

# Siemens Digital Industries Webinari

## AE1: Digitalna rešenja u procesnoj industriji


## Siemens Digital Industries Webinari 1/2



Datum	Tema	Predavač
14.04. / 19.05.	FA1: Motion Control	<i>Darko Živković, Jelena Đukić</i>
15.04. / 14.05.	FA2: Energy Management System	<i>Zoran Jovanović</i>
22.04. / 21.05.	FA3: Redundantni kontroleri serije S7-1500R/H	<i>Mirko Milovanović</i>
05.05. / 26.05.	FA4: WinCC Unified	<i>Mirko Milovanović</i>
15.04. / 13.05.	MC1: DT konfigurator	<i>Nenad Bakal, Pavle Dragišić</i>
23.04. / 22.05.	MC2: Sizer, large drives	<i>Miloš Marković, Pavle Dragišić</i>
06.05. / 26.05.	MC3: Sizer, motion drives	<i>Miloš Marković, Pavle Dragišić</i>
21.04. / 21.05.	CI1: Industrial Networks	<i>Jelena Đukić</i>

## Siemens Digital Industries Webinari 2/2



Datum	Tema	Predavač
16.04. / 15.05.	PI1: PI Academy world	Andrijana Popara, Miljan Miljanić, Marko Marić
24.04. / 22.05.	PI2: PI workshop for specialist	Andrijana Popara, Miljan Miljanić, Marko Marić
08.05. / 29.05.	PI3: #New@PI	Andrijana Popara, Miljan Miljanić, Marko Marić
 30.04. / 29.05.	AE1: Digitalna rešenja u procesnoj industriji	Jelena Đukić, Marko Milenković
29.04.	CP1: Control Panel Online Symposium	Siemens worldwide webinar
22.04. / 27.05.	CP2: Clever engineering in the control panel	Tijana Džodžo
28.04. / 12.05.	CP3: New series of signaling devices 3SU	Tijana Džodžo
21.04. / 20.05.	CP4: SIRIUS 3RW Soft starters	Bojan Janković
07.05. / 28.05.	DE1: Siemens Digital Enterprise	Zoran Jovanović

## Današnji predavač



### Jelena Đukić

#### Responsibility

Sales Professional for DCS and Industrial Communication

#### Contact

✉ [jelena.djukic@siemens.com](mailto:jelena.djukic@siemens.com)

🏭 RC-RS DI PA

🏠 Belgrade, Serbia



### Marko Milenković

#### Responsibility

Head of Process Automation

#### Contact

✉ [marko.milenkovic@siemens.com](mailto:marko.milenkovic@siemens.com)

🏭 RC-RS DI PA

🏠 Belgrade, Serbia



The background of the advertisement features a composite image. On the left, two men, one younger and one older, are looking at a tablet. Overlaid on the scene are translucent blue digital overlays showing technical diagrams, including a motor and a complex process flowchart. On the right, a large industrial refinery or chemical plant is visible at dusk, with tall distillation columns and complex piping. The Siemens logo and tagline are positioned in the upper right corner.

**SIEMENS**  
*Ingenuity for life*

# Digital Enterprise - Thinking process industries further

Paving the way for your digital transformation

Start the journey

[www.siemens.com/digital-plant](http://www.siemens.com/digital-plant)

## Shaping the future with our customers – Digitalization paves the way to Industrie 4.0



“ ReThinking digitalization in process automation: Together with our customers we shape the future to ensure their competitiveness throughout the entire plant lifecycle.

**From Integrated Engineering  
to Integrated Operations.** ”

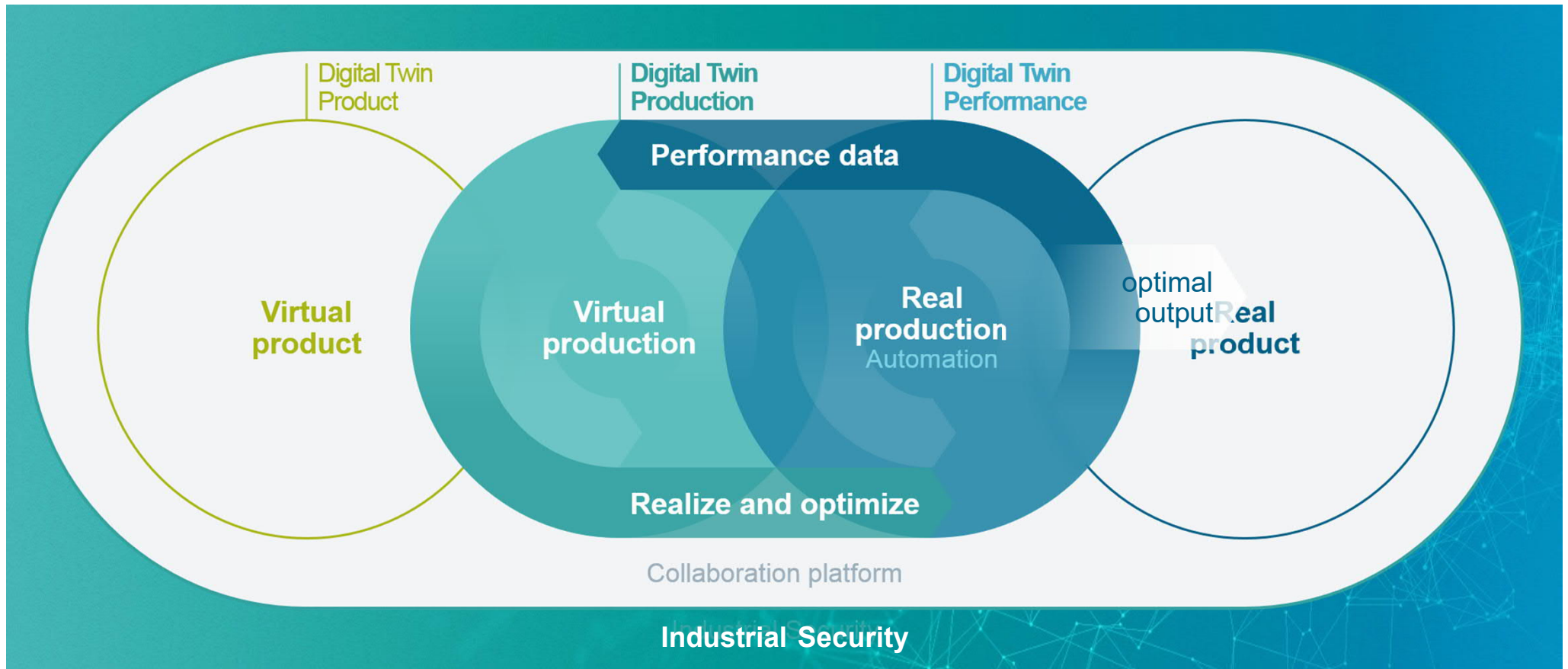
**Eckard Eberle**  
CEO Process Automation



The image shows a large industrial facility, possibly a refinery or chemical plant, with several tall distillation columns and a complex network of pipes and storage tanks. In the background, there are snow-capped mountains under a clear blue sky. A semi-transparent blue digital overlay is applied to the foreground and middle ground, showing a wireframe-like representation of the industrial structures, suggesting a digital twin or data visualization. A dark blue rectangular box is positioned on the left side of the image, containing white text.

**Our answer:  
Siemens Digital Enterprise**

# The Digital Twin enables optimal plant output





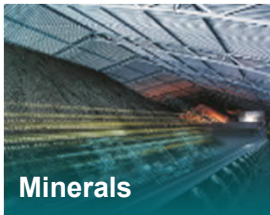
# A successful digital transformation offers tremendous opportunities **SIEMENS** in all industries

*Ingenuity for life*

## Process Industries

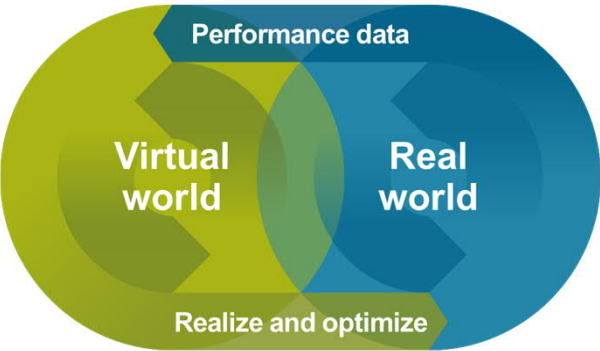
## Hybrid Industries

## Discrete Industries



Our software portfolio enables a holistic Digital Twin over the lifecycle
 

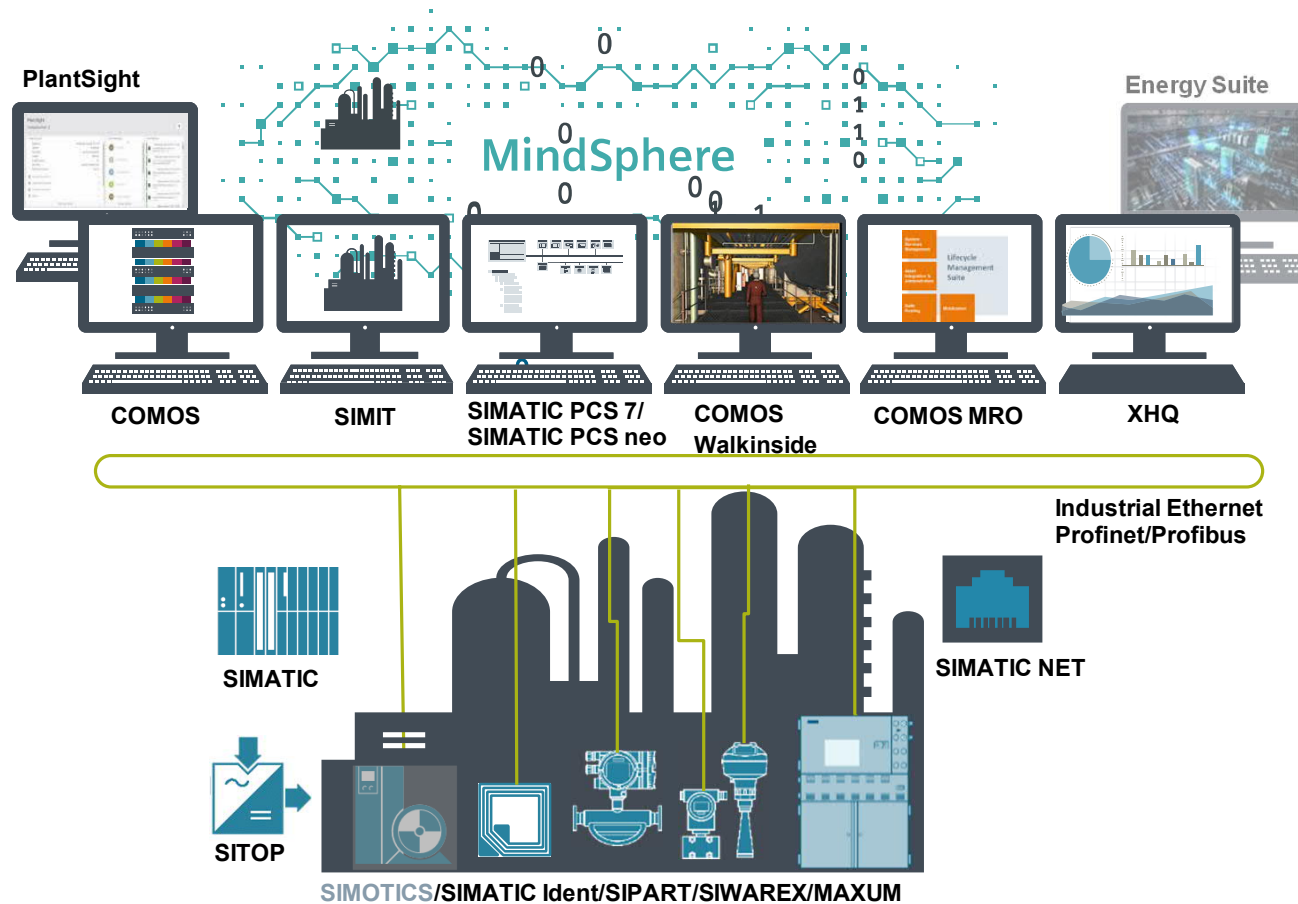
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MindSphere				
NX CAD	Teamcenter Manufacturing	NX Line Designer/MCD/ Automation Designer	SIMATIC IT / eBR	MindSphere apps
Polarion			Camstar	Digital Lifecycle Service
Simcenter	NX CAM/Additive	Simit / gPROMS <sup>2)</sup>	SIMATIC WinCC/SCADA	XHQ
Mentor Xpedition	Tecnomatix	TIA Portal	CNC Shop floor Mgt SW	Industry suites
Mentor Capital	Mentor Valor	SIMATIC PCS 7 / PCS neo	PA Accelerator	Edge apps
Teamcenter, Comos, PlantSight <sup>1)</sup>				

# Comprehensive Digital Enterprise portfolio for process plants

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## The Siemens offering for the Digital Enterprise in process industries

- Field data turn smart in the cloud
- Optimum digital infrastructure for all requirements
- Consistent and always up-to-date data across the entire plant lifecycle
- Comprehensive connectivity
- Optimal interplay with all levels

# Focus – Innovation and future technologies

Digital Industries Process Automation



# Process Automation

## SIMATIC PCS 7 Process Control System

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### Portfolio

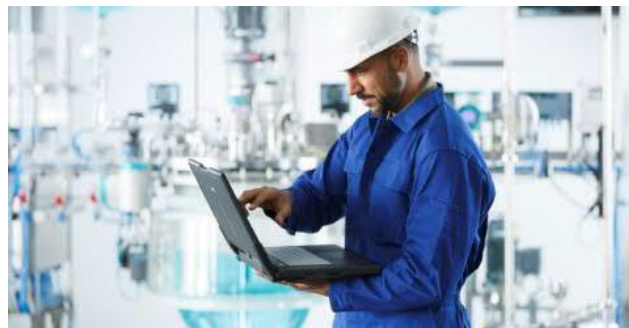
Intelligent automation – hard- and software – for all branches within process industries

- **SIMATIC PCS 7 Process control system**  
Flexible, scalable and powerful automation with integrated safety concepts
- **SIMATIC S7-410**  
The most powerful controller on the market
- **SIMATIC PDM**  
Efficient field device management
- **SIMATIC SIS compact**  
Standalone Safety Instrumented System



### Innovations

- **SIMATIC PDM V9.1**  
Intelligent bulk processing decreases commissioning and service times
- **SIMATIC PDM Maintenance Station V3.0**  
Asset Management for smart field devices
- **SIMATIC Plant Automation Accelerator 2.3**  
Integration of automation engineering and control system on a central data base
- **Hardware-Innovations**  
Digitalization to the field level with SIMATIC ET200SP HA and SIMATIC CFU



### Customer benefits

“The new control system gives us an open and reliable architecture that can communicate with third-party systems. Our plant managers were extremely happy with the user-friendly interface from the very beginning.”

**Massimo Beccaglia**  
Maintenance Manager  
Columbian Carbon Europe



# Process Automation

## SIMATIC PCS 7 – Hardware Innovationen

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### Innovations

Room for new perspectives!

#### **SIMATIC PCS 7 V9.0:**

More flexibility in process automation

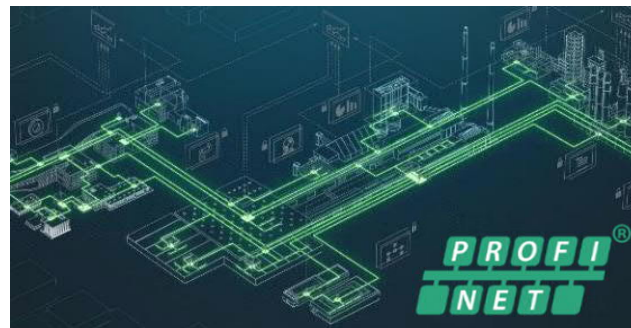
SIMATIC PCS 7 V9.0 is paving the way toward digital transformation. With its hardware and software innovations, the new version of the proven process control system is making it safer and easier to plan your start on the path to digitalization.



### Digitalization to the field level

#### **PROFINET**

The world's leading industrial Ethernet standard provides powerful, real-time communication all the way to the field. And significantly reduced time and effort for cabling means flexible, easy-to-scale network structures as well as massive cost savings throughout the entire lifecycle.



### Highlights

- **SIMATIC CPU 410 E**  
Controller specifically suited for smaller SIMATIC PCS 7 applications
- **SIMATIC CFU**  
Decentral periphery for highest flexibility. Automatic addressing and integration of field devices → simply Plug&Produce
- **SIMATIC ET 200SP HA**  
Combines flexibility with maximum availability through redundant PROFINET connections and even more compact dimensions



# Process Automation

## SIMATIC PCS neo – Enter a new world of process control

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### Portfolio

SIMATIC PCS neo is a completely web-based system that provides the foundation for a digital twin of the plant and comes with an easy-to-use GUI for all operational tasks.

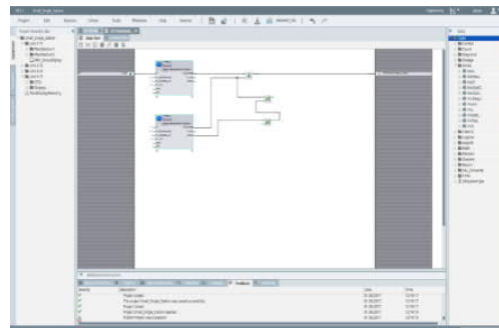
Object oriented data management (based on process objects) ensures that information remains consistent at all times, and the single workbench for all tasks enables seamless and secure access to all information with only two clicks.

Access to the entire system can easily be given from any device, from anywhere at any time – via secure internet connection.



### Innovations

- Completely web-based (HTML5)
- Multi-User-Web-Engineering
- Object oriented data management
- Intuitive Graphical User Interface (GUI)
- Common workbench for all workflows
- Device independent access
- Flexible scalability from <100 – >1 Mio. IOs
- Modular Automation (MTP)



### Customer benefits

SIMATIC PCS neo brings plant processes and plant automation to a new level of efficiency thanks to its easiness, usability, scalability and fastest response times to all market requirements.



# Process Automation

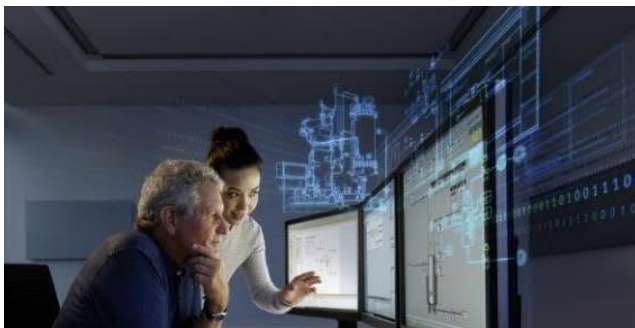
## Virtual commissioning and operator training with SIMIT



### Portfolio

Simulation with SIMIT increases efficiency and profitability over the entire lifecycle

- **Virtual commissioning**  
Faster commissioning of plants, machines and processes through real-time simulation for in-depth testing of automation projects
- **Operator training**  
Increased plant safety through faster and proper response of operators to special and critical plant states



### Innovations

Virtual and fast commission of machines and process modules

- Shorter commissioning due to real-time simulation of the automation. Optimized processes thanks to integrated simulation models and standardized communication (e.g. OPC UA)
- The strategic partnership with Process Systems Enterprise (PSE) enables new and end-to-end model-based solutions



### Customer benefits

“With virtual commissioning, we anticipate starting up our plant and thus increasing productivity and achieving a higher return on our investment. This requires high quality automation software as early as the engineering phase.”

**Dr. Michael Krauss**  
Senior Automation Manager  
BASF SE, Deutschland





# COMOS – Making data work

Better quality decision-making throughout the plant's entire lifecycle

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**Optimum interplay of all disciplines worldwide in each phase of the plant lifecycle**

→ From the initial design stage through to operations and modernization

## Your benefits

- Faster time-to-market through shorter engineering cycles
- Higher plant availability and security
- Cost savings in engineering and operations
- Consistent, up-to-date data and documentation
- Efficient management of largest data volumes



# Process Automation PlantSight

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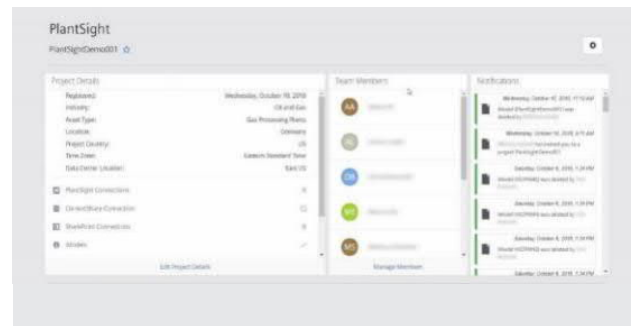
## Portfolio

- Digital Twin Cloud Services to capture unveiled data from different sources, e. g. DCS, CAE, Simulation, ERP, Analytics
- Transform raw data into one complete digital twin
- Visualize and use all current data in a single web portal
- Faster and better decisions anytime and anywhere



## Innovations

- Easiness of use – no complex scripting
- Data aggregation from any source
- Apply standardized procedures
- Use case oriented approach
- Plant consistency across disciplines
- Get & Work the Digital Twin for operations



## Customer benefits

- Operational safety by instant access to the right and consistent data
- Continuously monitor and quickly optimize plant assets, increase equipment availability and performance
- Faster reaction on change processes by customer demand changes
- Saves up to 30% cost by replacing paper-based workflows with digital processes



# Process Automation – XHQ Operations Intelligence Software

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## Portfolio

- Software that connects to various data types and sources, organizes and contextualizes the information
- Reduce operational and maintenance costs
- 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



## Innovations

- Contextualize engineering, operational, 2D, 3D data, and more
- Web-based (no browser plug-in needed), cloud or on premise, desktop or mobile – anywhere, any device
- Integrate with MindSphere IoT, analytics and applications
- Extend the on premise data to the cloud via XHQ Edge



## Customer benefits

“One of the reasons we partnered with Siemens is because of the capability, we really envision this (XHQ) as being again that single point of information for all information as we continue our digital journey.”

**Anthony Nalbone**

Director Digital IT Asset Maintenance and Engineering Applications (Phillips 66)







# SIMATIC PCS 7 at a glance

Room for new perspectives

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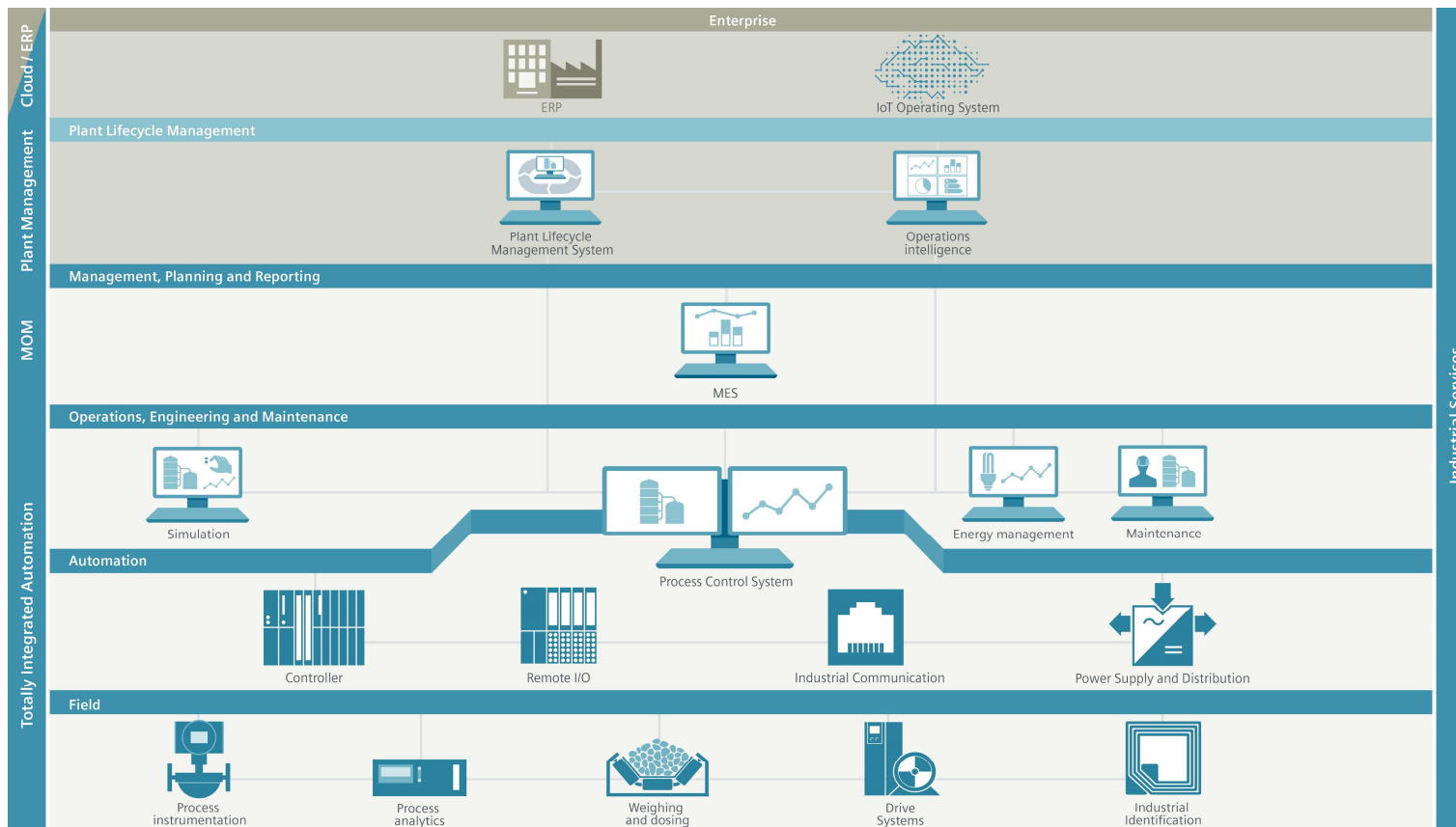
[siemens.de/pcs7](https://www.siemens.de/pcs7)

Unrestricted



# The Process Automation portfolio for the Digital Enterprise

## - efficient interoperability of all automation components



**Added value in all automation tasks**



**Integrated Engineering**



**Integrated Operations**



**Industrial Communication**



**Industrial Security**



**Process Safety**

# SIMATIC PCS 7

## Integrated system architecture from the field to the control level



- + Consistent in software and hardware
- + Consistent data down to the field level

### Engineering system

- Process control libraries
- Hardware/software configuration
- Field device management

### Operator system

- Process control
- Trends, alarms
- User management

### Archiving and reporting

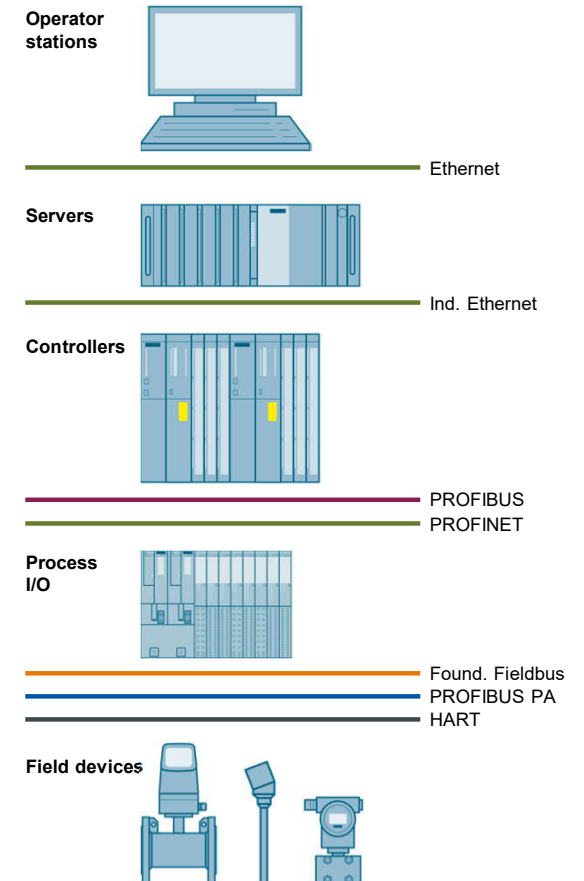
- Real-time process data archive
- Data visualization for operator system
- Generation of reports

### Plant asset management

- Diagnostics and condition monitoring of all process components from the automation level down to the field level

### Hardware components

- Automation systems, failsafe components
- Process peripherals with remote I/O, intelligent field/process devices



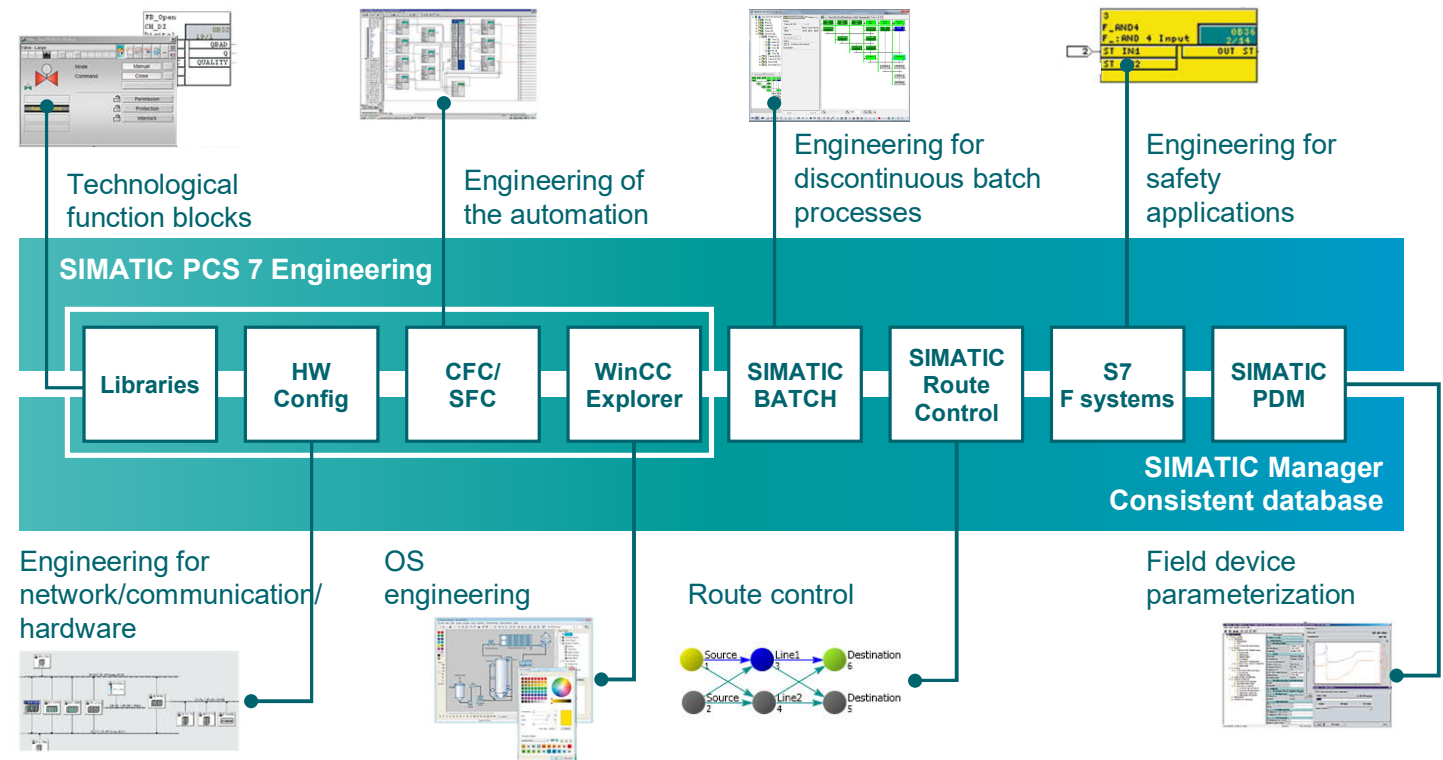
# SIMATIC PCS 7 – Engineering system

## Seamlessly coordinated – programmed for success

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**Central engineering:**  
simple, flexible and  
efficient configuration

**Customized for  
each plant**



# SIMATIC PCS 7 – Advanced Process Library (APL) Standard Library and door opener for other libraries

APL functionality can be complemented with further libraries on-demand, while keeping a consistent look & feel

## PCS 7 Industry Library (IL)

Expansion of the APL standard library by characteristic industry functions.  
Modules for HVAC, integration of Package units.

## PCS 7 Condition Monitoring Library (CML)

Expansion of the APL standard library with functions for monitoring of pumps and control valves.

## PCS 7 Advanced Process Graphics

Providing graphical objects for a task related design and intuitive visualization of plant situation.

## SITRANS Library

Integration of SIMATIC software, SITRANS and SIPART process instruments into the SIMATIC PCS 7 based on APL, config. In PDM



### APL Features

- Standardized modular software functions for process control and visualization
- Ready-made and tested function blocks, faceplates and symbols



Easy project planning



Reliable process control



Reduced engineering overheads

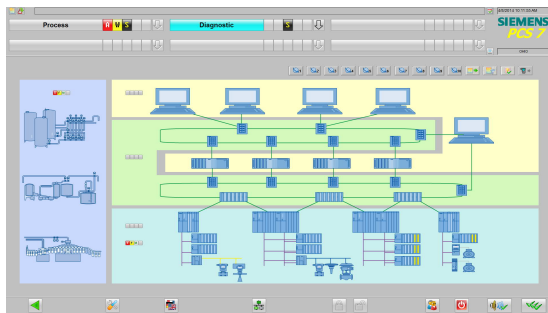


# SIMATIC PCS 7 – Plant asset management

## Integrated into PCS 7 or stand-alone down to the field level

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### PCS 7 Maintenance Station



### SIMATIC PDM



### SIMATIC PDM MS



#### Investment protection

- Value-adding and value-preserving maintenance as an additional option to SIMATIC PCS 7
- Increase of the plant performance
- Separation of status and process information
- Uniform visualization and central operation for all plant components



#### Increased productivity

- Management of intelligent field devices and field components
- Intelligent bulk operations and parallelization
- Free selection of field devices thanks to the use of standardized device description technologies



#### Sound business decisions

- Stand-alone maintenance station based on SIMATIC PDM
- Data transfer to cloud-based systems for data evaluation and analysis
- Easy further processing of the export data (XML) thanks to uniform data structure

# SIMATIC PCS 7 – Hardware components

## Controller for Process Automation



### SIMATIC PCS 7 controller for every requirement

#### CPU 410E

Special offer for very small applications  
(200 POs)



#### CPU 410-5H

Scalable CPU for all applications



#### CPU 410SIS

Exclusive for SIMATIC SIS compact



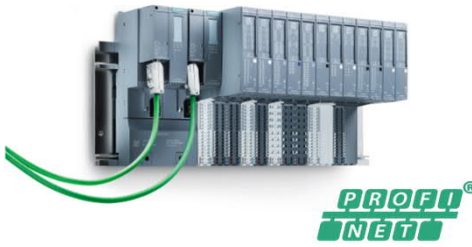
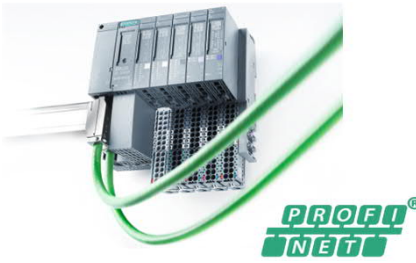
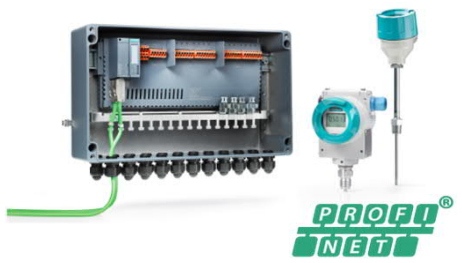

#### Future-proof

- Standardized, redundant and failsafe
- Expandable online
- Powerful, rugged, scalable
- Modular, fan-free design

# SIMATIC PCS 7 – Hardware components Process I/O for PROFINET communication



A coordinated solution reduces the wiring work and increases the flexibility

<p><b>SIMATIC ET 200SP HA</b></p> 	<p><b>SIMATIC ET 200SP</b></p> 	<p><b>SIMATIC CFU</b></p> 	<p><b>SIMATIC ET 200iSP</b></p> 
<p><b>+ High plant availability</b></p> <ul style="list-style-type: none"> <li>• Redundant PROFINET communication down to field level</li> <li>• High-performant and compact</li> <li>• Use in hazardous areas</li> <li>• Push-in technology</li> <li>• Redundant PROFINET-Interface, I/O modules and power supply</li> </ul>	<p><b>+ Flexible</b></p> <ul style="list-style-type: none"> <li>• PROFINET communication</li> <li>• Push-in technology</li> <li>• Compact design</li> <li>• System-integrated PROFIenergy</li> </ul>	<p><b>+ Reduction in cabling cost</b></p> <ul style="list-style-type: none"> <li>• Field distributor brings PROFINET down to the field level</li> <li>• Exchange of field devices and expandability during operation without interruption</li> <li>• Low commissioning, servicing and life cycle costs</li> </ul>	<p><b>+ Hazardous areas</b></p> <ul style="list-style-type: none"> <li>• Redundante PROFIBUS communication</li> <li>• Suitable for gas/dust atmospheres in Ex zone 1, 2, 21 or 22</li> <li>• Modular and flexible engineering, commissioning and cabling with low effort</li> </ul>

# SIMATIC ET 200SP HA

## ...high performance remote I/O for the Process Automation

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**+ Modular I/O series with one of the lowest footprint in process industries DCS**

**+ Compact dimensions**

- 203 x 163mm (high x depth)
- 16/32 channels at 22,5mm wide card
- up to 56 I/O modules per rack, 896 I/O signals

**+ Ready for the field**

- -40°..+70°C horizontal mounting
- -40°..+60°C vertical mounting
- conformal coating, NE21 conform
- operation up to 4,000m above sea level

**+ Highest availability**

- redundant 24V power supply
- redundant PROFINET interface
- redundant I/O modules

**+ Quick and easy wiring**

- PROFINET connection via RJ45, Fast Connect and fiber optic LC connector
- field wire up to 2.5mm<sup>2</sup> with Push-In
- no screws, no torque testing

**+ Easy maintenance**

- Online module replacement
- Online hardware configuration
- Online firmware update
- Identification & Maintenance data

**New!**

- Counter and frequency measurement
- Temperature values 24 Bit resolution
- TIA V16 Integration

**+ Full Range of I/O functionalities**

- DI 24V with field device supply and 1ms time stamp
- DI 125V DC and DI 120..240V AC
- DQ 24V and RQ changeover relays 240V AC / 5A
- AI 0/4..20mA with multi variable HART
- AI for Thermocouple and RTD
- AQ with HART
- Configurable module with AI / DI / DQ



**+ Certificates**



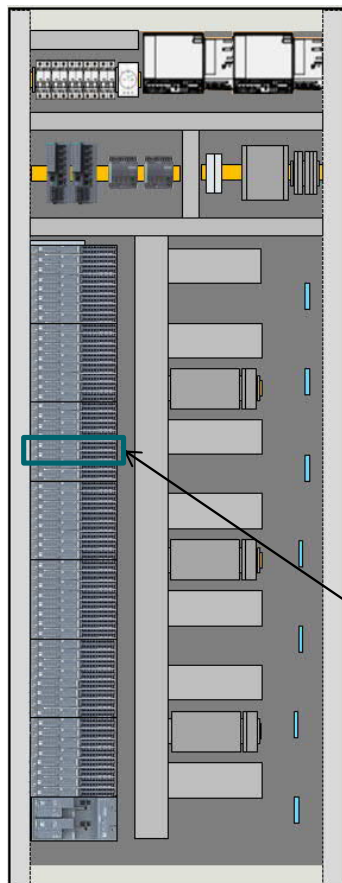
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# SIMATIC ET 200SP HA

... integrated electronic protection for fast troubleshooting and reduced costs

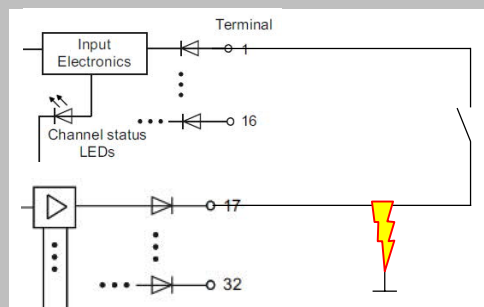
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## ET 200SP HA – integrated field device supply with overcurrent protection

In the case of short-circuit:

- 1) field device supply stops power output
- 2) alarm on single channel level
- 3) troubleshooting
- 4) resume operation at DCS



integrated short-circuit protection (~780 I/O)

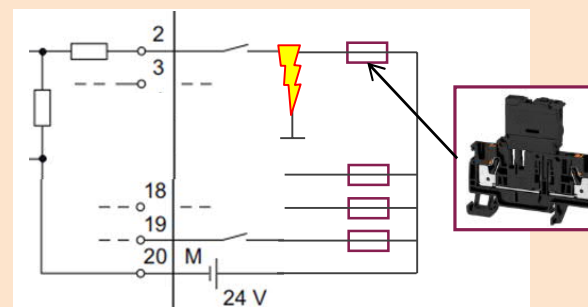
## → Compact and cheaper cabinets due to integrated overcurrent protection

- ✓ compact cabinets (no space consuming field fuses)
- ✓ faster and cheaper manufacturing (no internal wiring of field fuses)
- ✓ faster troubleshooting (channelwise diagnose and no fuse replacement)

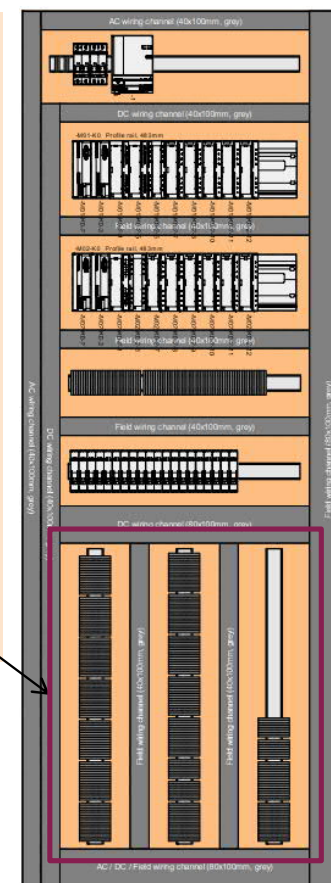
## Standard I/O – field wire must be protected by single fuses

In the case of short-circuit:

- 1) fuse will blow
- 2) no diagnose (opt. trouble alarm, costly)
- 3) localization, troubleshooting, fuse replace
- 4) resume operation at DCS



single channel fusing (~220 I/O)



# SIMATIC Compact Field Unit

## ... overcoming the limitations of the traditional I/O approach

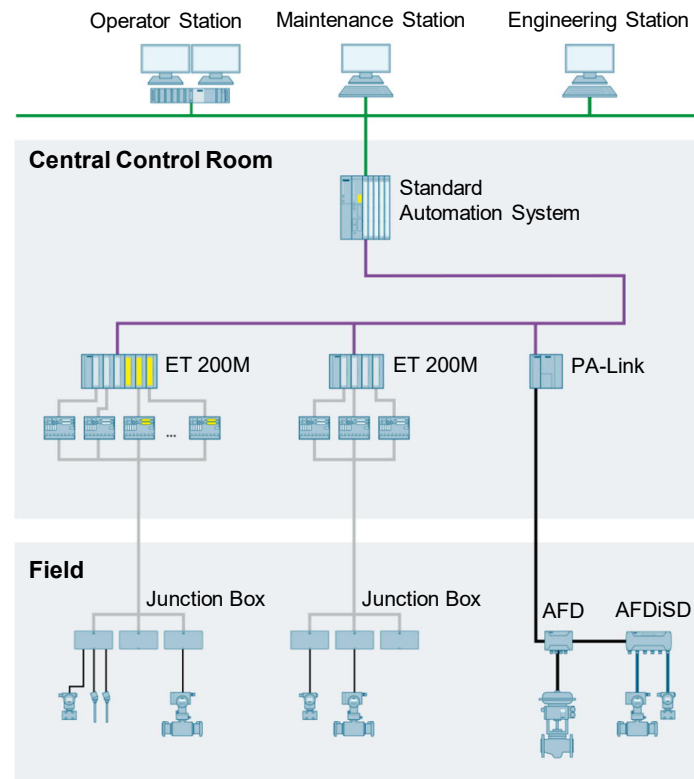
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**Various components** required

Spares need to be prepared  
(e.g. for plant expansion)

Extremely rigid project execution

**High effort**  
of field device integration



Large number of **cabinets** –  
Each **customer engineered**  
Marshalling cabinets required  
to simplify field wiring

**Large number of copper**  
**cables** and terminations

**Fault-prone wiring:**  
Full HW-FAT required  
to validate assembly



**Goal: Reduce overall I/O system footprint, increase flexibility and usability**



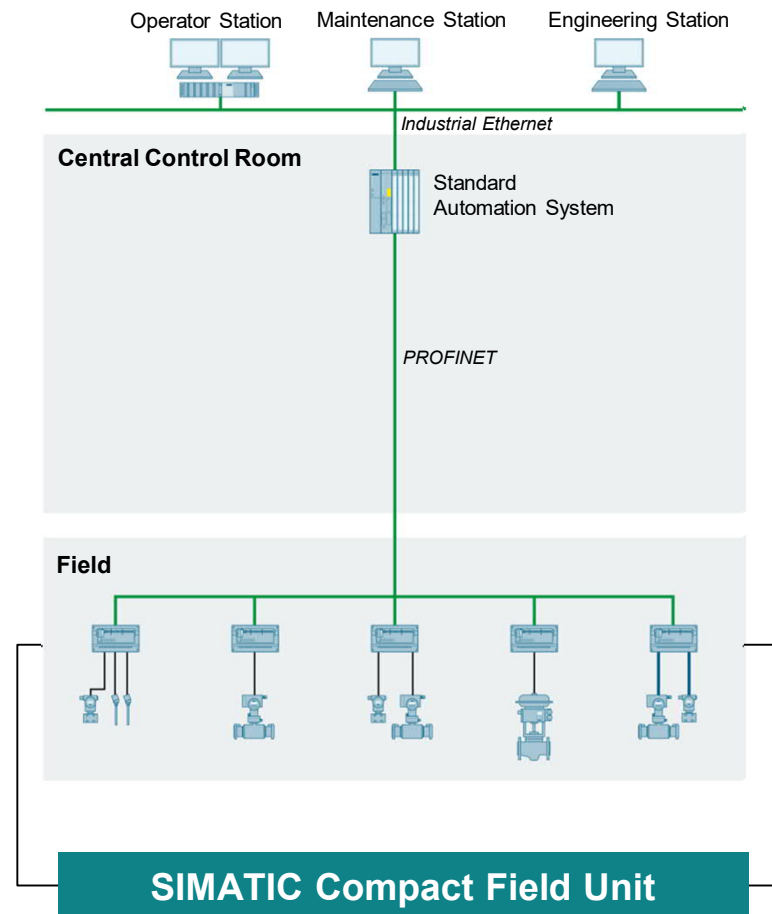
# SIMATIC Compact Field Unit

## ... Siemens' vision for a new plant I/O-design



**+ From a centralized to a decentralized I/O approach:**  
Achieve highest flexibility through modularization of your plant!

**+ From static to freely-configurable I/O:**  
Benefit from highly comfortable software wiring - late signal binding !



**+ From complex to simple device integration:**  
Plug-and-produce instead of trial-and-error!

**+ From specific to standardized solutions:**  
Allows full cost control over the whole plant lifecycle!





# SIMATIC Compact Field Unit – Plug-and-Produce

## ... flexibility through consistent decentralization

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### Fully redundant

- S2 Redundant PROFINET (Ring redundancy)
- Connection of redundant 24V Power Supply
- Detailed LED and System Diagnostic for preventive maintenance



**New V1.2.0**

Adaptable  
Bus Adapter  
for copper,  
fiber optic  
or mixed



### Plug-and-Produce

- Automatic addressing of PROFIBUS-PA devices
- System supported detection and integration of PROFIBUS PA devices into host system by using **standardized PA Profiles**
- Bottom-Up Engineering with Plug-and-Produce



### Brings transparency in the field installation

- Standardized detailed diagnostic (NE107) for predictive maintenance of PROFIBUS-PA devices



### Ease of Use

- Commissioning Wizards for fast and fault-free installation
- System guided online device replacement



### Future-oriented technology for digitalization

- Further SIMATIC CFU-Editions planned:
- PROFIBUS PAis Edition for use in Ex-Zone 1





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# SIMATIC PCS neo

Enter a new world of process control

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[siemens.com/simatic-pcs-neo](https://www.siemens.com/simatic-pcs-neo)

# SIMATIC PCS neo

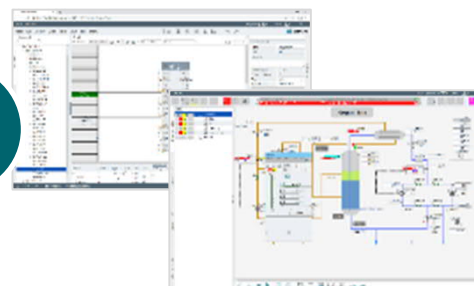
## Motivation for a new Software Architecture

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### SIMATIC PCS 7 Version 9 Hardware



### New System Software

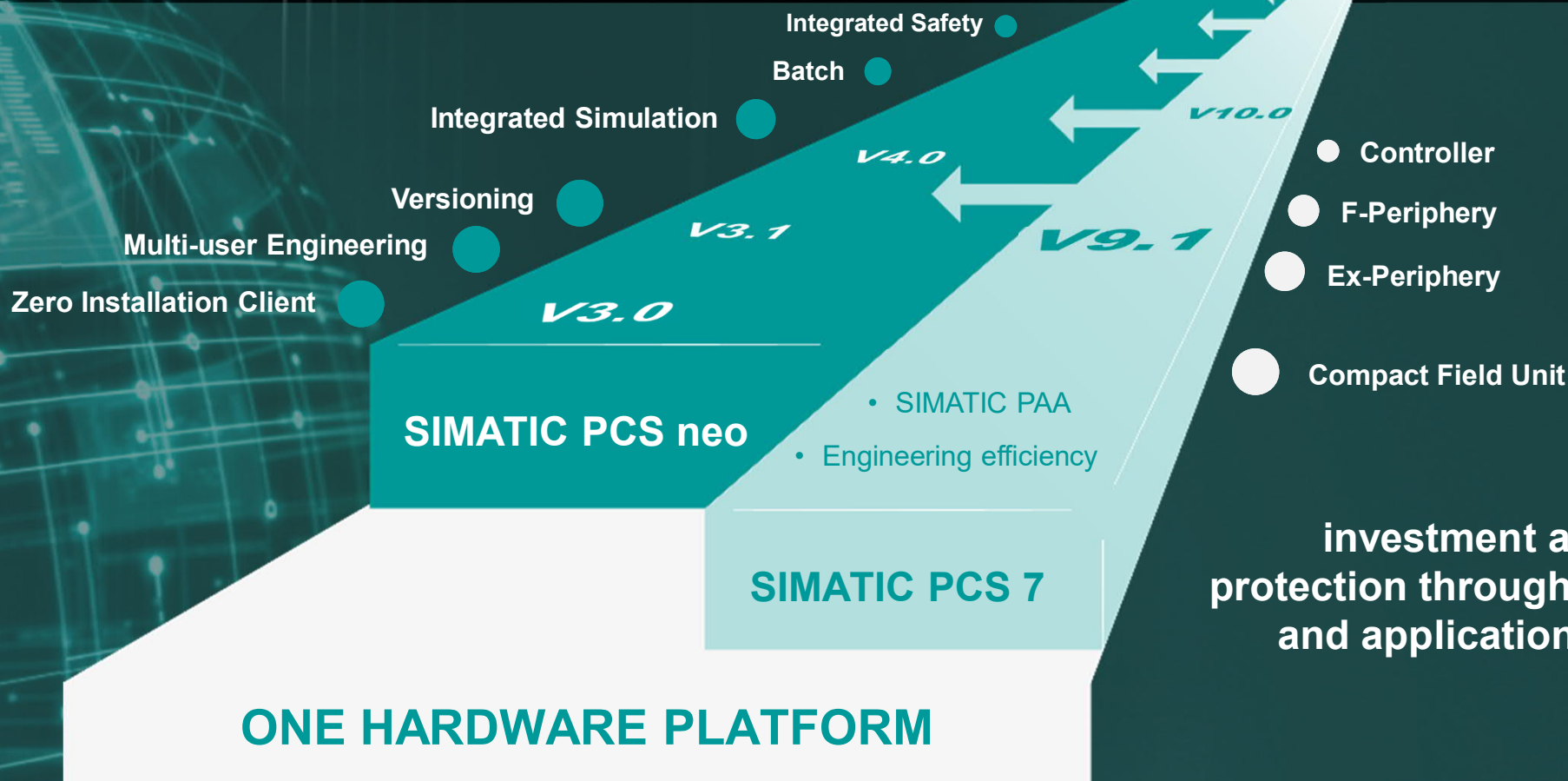


... using the same  
application architecture  
as SIMATIC PCS 7...



Siemens DCS portfolio with PCS 7 and PCS neo covers all customer requirements ... and allows an easy switch

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*Ingenuity for life*



# There are four possible situations for your Plant ... in the starting phase ...

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*Ingenuity for life*

## Greenfield and brownfield projects

Evaluation of User Requirements

Greenfield Projects with  
requirements covered by  
SIMATIC PCS neo

Projects with requirements not  
yet covered by SIMATIC PCS  
neo

## Evolution of SIMATIC PCS 7 systems

There is no need to switch now

Plant with  
SIMATIC PCS 7 V9

Plant with SIMATIC PCS 7  
older than V9

Select SIMATIC PCS 7 V9

Keep  
„Ready for future switch“  
criteria –

Operate SIMATIC PCS 7 V9

You can already adapt to  
„Ready for future switch“  
criteria.

Operate SIMATIC PCS 7

If you want to modernize now,  
go to SIMATIC PCS 7 V9.0

**SIMATIC PCS 7 V9**

You define when you switch! ... with the lowest effort conversion/ evolution

# SIMATIC PCS neo

For any situation  
and requirements  
Siemens provides  
the best individual  
portfolio-strategy  
and long-term  
solution!



### Object-oriented Data Management

Always up-to-date and consistent information



### neo System Access

Direct and secure connection to the system via web - anywhere, anytime and device independent



### neo Usability

Easy and intuitive GUI; all tasks in one workbench (Administration, Engineering, Monitoring & Control)



## SIMATIC PCS neo

New system software, completely web-based (HTML5)



### neo Collaboration

Multi-user web engineering; global collaboration on a new level; highly efficient



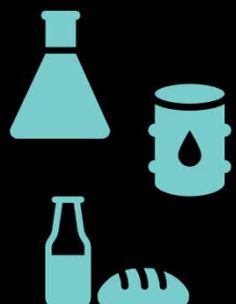
### neo Scalability

From smallest applications to world-scale plants



### Support of the open MTP standard

Modularization and package unit integration made easy



### Investment Protection



### Common Application Architecture with SIMATIC PCS 7

APL, CMT, Technological Products, COMOS, PAA, Recipes...



### Common Hardware and Network Platform with SIMATIC PCS 7



### Know-how Protection





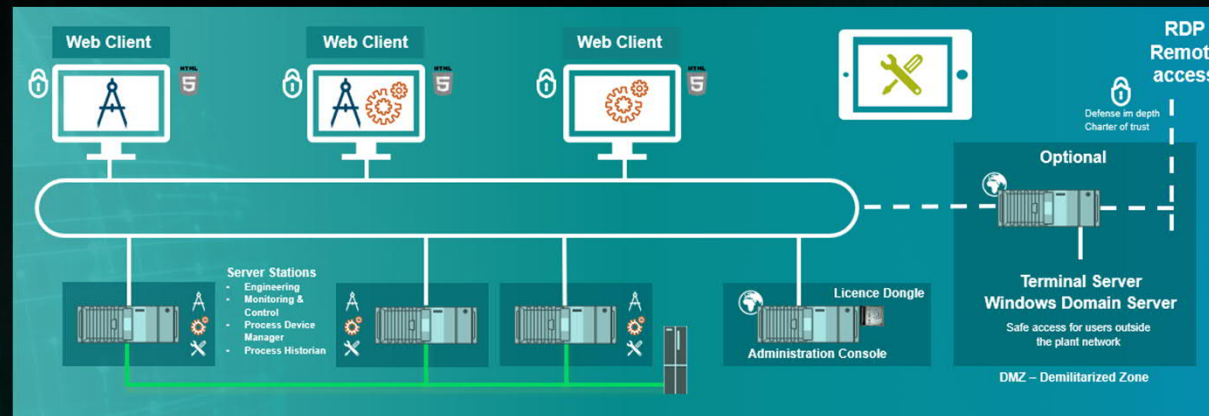
# neo System Access

Web-based, but data ownership stays at the customer

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Uses web-technologies based on HTML5 for communication between Servers and Web Clients

SIMATIC PCS neo works in a local network which is usually not connected to the internet



Remote access via a Terminal Server in the DMZ (demilitarized zone) with corresponding security standards

No pre-installation on devices necessary to run SIMATIC PCS neo due to Zero Installation Client approach

## Web-based means:

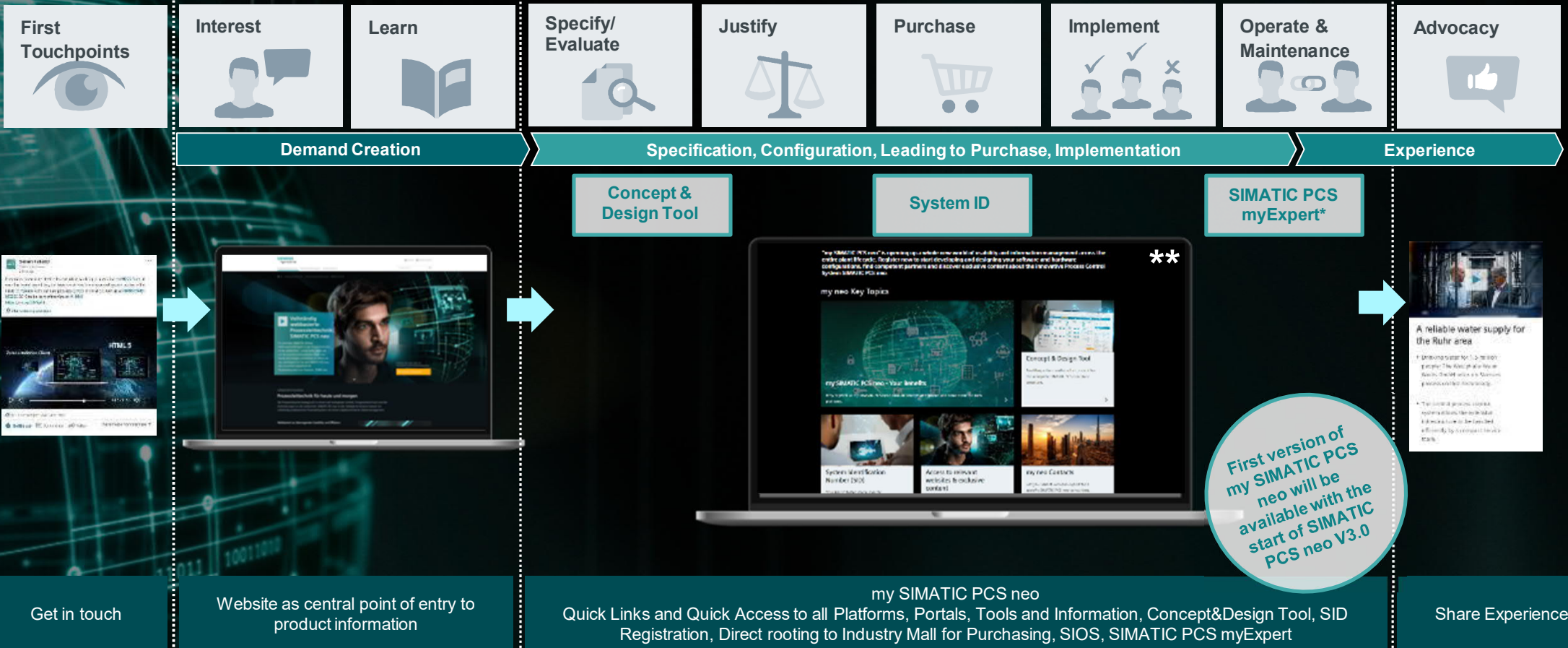
1. Your data is safe because you can host it in your local network
2. Reduced effort for stations due to no installation effort
3. Using web-technologies with HTML5 give maximum flexibility for distributed collaboration in engineering and operation as well as remote access



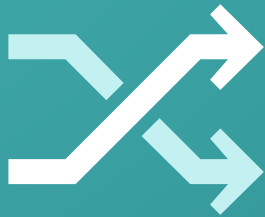
Online and offline set-ups in any aspect from engineering to license management up to operations and diagnostics

# my SIMATIC PCS neo – The new online platform along the entire plant lifecycle

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# Digitalization is the answer!



**Flexibility** and  
**scalability**



Always up-to-date  
**Digital Twin**



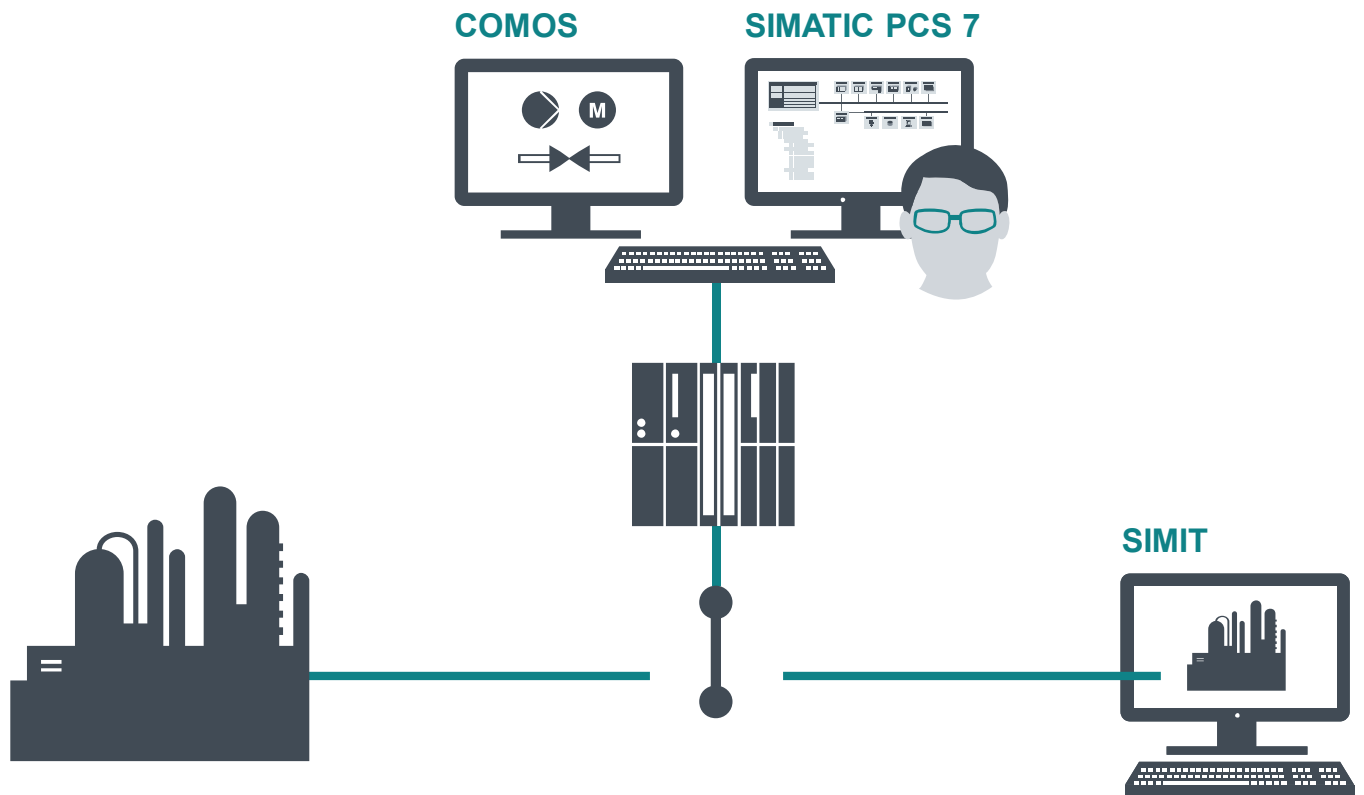
**Security** and  
**documentation**



## Aspects of digitalization – Integrated engineering on one database

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Unique and  
seamless data  
integration from  
engineering to  
simulation  
to plant operation  
with COMOS,  
SIMATIC PCS 7,  
Plant Automation  
Accelerator and  
SIMIT



# Sustainable creation of customer value and satisfaction - SIMIT



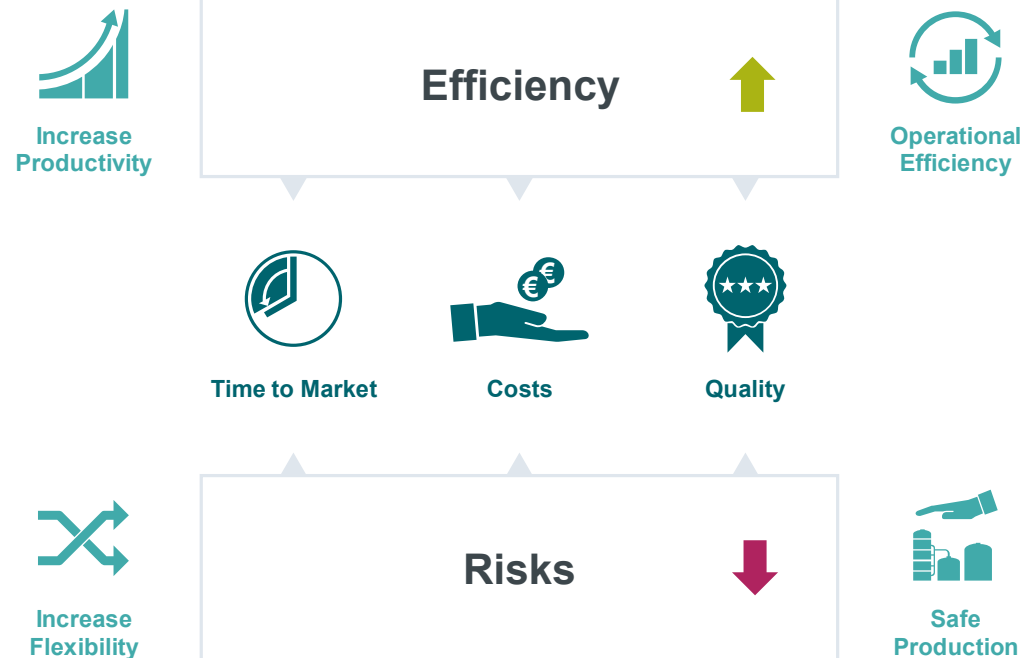
## Purposes

### Virtual commissioning (VCO)

Test the original automation software by the use of a simulation model

### Operator training (OTS)

Train the interaction with the original automation software by the use of a simulation model



## Answer customer needs

Ensure safe, efficient and demand-sufficient production in a fast changing market environment and to cope with an increased complexity of production plants

# Mapping between Real and Virtual Siemens World

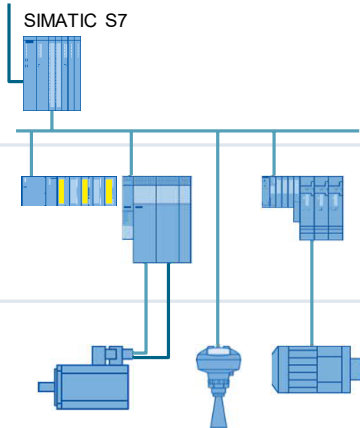


## Real World

HMI: PCS 7 OS  
Server/WinCC



Automation  
System (AS)



Remote IO/  
devices

Actuators/  
Sensors

April 2020

Plant/  
Machine

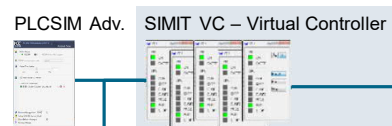


## Virtual World

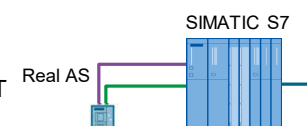
HMI: PCS 7 OS  
Server/WinCC



Software-in-  
the loop  
Emulation of  
AS

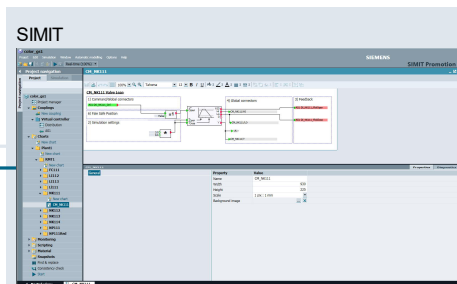


Hardware-in-  
the loop  
PROFIBUS or PROFINET  
via SIMIT Unit

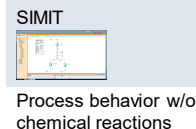


Simulation  
of Signals

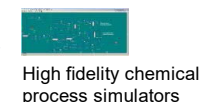
Simulation  
of Drives/Signals



Simulation  
of technological  
behavior



SIMIT-Connector to domain specific simulators



# Simulation based Engineering from Virtual Commissioning to Operator Training



## Product structure SIMIT Engineering S-XL

- SIMIT Engineering
  - S → e.g. Machines
  - M → e.g. Lines
  - L → e.g. PCS 7 projects
  - XL → e.g. OTS
- No functional differences between the packages S - XL
- Conversion packs
  - S → M
  - M → L
  - L → XL
- Flexible pricing based on project size
- Demo version without dongle
- Add-on's can be ordered additionally

### SIMIT ENGINEERING S - XL

- **Use cases (floating licenses, dongle)**
  - Virtual commissioning
  - Operator training (OTS)
- **Features**
  - **Couplings:** SU, VC, PLCSIM, PLCSIM ADV, PRODAVE, OPC DA (Client/Server), OPC UA (client), SHM, Ext. Coupling
  - Standard library
  - Scripting, Trend and Messaging, Macro Component Editor, 2D Dynamic Graphics Editor, 3D VRML Viewer
  - Automatic model generation: Template based engineering: Excel / IEA / CMT import; gen. XML import for full model generation
  - Virtual time, snapshots, remote control interface, modify in run
- **Scaling**
  - **There are packages which scale with the model size (sum of all #input+#outputs+#states for all components)**
  - **XS Package is only sold and delivered together with SIMIT Unit (functionality to configure SIMIT Unit)**

**SIMIT COMPONENT TYPE EDITOR (CTE):** Editor to write and develop own SIMIT components

Libraries	<b><u>SIMIT CONTEC LIBRARY:</u></b> 2D conveyer simulation
	<b><u>SIMIT FLOWNET LIBRARY:</u></b> Pressure driven process simulation of water-/steam-cycles
	<b><u>SIMIT CHEM-BASIC LIBRARY:</u></b> Basic process simulation for chemical / pharmaceutical processes (pressure driven, P&ID)
HIL	<b><u>SIMIT UNIT:</u></b> Profibus / Profinet emulation (1 PB UNIT – 2 channels, 1 PN UNIT – 128 devices, 1 PN UNIT – 256 devices)
SIL	<b><u>SIMIT VIRTUAL CONTROLLER:</u></b> S7-300/400 emulation; Sold by quantity 1 or 5 packages
	<b><u>PLCSIM ADVANCED*:</u></b> S7-1500 emulation; Sold by quantity 1

\*DF FA Product (MLFB)

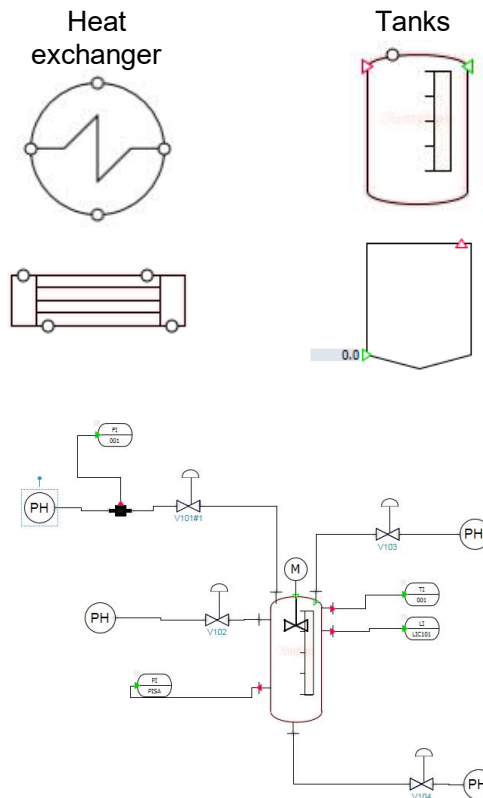


# Simulation based Engineering from Virtual Commissioning to Operator Training



## Simulation CHEM BASIC Library

- For chemical or pharmaceutical plant simulation
- To build models in the schematics of a P&ID
- Import via the generic import the technological behavior out of COMOS P&ID
- Simulate a piping network with single (pseudo) component, liquids or gas (e.g. water) including pressure, temperature and flow



Measurements



SIMIT Promotion	
Komponenten	
▼ Basiskomponenten	
▼ CHEM-BASIC	
▶ Burners	
▶ Fittings	
▶ Graphics	
▶ Heatexchangers	
▶ Measurements	
▶ Mixing Apparatuses	
▶ Pumps	
▶ Separators	
▶ System	
▶ Tanks	
▶ Valves	
▶ COMMUNICATION	
▶ CONNECTORS	
▶ CONTEC	
▶ DRIVES	
▶ FLOWNET	
▶ SENSORS	
▶ STANDARD	

The background of the advertisement is a composite image. It features a night-time photograph of an industrial facility, likely a refinery or chemical plant, with its lights reflecting on a body of water in the foreground. Overlaid on this image are several technical diagrams. On the left, there is a P&ID (Process and Instrumentation Diagram) showing various process units like pumps (P002), tanks (T002), and control loops (LICSA L002). On the right, there is a large, circular, semi-transparent overlay that resembles a complex network or a data visualization, with lines connecting different nodes. The Siemens logo and tagline are in the top right corner.

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*Ingenuity for life*

# COMOS Platform

Making data work

Free for use

[siemens.com/COMOS](https://www.siemens.com/COMOS)

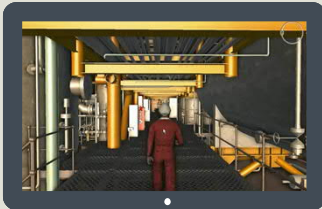
Siemens with comprehensive and seamless  
Digital Enterprise portfolio for process plants



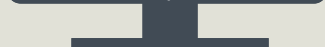
COMOS



COMOS Walkinside



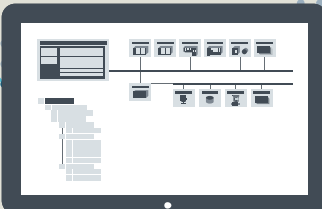
XHQ Operations Intelligence



MindSphere

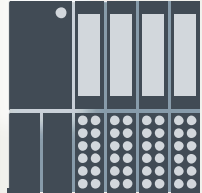
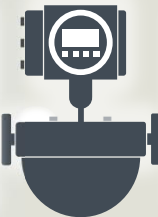
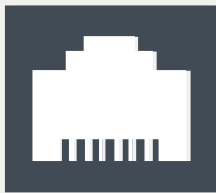


SIMIT



SIMATIC PCS 7

MindSphere



...

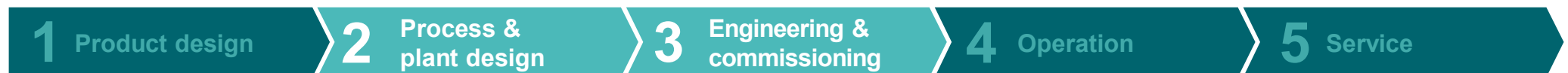
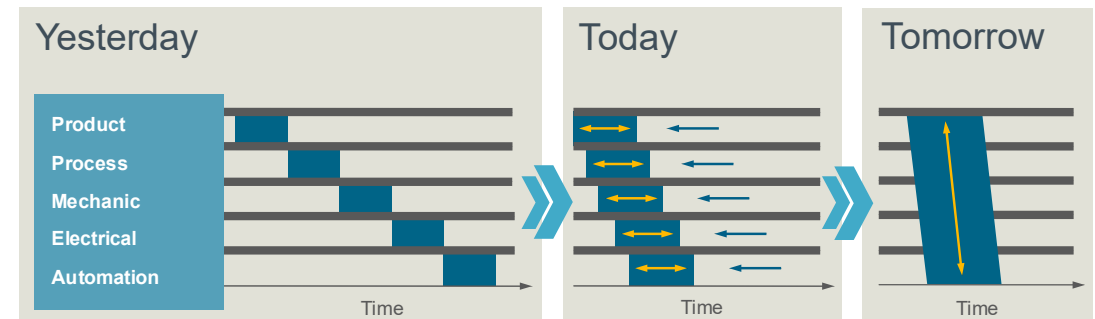
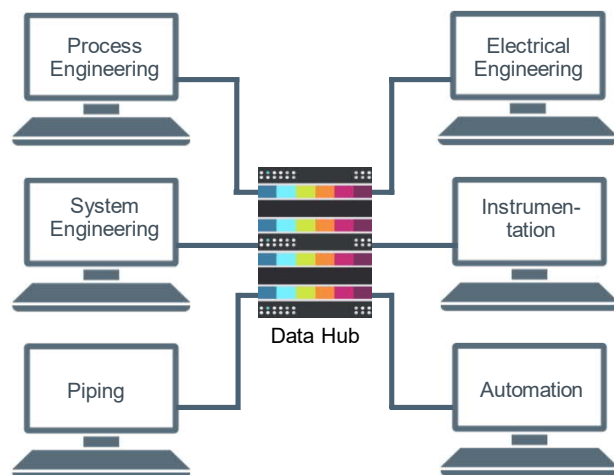


# Integrated Engineering for process plants: Common data model ensures consistency for all workflows along the lifecycle



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

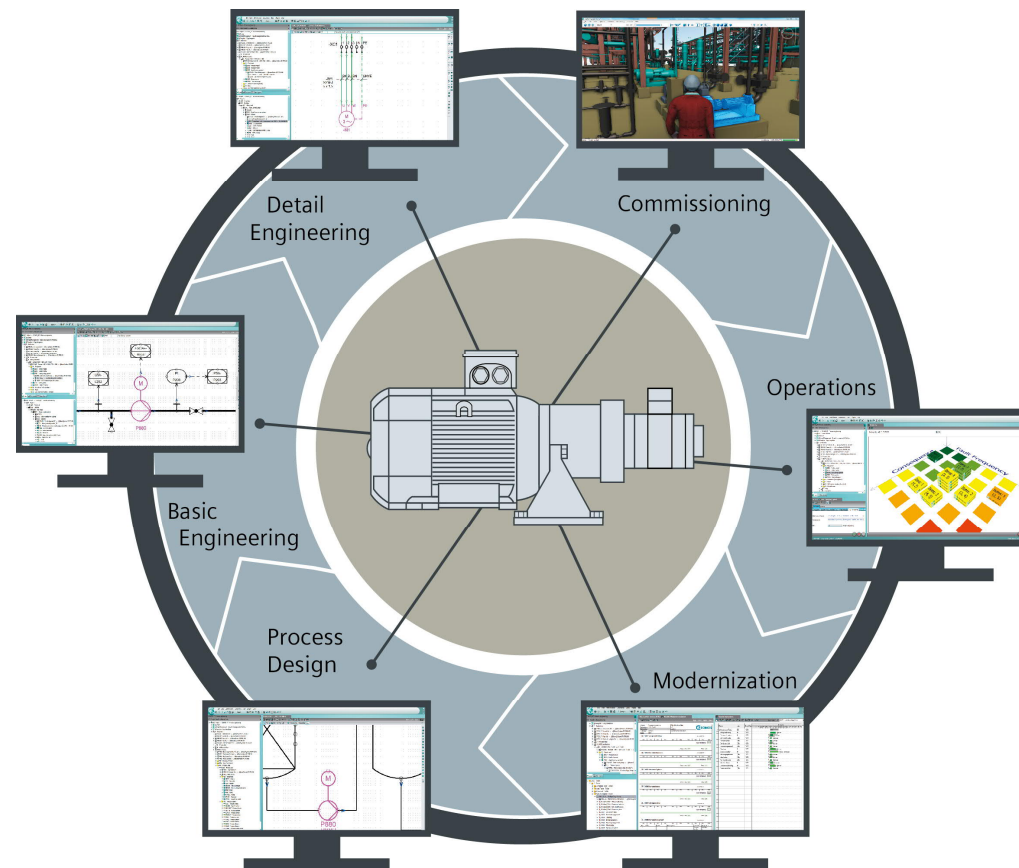




# Siemens Answers: COMOS



## Based on Objects:

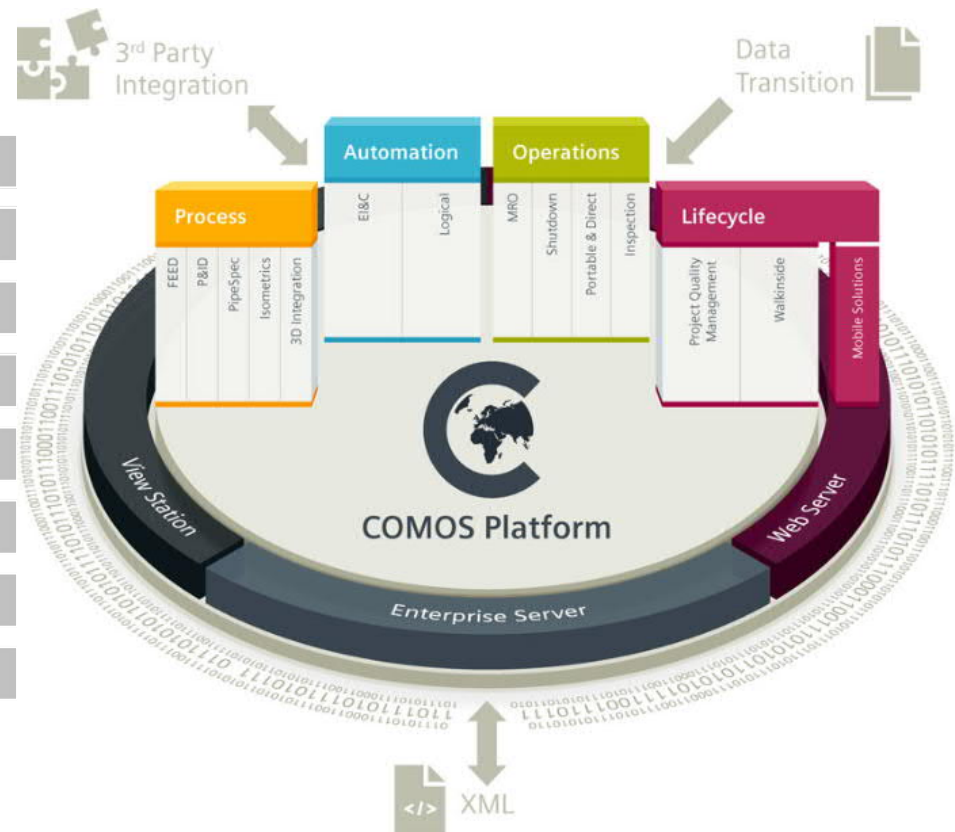
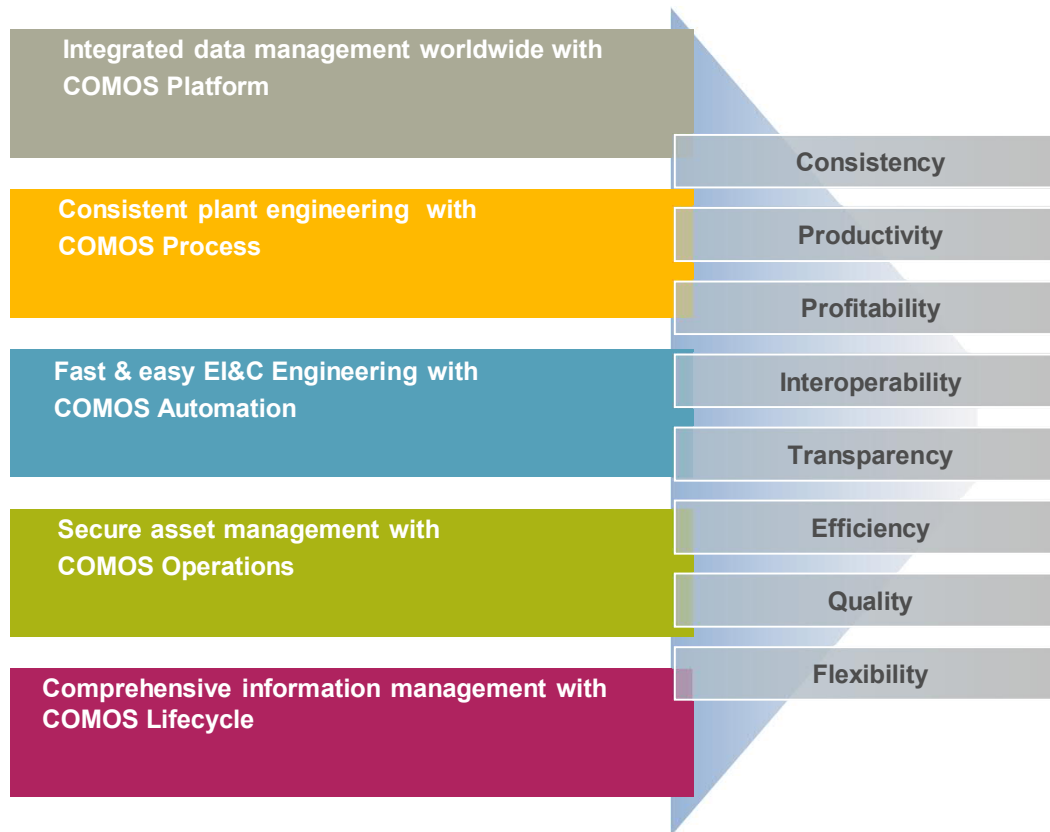


# COMOS

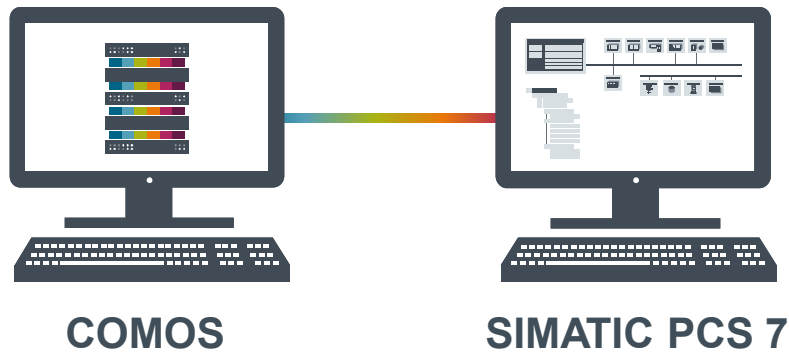
## Maximum productivity for the entire plant lifecycle

# SIEMENS

*Ingenuity for life*



# Integrated Engineering: Data exchange between engineering system and automation



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

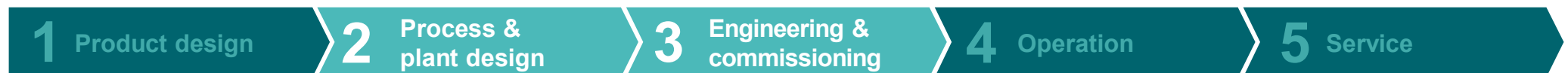


# Integrated Engineering for process plants: Digital Twin and 3D visualization of the plant



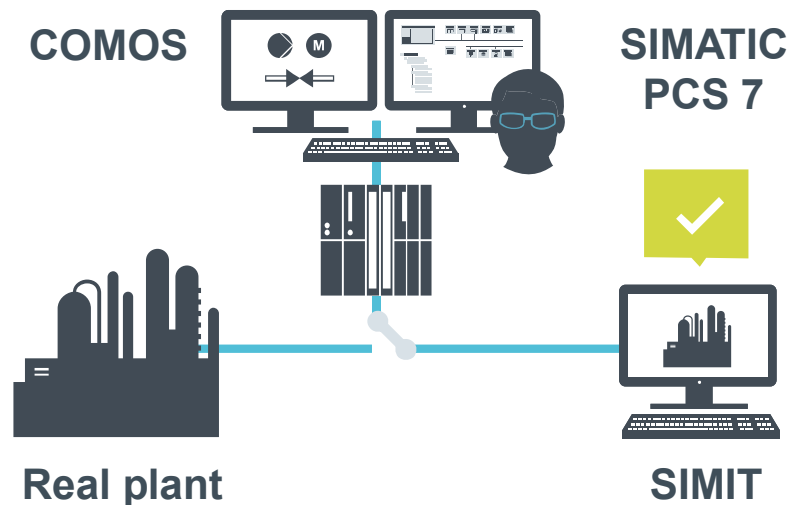
During engineering, the Digital Twin of the plant is created, even before the real plant exists ...

... this offers the possibility of an early 3D visualization of the plant, e.g. for training of service staff



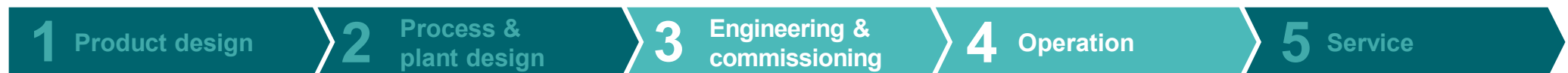


# Integrated Engineering and Integrated Operations for process plants: Simulation improves engineering and operational efficiency

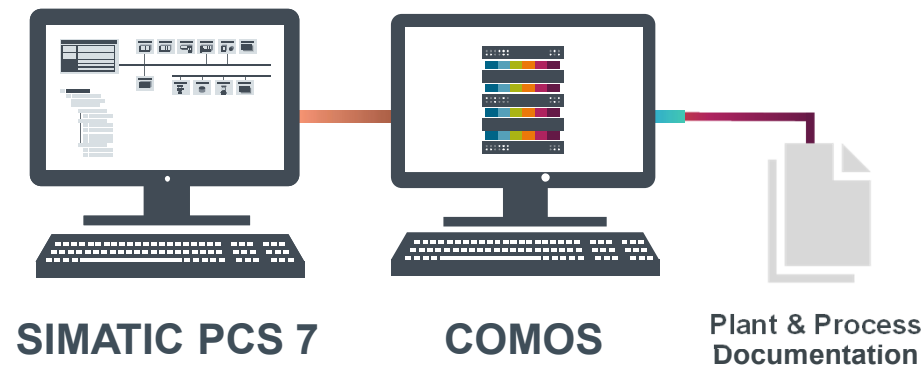


## Your benefits in Engineering and Commissioning

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



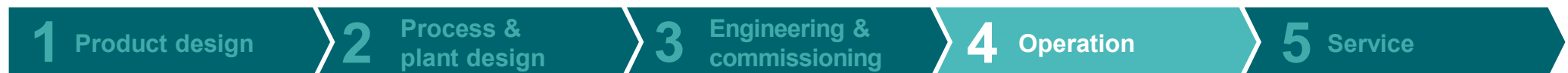
# Integrated Operations for process plants: Data exchange between automation and engineering system



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

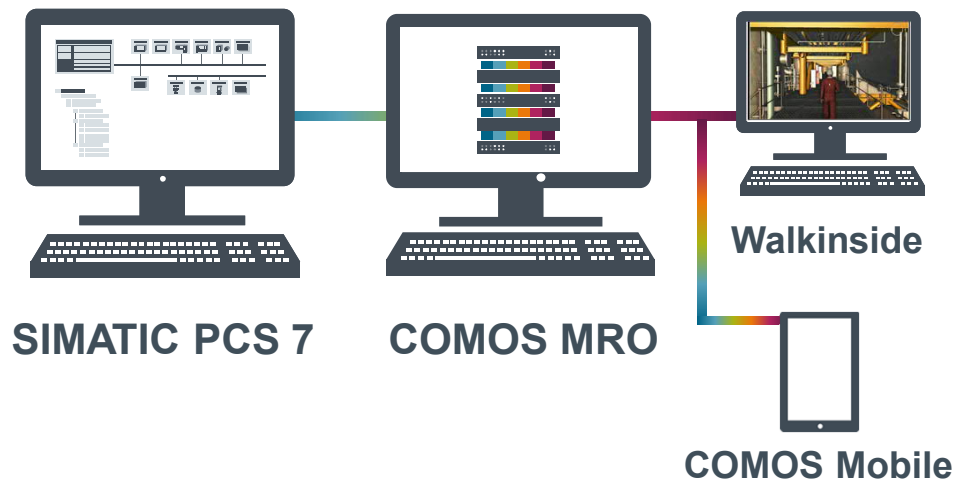
## Your benefits in operation

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



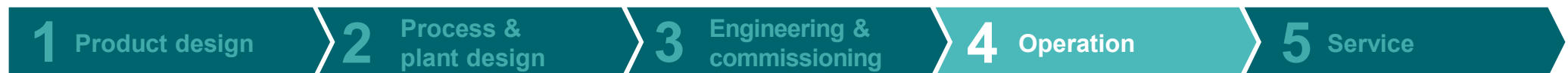
## Integrated Operations: Optimized workflow for maintenance management

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### 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





# Gaining invaluable insights with PlantSight

Discover the benefit from the Digital Twin  
in a brownfield environment



Dark Data is the key

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## How to manage Dark Data?

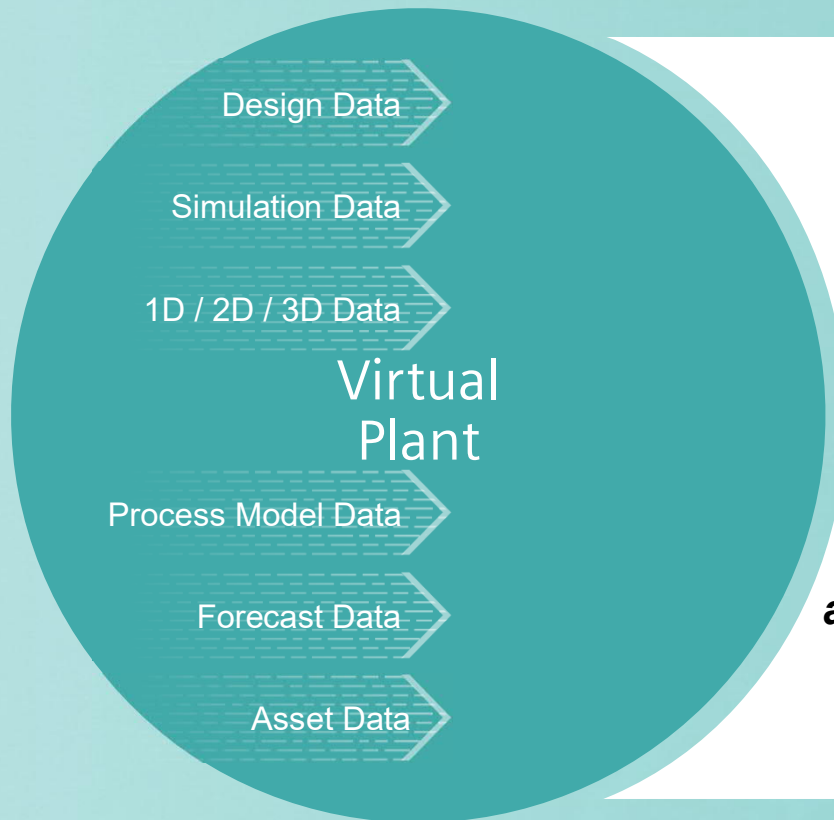
Unstructured and untagged  
data and documents

**Different** data storage locations

**Where** is the application?

Finding **current** and **valid** status

## PlantSight - Digital Enablement



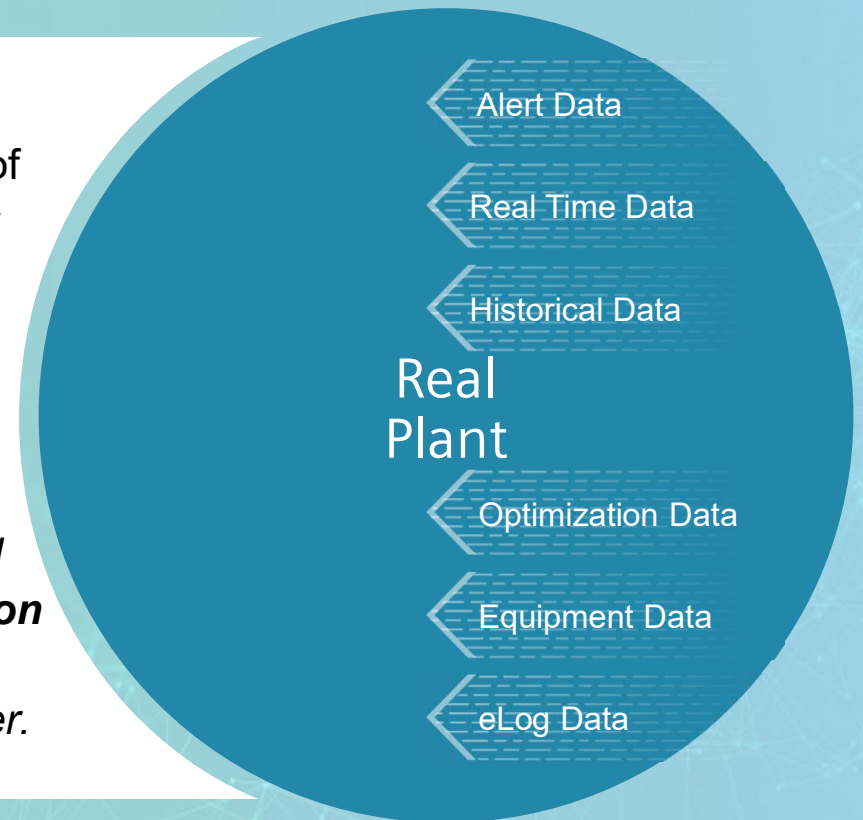
### Digitalization

Brings these worlds of information together

- ✓ Quickly
- ✓ Reliably
- ✓ Consistently
- ✓ Seamlessly

**Origins of data and access to visualization tools ...should be transparent to the user.**

## PlantSight - Digital Reliability



Clean handover and continuous change management is essential

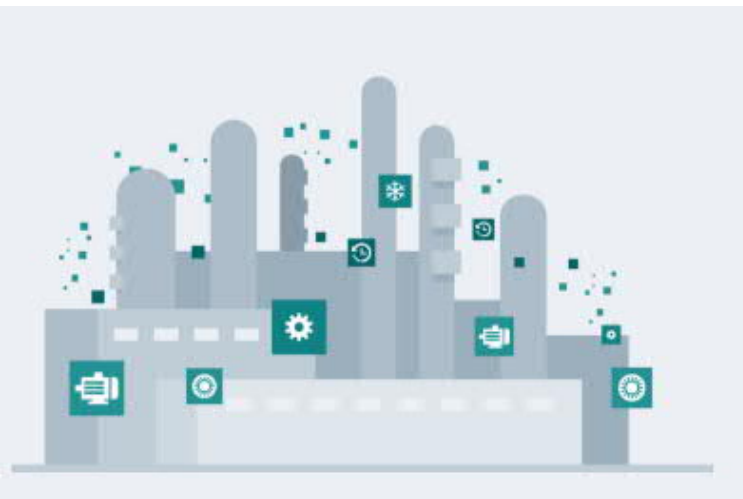


# PlantSight

## One complete, digital twin for the process industry



Your plant - in data



Capture data from different sources



# PlantSight

## One complete, digital twin for the process industry



Your plant - in data

One complete, digital twin



Consolidate and validate data

# PlantSight

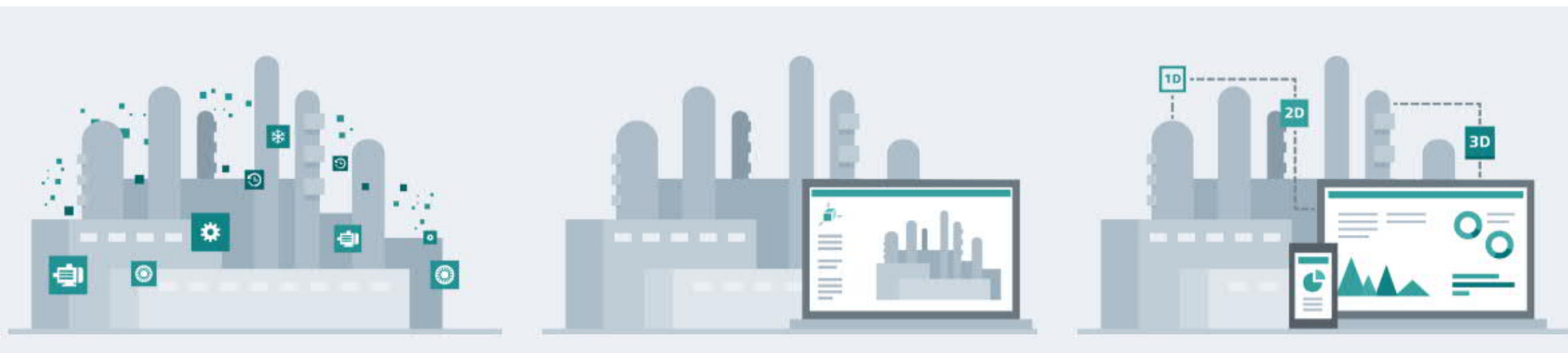
## One complete, digital twin for the process industry

**SIEMENS**  
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Your plant - in data

One complete, digital twin

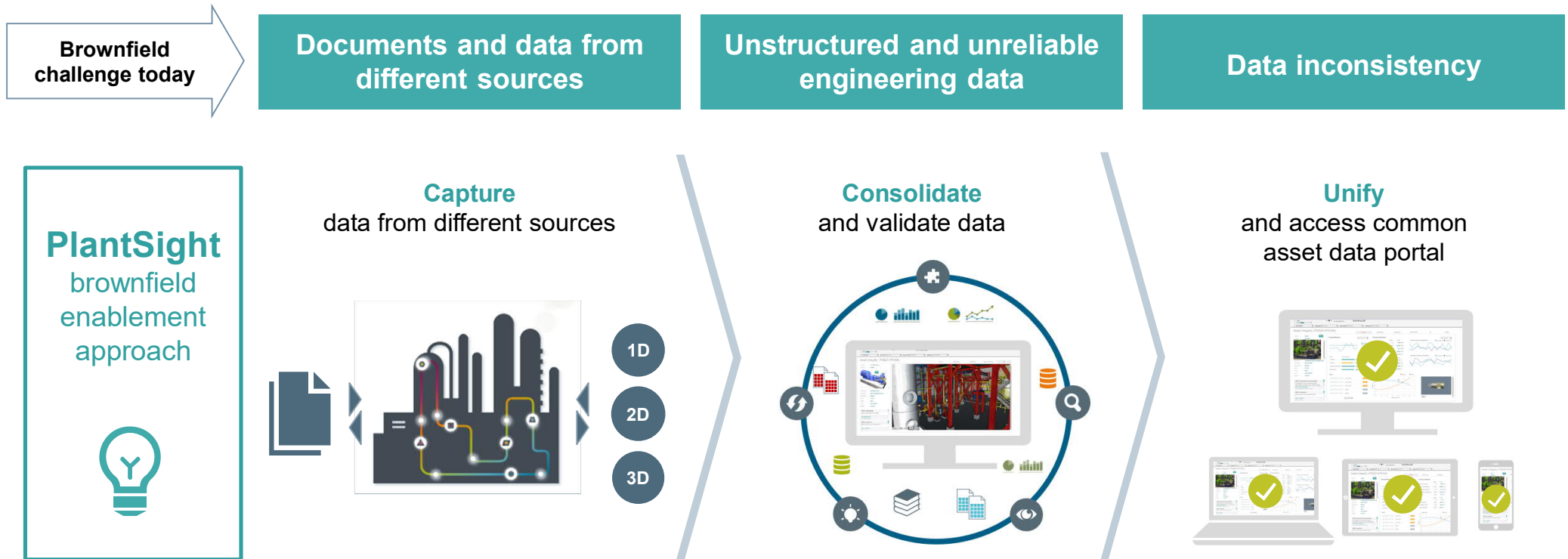
Invaluable insights: anytime, anywhere



See everything, discover new possibilities, work purposefully – and profit immediately

# Brownfield enablement and asset integrity management

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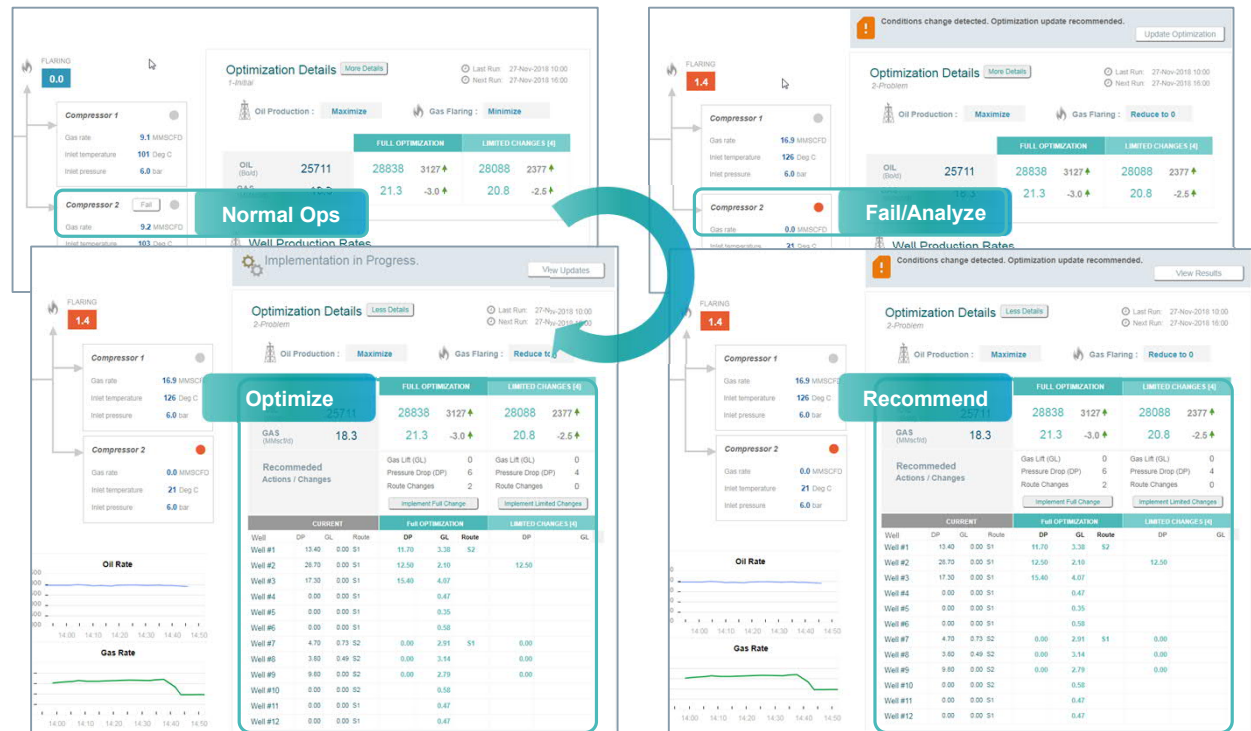


**Digital Twin enablement without disruption to existing physical or virtual environment**

# An intelligent twin for optimization

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- Operational improvements under normal conditions
- Optimized process recommendations for abnormal situations/ unplanned outages
- Deep data level integration to leverage all of your data sources



**Open technology: Leverage the simulation and optimization tools of your choice**



# What does it mean for you?



## Gaining insights with PlantSight

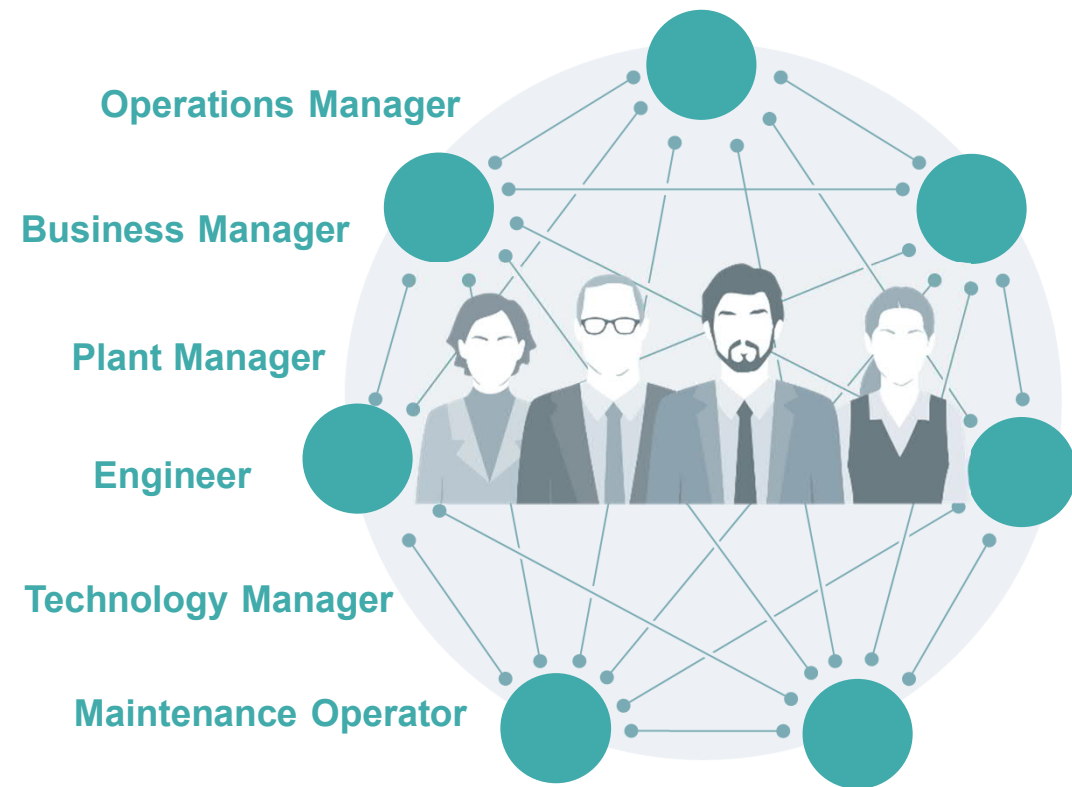
### A single point of access for your digital twin



Easy access to updated information considering **your responsibilities and needs**

See the information ***you*** need – **when, where and how** you need it

- ✓ **Make better and faster decisions**
- ✓ **Optimize process and performance**
- ✓ **Improve your operations**



# Roll-ups and Visibility for Operations

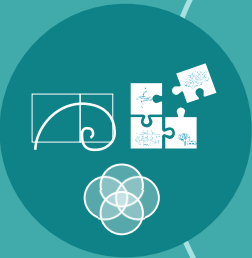
*Providing a clear view to the horizon*



Mobile Clients

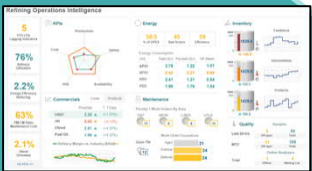
Handover

Engineering and Design View

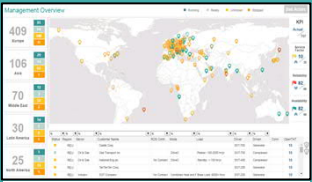


Change Management

Operations View



Corporate Rollup KPIs



Global Fleet Management

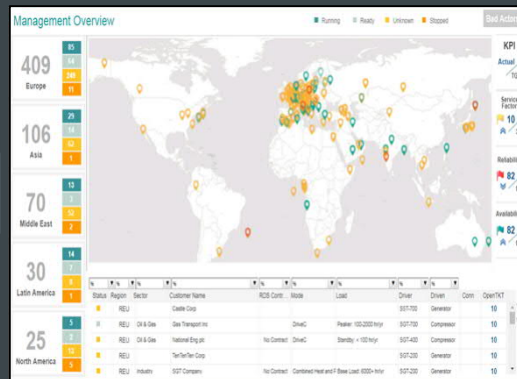


Asset Level Performance & Bad Actors

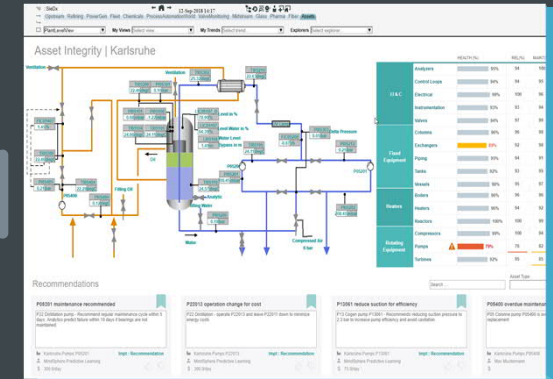
# Gaining invaluable insights with PlantSight – dedicated to your requirements!

**SIEMENS**  
*Ingenuity for life*

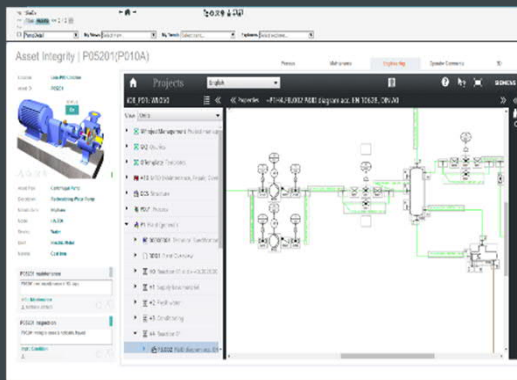
Operations Manager



Plant Manager



Plant Engineer



Maintenance Operator





## Key Takeaways

The digital twin with contextualized data from different sources provides better insights to leverage enormous savings potentials



Workflows are triggered promptly and efficiently based on combined input from the DCS and Asset Performance Applications



Replacing disconnected/manual workflows with digital processes

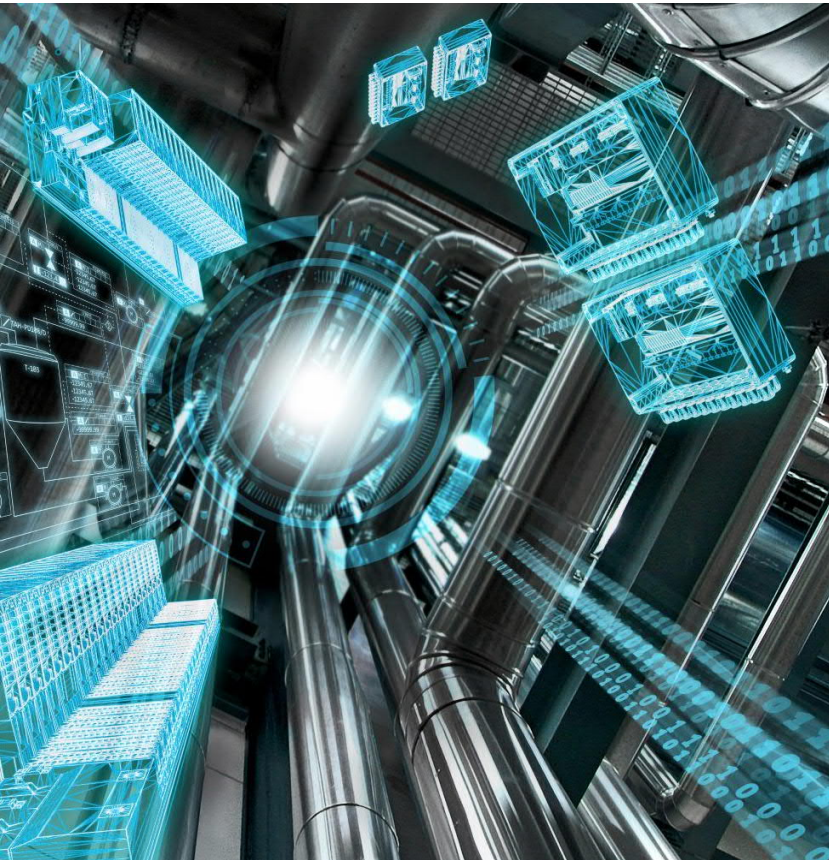


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Thank you for your attention!

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*Ingenuity for life*



**Jelena Đukić**

+381 60 8170 288

E-mail: [jelena.djukic@siemens.com](mailto:jelena.djukic@siemens.com)

**Marko Milenković**

Mob: +381 60 817 0178

E-mail: [:marko.milenkovic@siemens.com](mailto:marko.milenkovic@siemens.com)