Digitalization changes everything

Driving the Digital Enterprise for Process Industries
Digitalization is the next level to yield productivity within Process Industries

Computing power
Connectivity
Sensors
Cloud computing
Data analysis ...

Digitalization

Automation

Electrification

Next level of productivity
Siemens as experienced partner for Automation and Electrification
Pioneer for Digitalization in industry
Generating customer benefits is our key priority

Industry trends

**Efficiency**
- Resource and energy efficiency
- Demanded product/quantity
- ...

**Flexibility**
- Individualized mass production
- Volatile markets
- ...

**Quality**
- Closed-loop quality
- Traceability
- ...

**Time-to-market**
- Fast innovation
- More complex products
- Lifecycle Management
- ...

**Security**

**HSSE** – Health & Safety | Environment | Regulations/Standard | …
Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry
Siemens drives the Digital Enterprise for Process Industries

VIRTUAL WORLD

Integrated Engineering
Cloud platform and operating system
(2D/3D) & commissioning

Data analytics
Asset Performance Management

Digital Twin & Simulation
Recipe, feedstock quality, ...
Process & plant documentation
Real Plant

Secure Connectivity
Maintenance

REAL WORLD

Integrated Operations & Services
Digitally enhanced products

1 Product design
2 Process & plant design
3 Engineering & commissioning
4 Operation
5 Service
From Integrated Engineering to Integrated Operations

- Lifecycle plant management with a holistic tool landscape
- Common data model for a shorter time-to-market
- Increased efficiency through simulation
- Optimized operations based on high plant and process transparency with a digital twin
Integrated Engineering for process plants: Common data model ensures consistency for all workflows along the lifecycle

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

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

1 Product design
2 Process & plant design
3 Engineering & commissioning
4 Operation
5 Service

Yesterday
Today
Tomorrow

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Integrated Engineering for process plants: Digital Twin and 3D visualization of the plant

During engineering, the Digital Twin of the plant is created, even before the real plant exists…

… this offers the possibility of an early 3D visualization of the plant, e.g. for training of service staff
Integrated Engineering:
Data exchange between engineering system and automation

COMOS

SIMATIC PCS 7

Automated engineering for DCS hard- and software

Your benefits in Engineering

• Up to 60% time saving in automation engineering due to automated engineering of DCS hard- and software
• Consistent data ensure higher engineering quality
• Easy and fast integration of product data with configurators, libraries or standard interfaces
Integrated Engineering and Integrated Operations for process plants: Simulation improves engineering and operational efficiency

1. Product design
2. Process & plant design
3. Engineering & commissioning
4. Operation
5. Service

Your benefits in 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
Integrated Operations for process plants: Data exchange between automation and engineering system

Thanks to the bi-directional data exchange between engineering system and automation, the Digital Twin is continuously updated and shows the current status of the plant

Your benefits in operation

- Bi-directional interface
- Always as-is plant documentation
- More efficient maintenance management
- 30% time savings
- 20% lower cost
- Optimized availability
Integrated Operations: Optimized workflow for maintenance management

Your benefits in Maintenance

- Time saving by direct and easy communication between operator and service personnel
- Asset location and necessary documentation available via COMOS and COMOS Walkinside
- All information also available on site
- Direct feedback about maintenance execution
- Plant documentation immediately updated
Integrated Operations for process plants: Operations Intelligence enables optimal decision-making in real-time

Your benefits with XHQ 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 HSE information
  - Improved asset transparency
  - Up to 8% reduction in operating costs
  - Up to 10.5% increase in production
Our cooperation with Bentley opens numerous saving potentials, for example in engineering and plant lifecycle management.

**Extended Interface**
- Between COMOS (2D) and Bentley OpenPlant (3D)

**Cable Routing**
- Bentley BRCM and COMOS EI&C

**Digital Brownfield Approach**
- COMOS/COMOS Walkinside 3D Visualization and Bentley Context Capture (3D)

**FEED & Conceptual Design**
- Interaction between COMOS FEED & Bentley PlantWise for general arrangement
Industrial Security

- Protection of industrial plants from cyber attacks
- Productivity through in-depth defense concepts
- Network security and system integrity for plants
The Siemens security concept: “Defense in Depth”

Siemens products and systems offer integrated security

- Know how and copy protection
- Authentication and user management
- Firewall and VPN (Virtual Private Network)
- System "hardening"

Siemens Plant Security Services

Assess Security
Manage Security
Implement Security
MindSphere – the cloud-based, open IoT operating system offers a solid foundation for new, data-based business models

Developed by Siemens, OEMs, end customers and App developers

MindApps
• Asset transparency and analytical insights, e.g. predictive maintenance
• Subscription based pricing model
• Fleet management

MindSphere
• Open interface for development of customer specific apps (MindApps)
• 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 products
Smart Motor Concept is an example for digitally enhanced Electrification and Automation

Smart Motors – connected to MindSphere

- Integrated vibration, magnetic flux and temperature sensors
- Reduce down times to increase fleet and plant availability and reliability
- Optimize operation efficiency
- Maintenance and servicing activities for early planning and optimization
Drive Train Analytics for increased availability, predictability of downtime and improved maintenance

• Remote Automated Monitoring & Managed Diagnostics Services supporting condition-based and predictive maintenance for drive systems (HV-motors, MV-drives and application gear units)

• Promotes increased availability of the drive train, predictability of downtime and improved maintenance

• Certified experts provide cloud-based monitoring and data evaluation services
Siemens with comprehensive and seamless Digital Enterprise portfolio for process plants

COMOS

COMOS Walkinside

XHQ Operations Intelligence

SIMIT

SIMATIC PCS 7

MindSphere

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Digitalization provides the next level of productivity building on our core competences Electrification and Automation

The next level of productivity: Digitalization
From Integrated Engineering to Integrated Operations

Our foundation: Electrification and Automation

Our mission:
• “We drive the world”
• “We save energy … and fuel”
• “We provide a Digital Twin”

Vertical solutions and services