The advantages of digitalization for the glass industry

Philippe Mary, Head of Glass Branch, Siemens Belgium

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Digitalization is next level of productivity for the glass industry

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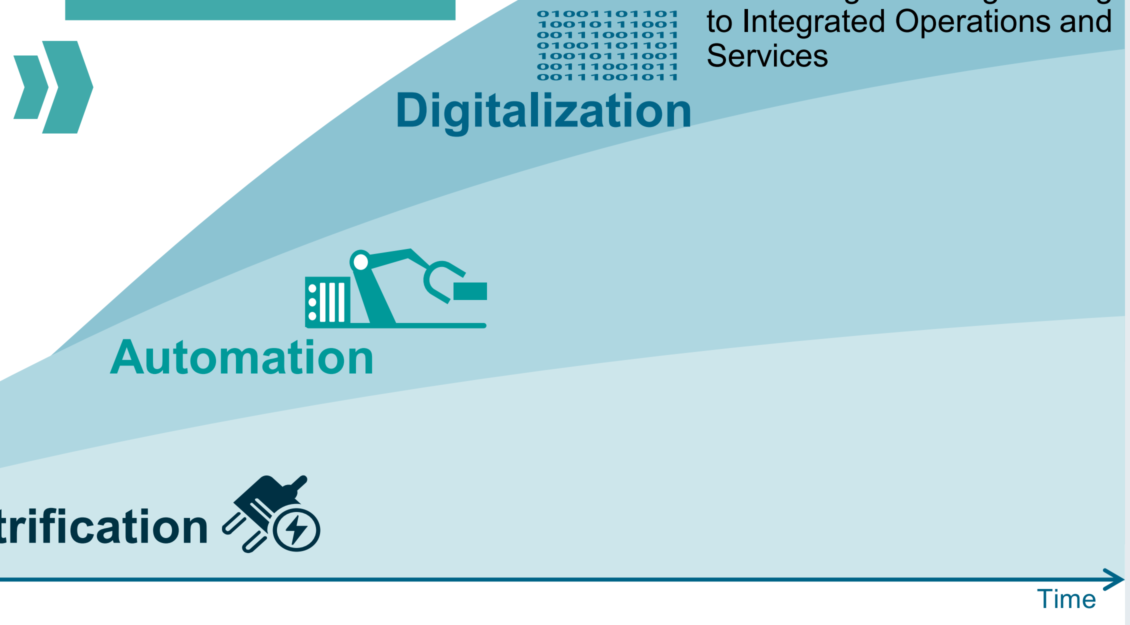
Process industries → electrification, automation, and digitalization as drivers of productivity

Technological driver

- Computing power
- Communication
- New sensors
- Virtualization
- Cloud computing
- Simulation
- …

Different initiatives, e.g.,
- Industrie 4.0
- Industrial Internet Consortium (IIC)
- Made in China 2025
- ...



Next level of productivity

Industry trends

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Efficiency

- Resource and energy efficiency
- Demanded product/ quantity

Flexibility

- Customized mass production
- Volatile markets

Quality

- Closed-loop quality
- Traceability

Time-to-market

- Fast innovation
- More complex products
- Lifecycle management

Security

Health and safety | Environment | Regulations/standards | …

Digital Enterprise is the portfolio of solutions for the digital transformation – for both the discrete and process industries

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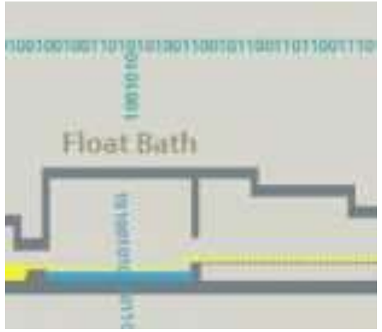
Digital Enterprise

Process industries — **Discrete industries**

Process industries: Product design → Process and plant design → Engineering → Operation → Services

Discrete industries: Product design → Production planning → Production engineering → Production execution → Services

Industrial software and automation for process industry

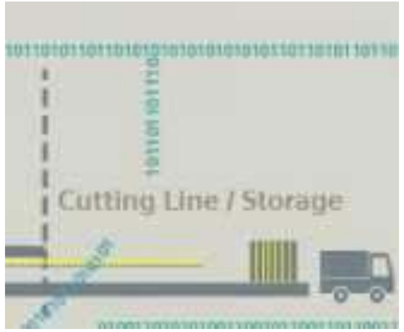


+ **Industrial communication** +

+ **Industrial security** +

+ **Industrial services** +

Industrial software and automation for discrete industry



Digitalization of the field level

Mission of the Digital Enterprise for process industries

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Integrated engineering

Cloud platform and operating system

Data analytics

(2D/3D) and commissioning

Asset performance management

Digital twin and simulation

Recipe, feedstock quality, …

Process and plant documen-tation

Real plant

Secure connectivity

Integrated operations and services

Maintenance

Digitally enhanced products

1 Product design

2 Process and plant design

3 Engineering and commissioning

4 Operation

5 Services

Integrated engineering for process plants: Common data model ensures consistency of all workflows along the lifecycle

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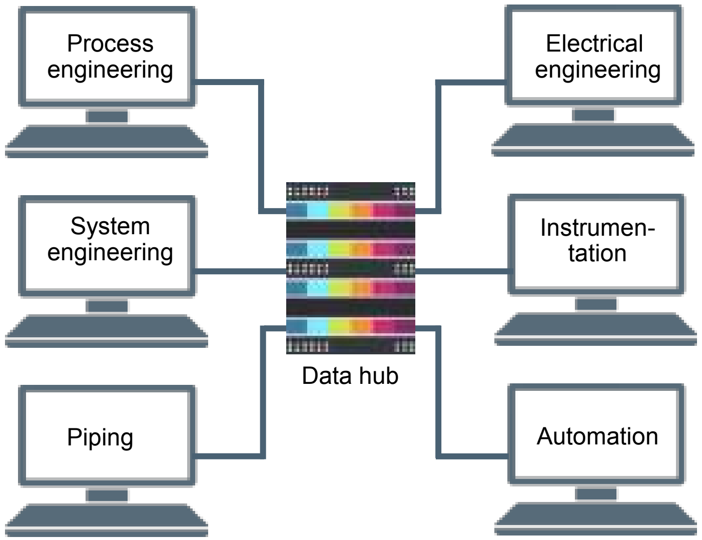
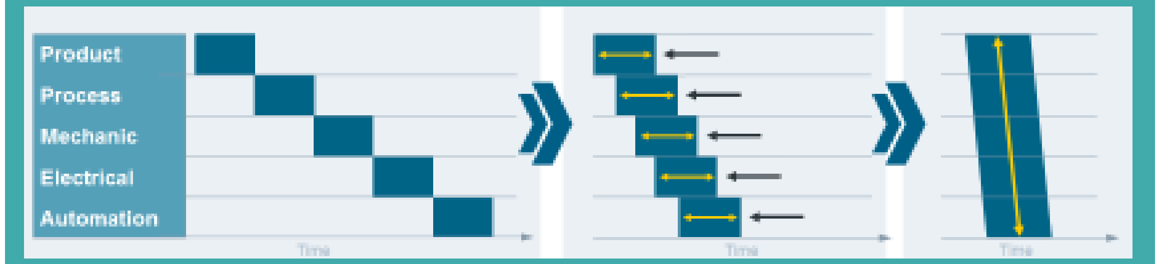
One data hub that completely integrates all disciplines into a globally consistent database …



… and workflows that can be executed in parallel, which saves valuable time and therefore reduces costs

Yesterday Today Tomorrow



1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

Integrated engineering for process plants: Digital twin and 3D visualization of the plant

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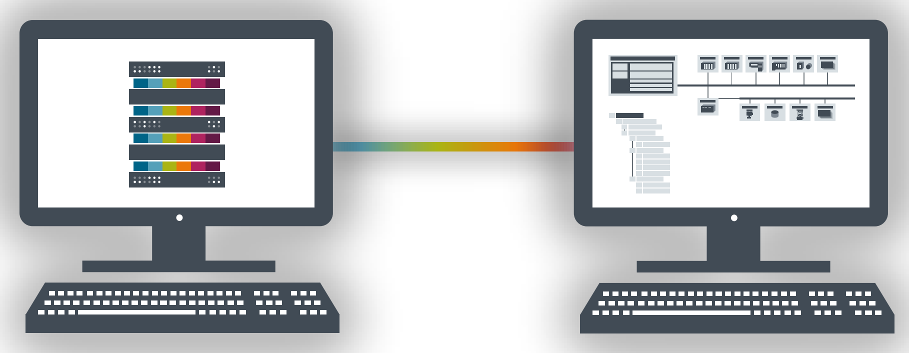
During engineering, a digital twin of the plant is created, even before the real plant exists …

… this offers the opportunity for an early 3D visualization of the plant: for example, for training the service staff

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

Integrated engineering:
Data exchange between engineering system and automation



Plant designer

Distributed control system (DCS)

Automated engineering for DCS hard- and software

Your benefits for engineering

- Up to 60 percent time savings in automation engineering thanks to automated engineering of DCS hard- and software
- Consistent data ensure higher engineering quality
- Easy and fast integration of product data with configurators, libraries, and standard interfaces

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Integrated engineering and integrated operations for process plants: Simulation improves engineering and operational efficiency

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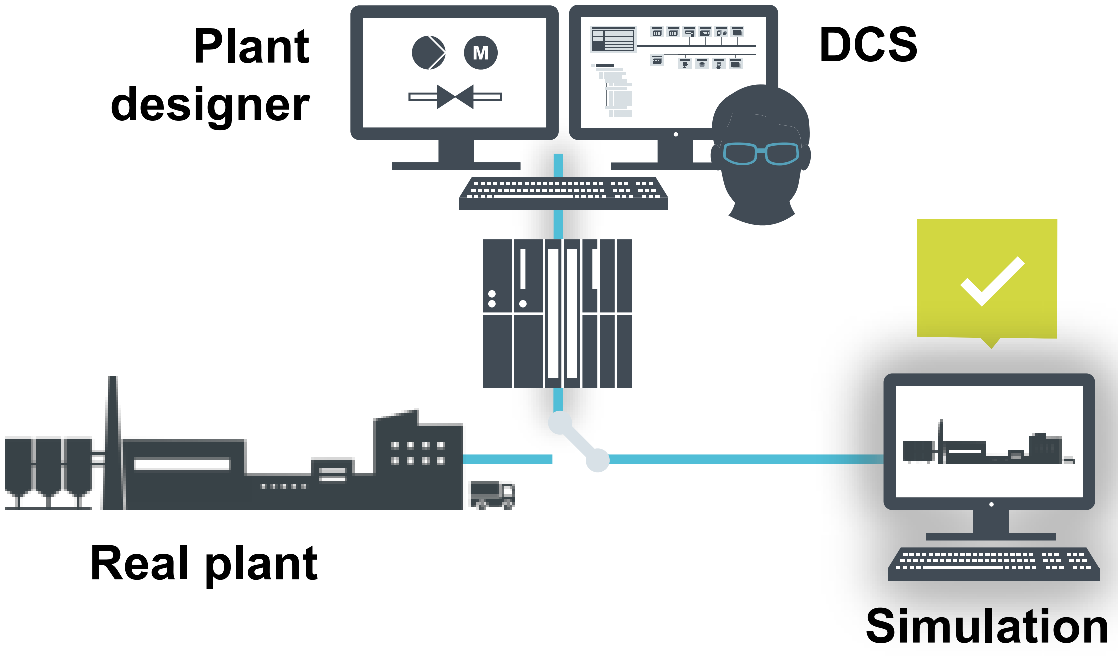

Benefits for engineering and commissioning

- Seamless transfer of engineering data
- Simulation and testing of the automation functions
- Training of operating personnel
- ✓ **Efficient and smooth system start-up of the real plant**
- ✓ **Avoidance of errors and costly reworking**
- ✓ **Increased safety**

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Integrated engineering and integrated operations for process plants: Simulation improves engineering and operational efficiency

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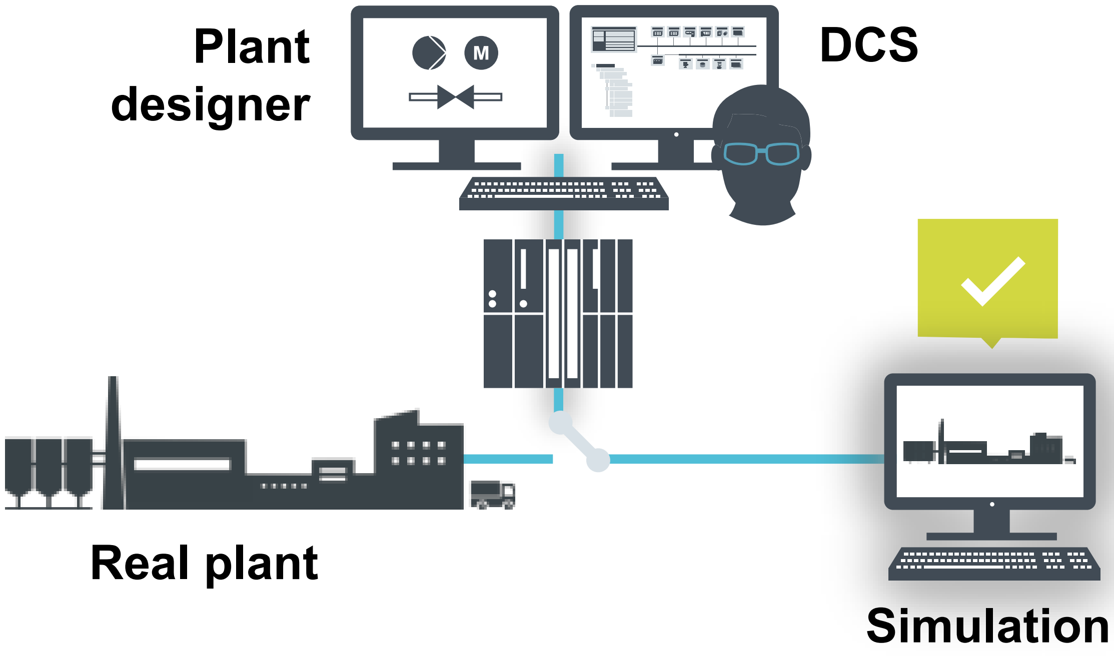

"The Gallo Glass plant is so complex that Simit was essential for us for conducting tests and evaluations. It optimized our engineering and substantially shortened the commissioning time."

Roger Knüttel,
Manager of the Control Engineering Department at EME Maschinenfabrik Clasen GmbH

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

Integrated operations for process plants: Data exchange between automation and engineering system

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DCS | Plant designer | Plant and process documentation

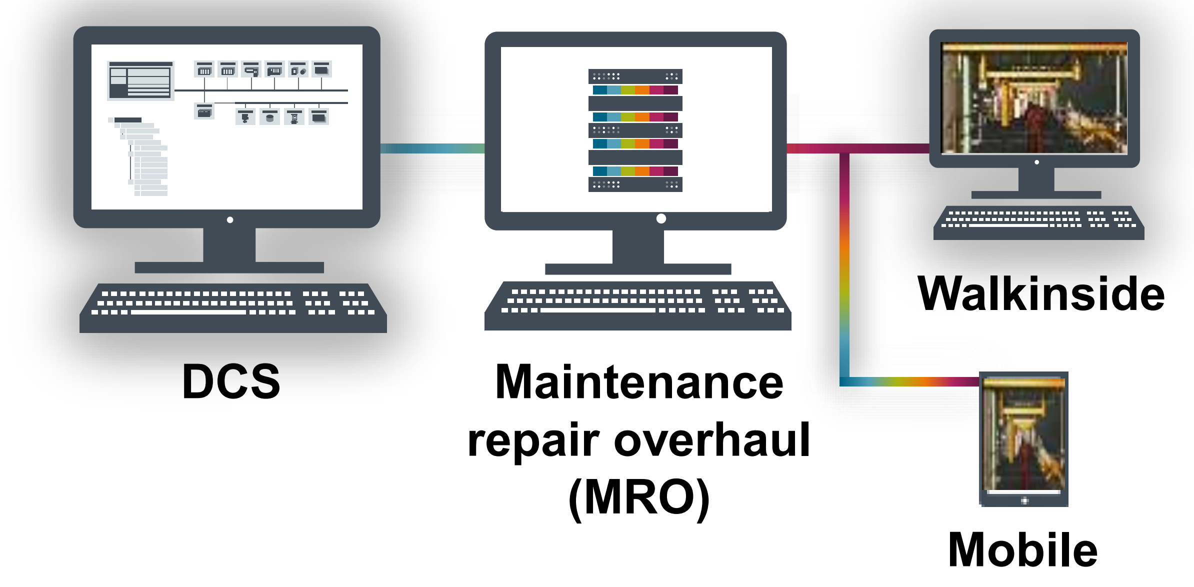
Thanks to the bidirectional data exchange between engineering system and automation, the digital twin is continuously updated and shows the current status of the plant

Benefits for operations

- Bidirectional interface
- Always as-is plant documentation
- More efficient maintenance management
- ✓ **30 percent time savings**
- ✓ **20 percent lower cost**
- ✓ **Optimized availability**

1 Product design | 2 Process and plant design | 3 Engineering v commissioning | **4 Operation** | 5 Services

Integrated operations:
Optimized workflow for maintenance management



Benefits for maintenance

- ✓ Time savings thanks to direct and easy communication between operator and service personnel
- ✓ Asset location and necessary documentation available
- ✓ All information also available on site
- ✓ Direct feedback about maintenance execution
- ✓ Plant documentation immediately updated

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | **4 Operation** | 5 Services

Integrated operations: Operations intelligence enables optimal decision-making in real time

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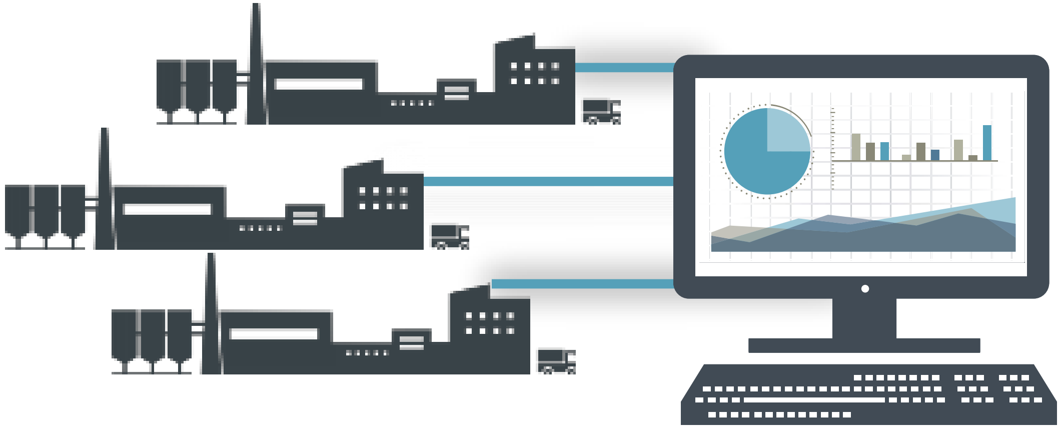

Plant, process, and business data

Operations intelligence

Benefits from operations intelligence

- Access operating data across the entire supply chain
- Compare plant and asset data of your plants worldwide
- Visualize cost factors to identify saving potential
- Monitor Heath Safety Environmental information

✓ **Improved asset transparency**
✓ **Up to 8% reduction in operating costs**
✓ **Up to 10,5% increase in production**

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | **4 Operation** | 5 Services

Digital services for the glass industry:
Efficient and flexible production, optimized complex value chains

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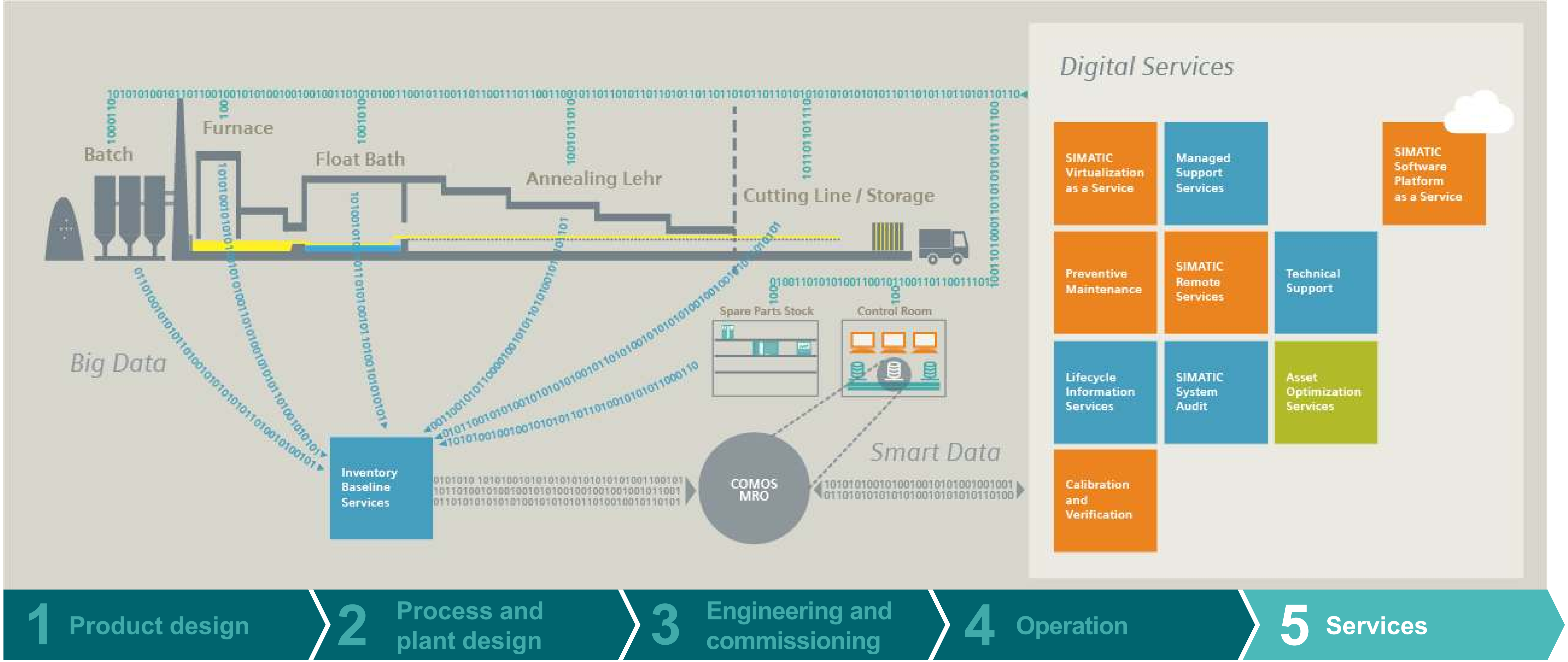

Cloud-based, open Industrial IoT operating system offers a solid foundation for new, data-based business models

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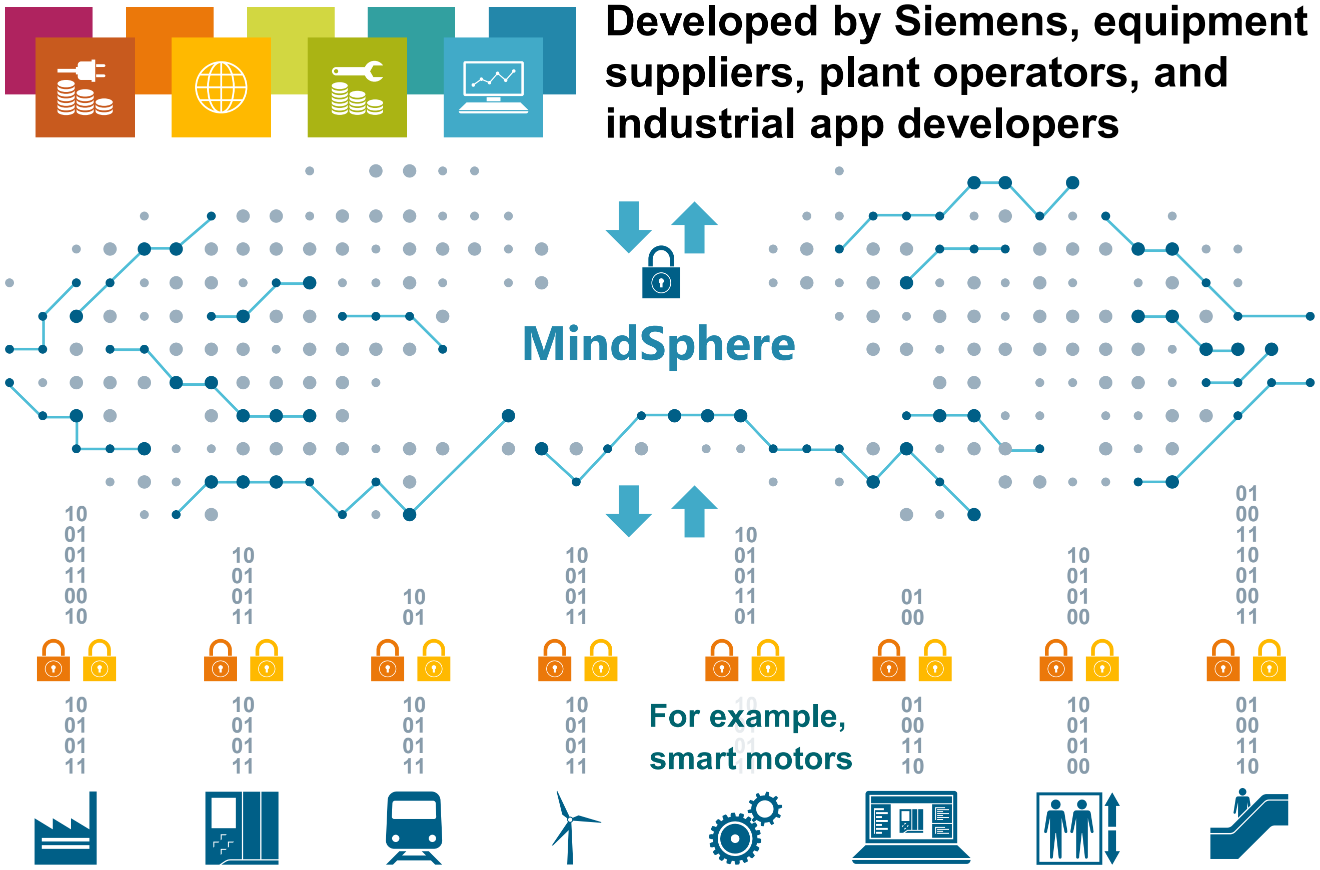

MindApps

- Asset transparency and analytical insights: for example, predictive maintenance
- Fleet management

MindSphere

- Open interface for developing customer-specific apps (MindApps)
- Various cloud infrastructures: public, private, or on site

MindConnect

- Open standards (like OPC UA) for connectivity (also to third-party products)
- Plug-and-play connection
- **Example: smart motors**

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

Example of MindConnect
Smart motor: digitally enhanced electrification and automation

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Smart motors – connected to MindSphere

- Integrated vibration, magnetic flux, and temperature sensors
- Reduce downtime to increase fleet and plant availability and reliability
- Optimize operation efficiency
- Maintenance and servicing activities for early planning and optimization

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

The security concept

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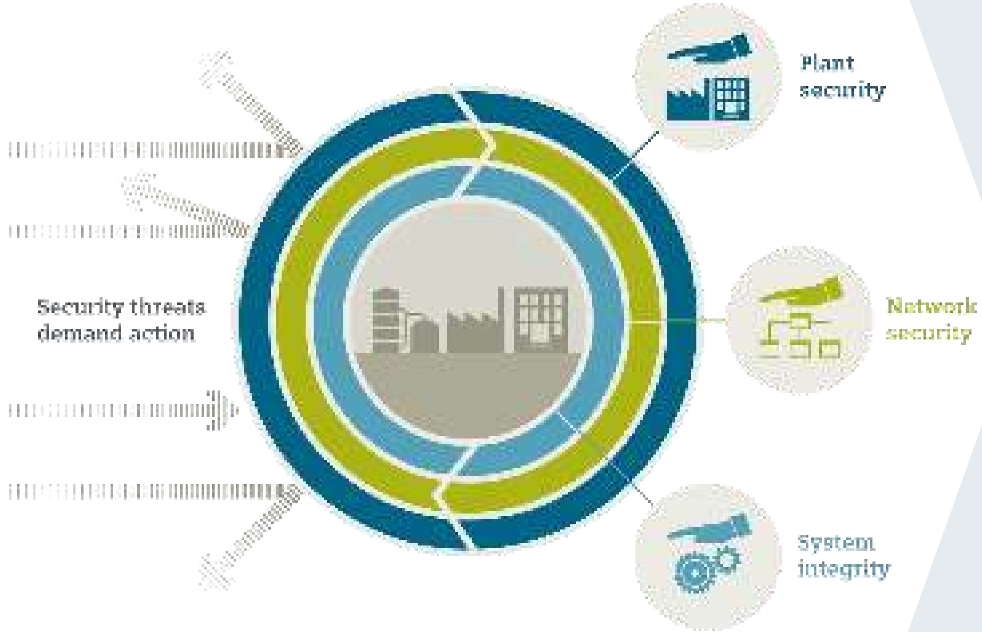
The security concept – Defense in Depth



Products and systems with integrated security

- Knowledge and copy protection
- Authentication and user management
- Firewall and VPN (virtual private network)
- System “hardening”

Plant security services

1 Product design | 2 Process and plant design | 3 Engineering and commissioning | 4 Operation | 5 Services

Summary

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Efficiency	Flexibility	Quality	Time-to-market
• Resource and energy efficiency • Demanded product/ quantity	• Customized mass production • Volatile markets	• Closed-loop quality • Traceability	• Fast innovation • More complex products • Lifecycle management

Security

1 Product design → 2 Process and plant design → 3 Engineering and commissioning → 4 Operation → 5 Services

Thank you for your attention

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