

# Digital Enterprise – Thinking industry further!

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Klaus Helmrich, Member of the Managing Board of  
Siemens AG and CEO Digital Industries



# Digital Enterprise 2019 – Thinking industry further!



- 1** Our customers' requirements are increasing: environmental efficiency is just as important as productivity, flexibility and time-to-market
- 2** Our Digital Enterprise portfolio meets these requirements through an even more powerful connection of the virtual and the real world
- 3** New control systems and other platform innovations ensure data integration and flexibility across all stages of the value chain
- 4** Our growing ecosystem for Industrial Edge and Cloud supports scalability from the shop floor to the Cloud
- 5** With cutting-edge technologies, we are paving the way for modular, highly flexible production processes



# Continuously growing demands for productivity and flexibility as well as for environmental efficiency



**Productivity**

**Flexibility**

**Time-to-market**

**Environmental efficiency**

Our comprehensive end-to-end portfolio – aimed at the requirements of specific industries



Example machine building

Up to 25% shorter machine commissioning



Example chemicals

Individualized color batches of 100 liters instead of 5000+ liters




Example aerospace

2.5 instead of six years of development time for airplanes



Example water

Up to 240,000 m<sup>3</sup> supply of desalinated water per day instead of 51,000 m<sup>3</sup>



Simatic  
HMI  
Comfort  
Panels

Simatic  
S7-1500

Simatic  
Energy  
Manager  
Pro

## Alfred Ritter GmbH & Co. KG

# Energy data analytics increases energy efficiency

### Integration of data

from production, building and power generation

### Lower energy costs

Reduced primary energy consumption: -20%

Optimized generation of compressed air: -40%

### Target

Further -10% energy consumption  
per bar of chocolate



Solid Edge

MindSphere

MOM

Sidrive IQ

## Strategic partnership with Grundfos Digital solutions reduce water consumption

**Digital twin** for increased productivity, shorter time-to-market and reduced material consumption

**MindSphere connection** for optimization of pumps and motor schedules for reduced energy consumption

### Aims for Grundfos

- Halving of water consumption by 2025
- Water efficiency and treatment saves 50 billion liters of fresh water

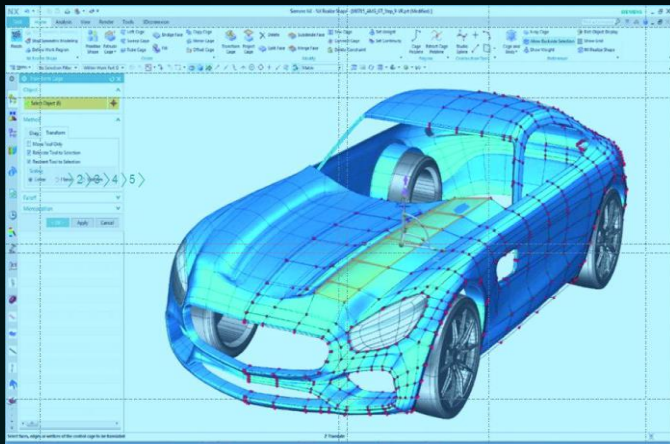


# Environmental efficiency across the entire value chain – Example Additive Manufacturing



## Design

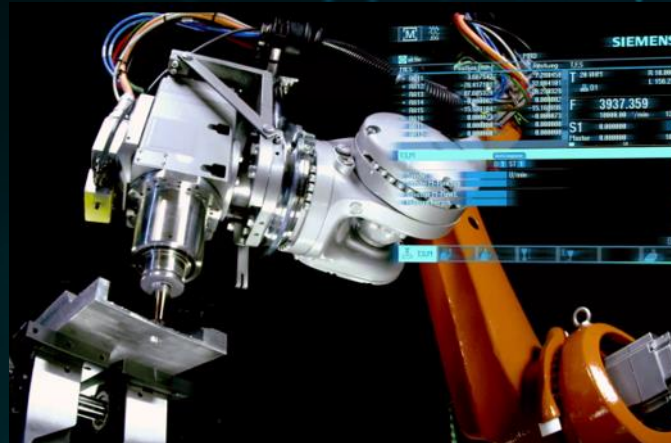
>50% weight reduction for energy  
savings in production and operation



With bionic structures using  
Siemens NX, StarCCM+

## Production

> 60% weight reduction  
> 800,000 liters less kerosene



With Sinumerik Run  
MyRobot/Direct Control, Simotics

## Performance

70% saving on resources  
in burner repair,  
no new purchase required



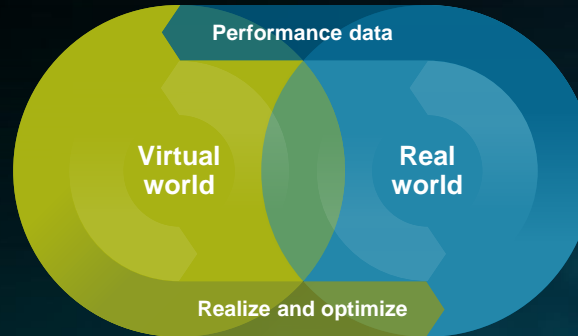
With on-demand printed spare  
parts using Siemens AM network

# Digital Enterprise – Creation of data pools for the seamless connection of the virtual and the real world



## Digital Enterprise

Digital end-to-end solutions  
for industry



MindSphere

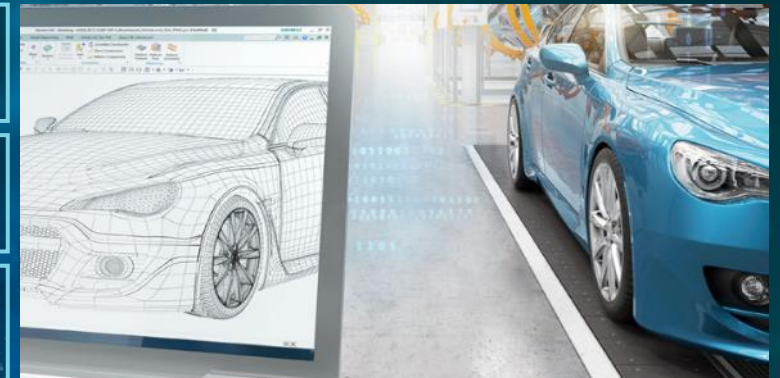
Automation and industrial software for process industry and discrete industry



Industrial communication

Industrial security

Industrial services





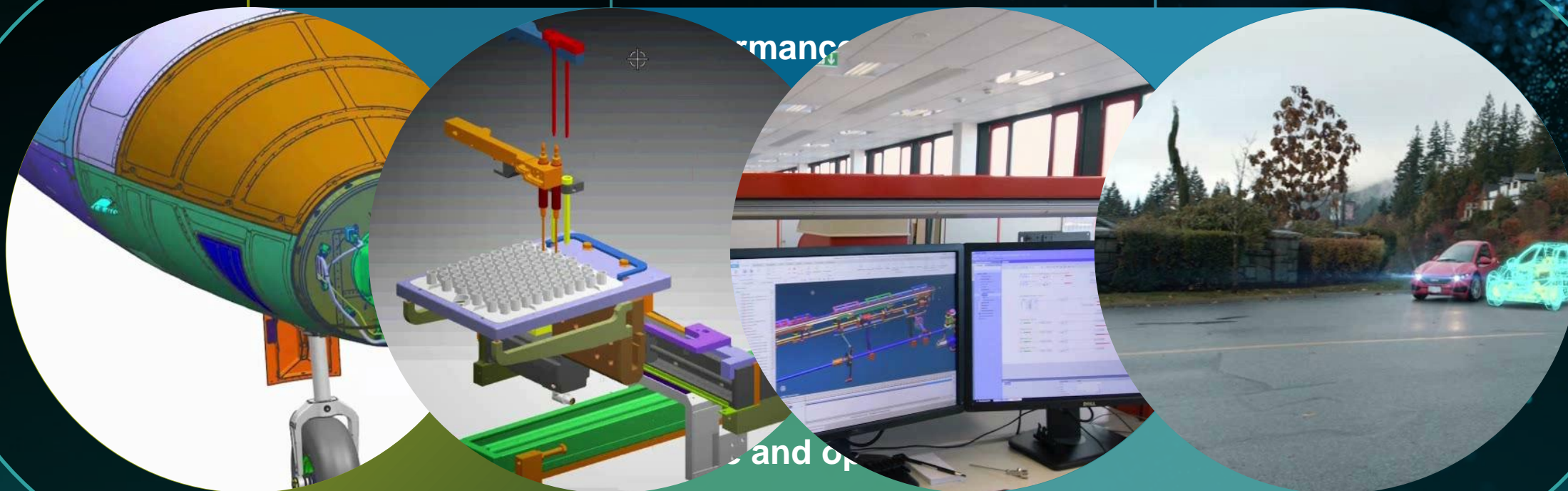
# Digital Enterprise – Powerful connection of virtual and real worlds



Digital Twin  
Product

Digital Twin  
Production

Digital Twin  
Performance



Collaboration platform

Industrial Security



# Digital Enterprise 2019 – Thinking industry further!

## More technologies for implementing the future



**Automation  
platforms**

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**Software  
platforms**

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**Industrial  
Edge**

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**Industrial  
5G**

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**Handling  
systems**

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# Digital Enterprise 2019 – Thinking industry further!

## Platform innovations from the shop floor to the Cloud



**Data analytics  
in the Cloud**



**CNC system  
Sinumerik One**

**NEW**

**Process  
control system  
Simatic  
PCS neo**

**NEW**

**Software and  
low-code  
development**

**NEW**



**Visualization  
WinCC Unified  
System**

**NEW**

**Data analytics  
on the shop floor –  
Industrial Edge**





**First digital CNC – Completely seamless  
image from the virtual idea to the  
real production of the product**



## **SINUMERIK ONE** CNC platform



- Design and concept with Mechatronic Concept Designer
- Engineering with TIA Portal
- Test/commissioning with Create/Run My Virtual Machine

- Simulation of product processing in foreman's office
- Seamless high-performance connection of CNC and PLC
- Shorter commissioning times

**Up to 50%**  
shorter time-to-market

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**Up to 25%**  
increased productivity  
in processing

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**10x**  
shorter PLC cycle times  
through integration of  
Simatic S7-1500

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# New process control system Simatic PCS neo – For a more modular production

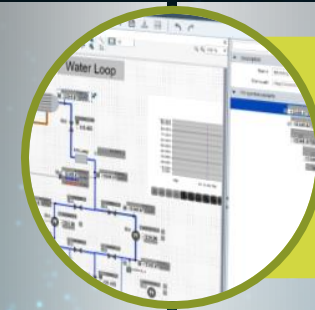


## Simatic PCS neo

- Petrochemicals, water and plant infrastructure
- Continuous processes, modules are scalable from single plants to globally networked systems

## Simatic PCS 7

- Comprehensive range of applications for all process industries
- Continuous processes as well as batch and regulated industries e.g. pharma
- Further development for all existing process applications



### SIMATIC PCS neo

- Web-based
- Multi-user concept



### SIMATIC PCS 7

Past

2019

Future

**Common hardware platform and application architecture  
for Simatic PCS 7 and Simatic PCS neo**

## Acquisition of PSE Precise simulation models for the entire life cycle

- **Model-based simulation** optimizes digital twin for product/process design and operation in **Chemicals, Petrochemicals, Pharma and F&B**
- Detailed dynamic simulation of technical processes, validated with **real-time process data**



## Customer SABIC

- Optimized operation of a cracker
- Precise simulation of operation

Up to 2% higher yield



Newly developed visualization platform  
based on modern web technologies

## Simatic WinCC Unified System

- **Scalable** from the machine level to a comprehensive system visualization
- Execution on **panel** and **PC systems**, fit for **Cloud and Edge**
- Integration of applications through **open, powerful interfaces and technologies**<sup>1</sup>
- New generation of **HMI panels** with **Edge functionality**
- Engineering in the **TIA Portal**

<sup>1</sup> ODK (Open Development Kit), OpenPipe, Custom Web Control

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# Xcelerator – Platform for rapid app development



- Data analytics and apps
- Software, digital services and new business models



Rapid low-code app development



Any database/Cloud/  
device/infrastructure



Low code, leading Rapid App  
Development (RAD) system



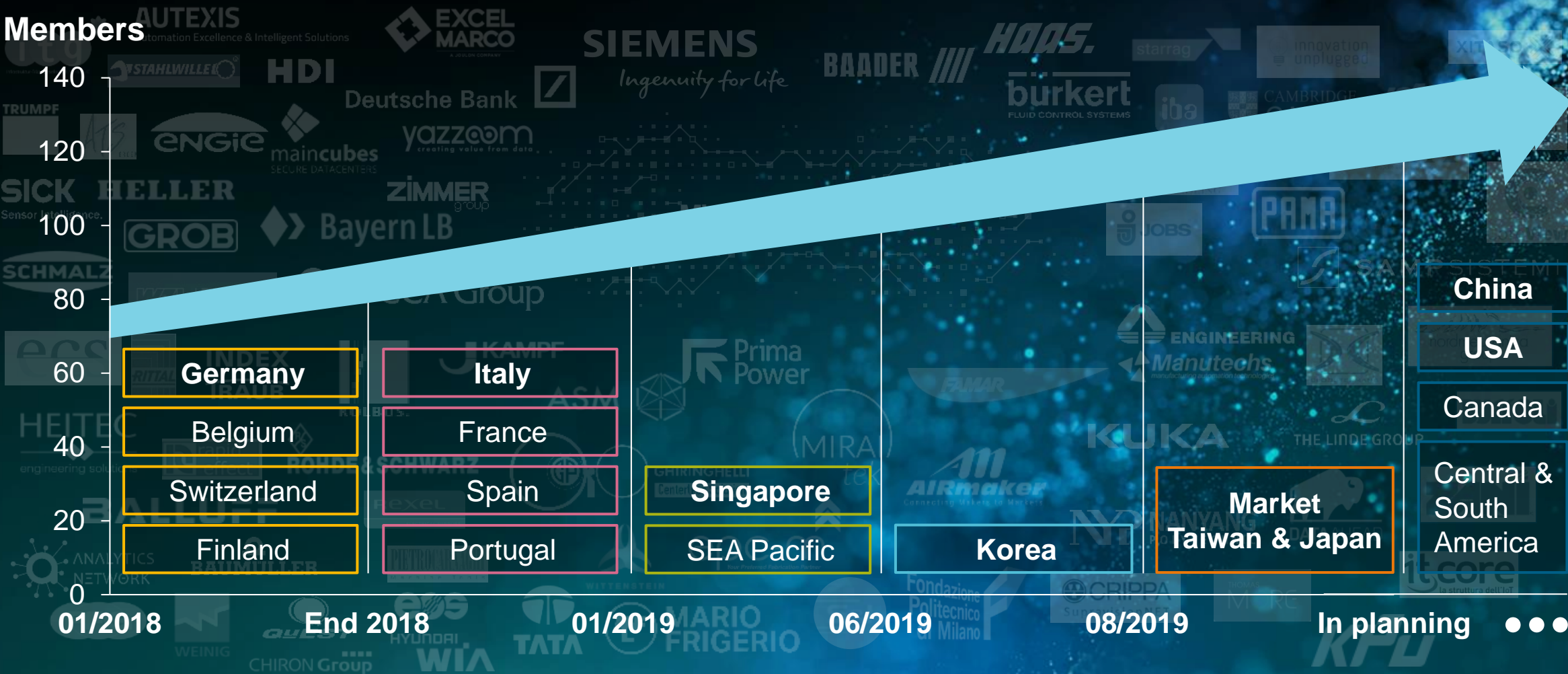
Individual,  
adaptable apps



Can be integrated inside  
and outside the company



Growing ecosystem for MindSphere World –  
Currently >120 members from a whole range of industries



## Bror Tonsjö AB, Sweden Finance concepts for the digital transformation of SMEs

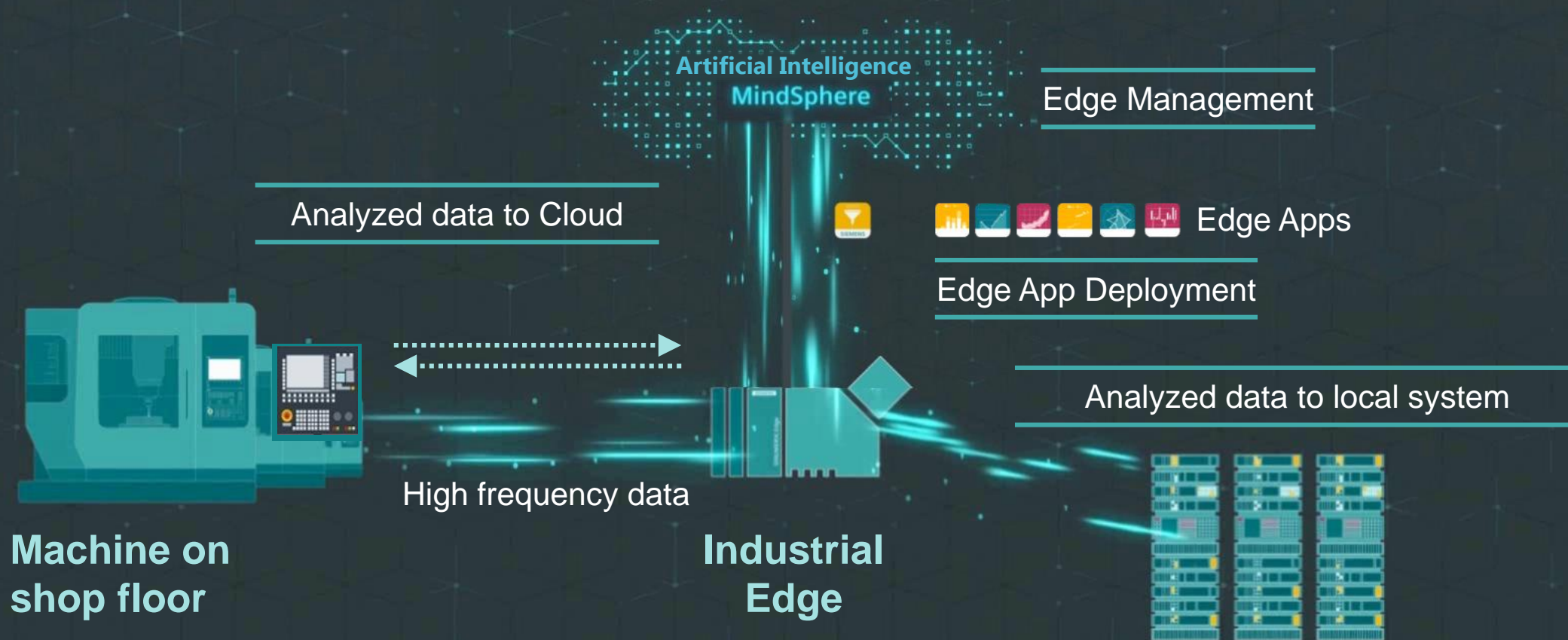
- **Connection of shop floor and ERP system to MindSphere:** Optimized production processes and fewer downtimes
- **15% higher production efficiency**
- **Financing: Predictable cash flow management** (24-months payment plan)
- **Costs are covered by gains in efficiency**

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“With the payment plan from SFS we can match benefits to costs much more effectively.”

Clas Tengström, CEO Bror Tonsjö



# AI-based data analytics close to the process to increase machine performance – Industrial Edge



## Acquisition in Edge environment: Pixeom

# Creation of an Industrial Edge ecosystem

- Container technology: execution of Cloud and Edge apps without additional hardware configuration
- Easy management of apps and central updates for devices, even on distributed infrastructures
- Industrial Edge ecosystem:  
Openness for apps and devices  
from different manufacturers

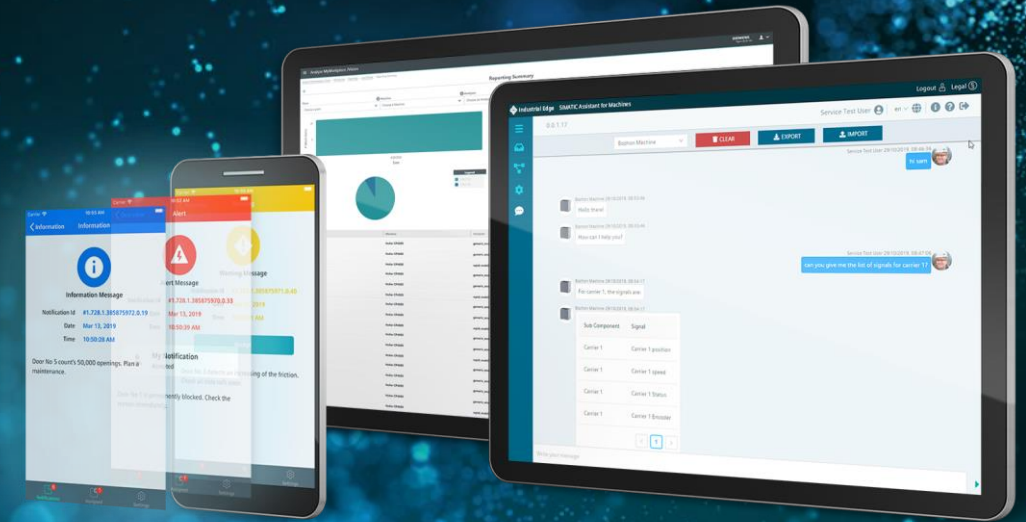




New Edge apps for concrete customer benefits

## Industrial Edge apps for manufacturing and machine tools

- **Simatic Notifier:** Notifications on wearables for rapid responses in the event of errors – increased availability and productivity
- **Simatic Assistant for Machines:** Direct interaction with industrial equipment via voice control
- **Sinumerik Analyze MyWorkpiece/Vision:** Artificial intelligence for image detection – higher quality and reduced wear

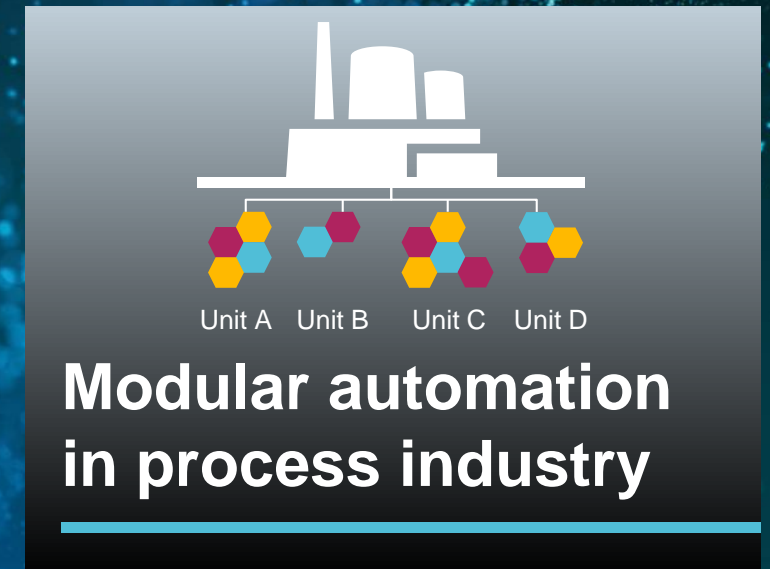
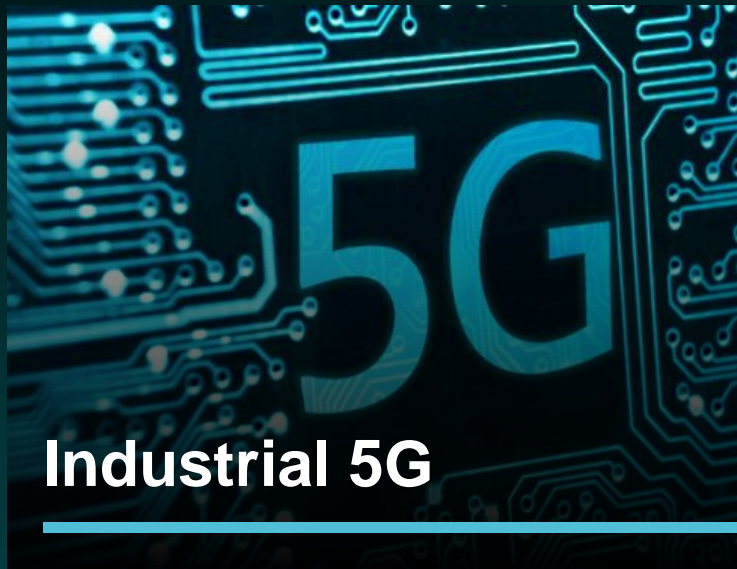


# From linked automation to the flexible shop floor – Increased networking makes production more modular



Digital Enterprise

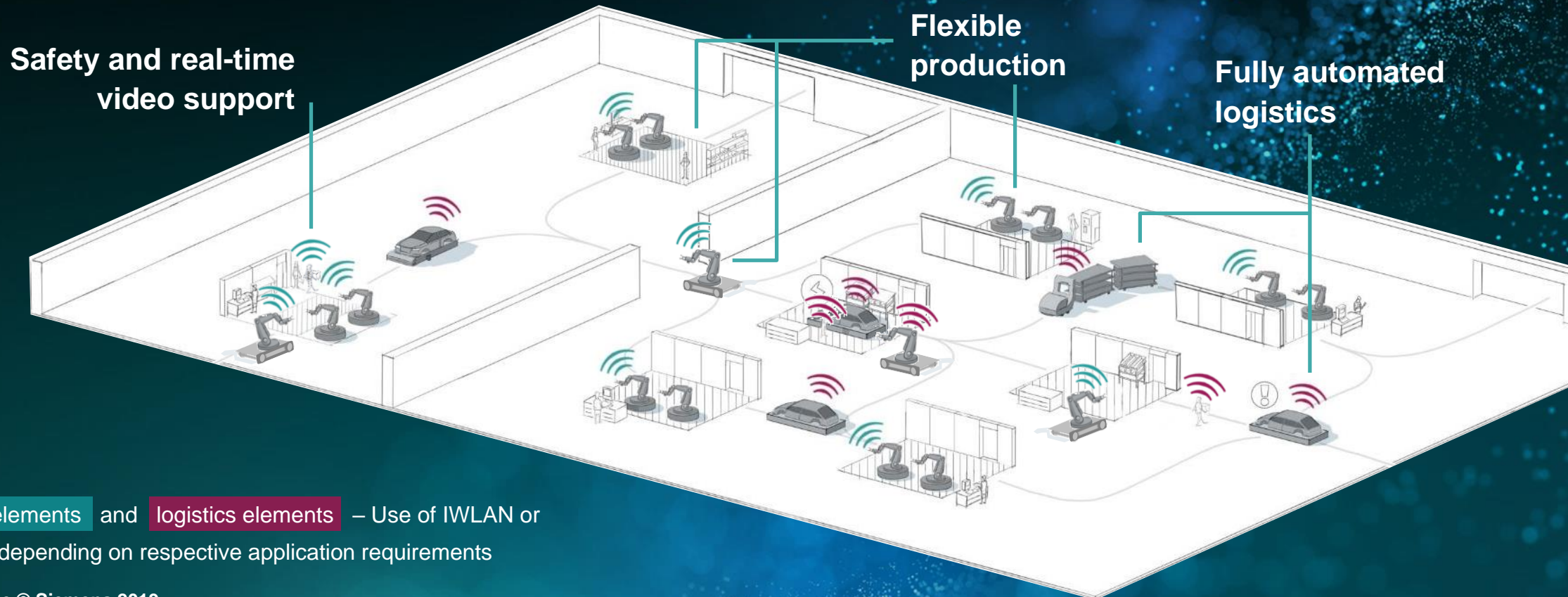
## 2019 – Thinking industry further!





# Production and logistics in the next five years – Clear rise in wireless communication

Trend toward flexible and modular production concepts creates challenges for wireless communication: more devices, lower latency, greater reliability



Production elements and logistics elements – Use of IWLAN or Industrial 5G depending on respective application requirements



## Complete networking Industrial 5G at Siemens

- Portfolio expansion with industrial 5G-based hardware
- Application for a private industry frequency at Siemens' own location
- Research projects and test center for interoperability



## Siemens and Qualcomm First stand-alone 5G network in industrial environment

- Proof of concept by Siemens and Qualcomm in Siemens Automotive Test Center in Nuremberg
- Test of 5G technologies and relevant standards under industrial conditions, e.g. for secure real-time communication
- Stand-alone network as basis for the development of the first 5G-capable routers in the Scalance M product family



We offer our customers a complete portfolio  
for their digital transformation



# Consulting

Showing the way to digital transformation

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# Implementation

Implementing technologies

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# Optimization

Continuously optimizing existing plants

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# Finance

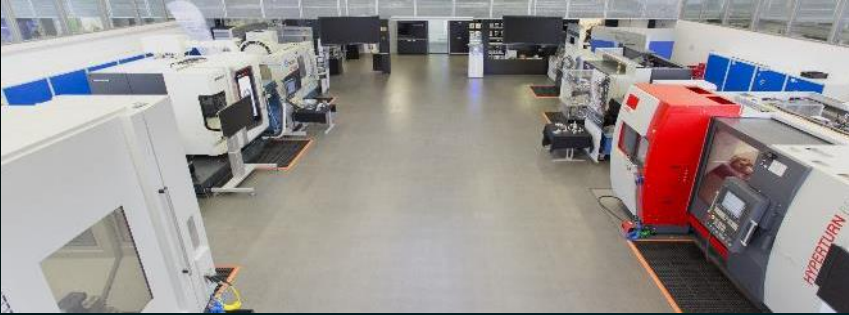
Offering finance solutions

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# Digitalization changes the face of industry – From design through sales to the shop floor

**SIEMENS**  
*Ingenuity for life*



From real showroom  
to digital **design and  
sales room**



From foreman's office  
on site to **simulation  
room in the factory**

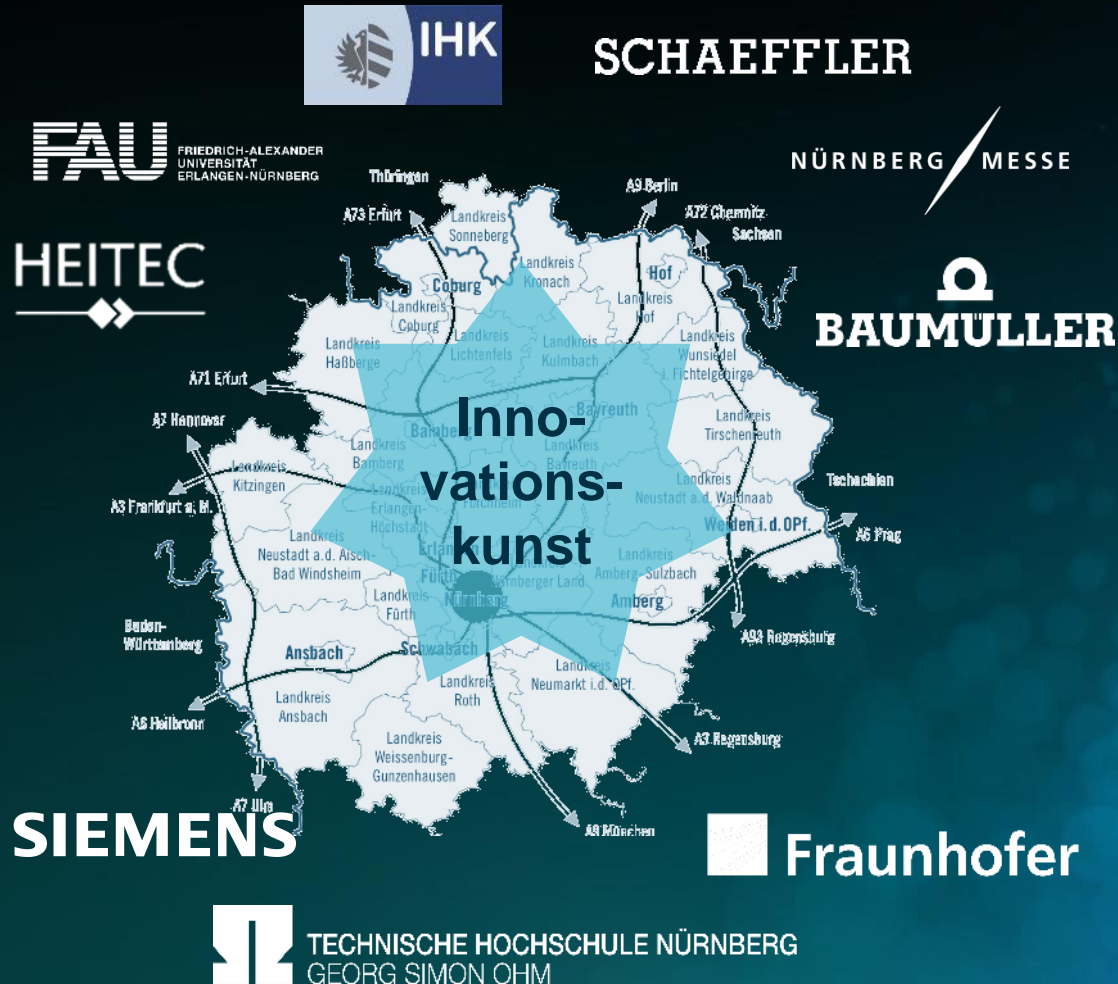


From linked automation  
to the **flexible shop  
floor**





# Nuremberg Metropolitan Region



## From SMEs to global players Innovation in the Nuremberg Metropolitan Region

- “Innovationskunst” initiative by science and business to promote innovation in the Metropolitan Region
- 10 founding companies
- Almost 2,000 Siemens developers and 1,100 developers from Siemens Healthineers involved
- Nuremberg: e.g. AI and Cloud applications; energy-efficient motors | Fürth: e.g. Industrial Edge | Erlangen: e.g. additive manufacturing



# Experience Industrie 4.0 with Digital Enterprise – in Hall 11

