Il paradigma produttivo
Industry 4.0 per l’industria di processo

Driving the Digital Enterprise for Process Industries
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

Next level of productivity

Automation

Siemens as experienced partner for Automation and Electrification

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
- ...

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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.

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**Industrial Software and Automation for process industries**

- Industrial Communication
- Industrial Security
- Industrial Services

Digital Enterprise Suite

**Digitalization of the field level**
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
Siemens drives the Digital Enterprise for Process Industries

- **Integrated Engineering**
  - Cloud platform and operating system
  - (2D/3D) & commissioning
  - Data analytics
  - Asset Performance Management

- **Digital Twin & Simulation**
  - Cloud platform and operating system
  - Recipe, feedstock quality, ...
  - Process & plant documentation
  - Real Plant

- **Integrated Operations & Services**
  - Secure Connectivity
  - Digitally enhanced products
  - Maintenance

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

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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

Yesterday  
Today  
Tomorrow

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

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

COMOS  SIMATIC PCS 7
PLCs & Controllers
Real plant

Your benefits in Engineering and Commissioning:

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

Your benefits in operation

- Bi-directional interface
- Always as-is plant documentation
- More efficient maintenance management
  ✓ 30% time savings
  ✓ 20% lower cost
  ✓ Optimized availability

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.
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

1. Product design
2. Process & plant design
3. Engineering & commissioning
4. Operation
5. Service
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
Integrated Engineering and Integrated Operations for process plants: Sanofi-Aventis, Germany

Sanofi-Aventis COMOS were ported to the corresponding continuous function chart (CFC) typical in SIMATIC PCS 7

Expectation: from 4 months to 2 weeks for the system programming between function clarification and commissioning

- >20 % savings in function planning and automation engineering
- Easier qualification through qualified system interfaces
- Up-to-date documentation over the lifecycle
- Learning for subsequent projects
Simultaneous engineering of two plants for superabsorbent polymers in China and Brazil (cloning) by COMOS+PCS7

- Immediate learning effects support optimization of the system design and engineering processes
- The synergy effects exceeded all expectations
- Additional benefits that extend beyond the engineering and design phase
Progressing toward the factory of the future with digitalization – Solvay/Butachimie, Chalampé, France

Solvay/Butachimie in Chalampé is one of the world’s biggest chemical manufacturers. Reindustrialization and concrete step towards the factory of the future

• Migration of all process control systems to SIMATIC PCS 7
• Virtual commissioning with SIMIT simulation framework
• Lifecycle management of plants and services until 2021
• Problem-free migration and smooth operation
• Fast commissioning, readiness for future modifications
Increase transparency and support decisions through combination of multiple data point into meaningful information

Use Case → Asset Performance Management: ExxonMobil and Tengizchevroil

Data Dimensions around Assets

Challenges
Holistic Asset Performance Management across fleet
- Reduce unplanned outages and maintenance costs
- Optimize asset lifecycle
- Improve safety and reliability

Value Proposition
XHQ for
- Descriptive analytics for asset conditions
- Predictive analytics for anomalies and early warning
- Prescriptive analytics for decision support

XHQ Solution Examples today

ExxonMobil Upstream
- High value rotating equipment e.g., gas turbines, pumps or motors
- Enhanced asset diagnostics, preventive maintenance and continuous asset health monitoring for 200 sites (globally)

Tengizchevroil
Automated asset surveillance and asset performance monitoring, incl.,
- Predictive and real time monitoring
- Calculated indicators and reliability metrics
- Early indicators
COMOS Walkinside enables virtual training in a safe environment

Use Case → Simulation and Virtual Reality: Total

**Initial situation**

- Increasing shortage in experienced personnel
- Need for increased **asset uptime** and **safe operation**
- Need for **up-to-date** plant information

**Value Proposition**

- Efficient and safe operator **trainings**:
  - **before** real plant **operation**
  - Based on **real-life scenarios**

**Actual status**

- **Virtual training** in the life-like virtual environment improves personal safety
- **Remote instruction** reduces costs for asset-related training through efficient collaboration for project stakeholders
  - Faster **time to first oil**
  - **Enhanced ROI** - increased efficiency, safety and asset uptime, lowered risk

Example TOTAL E&P, France

Training based on COMOS Walkinside
DSM Nutritional Products AG reduce engineering time and cost by use of Integrated Engineering with COMOS

Use Case → Integrated Engineering: DSM

Initial situation

Challenges
• Co-operation between engineering disciplines with individual tools
• Data erosion during plant lifecycle
• Up-to-date documentation

Value Proposition
• Data-base oriented engineering (COMOS) incl. defined workflows and platform for global cooperation
• Seamless transfer of plant documentation
• Data transparency

Actual status

Example DSM Sisseln
• Reduced errors through data base and instantiation (higher data quality, single data input and data transparency through common platform)
  → Reduction of engineering time
  → Reduction of cost through automatisms
  → Higher planning and budget reliability
  15 – 25% cost savings in process and automation engineering
Integrated Engineering: Master of Engineering Data

Initial situation

- **Challenges**
  - Data exchange and consistency (non-integrated engineering tools)
  - “Compliance” based on plant qualification
  - Transparent documentation for regulation in accordance with ‘risk-based approach’

Actual status

- **Value Proposition**
  - Increased efficiency and quality in plant engineering
  - Optimized qualification process
  - Plant documentation in electrical format

- **COMOS used since 2004**
  - Plant engineering, lifecycle data management and plant documentation

“Internal studies show we have achieved engineering savings of between 8% and 12% by using COMOS software.”

**Christoph Jauslin**, Head Engineering IT at Novartis Pharma

Structure Document Management

Already using COMOS since 2004