SIPAPER

Driving the Digital Enterprise in the Fiber Industry

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Ingenuity for life

siemens.com/sipaper

An Industry in Transformation
Strategic Approach – Siemens Fiber Industry – more than Pulp & Paper

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„Yesterday"

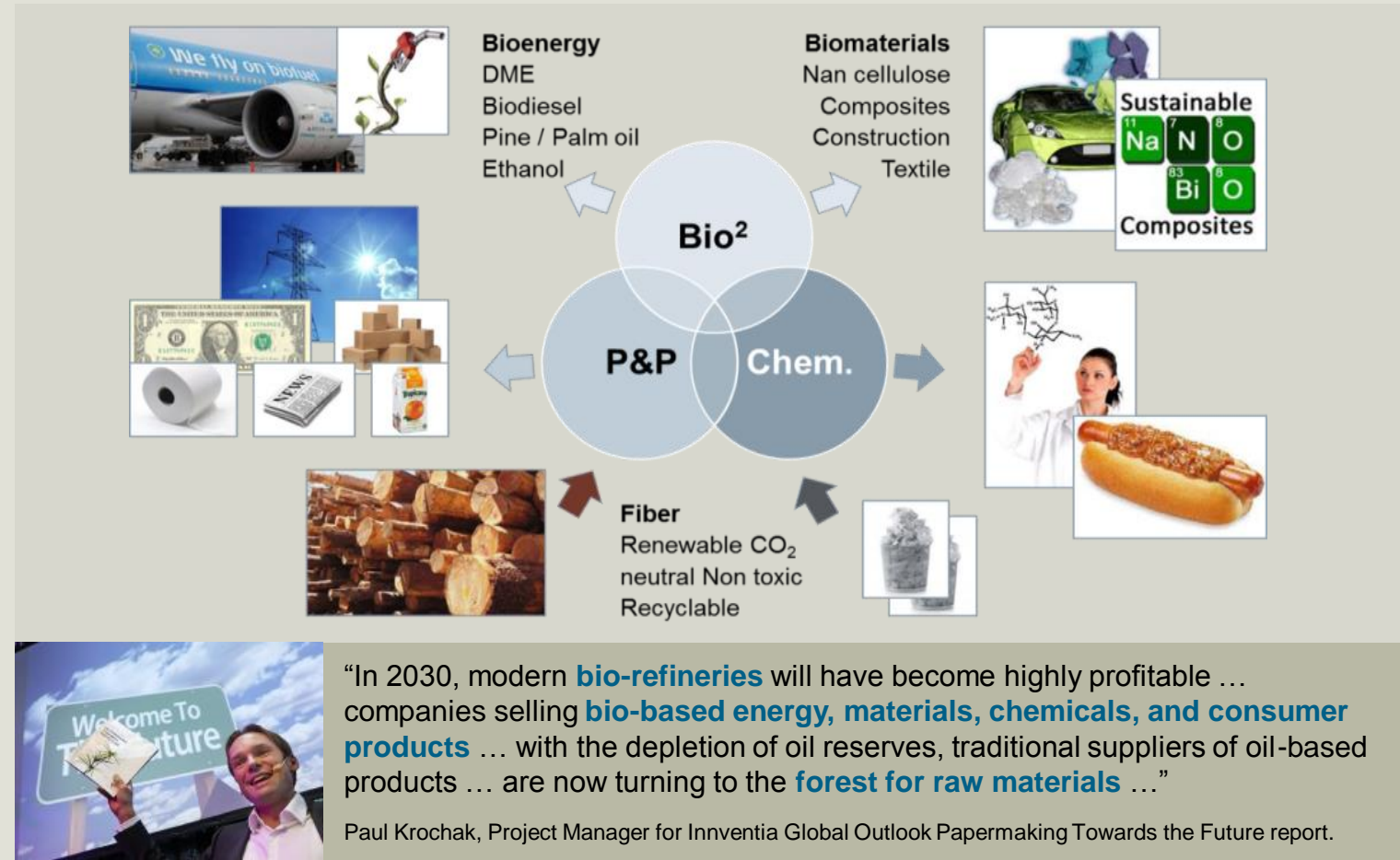### 1. "Traditional" P&P Business

Paper, Board, Pulp, Tissue

+

„Today"

2. Extended Market Approach

Non-Woven, Composites …

+

„Tomorrow"

3. New FIBER Technology

BioChemicals, BioFuels

Bioenergy
DME
Biodiesel
Pine / Palm oil
Ethanol

Biomaterials
Nan cellulose
Composites
Construction
Textile

Bio²

P&P   Chem.

Fiber
Renewable CO$_2$
neutral Non toxic
Recyclable

"In 2030, modern **bio-refineries** will have become highly profitable … companies selling **bio-based energy, materials, chemicals, and consumer products** … with the depletion of oil reserves, traditional suppliers of oil-based products … are now turning to the **forest for raw materials** …"

Paul Krochak, Project Manager for Innventia Global Outlook Papermaking Towards the Future report.

Driving the Digital Enterprise in the Fiber Industry – with SIPAPER!

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The **SIPAPER** Portfolio

World-class products + perfectly matching, industry-specific modules

Drive Technology
SINAMICS, SIMOTICS, FLENDER, .

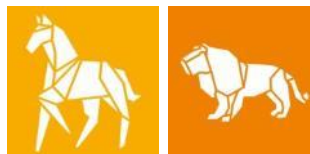**Industrial Automation**
SIMATIC, SIPLUS, …

Energy Management
SIMOCODE, SIVACON, SIPROTEC, ...

Industry Services
Life Cycle Services, Plant Data Services, …

SIPAPER Drive Systems

SIPAPER Drives APL

SIPAPER Winder APL

FLENDER Gear Units for SIPAPER

SIPAPER Process Automation
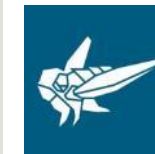
SIPAPER DCS APL

SIPAPER QCS APL

SIPAPER APC

SIPAPER XHQ

SIPAPER Power Distribution

SIPAPER Power

SIPAPER Operations

SIPAPER Services

Integrated **SIPAPER** Solutions

Juergen Mielke / PD SLN FI

Siemens' approach to Digitalization:
The Digital Enterprise

Digitalization is the next level to yield productivity within Process Industries

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Computing power
Connectivity
Sensors
Cloud computing
Data analysis …

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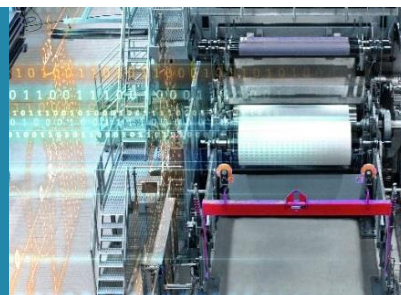10010111001
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Digitalization

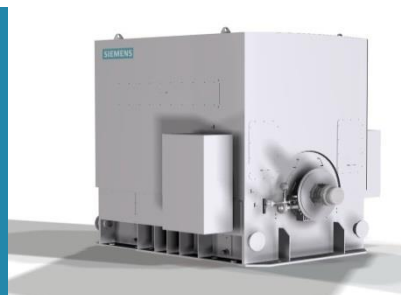Next level of productivity

Automation

Siemens as experienced partner for Automation and Electrification

Electrification

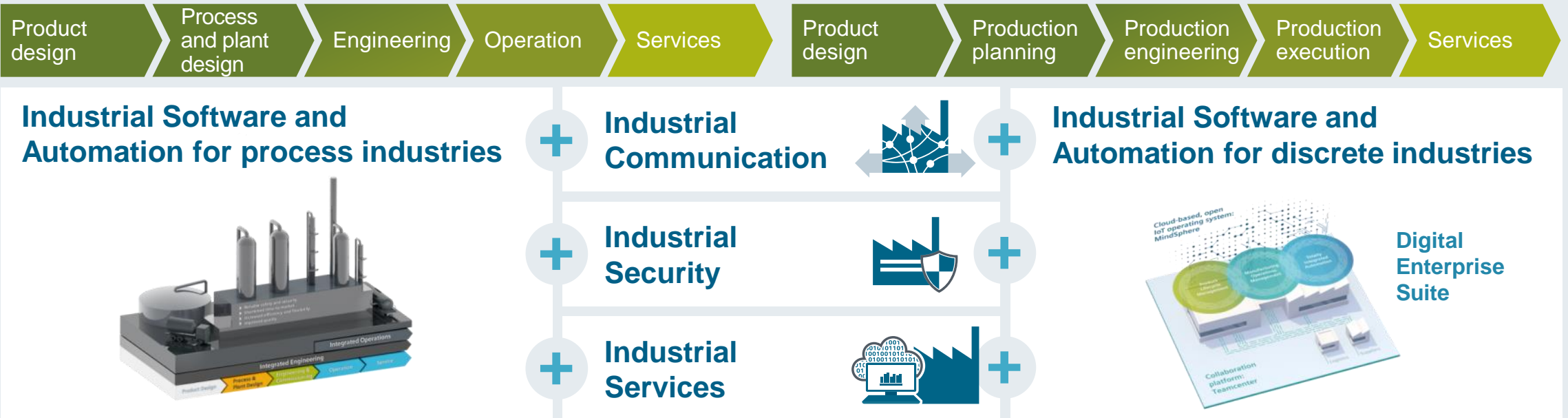Pioneer for Digitalization in industry

Time

Digital Enterprise is our portfolio of solutions for the digital transformation – in both discrete industry and process industry

Digital Enterprise

Process Industries	Discrete Industries

Product design	Process and plant design	Engineering	Operation	Services	Product design	Production planning	Production engineering	Production execution	Services

Industrial Software and Automation for process industries

\+ **Industrial Communication**

\+ **Industrial Security**

\+ **Industrial Services**

\+ **Industrial Software and Automation for discrete industries**

Cloud-based, open IoT operating system: MindSphere

Digital Enterprise Suite

Collaboration platform: Teamcenter

Digitalization of the field level

Driving the Digital Enterprise in the Fiber Industry …

Converting 4.0

Integrated Manufacturing in the Furniture Industry   Papermaking 4.0

Paper Industry 4.0

From Wood into the Cloud

Industrie 4.0 in der Zellstoff- und Papierindustrie

Forest-Wood Value Chain 4.0

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WHAT DIGITAL CAN DO
FOR THE PAPER INDUSTRY

Five elements of Digitalization

Investment in each of these pillars will give companies an increase in efficiency and flexibility as well as a better strategic position than their competitors:

1	2	3	4	5
Smart equipment	Networking & connectivity	Value chain integration	Smart products	Data analytics

Opportunities of Digitalization

- Improved offerings & new offerings creating new markets
- Improved performance of offerings
- Synergy offering across industries

Challenge

- Information management

  - Lack of data **quality and consistency** from concept to operations

  - **Data silos** across the value chain

  - **Compliance** with industrial and environmental **regulations**

  ➡ **More than 60%** of the engineering and production costs

  ➡ Engineers **spend >20 %** of their time **in searching for data**

Solution

- COMOS – Siemens **Plant Lifecycle Data Platform**
- Integrated engineering along the plant lifecycle
- Stepwise approach recommended

Our cooperation with Bentley opens numerous saving potentials, for example in engineering and plant lifecycle management
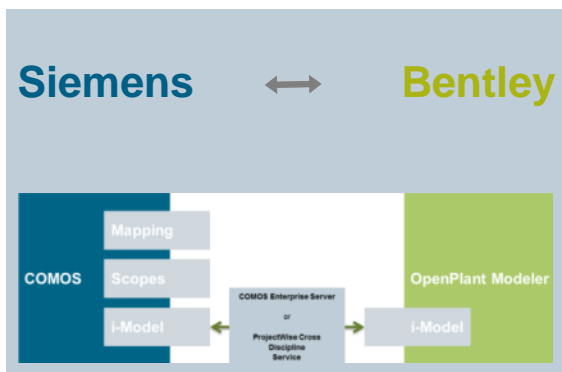
Extended Interface

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

Product design	Process & plant design	Engineering & commissioning	Operation	Service

Use case #1
A real example of SIPAPER Process Automation (Stock Preparation)
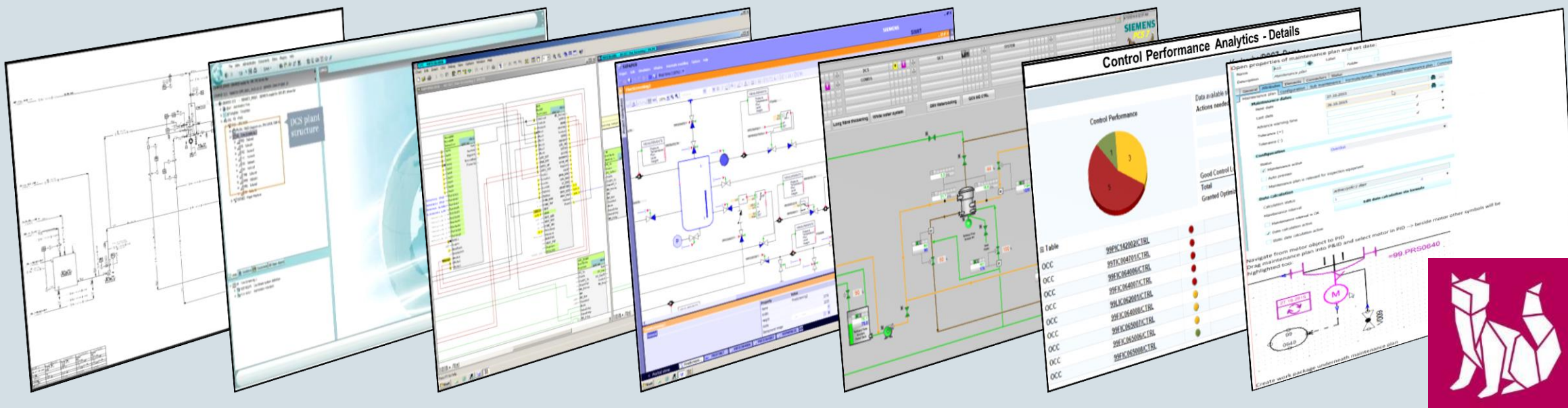
COMOS EI&C　　**SIPAPER DCS APL**　　**SIMIT**　　**CPA**　　**COMOS MRO**

Time savings by database oriented engineering incl. platform for global cooperation

Improved quality by standardized and modular plant design

Faster ramp up by flexible and easy simulation design

Optimal resource and energy efficiency by higher control loop performance

Optimized asset management by integrated system for maintenance, repair and overhaul

Use case #3
Real-time performance monitoring for faster, fact-based decision-making

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Challenge

- Data transparency in production

  - **Data silos** in ERP / MES / DCS

  - Huge amount of **not managed "bulk" data** available

  - **No** detailed **information on product & process** available

  - **No** centralized **alarm/event logging**

  - **ISO 9000,** traceable production

  ➡ Management & Engineers **spend more than 80 %** of their time **in collecting data**

Solution

- SIPAPER XHQ – Real-time **Management Information System**

- High performance and easy to configure tool

- Scalable standard software (from machine to mill and corporate level)

Use case #3
SIPAPER XHQ – Real-time Managements Information System

Trend Analysis

Documents

Reporting

Operator Input

Alarm Statistics

Shift Books

XHQ Integrated Data Gateway

SIPAPER MIS Server

Archive

SIPAPER DCS APL

Others

Tailored Management Information System **for the Fiber Industry.**

- Networking of the **process control and production control** levels
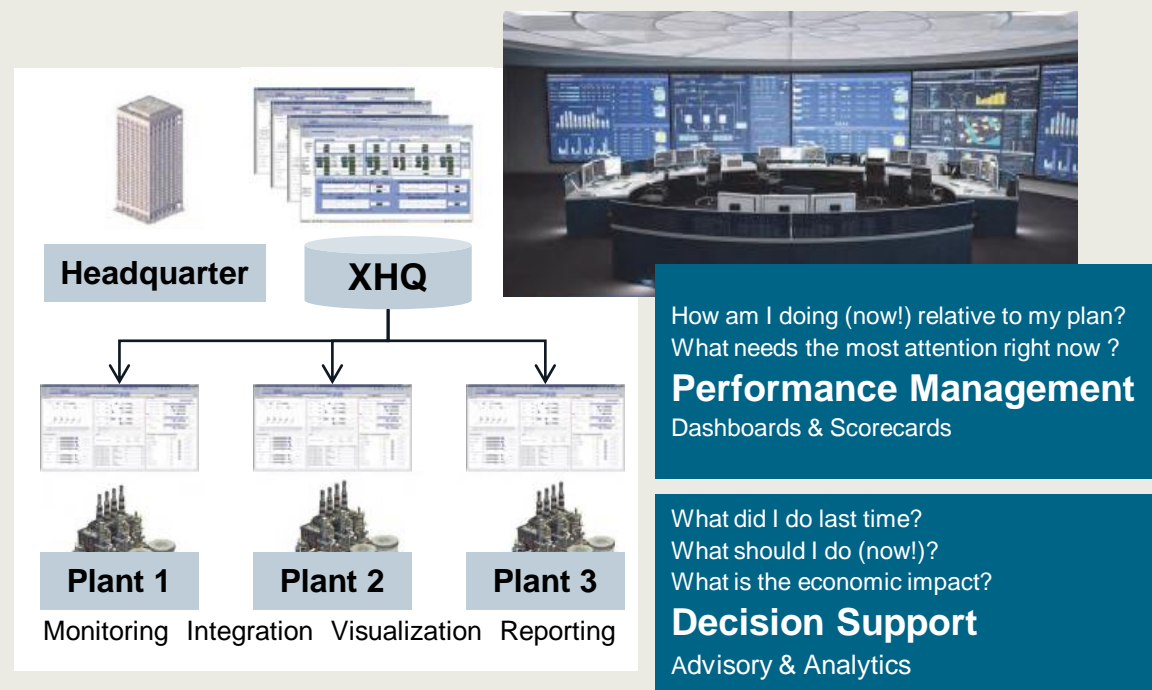- **Transparency** of all available **data and information** for the entire production process

Application area

- Monitoring & reporting
- Data analysis
- Alarm analysis
- Process analysis
- Key performance indicators (KPI)
- Production report
- Quality report

- Energy report
- Emission & CO_2 report
- Sustainability report
- Long term bench marking
- Weather information
- Down time analysis

Use case #3
XHQ Operations Intelligence – Better information, better results

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Headquarter **XHQ**

Plant 1   Plant 2   Plant 3

Monitoring   Integration   Visualization   Reporting

How am I doing (now!) relative to my plan?
What needs the most attention right now ?
Performance Management
Dashboards & Scorecards

What did I do last time?
What should I do (now!)?
What is the economic impact?
Decision Support
Advisory & Analytics

Sales Department | **Crude Supply** | **Chemical Production Monitoring**

Dashboards

- Play an important role in managing business performance
- Present KPIs on plant or enterprise level
- Help prepare substantiated decisions
- Connectivity to external data sources
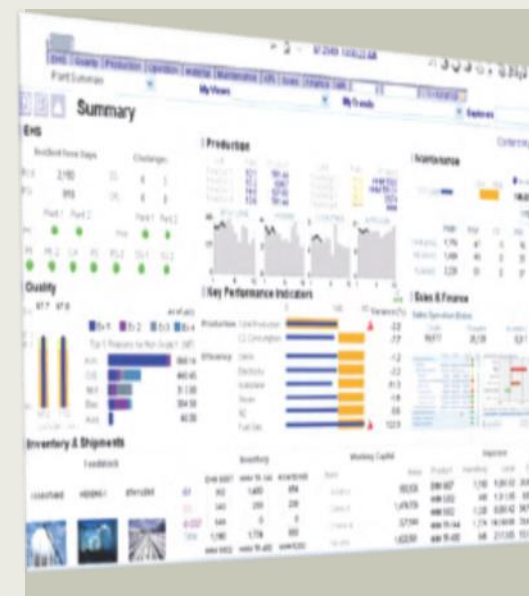
KPI and Balanced Scorecard
Sales
Transfer Orders
Workflow Capital
Operations Overview
Inventory & Shipments
Environmental
Safety
Maintenance
Production
Quality
Energy
Operations Compliance

Use case #2
Continuous improvements in plant performance and maintenance

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Challenge

- "Only **50 % control loops are optimized**" (Source: Control Engineering)

- Assessment of real P&P plants – percentage of optimized control loops at …

    … Pulp   Mill in Sweden **39%**, in Finland   **23%**
    … Paper Mill in Sweden **17%**, in Germany **14%**

- "The performance of process control systems will decline if the system is not optimized on a regular basis.
  In most plants, this **decline** will result in a performance decrease of **50% every 6 months** if no effort is made"

  (Source: Instrument Engineers' Handbook, Volume 3)

Solution

- Integrated SIPAPER E&A solution plus data historian

- SIPAPER Control Loops Optimization by Control Performance Analytics

The challenge
– Construct a new, integrated cardboard factory in Beihai, Guangxi, China, annual production capacity of 450,000 metric tons (MT)
– Ensure higher production output and efficiency with greater product complexity and highest quality standards

The solutions
– Complete package comprising power generation, power and drive technology, and integrated automation
– Planned connection to **MindSphere** via Control Performance Analytics (CPA) for SIPAPER DCS APL

Customer benefits
– Out-of-the-box **digital services** for end customers
– More transparency through plant availability and higher plant performance

MindSphere – Open cloud based IoT operating system
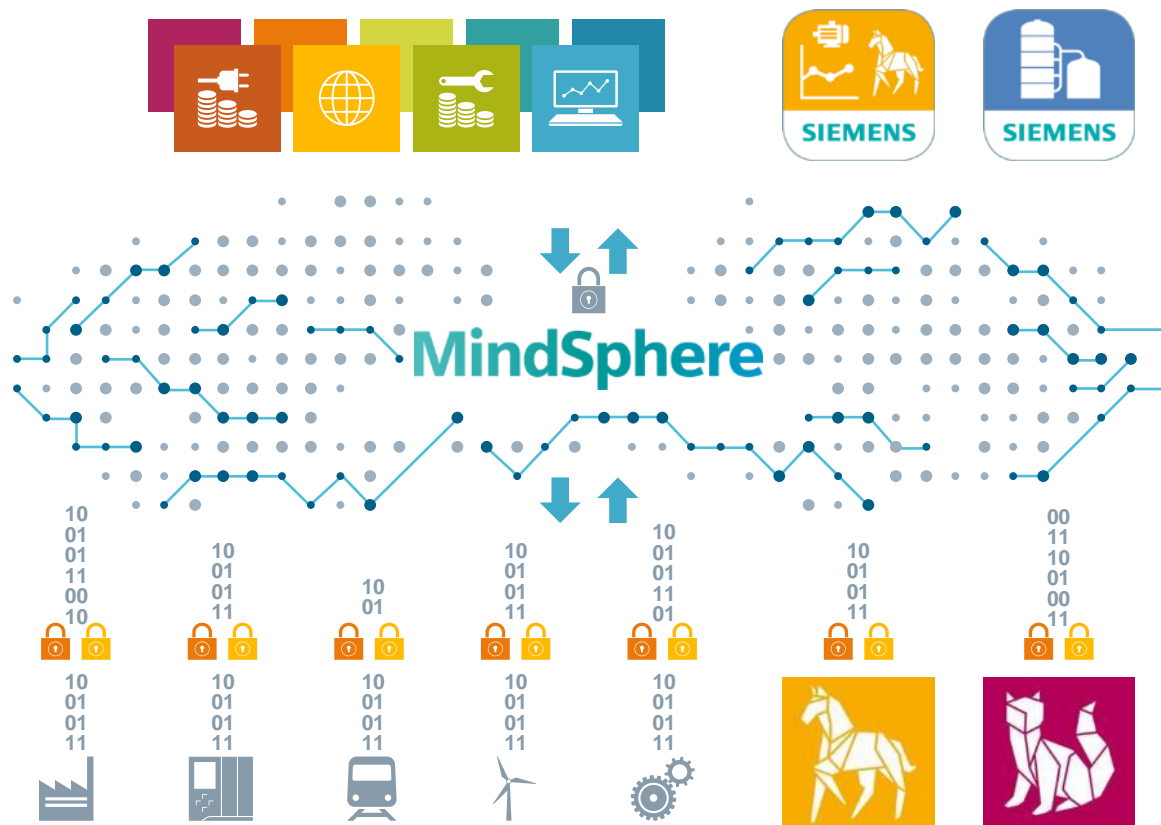
MindApps

- Use apps from Siemens, partners or develop your own
- Gain asset transparency & analytical insights
- Subscription based pricing model

MindSphere

- Open interface for development of customer specific apps
- Integration with 3rd party clouds and -applications
- Various cloud infrastructures: SAP, AtoS, Microsoft Azure offered as public, private or on-premise

MindConnect

- Open standards for connectivity, e.g., OPC UA
- Plug and play connection of Siemens and 3rd party products
- Secure and encrypted data communication
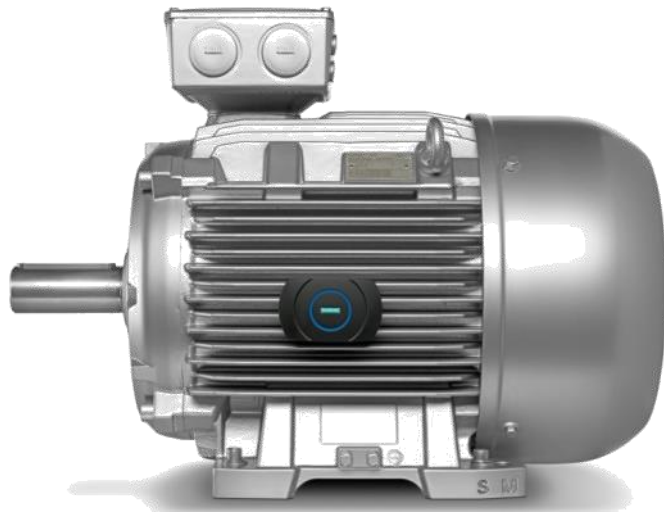
Smart Motors – connected to MindSphere

- 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

SIPAPER Drive Systems –
Continuous operational improvements by analytical insights

SIPAPER Drive System Engineering

HW-Config

CFC

Safety

WinCC

Panels

Customer value

- Efficient engineering
- Safety concept fulfilling EN1034
- Easy migration
- Common database
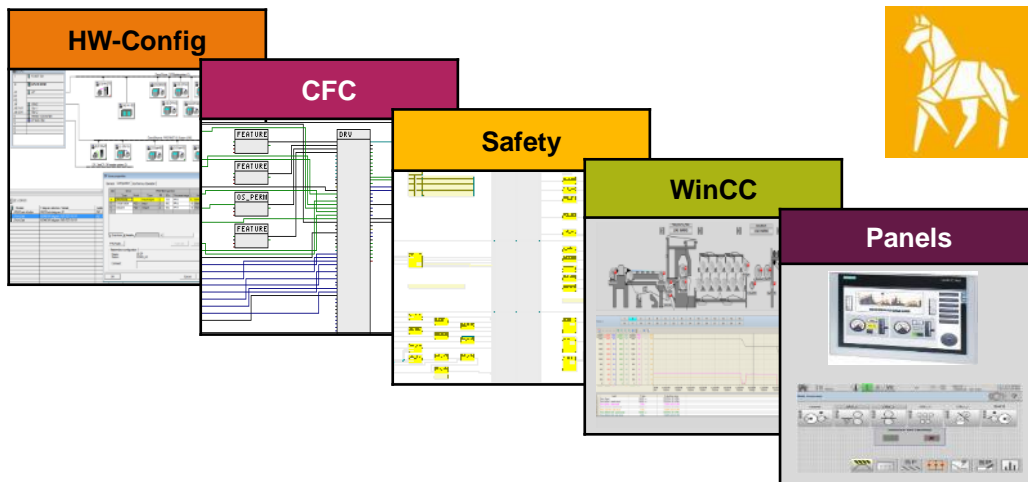
SIPAPER Drive System Analytics

MindSphere

Data generated value

- Operational intelligence
- Drive system optimization
- Predictive maintenance
- Guided commissioning and ramp-up

Digital Fiber Ecosystem − Discover the value of digitalization

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Digital Enterprise Software

Reliable safety and security
Shortened time-to-market
Increased efficiency and flexibility
Improved quality

Integrated Operations

Integrated Engineering

Product Design | Process & Plant Design | Engineering & Commissioning | Operation | Service
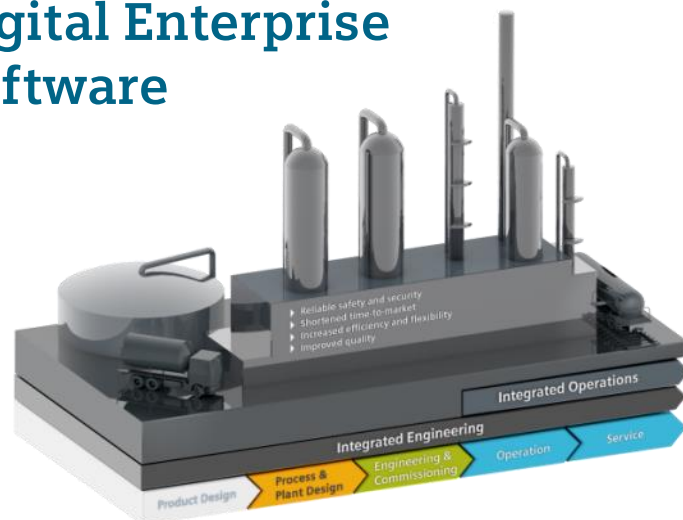
From Integrated Engineering

New fiber applications

Process Simulation

Virtual commissioning

Operator training

MindSphere

Technology Provider

OEM

Connectivity Developer

App Developer

Go-2-Market Partner

Plant Operators

to Integrated Operations

Process Automation

Remote Monitoring

Process Analytics & Optimization

SIPAPER DCS APL AS Bundle –
Getting ready for reliable and optimized operations

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SIMATIC PCS 7 automation system AS 410 including SIPAPER DCS APL runtime license and CPA 2.0 collector software

- ✓ Ready for mill-wide automation by a pre-assembled and tested automation system and the matching **SIPAPER DCS APL** Process Automation module

- ✓ Ready for integrated engineering in COMOS by **SIPAPER Control Module Types** including blocks, charts, control variables and messages

- ✓ Ready for efficient plant optimization with automated control loop analysis by **Control Performance Analytics**

- ✓ Ready for **SIPAPER Extended Lifecycle Service** over a contracted period up to 15 years including SIPAPER DCS / QCS / Drives / Winder APL and SIMATIC PCS 7 upgrades

SIPAPER DCS APL AS Bundle
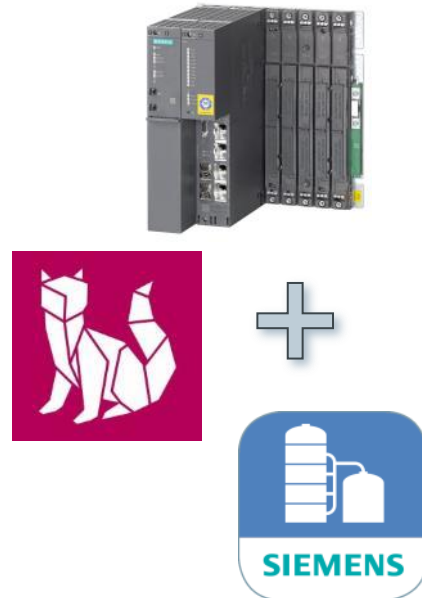
SIPAPER Smart System Controller

Benefits of the Digital Enterprise are shown to our customers by the SIPAPER plant model

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Consistency along the product lifecycle workflow:

From Integrated Engineering to Integrated Operation – with **SIPAPER**

COMOS data platform for a seamless data flow across the entire plant life cycle

Embedding of drive systems into process automation using **SIPAPER Drives APL**

Ideally matching **Integrated Drive Systems** – from the converter through the motor to the gear

Questions?

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Thank you.

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