silos in the virtual and real world

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# Consulting

Making sure our customers' way towards digital transformation is the right one

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# Implementation

Helping customers implement and optimize the digital enterprise

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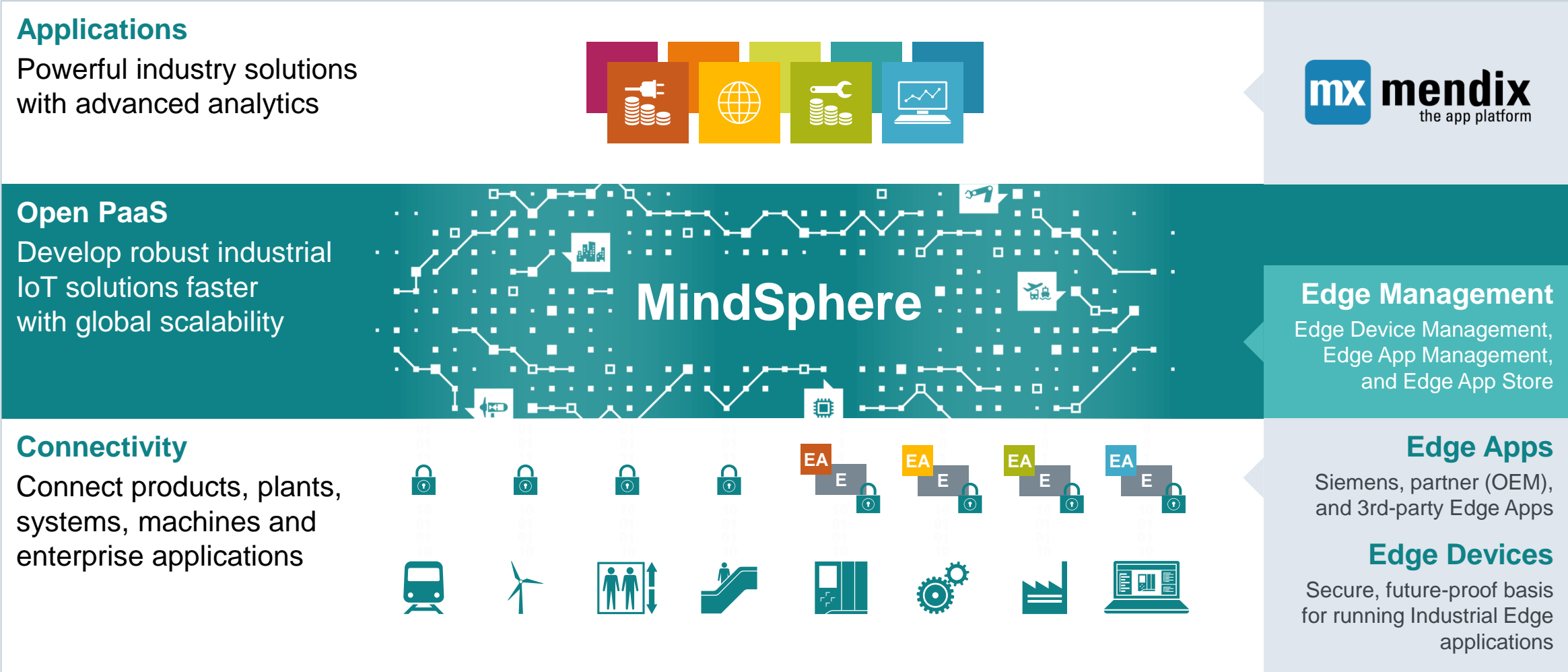
# Optimization

Continuous improvement by analyzing ongoing operations

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# Our IoT operating system MindSphere – enhanced by Edge and mendix



# MindSphere World – a global IoT ecosystem

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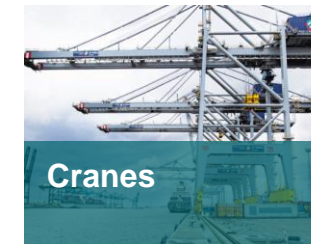
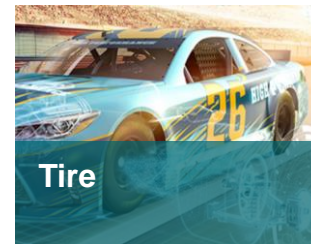
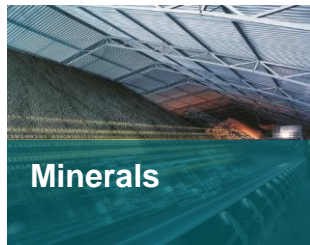


# Driving digital transformation in all industries



## Process Industries

## Discrete Industries



# Hannover Messe 2019

## Digital Enterprise – Thinking industry further!



Process industries

Discrete industries





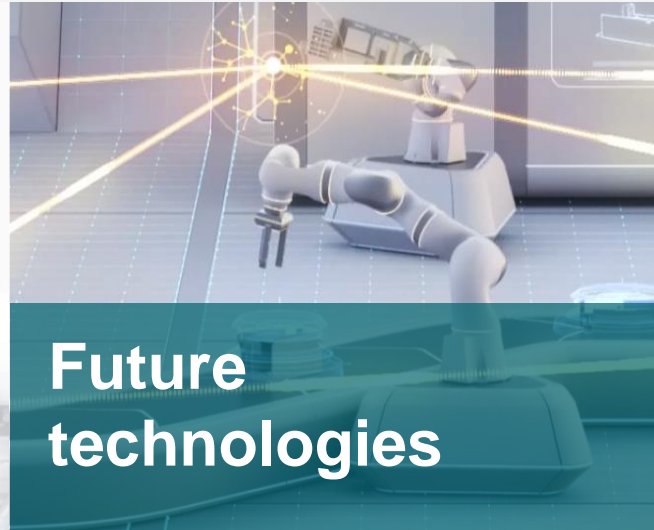
# Hannover Messe 2019

## Digital Enterprise – Thinking industry further!



### Future technologies

- Edge and Artificial Intelligence
- Autonomous AGV
- Process Control Innovation
- Blockchain
- Cognitive engineering
- Virtual Reality



### Platform:

- Customer use cases
- Product demos
- Solution Package Offering

### Ecosystem

**MindSphere World**



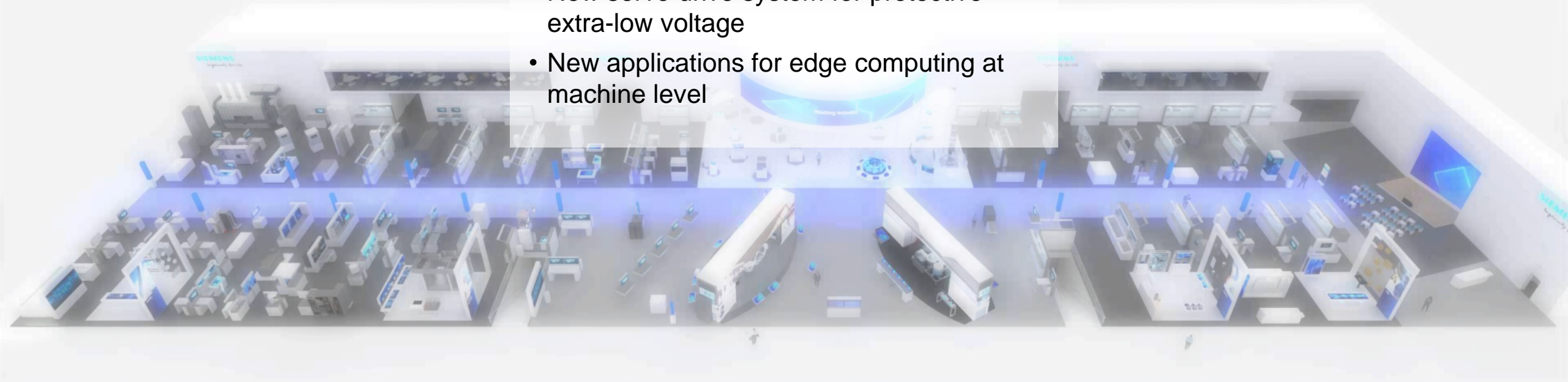
# Hannover Messe 2019

## Digital Enterprise – Thinking industry further!



### Product innovations:

- New generation of high-end industrial PCs
- Combined transport system from Festo, Siemens and Bosch Rexroth
- New servo drive system for protective extra-low voltage
- New applications for edge computing at machine level



# Electrical Design completes Siemens' multi-disciplinary design environment

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Automation Designer now enables full mechatronics design for faster engineering and better quality: through integrated data handling with round-trip functionalities of mechanics, electrics, and automation.

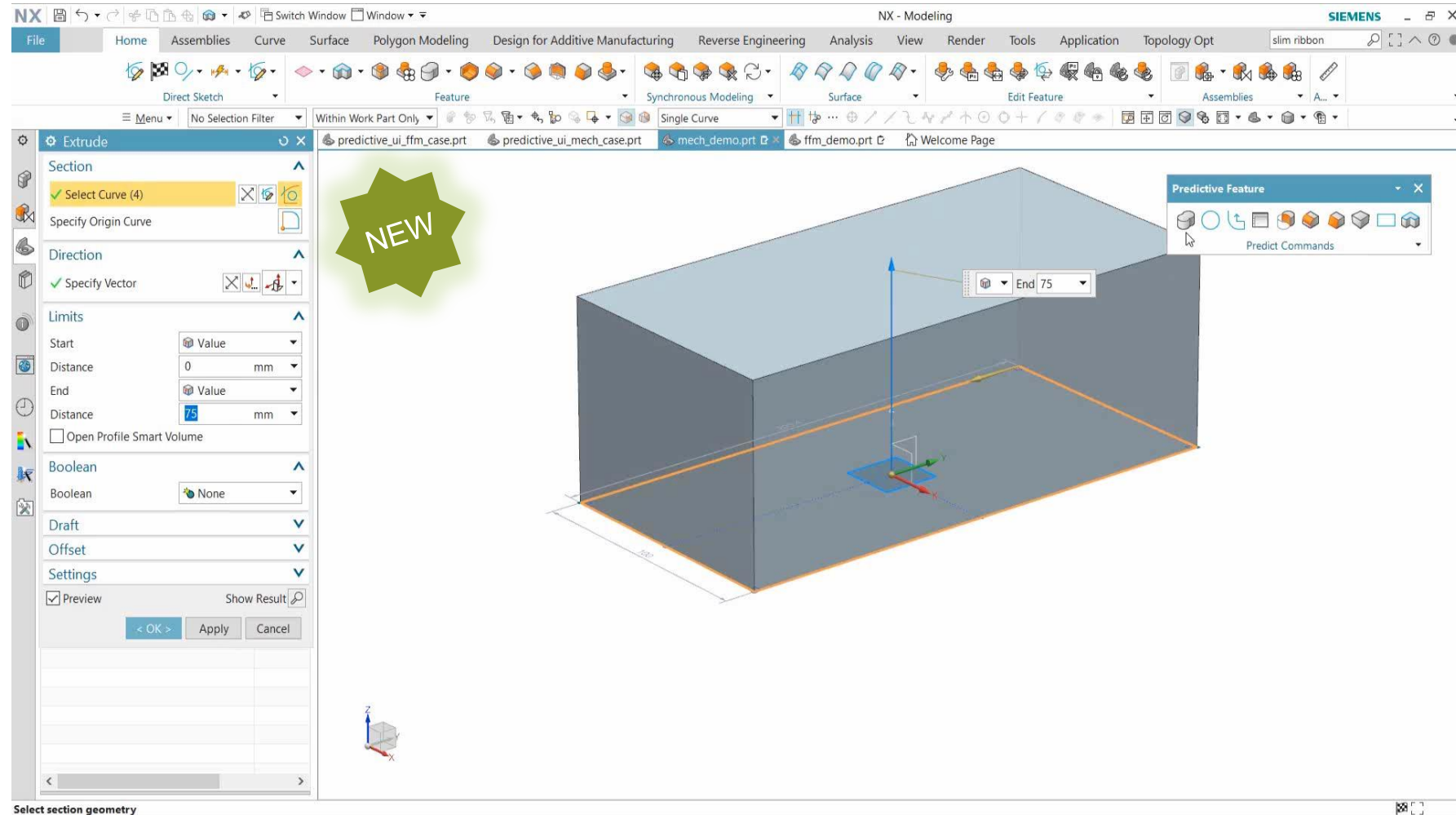
Electrical function Electrical schematics Mechanical design Automation design



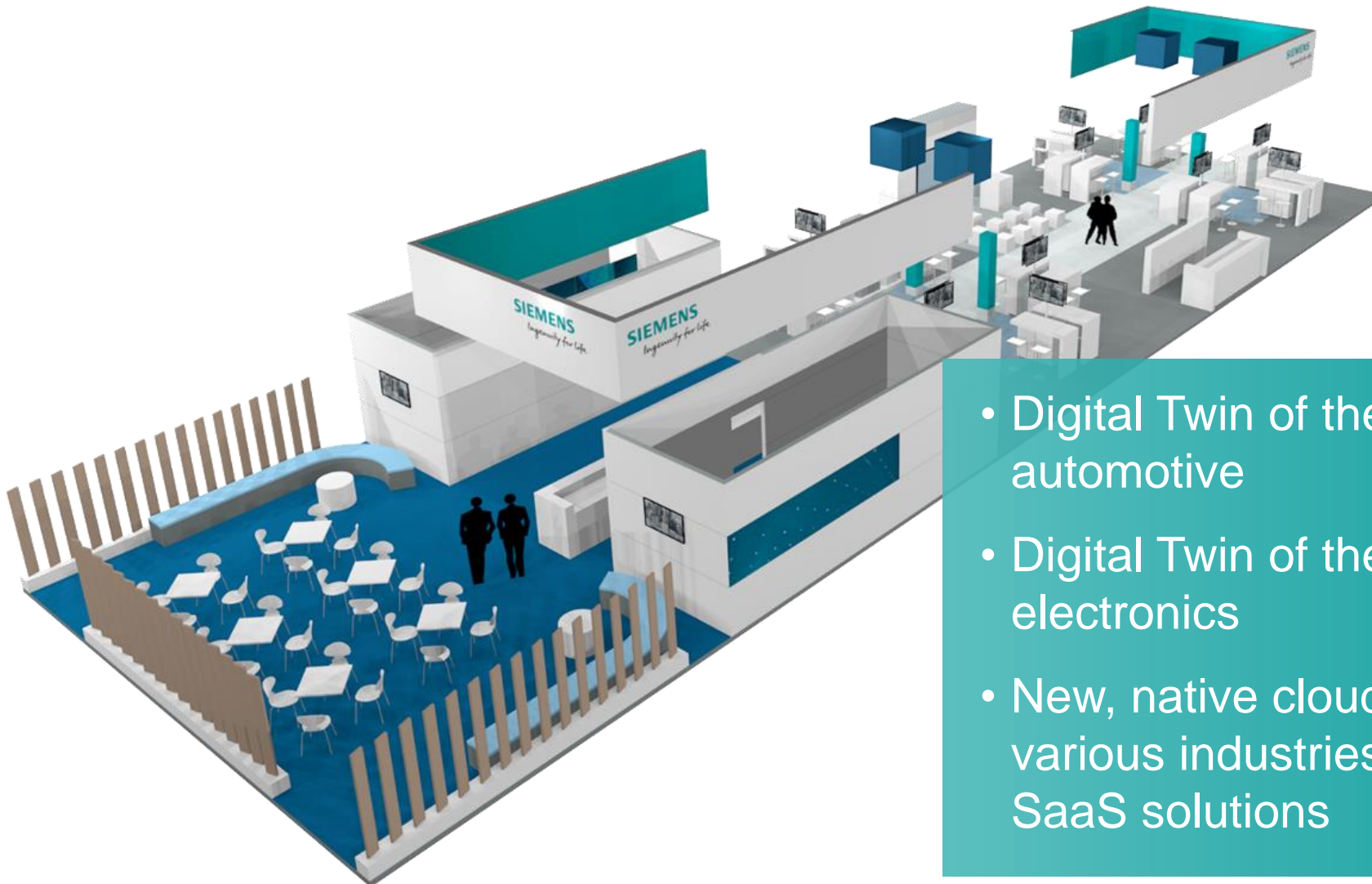
# Update of NX Software includes Artificial Intelligence and Machine Learning



New capabilities of NX software leverage machine learning and artificial intelligence technology. It creates user interfaces based on expected tasks to increase user adoption and productivity.



## PLM booth, hall 6: Integrated, cloud-based software solutions for various industries



- Digital Twin of the product in automotive
- Digital Twin of the production in electronics
- New, native cloud applications for various industries and innovative SaaS solutions



# Thinking process automation further!

Eckard Eberle,  
**CEO Business Unit Process Automation**  
Siemens press conference prior to Hannover Messe 2019

Cathay Industrial Biotech Ltd., China



## Rewriting the future of the bio-manufacturing industry

- ✓ Consistent **increased capacity** with accuracy and control at every stage
- ✓ **Autonomous** factory **control** with stronger digital teaming
- ✓ **Faster time to market** with increased R&D qualification rate
- ✓ Greater **production security** with predictive operation and maintenance

SIMATIC  
PCS 7

COMOS

XHQ

SIMATIC  
IT

SIMIT





**Let's reThink Process Automation  
to accelerate the digital transformation**

**reThink Process Control**

**reThink Digital Enablement**

**reThink Business Models**

**reThink Data Flow**

re

think



Start the journey with SIMATIC PCS 7

SIMATIC PCS 7  
State-of-the-art process  
control system, future proof  
and fit for digitalization

- ✓ More than 20 years of experience therewith full customer understanding
- ✓ Efficient engineering with libraries and re-use of flexible control types
- ✓ Innovative I/O periphery and controller hardware with PROFINET communication

PROFI  
NET





# Go the next step with Process Control Innovation

## SIMATIC PCS 7

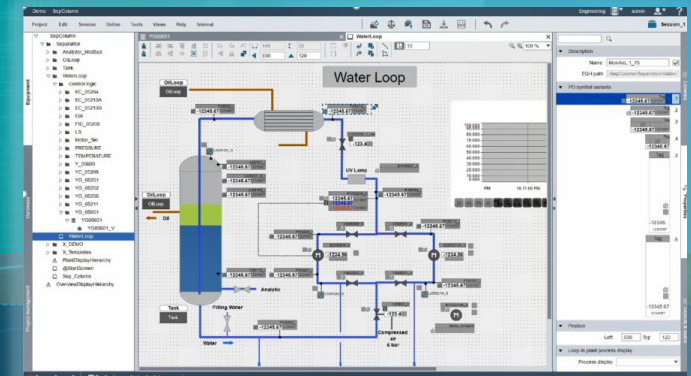
- Widest range of applications for all process industries
- Continuous processes, as well as batch and regulated industries
- Greenfield and brownfield

## Process Control Innovation

- Petrochem, water and plant infrastructure
- Continuous processes, from process modules to world-scale plants
- Greenfield

## Software Evolution

Control Module Types, Advanced Process Library, ...



## Hardware Evolution

PROFINET for Process Industries, SIMATIC ET 200SP HA, SIMATIC CFU, ...



Know why it's worth it

THINK the needs of our customer





# Enter a new world of process control

- ✓ **Web-based multiuser collaboration** for 1 to >30 engineers working with zero installation concurrent around the globe
- ✓ **One intuitive user interface** for every user group and all applications
- ✓ **Object oriented data management** for most efficient workflows and maximum reusability in a clear software structure
- ✓ **Open and flexible architecture** for modular automation and highest scalability



based on hardware  
known from SIMATIC PCS 7








# Be curious!

See you at Hannover fair  
to explore our new  
Process Control System!





## reThink Digital Enablement – Think PlantSight

### Benefit from the Digital Twin in a brownfield environment

#### Enabling digitalization

**Capture 1D/2D/3D Data** from different sources

**Transform raw data** into one complete digital twin

**Visualize all current data** in a single web portal

#### Creating value for our customers

**PlantSight opens your eyes to insights for faster and better decisions anytime and anywhere to:**

- ✓ Continuously monitor and quickly optimize your plant assets
- ✓ Increase equipment availability and performance
- ✓ Reduce operational and maintenance costs

# PlantSight

PlantSightDemo001 













## Project Details

Registered:	Wednesday, October 10, 2018
Industry:	Oil and Gas
Asset Type:	Gas Processing Plants
Location:	Germany
Project Country:	US
Time Zone:	Eastern Standard Time
Data Center Location:	East US

 PlantSight Connections	0
 ContextShare Connection	
 SharePoint Connections	0
 iModels	











[Edit Project Details](#)

## Team Members

[Manage Members](#)

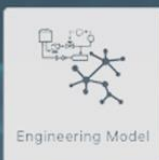
## Notifications

	Wednesday, October 10, 2018, 11:12 AM iModel (PlantSightDemo001) was deleted by 
	Wednesday, October 10, 2018, 9:11 AM  has invited you to a project PlantSightDemo001
	Saturday, October 6, 2018, 1:34 PM iModel (IKOPM46) was deleted by 
	Saturday, October 6, 2018, 1:34 PM iModel (IKOPM44) was deleted by 
	Saturday, October 6, 2018, 1:34 PM iModel (IKOPM43) was deleted by 
	Saturday, October 6, 2018, 1:34 PM



## Engineering

## Engineering



Engineering Model



Comos in the Cloud



Connectivity Model



Model Transformation



Pattern Recognition



Zero Engineering

## Ensure Asset Uptime

## DCS



DCS Health



DCS Lifecycle Portal

## Instrumentation



Digital twin Smelter 4.0



Field Device Performance Monitoring



Fleet Monitor



PAT in the Cloud



Predictive analytics for process industries CN



Predictive analytics for process industries CN

## Improve Processes

## Control Loops

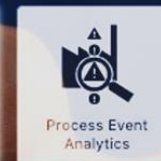


Control Performance Analytics

## Process Event Operation



Anomaly Detection for Oil and Gas



Process Event Analytics

## SIWA Optim



Unmanned Pressure Control App



SIWA Optim



SIWA Optim CN

## Optimization &amp; Analytics

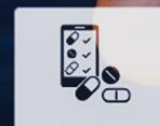


Weighing Sensor Accuracy Tracing

## Industry Specific



Disruptive process



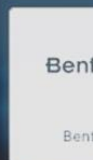
eBR in the Cloud



SIPAPER - Drive Performance

## Manage O

## Brownfield E



Brownfield E

## Maintenance



Digital L

## Logis



Axit - AX

## Remote



Control in

## Production



Oil Production

reThink Business Models –  
Think Applications  
Created according to customer requirements



# reThink Data Flow – Think Communication, Identification and Locating

## Create the basis of your digital enterprise



# Thinking factory automation further!

Ralf-Michael Franke,  
CEO Business Unit Factory Automation  
Siemens press conference prior to Hannover Messe 2019



# Highlight

## Food and Beverage



### End Customers: Supply chain from farm to table

- Tailored end-to-end solutions for highest food quality and full traceability
- Managing a huge product variety and smaller batch sizes

### Machine Builders: Doubled productivity

Exhibit: Machine from Tronrud Engineering  
The world's fastest packaging machine for pillow bags, using digital twins

- Time to production reduced by 50%
- Commissioning phase shortened by 25%



# Highlight Battery Production

## Strong demand for new battery factories

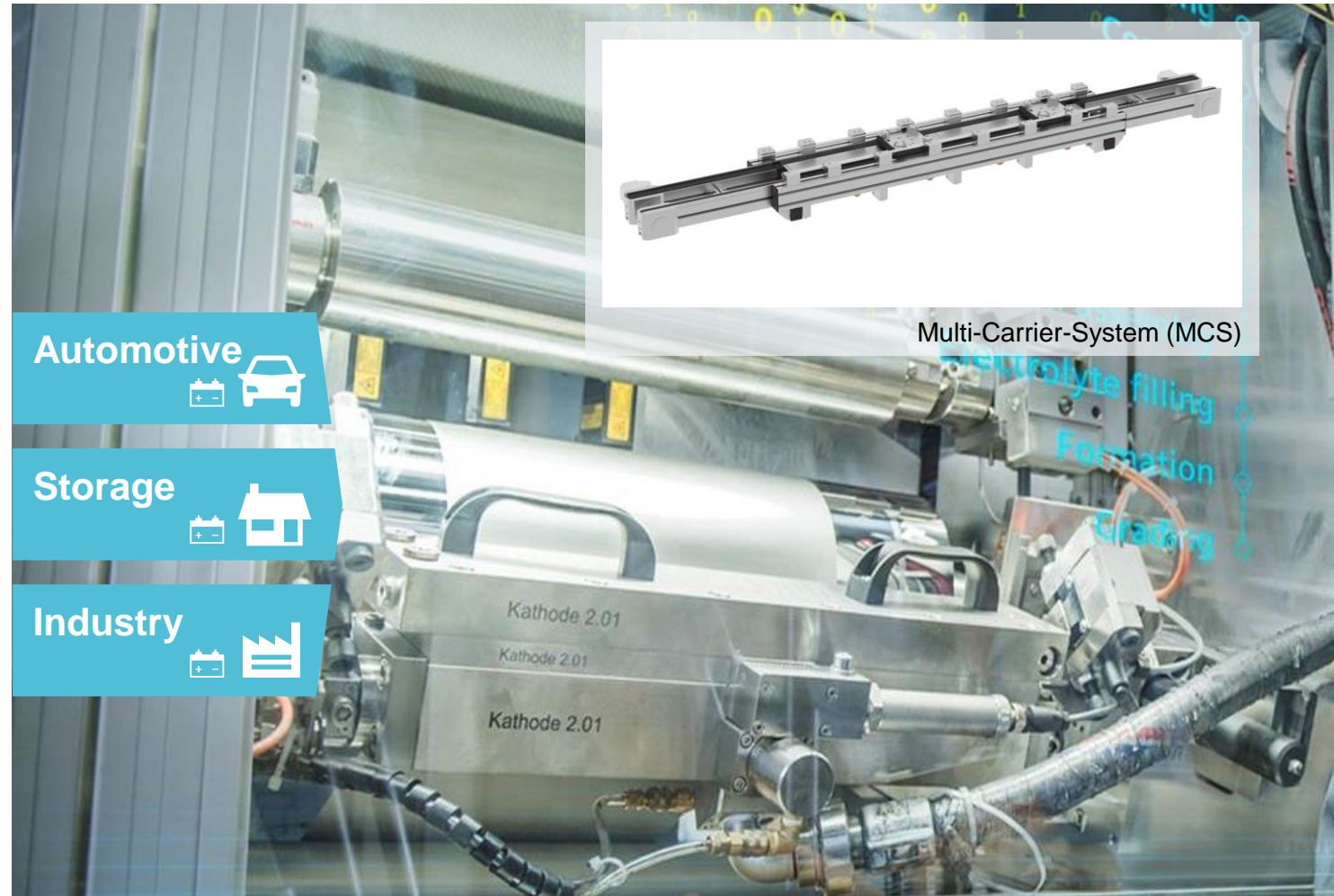
- Higher productivity and quality
- More flexible and efficient manufacturing processes

## Our solution – Holistic Digital Enterprise portfolio

New:

- Faster time-to-market thanks to easy robotic integration in TIA Portal
- Kombiniertes Transportsystem von Festo, Siemens und Bosch Rexroth

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Automotive  
🔋 🚗

Storage  
🔋 🏠

Industry  
🔋 🏭



# SIMATIC Automation Technology – Important building block of the Digital Enterprise



## SIMATIC Product Highlights

### TIA Portal V15.1

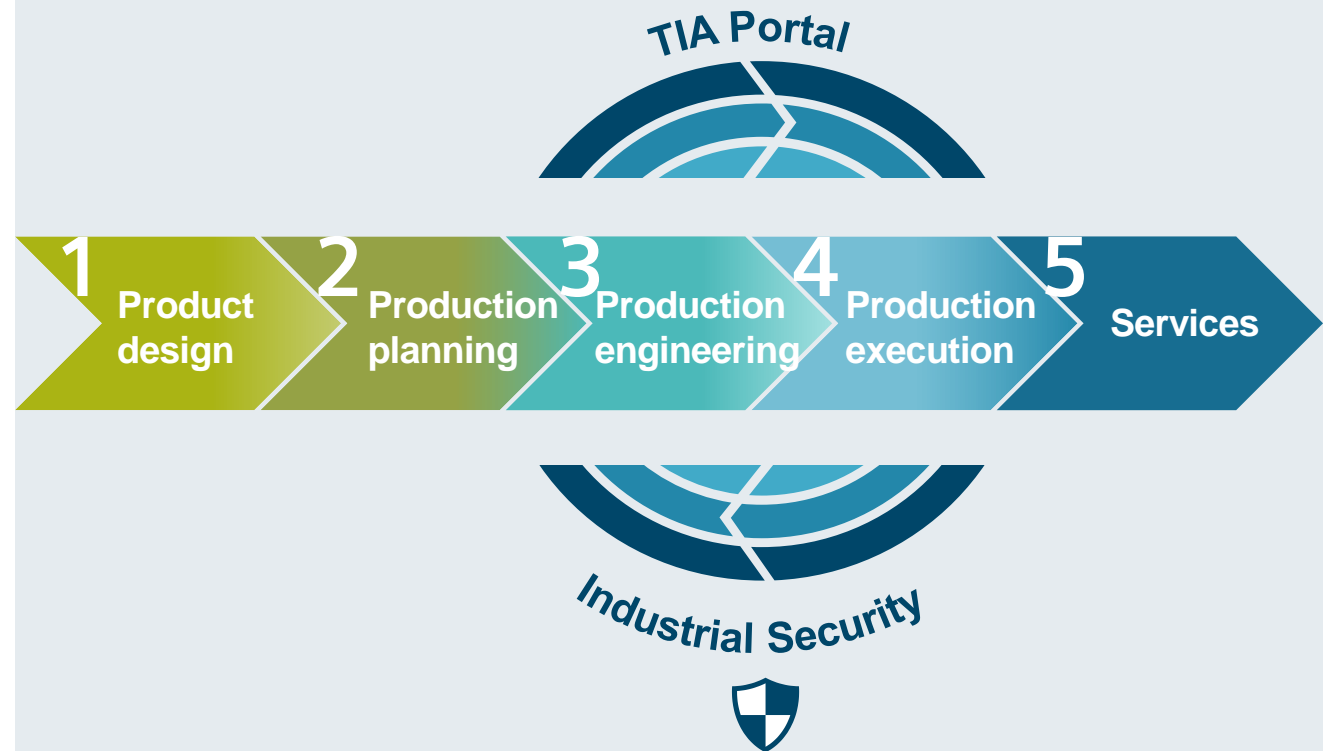
- Support for S7-1500 R/H (redundant controller)
- OPC UA Client for S7-1500
- Virtual Commissioning with SIMATIC Machine Simulator
- Drive system commissioning with SINAMICS Startdrive

### New generation of high-end industrial PCs

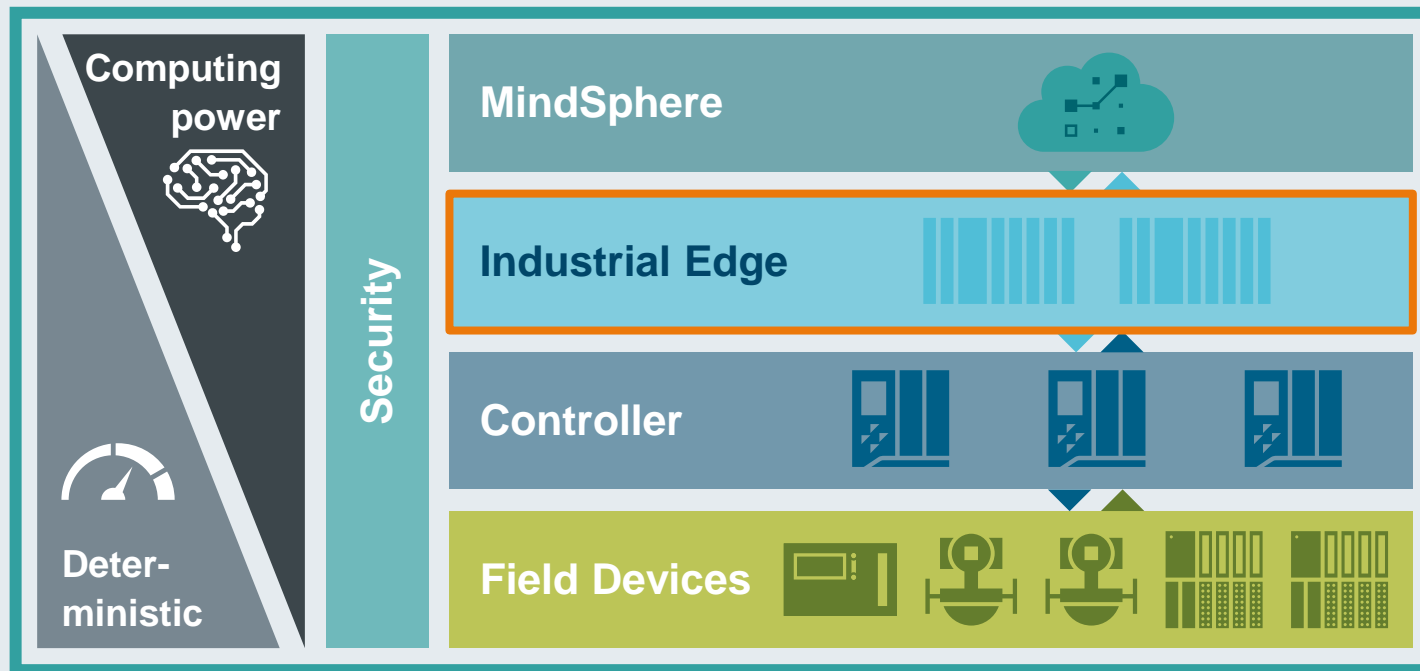
- High data and system availability in 19" racks, control cabinets or directly at the machine
- Maximum expansion scope for flexible integration

### Mind Apps

- Increased machine transparency
- Analysis of energy consumption levels
- Optimized machine productivity



# Future of Automation – Integration of new technologies into the TIA ecosystem



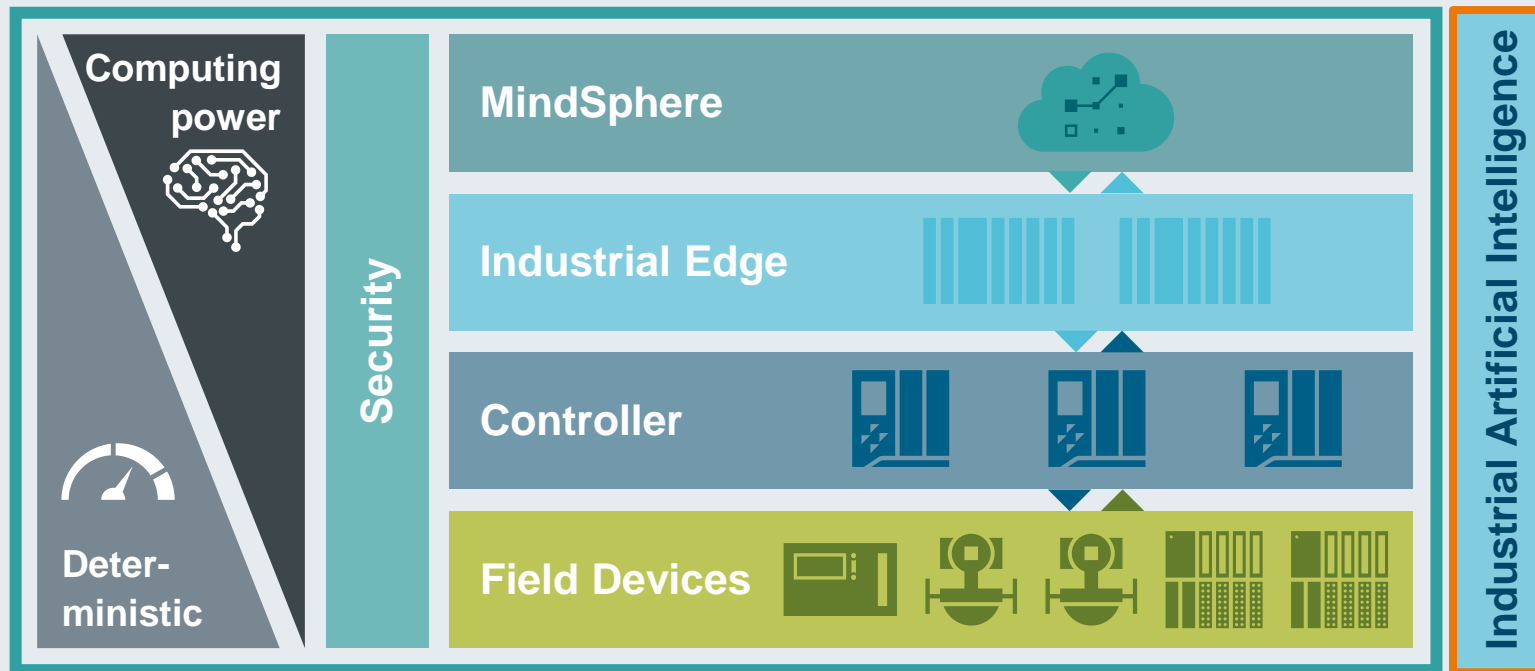
## Siemens Industrial Edge for automation

One system based on domain  
and use case-specific portfolio

- Edge Management
- Edge Apps
- Edge Devices



# Future of Automation – Integration of new technologies into the TIA ecosystem



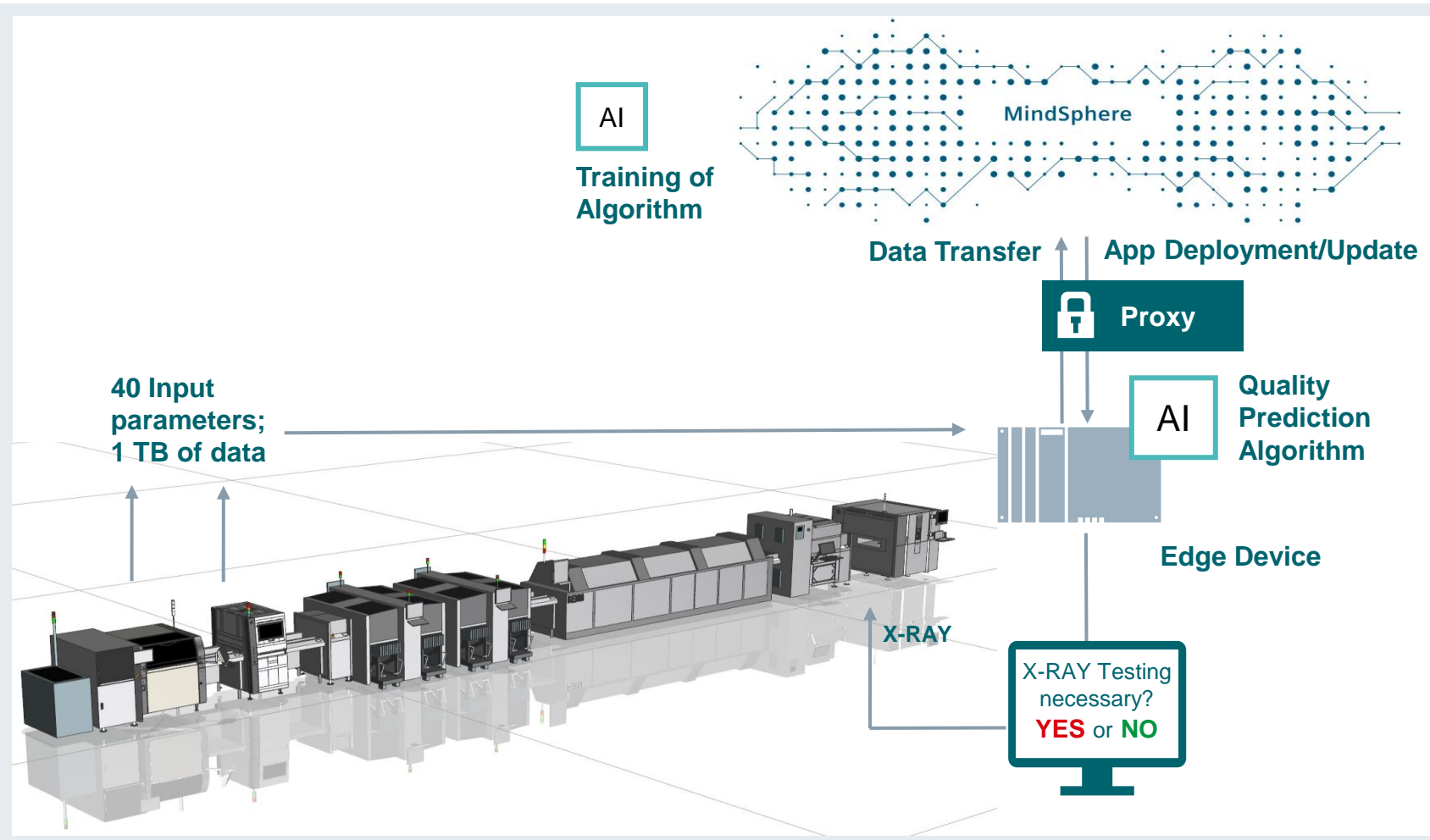
Our future portfolio  
will enable

**Artificial Intelligence**  
across all levels of  
Totally Integrated Automation

Discover 2 applications  
for hidden potentials

# 1<sup>st</sup> Application

## Optimized production line for printed circuit boards



## Smart interaction of OT and IT with Artificial Intelligence and SIMATIC Edge

- Number of necessary X-ray tests reduced by >30%
- Assured 100% quality of printed circuit boards
- Re-trained, up-to-date machine models

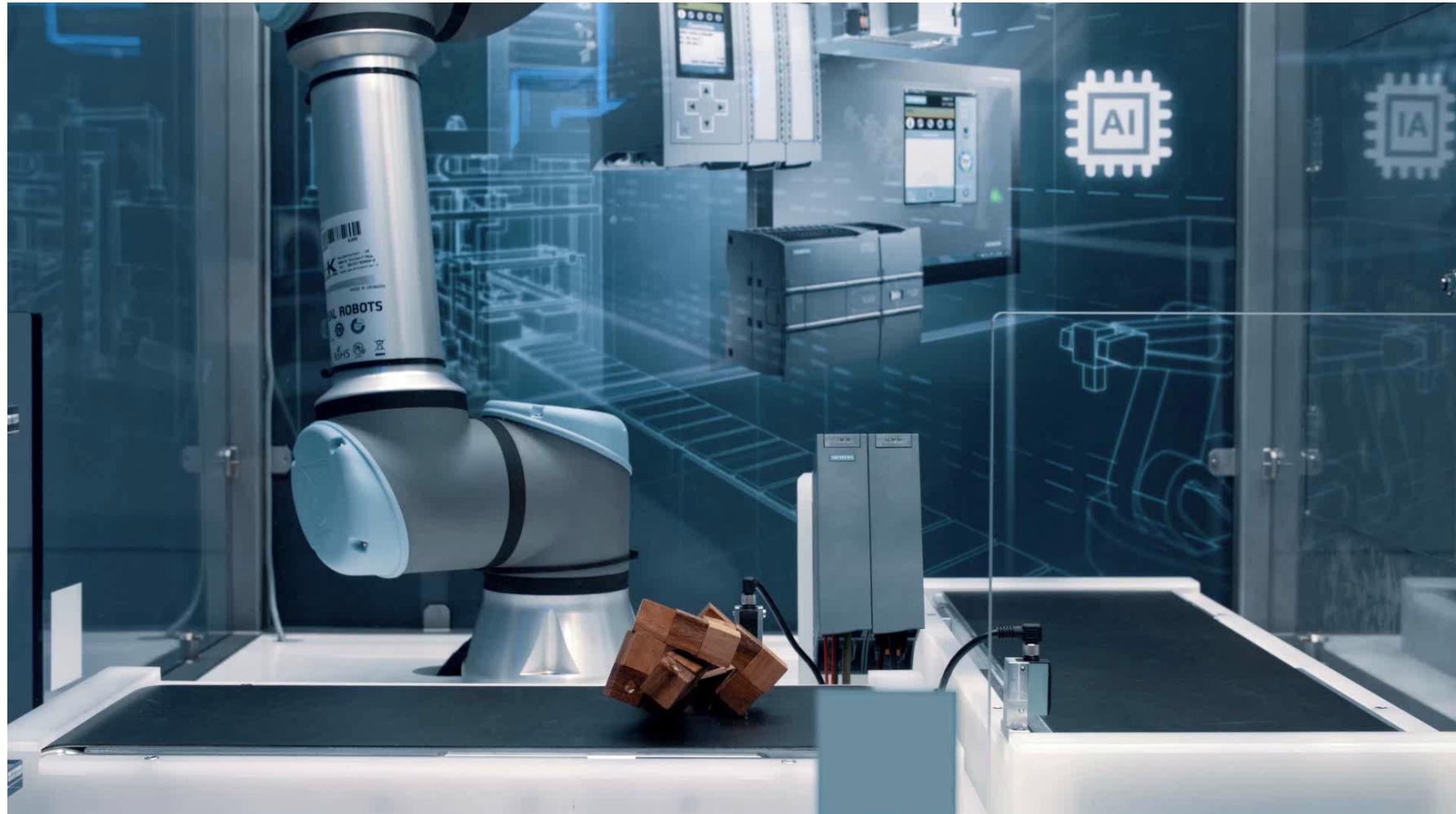
## 2<sup>nd</sup> Application

### Grasp detection with Artificial Intelligence

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#### Artificial Intelligence module for SIMATIC S7-1500

- Visual quality control
- Anomaly detection
- Condition Monitoring

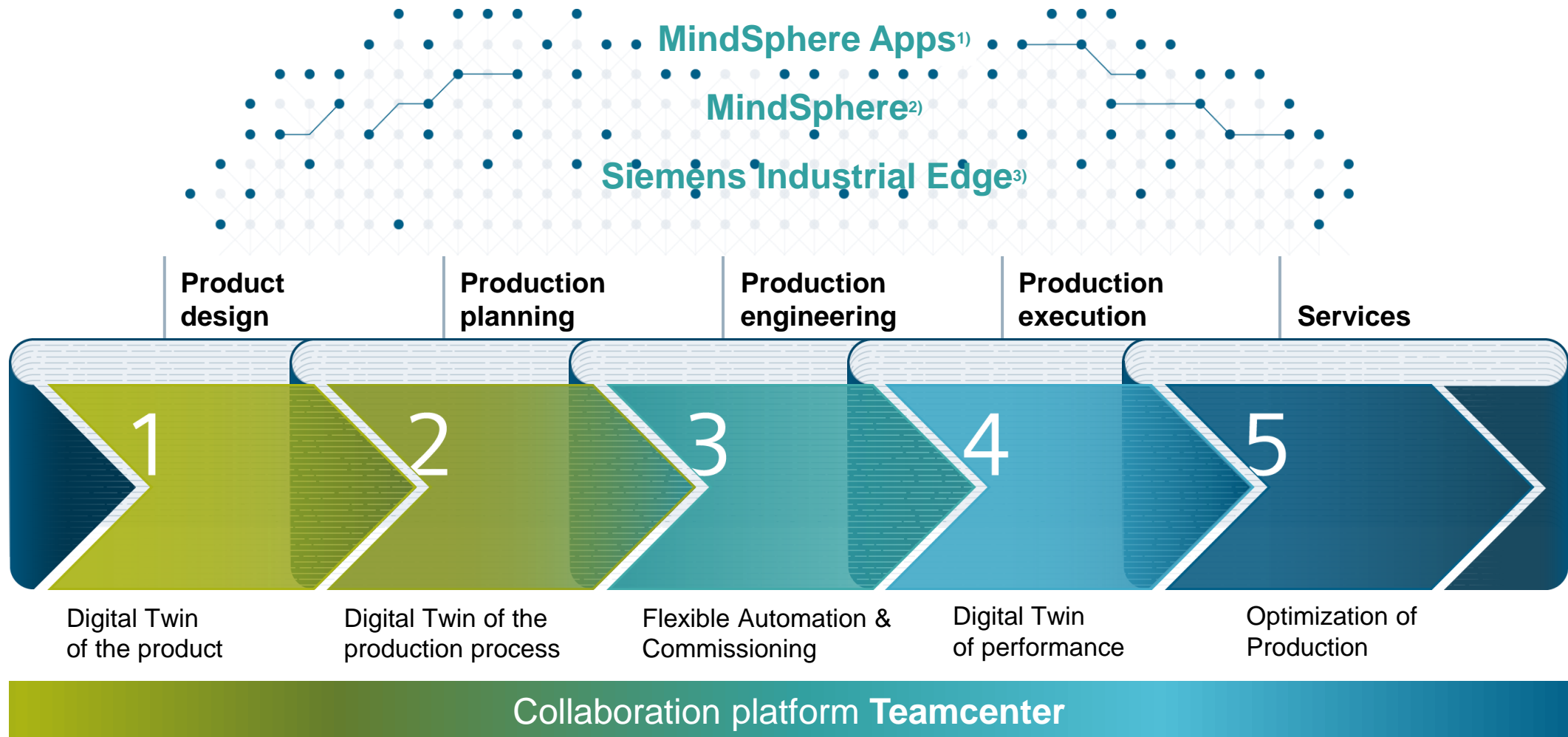




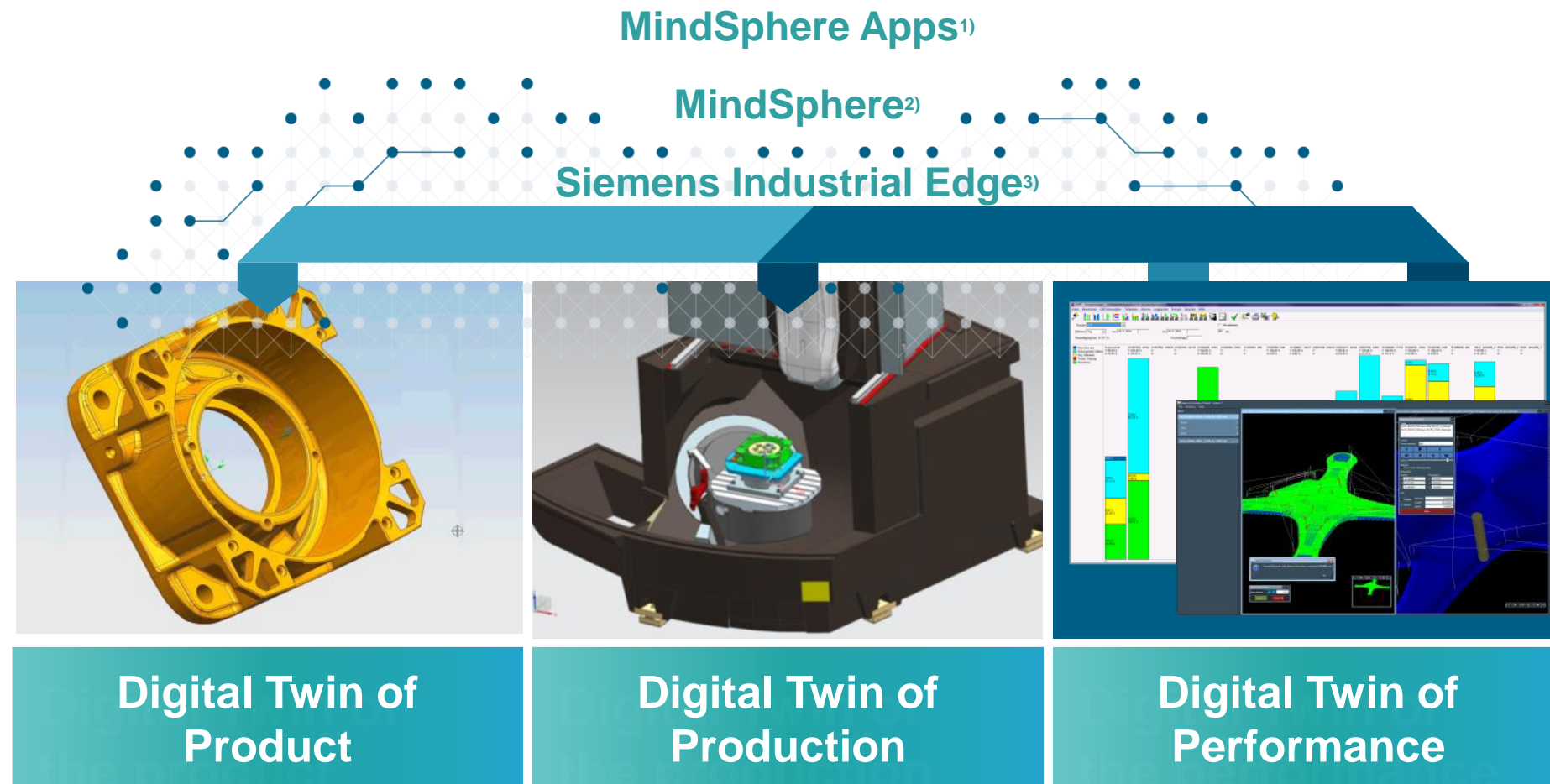
# Digital Enterprise – Thinking Motion Control further!

Dr. Wolfgang Heuring,  
CEO Business Unit Motion Control  
Siemens press conference prior to Hannover Messe 2019

# We implement digitalization and flexible automation along the entire value chain



# Creating the most holistic digital twin available on the market





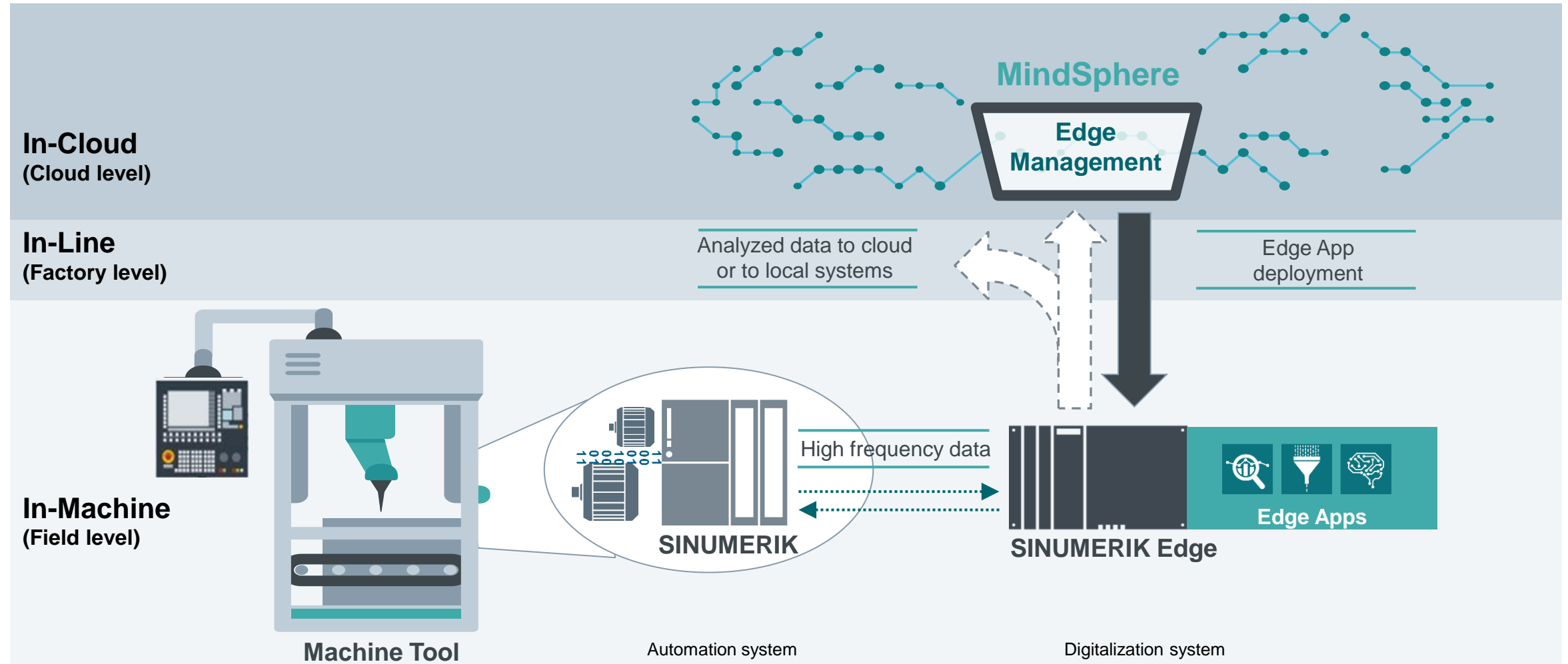
# SINUMERIK Edge

Improves machining,  
process quality, machine health  
and process efficiency

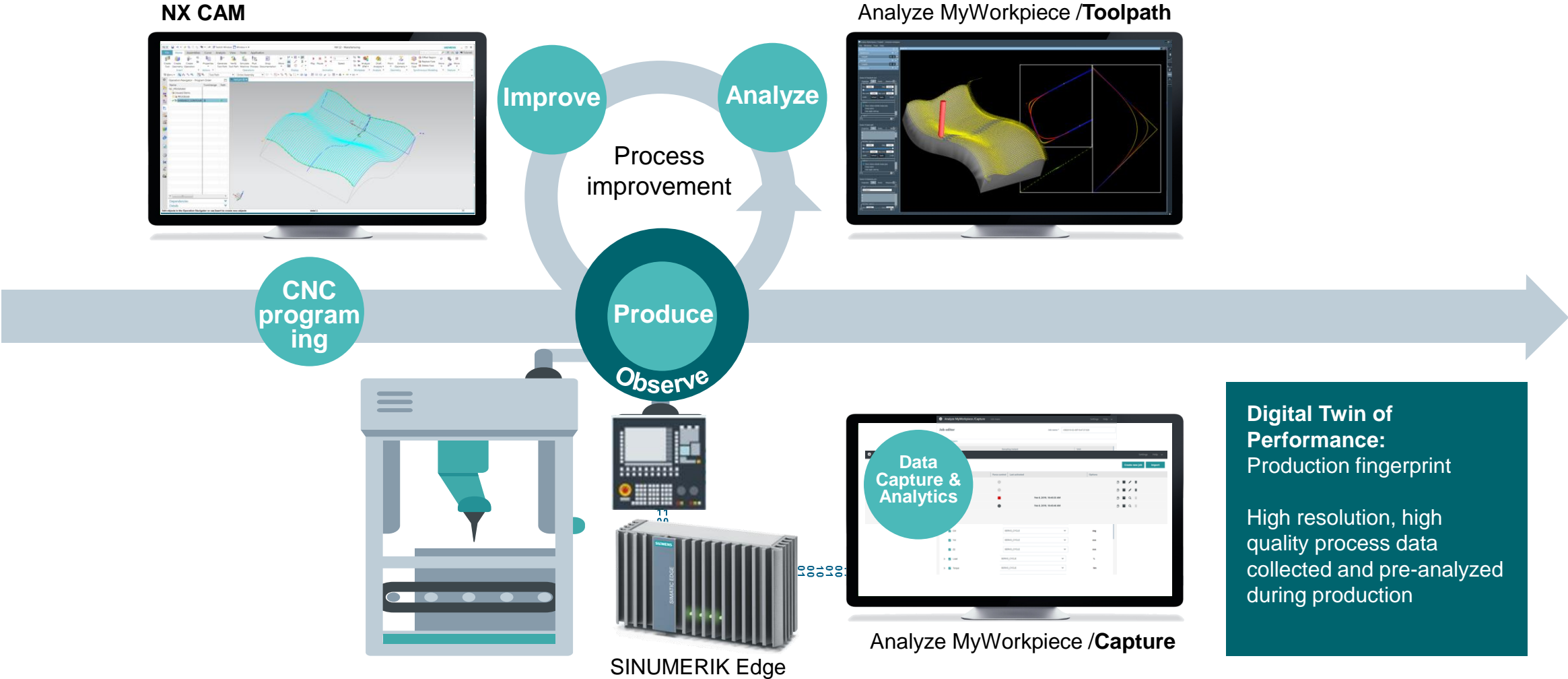
# SINUMERIK Edge

## The Industrial Edge system for Machine Tools

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# Analyze MyWorkpiece: Continuously enhancing process quality with Digital Twin of Performance





# Analyze MyMachine /Condition: Continuously maintain high machine performance and availability with edge application

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*Ingenuity for life*



# Industrialize Additive Manufacturing

Reimagine products, reinvent  
manufacturing, rethink business

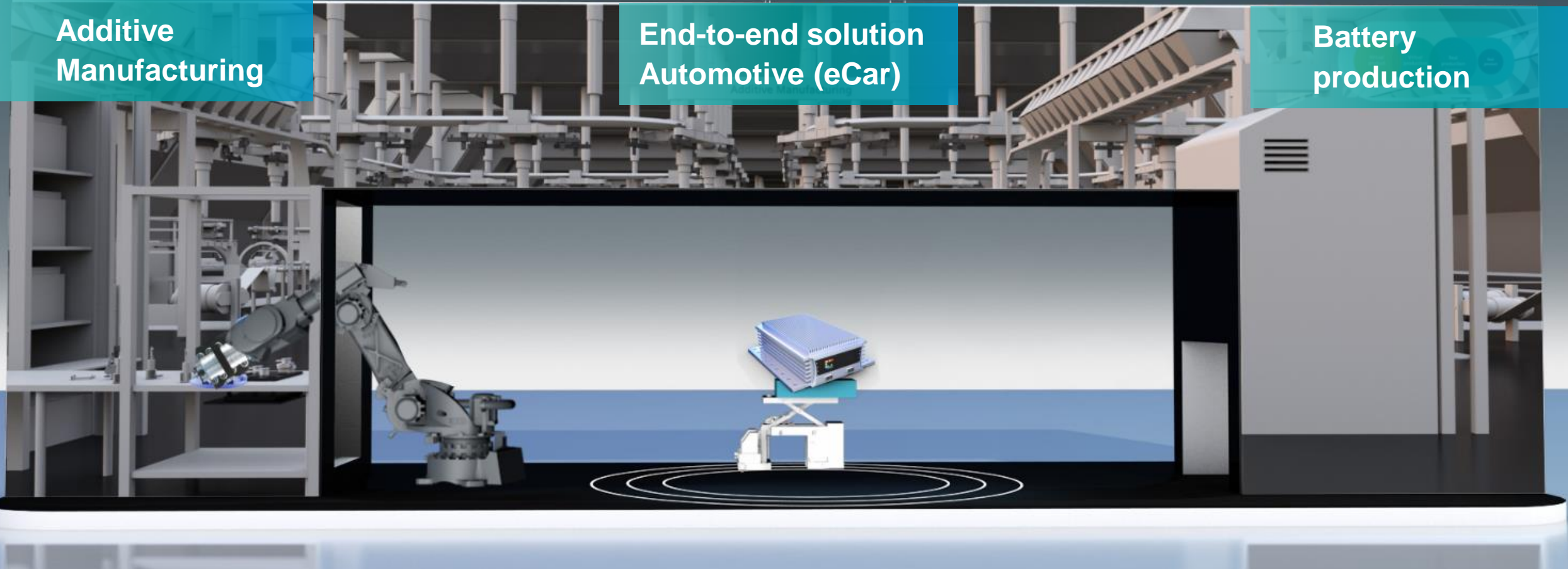
# Highlight Additive Manufacturing Digital Enterprise showcase

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Additive  
Manufacturing

End-to-end solution  
Automotive (eCar)

Battery  
production





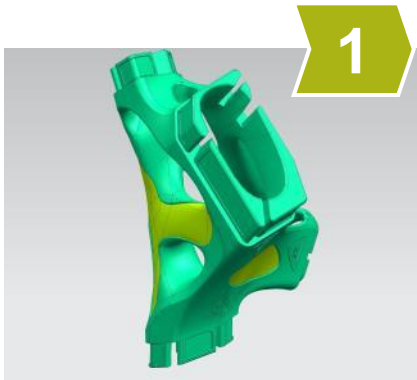
# Siemens offers a seamlessly integrated portfolio for industrial Additive Manufacturing along the whole value chain



## Example

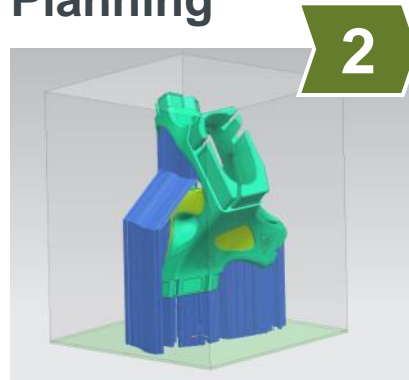
## Flexible production of carrier frames for e-car batteries\*

### Product Design



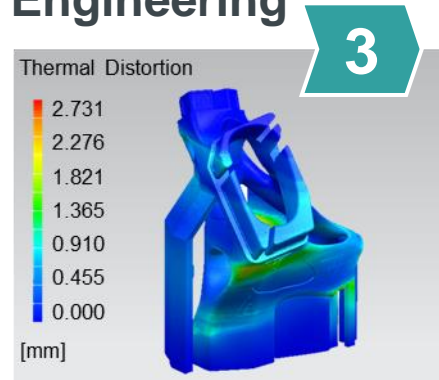
Design, validate and optimize parts for AM

### Production Planning



Prepare build space for scaled and optimized production

### Production Engineering



Realize first-time-right printing powered by the digital twins

### Production Execution



Manage production process seamlessly across several steps via digital twin & Siemens automation

### Services



Ensure quality through analysis of data captured during production

## Data and Process Management

# One integrated solution enables the industrialization of the complete Additive Manufacturing production



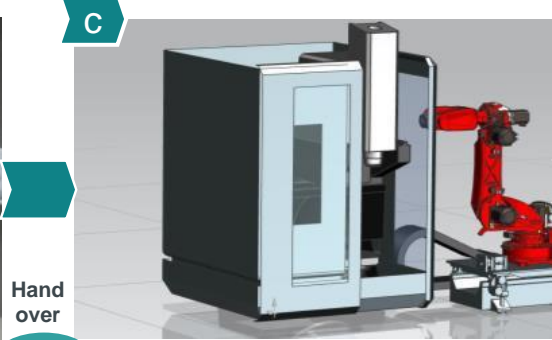
First time right printed part



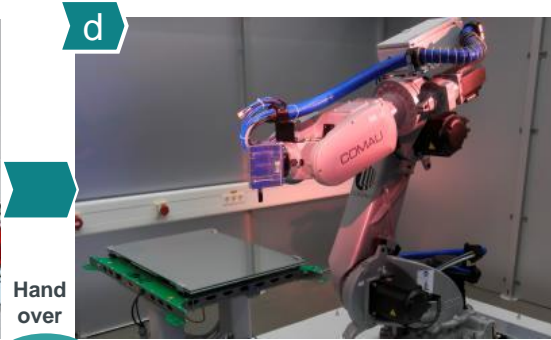
Automated removal of powder



Automated removal of support



Automated finish and assembly



Hand over

Hand over

Hand over

Digital Twin of Product

Product and process

Digital Twin of Machine

EOS

Automation

SIMATIC and SINAMICS

Powder removal

Solukon

SIMATIC

Support removal

Machine Tool

SINUMERIK

Assembly

Comau Robot

4

Production process industrialized using digital twins and automation from printing to finishing



# Highlights in Drive Technology





# Motion Control Drive Technology seamlessly integrated in the Digital Enterprise

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## Drive Technology Product Highlights

### Enter new markets:

#### 1 SINAMICS G120X

- Infrastructure market/pump & fan applications
- Comprehensive new portfolio from 0,75 – 630 kW

#### 2 SIMATIC MICRO-DRIVE

- E.g. AGVs and handling systems
- New servo drive system in protective extra low voltage

#### 3 SINAMICS S120 Chassis-2/ SINAMICS S120 Cabinet Modules-2

- Extended power range
- Innovative compact design

### Digitalization:

#### 4 SINAMICS und SIMOTICS CONNECT

- Connect drive systems and motors to MindSphere
- No hard- and software adaptations required



# Use digitalization to increase the performance of Drive Systems

SIDRIVE IQ – Suite of software and services for the drive train

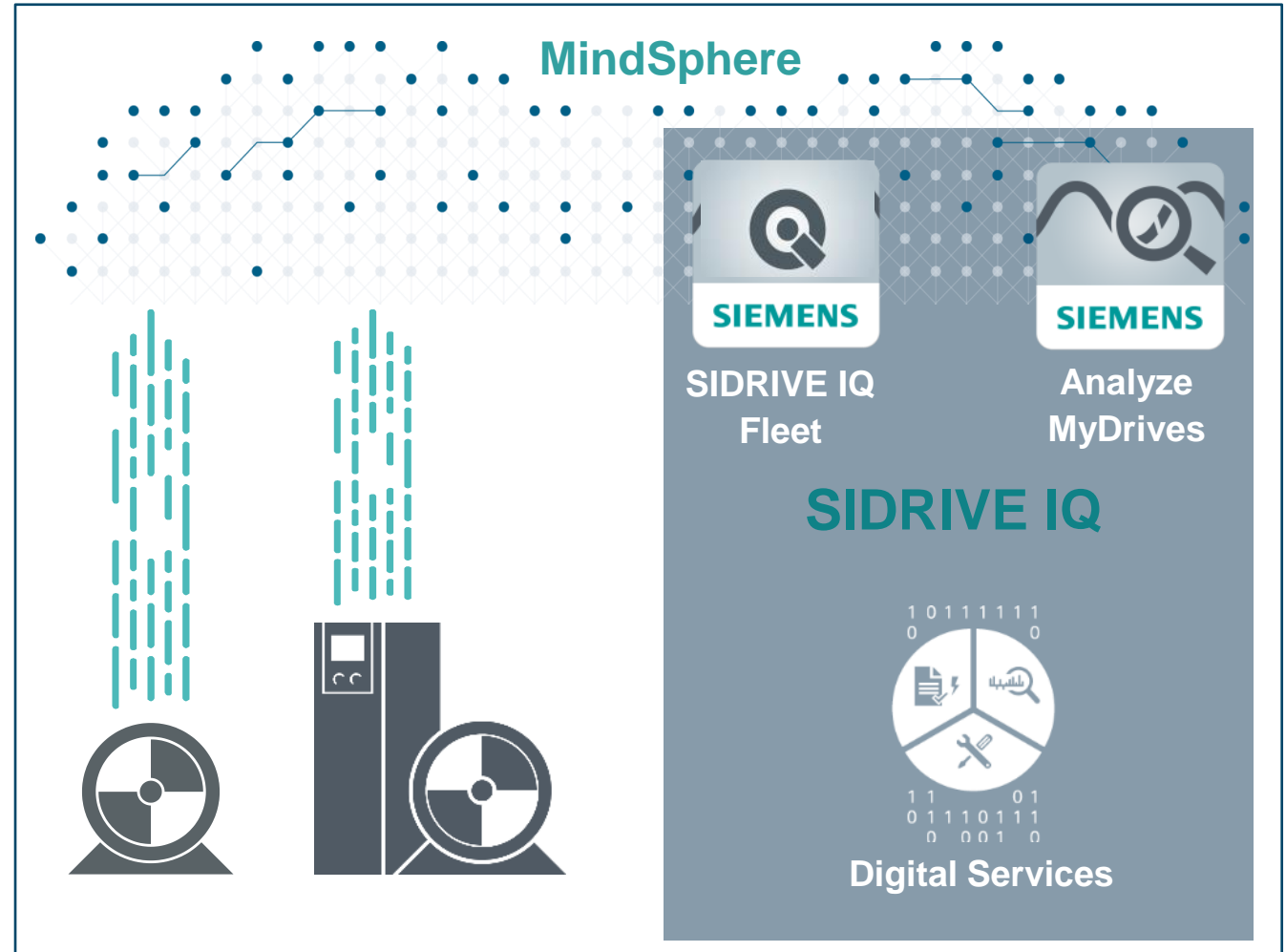


## MindSphere applications SIDRIVE IQ Fleet & Analyze MyDrives

- Providing transparency
- Increased availability
- Deducing measures based on data analytics
- Supporting preventive maintenance

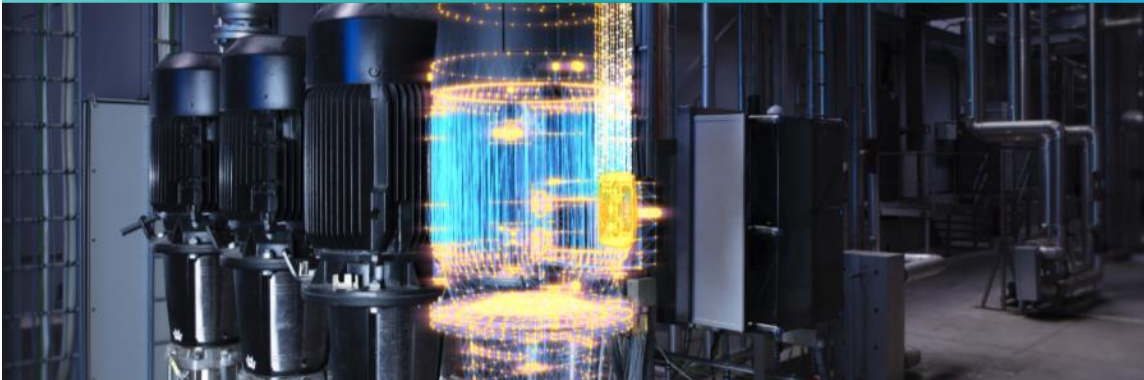
## Digital Services

- Consulting
- Digitalization check as a service
- Implementation of digital technologies
- Optimization of performance



# References for Digitalization of Drive Systems

## Partnership between Grundfos and Siemens Reducing downtimes at Danish Crown in Denmark



### Solution

- SIMOTICS motors connected via SIMOTICS CONNECT to MindSphere App SIDRIVE IQ Fleet
- Combined data from pump and motor to gain new insights for optimizing pump solutions

### Benefit

- Excellent motor and pump asset & maintenance management
- Transparency on motors and pump fleet
- Increased productivity due to higher availability and optimized performance

## Siemens electronics factory Erlangen Monitoring of pump drives in soldering machines



### Solution

- Drives connected to MindSphere via SINAMICS Connect
- > 10 parameters being monitored and visualized via Analyze MyDrives
- Automated initiation of maintenance if threshold is exceeded

### Benefit

- Optimized service intervals save money and energy
- Increased capacity utilization and productivity



**See you  
tomorrow!**

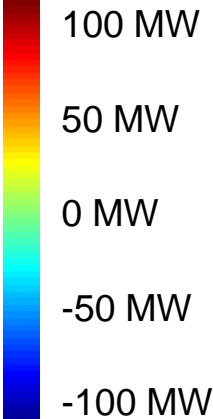
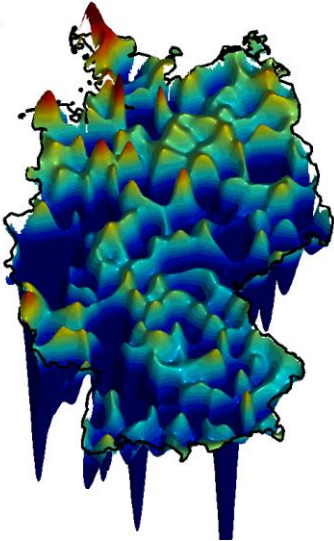
# Smart energy in the digital age

Ralf Christian,  
CEO Energy Management Division  
Siemens press conference prior to Hannover Messe 2019

# Increased renewable power generation – Germany as an example

## 40% share of renewables

Tag 130  
00:00Uhr

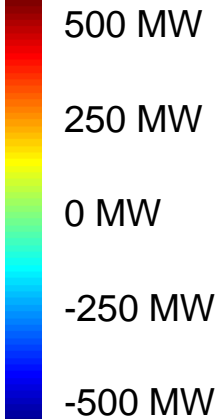
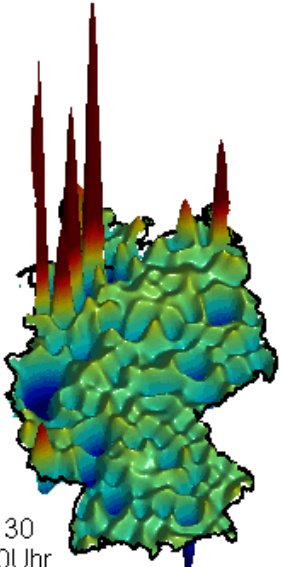


Most likely scenario  
for 2024

© IFHT

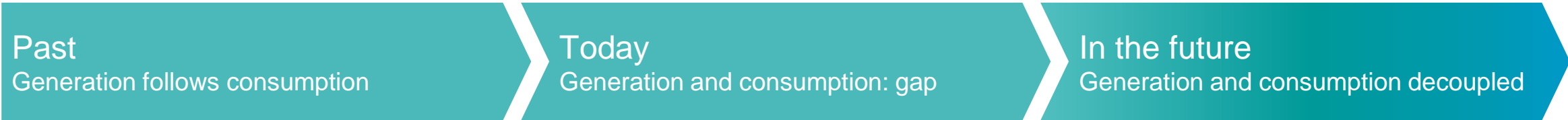
## 80% share of renewables

Tag 130  
00:00Uhr



Most likely scenario  
for 2035+

© IFHT

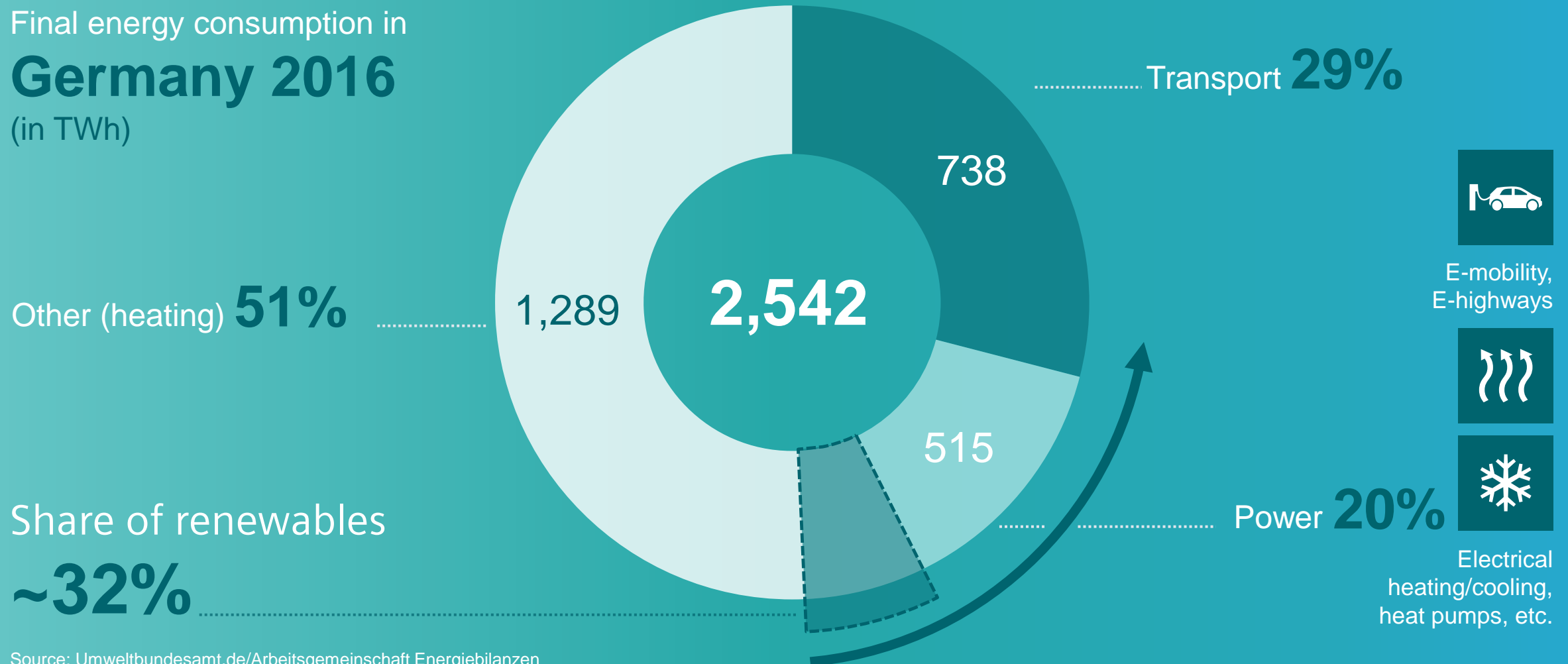


**Source:** German Power Network Development Plan



# There is tremendous potential for the electrification of other sectors

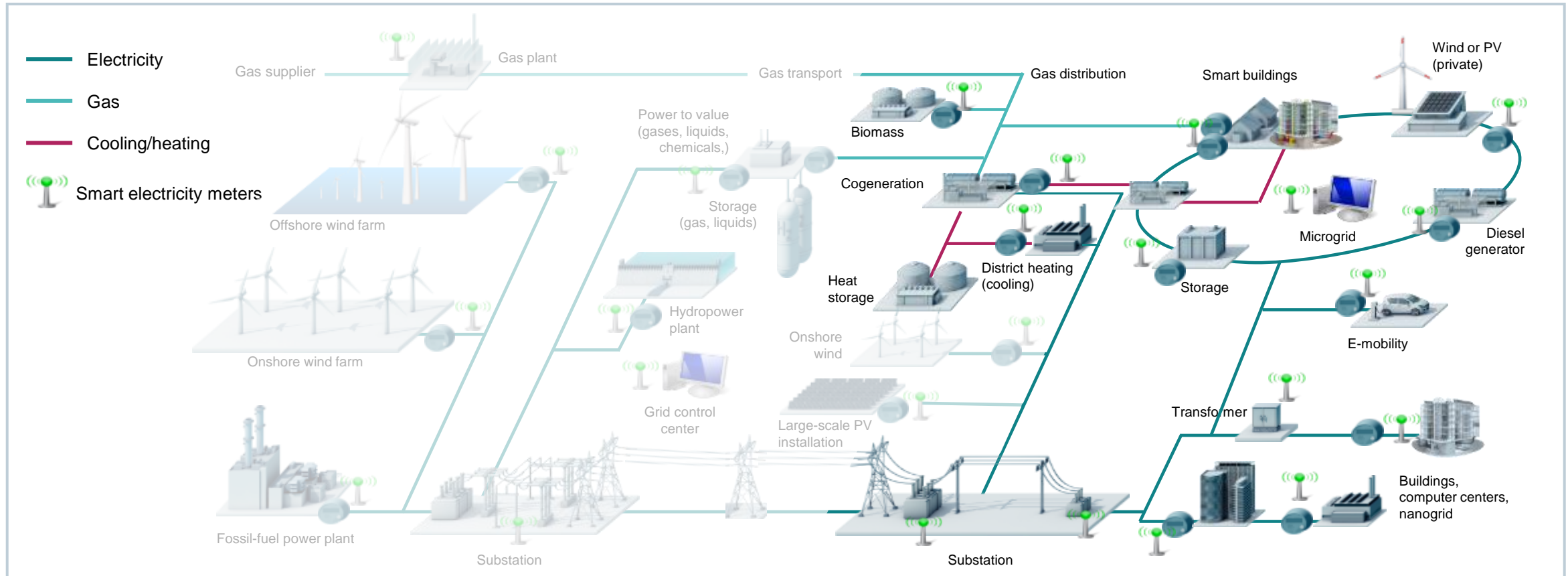
Final energy consumption in  
**Germany 2016**  
(in TWh)



Source: Umweltbundesamt.de/Arbeitsgemeinschaft Energiebilanzen

# The energy system of the 21<sup>st</sup> century is combining several energy sectors in one overall “connected” system

**SIEMENS**  
*Ingenuity for life*



From a centralized power generation and unidirectional grid ...

to a

... decentralized and distributed energy system

## Increased connectivity – digital promoters

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>20 billion  
“connected things”  
globally up until 2020<sup>1</sup>

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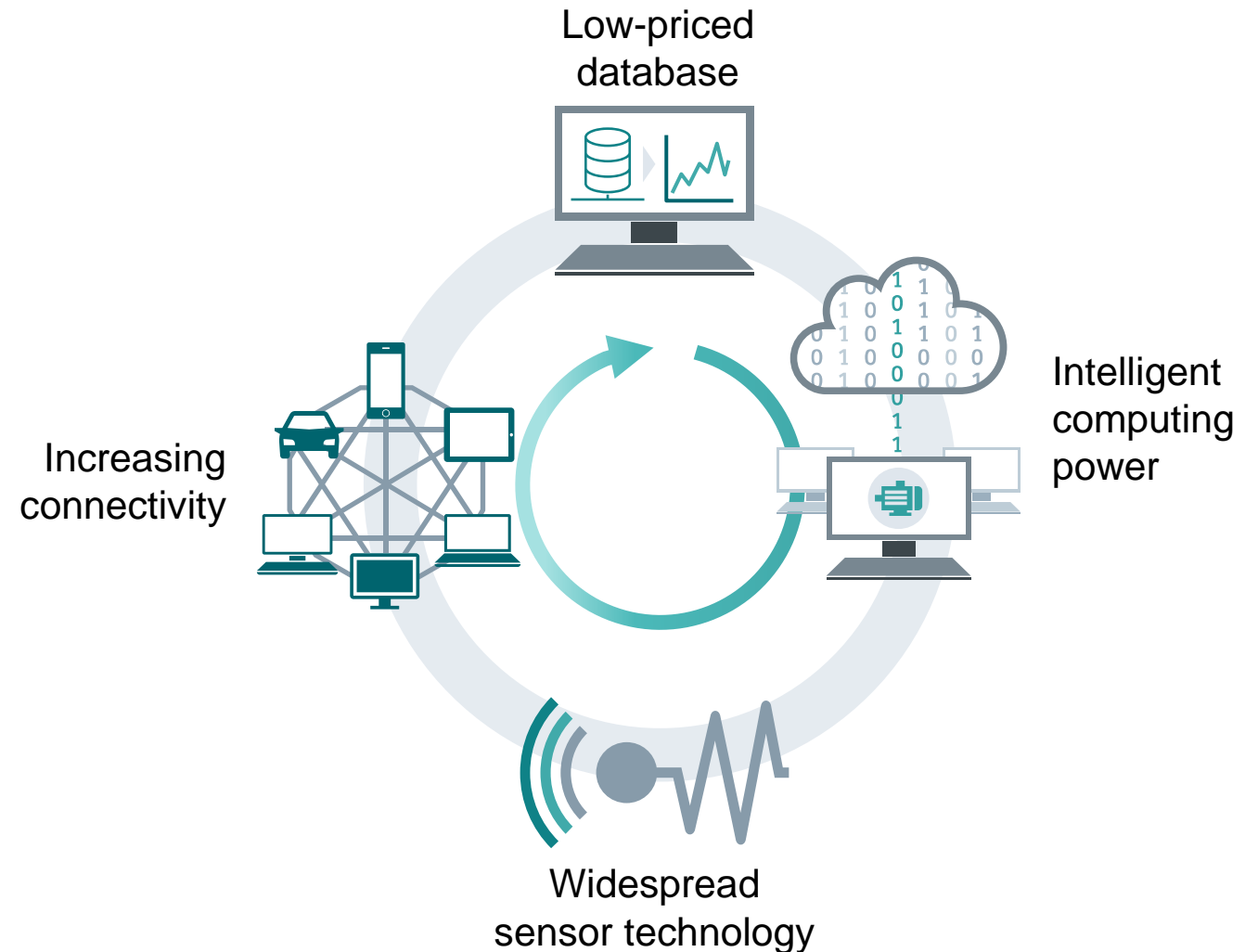
<sup>1</sup> Source: forbes.com

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February 18, 2019

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[www.siemens.com/press/hm19](http://www.siemens.com/press/hm19)



# The 3 Ds – drivers for a fundamental change of the energy system



# Consumers become market participants: “prosumers”

## Industry & infrastructure are crucial for greater energy efficiency



Electrical  
devices



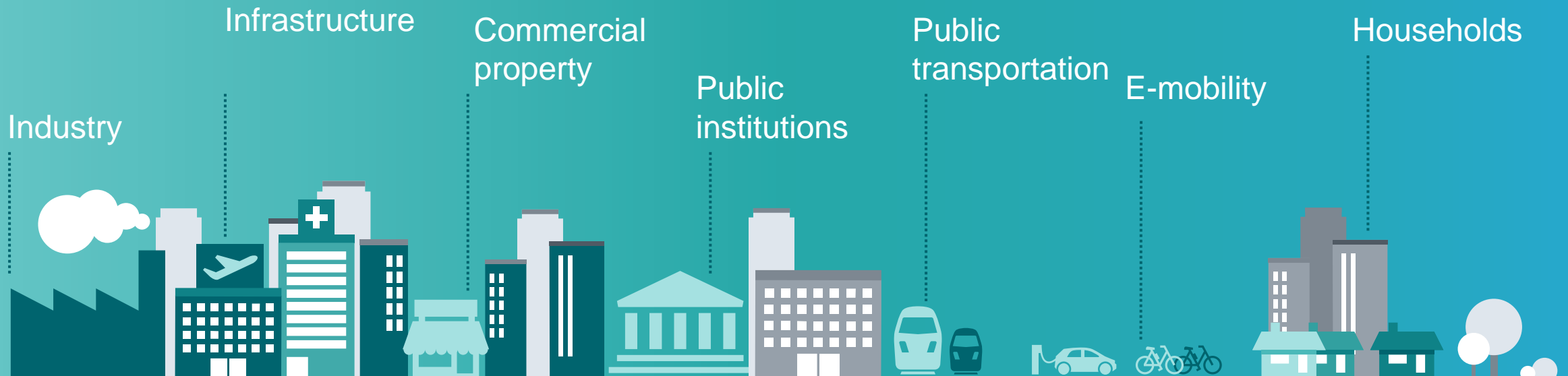
Heating



Cooling



Light



# Smart energy in the digital age at Hannover Messe 2019



## Energy supply



Complete solutions for a sustainable, reliable, and independent power supply

## Power for the Digital Enterprise



Communication-capable devices and intelligent solutions for the seamless integration of power distribution into digital automation environments



Reliability



Sustainability



Transparency



Energy efficiency





# Digitalization – solutions for seamlessly integrating power distribution into automation environments

## Smart devices and sensors

Communication-capable protection, switching, and measuring devices, switchboards, transformers, etc.



Power for the Digital Enterprise



## Application for analyzing the power supply

Energy IP Efficiency Analytics, Grid Diagnostics Suite, Power Quality Analytics, etc.



Energy Supply



### New HM19

## Powermanager power monitoring software with cloud connection

Direct data transmission to open IoT operating systems like MindSphere for comprehensive evaluations, such as cross-location analyses.



## Sivacon 8PS busbar trunking system with powerline technology

Current and data are transmitted in parallel via the conductor paths and can be forwarded to higher-level automation and energy management systems.



## 7KN powercenter3000 IoT data platform

Quick and economical introduction into cloud-based energy management for small and medium-sized companies.





## Sustainable, SF<sub>6</sub>-free power supply – Siemens blue portfolio

SF<sub>6</sub> emissions in conjunction with electrical equipment in Germany

50 t 1997

17 t 2015

Blue portfolio

Compact switchgear with reduced SF<sub>6</sub>

Improved gas-tightness

Ring Main Units (8DJH)  
hermetically welded = gas-tight

HV

AIS circuit  
breaker

AIS instrument  
transformers

GIS for wind  
applications

GIS

MV

Generator  
switchgear

Primary GIS



## Independent power supply with Distributed Energy Solutions (DES)



### Energy Configurator (ECO)

- Easy-to-use, free online tool
- Makes it possible to find the optimization potential of businesses based on their location, consumption, and other factors



### Comprehensive portfolio for the

- generation of power, heat and cold
- energy storage
- energy and grid management



### Technical and economical consultation for

- industries
- commercial areas
- large buildings
- municipalities
- communities





# Pioneering ecosystem for eMobility – Siemens charging ecosystem





## A pioneering community for the energy transition Wunsiedel, Bavaria, as blueprint

“WUNsiedler Weg Energie 2.0”:  
infrastructure development with **decentralized power grid** for smart cities

- **Integration into energy mix** – regulation of local energy producers and consumers
- **Grid stability and security of supply** thanks to 8.4 MW lithium-ion battery storage
- Economical implementation of technologies in the grid and new business models
- End-to-end data networking on the **MindSphere IoT platform**

## Worth seeing at HM19

- Animation of decentralized power system in Wunsiedel based on project data
- Siestotage
- VersiCharge wallbox
- Spectrum Power (cloud)
- Protection technology (e.g. Siprotec)
- Medium-voltage switchgear
- Distribution transformers (Geafol)
- etc.







Real-time energy efficiency

## Electronics wholesaler REXEL, Germany

Cloud-based power monitoring system  
in logistics center in Maisach, Germany

- **At >40,000 m<sup>2</sup>**, the Maisach logistics center is one of their most power-intensive facilities
- Energy monitoring with **connection to MindSphere**
- **Analysis of actual power consumption values** makes savings potential visible
- Reduction of power consumption by up to **15 percent annually**
- **New business area:**  
Consulting services for their own customers from the industry and retail sectors with regard to energy efficiency and the implementation of digital, cloud-based technologies

### Worth seeing at HM19

- Power monitoring system with measuring devices
- Powermanager power monitoring software with cloud connection
- Sivacon 8MF1 system cubicle
- New at HM19:  
7KN powercenter3000 IoT data platform







Sustainable power supply

## SF<sub>6</sub>-free high-voltage products for E.ON in Sweden

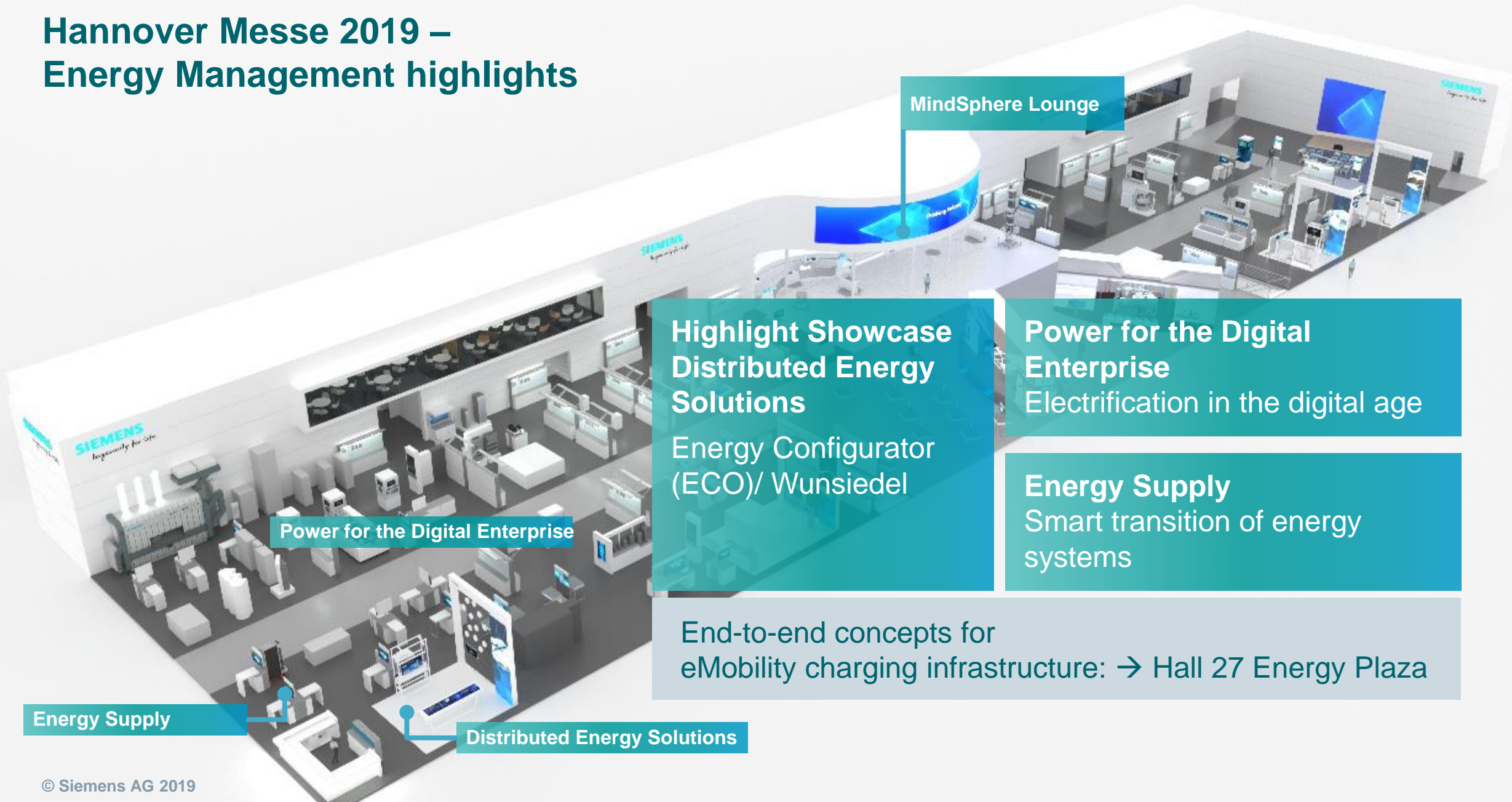
- **First CO<sub>2</sub>-neutral high-voltage project** for Siemens in **Sweden**
- **Vacuum switching technology combined with “clean air”** replaces SF<sub>6</sub> as switching and insulating medium
- **High operational performance** even at extreme temperatures as low as -55 degrees Celsius without heating systems

### Worth seeing at HM19

- Blue instrument transformer  
→ New at HM19: 420 kV
- Blue 3AV1 circuit breaker
- Overview of the entire blue portfolio



# Hannover Messe 2019 – Energy Management highlights



MindSphere Lounge

**Highlight Showcase  
Distributed Energy  
Solutions**

Energy Configurator  
(ECO)/ Wunsiedel

**Power for the Digital  
Enterprise**

Electrification in the digital age

**Energy Supply**

Smart transition of energy  
systems

Power for the Digital Enterprise

End-to-end concepts for  
eMobility charging infrastructure: → Hall 27 Energy Plaza

Energy Supply

Distributed Energy Solutions

# Thank you.

Siemens press conference prior to Hannover Messe 2019  
Herzogenaurach | February 18, 2019



# Siemens press conference prior to the Hannover Messe 2019

Herzogenaurach | February 18, 2019  
**Digital Enterprise – Thinking industry further!**