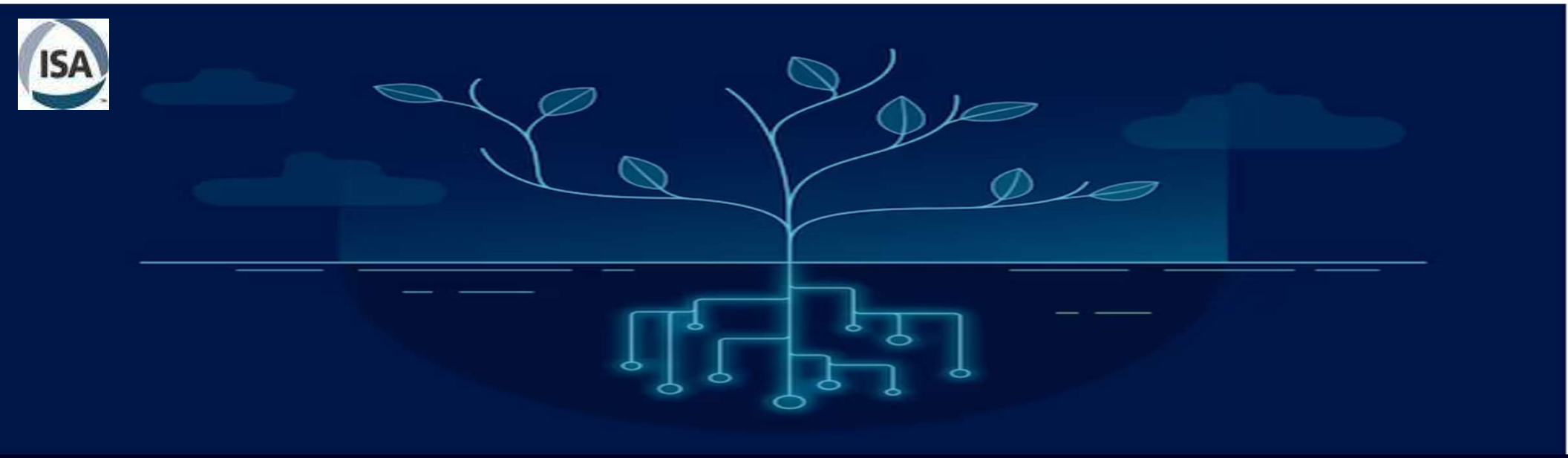
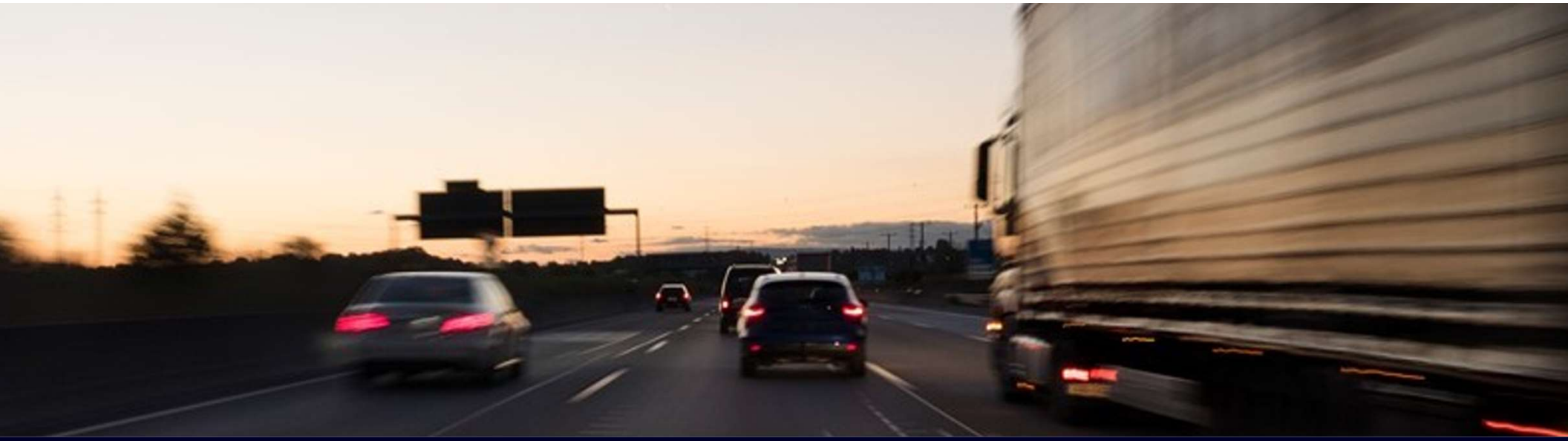


Field to Cloud

Vertical Integration enabling the Digital Transformation in Process Industries

ISA-D: “Fertiliser , Food and Pharma Symposium-2023”

SIEMENS



Without the right data, you are **lost and disoriented** in the middle of a freeway

SIEMENS

“Megatrends” shaping consumer behavior are having a major impact on the industry

Climate change

Reduction of carbon-footprint.
Leads to CO_2 neutrality in production.

Individualization

The need for individual products leads to lot size one in the production.

Globalization

Global crises put supply chains under pressure. Leads to better security of supply in production.

Digitalization

Technologies enable seamless data management flow and connected systems.

More Sustainability

More Flexibility

More Efficiency & Resilience

More Transparency & Quality

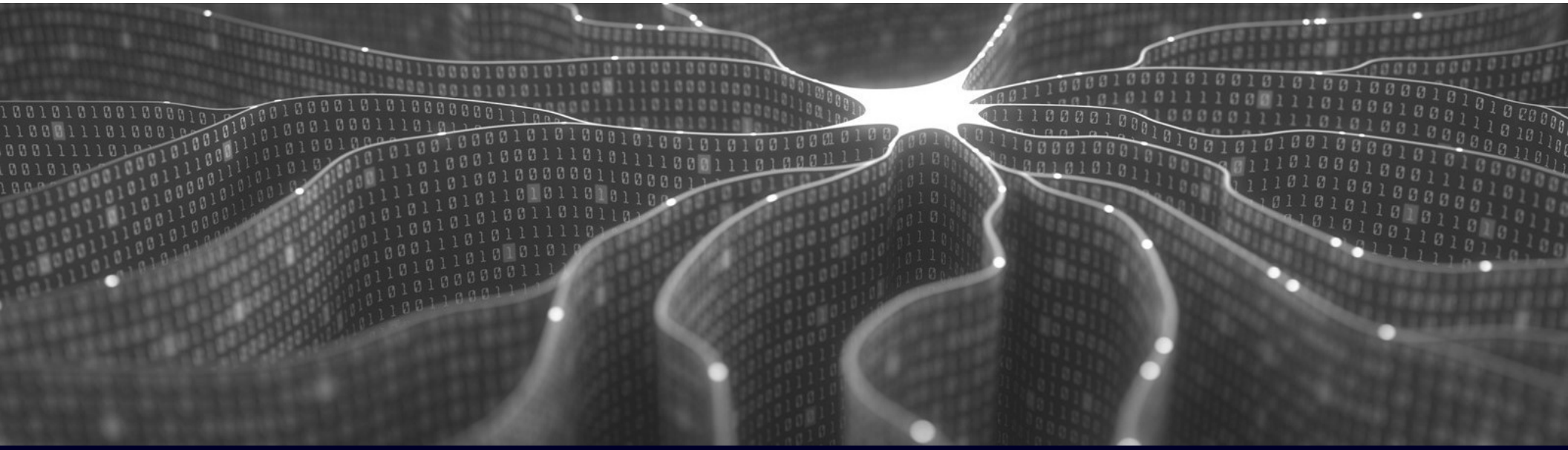
SIEMENS

Challenges are increasing

Maximize

throughput with the highest quality while steadily accelerate the introduction of new products.

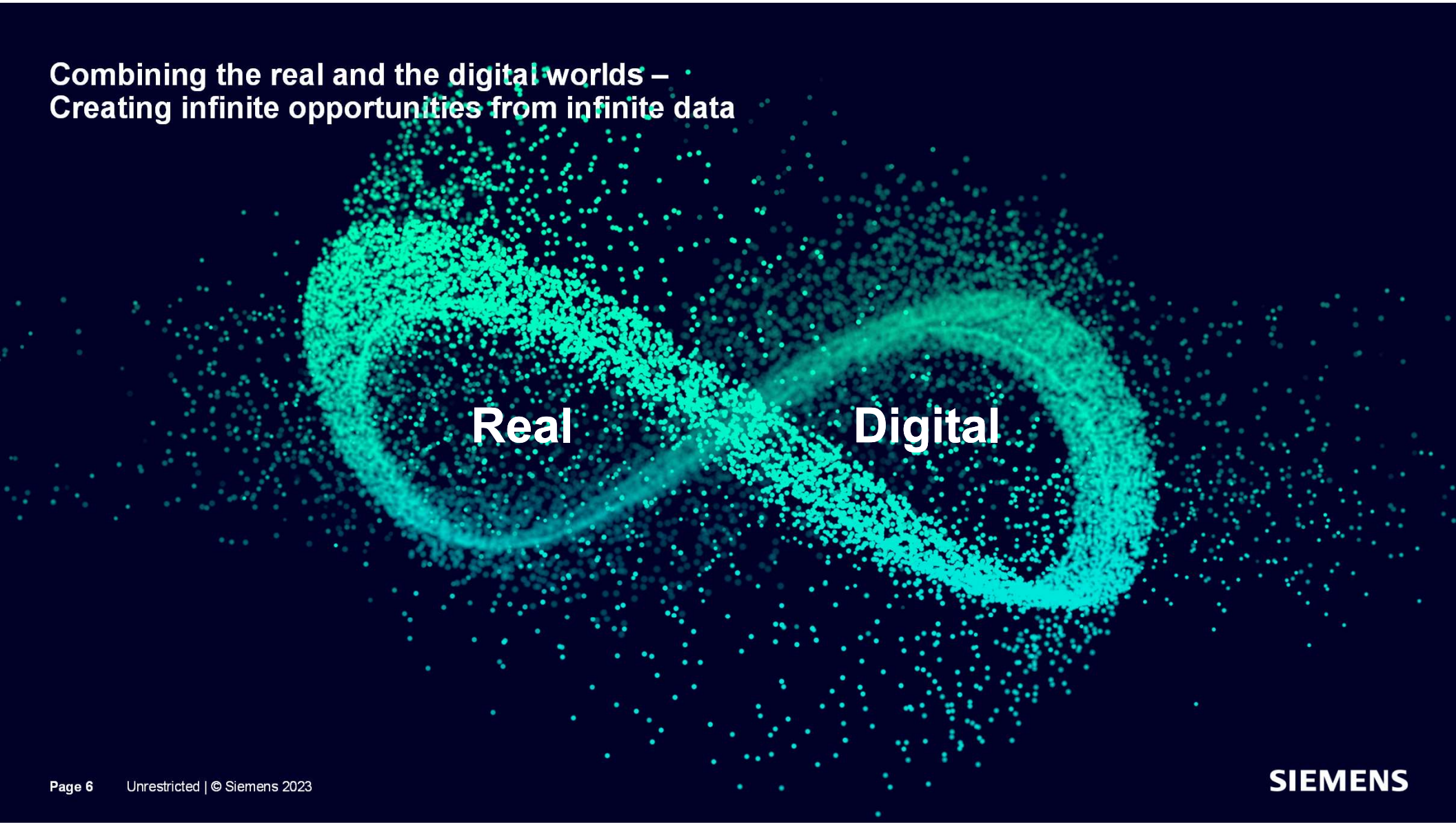
SIEMENS



Companies can manage these challenges through data-driven **decision making based on IT/OT integration**

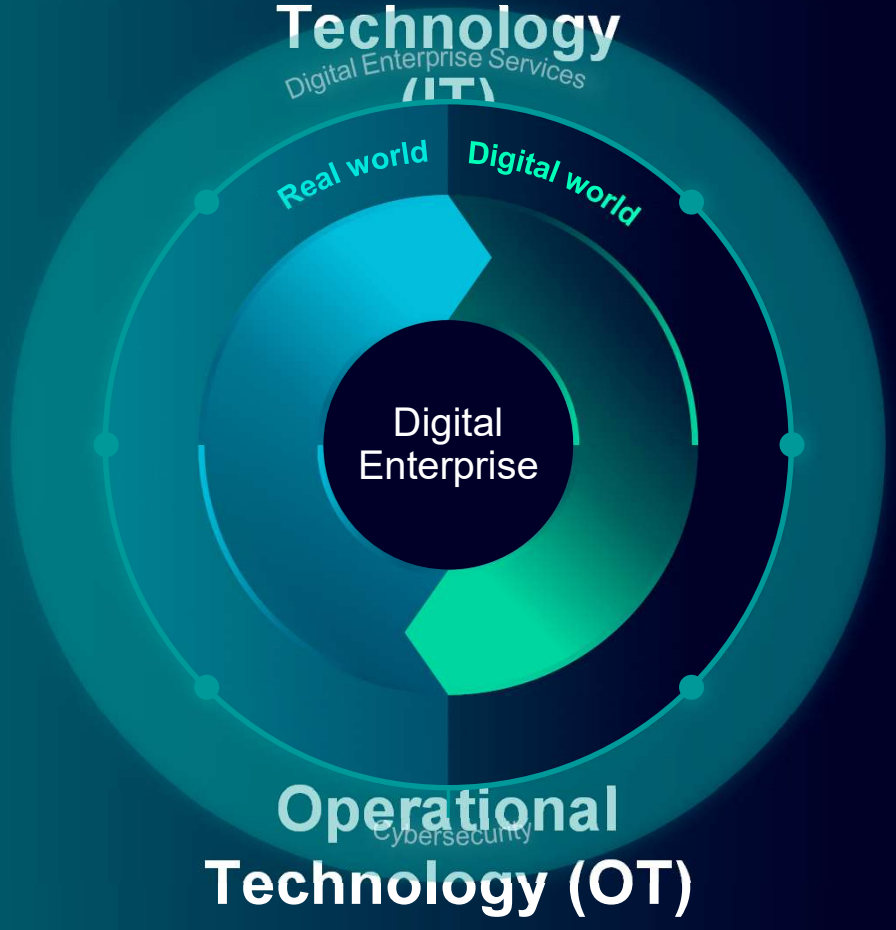
SIEMENS

Combining the real and the digital worlds – Creating infinite opportunities from infinite data

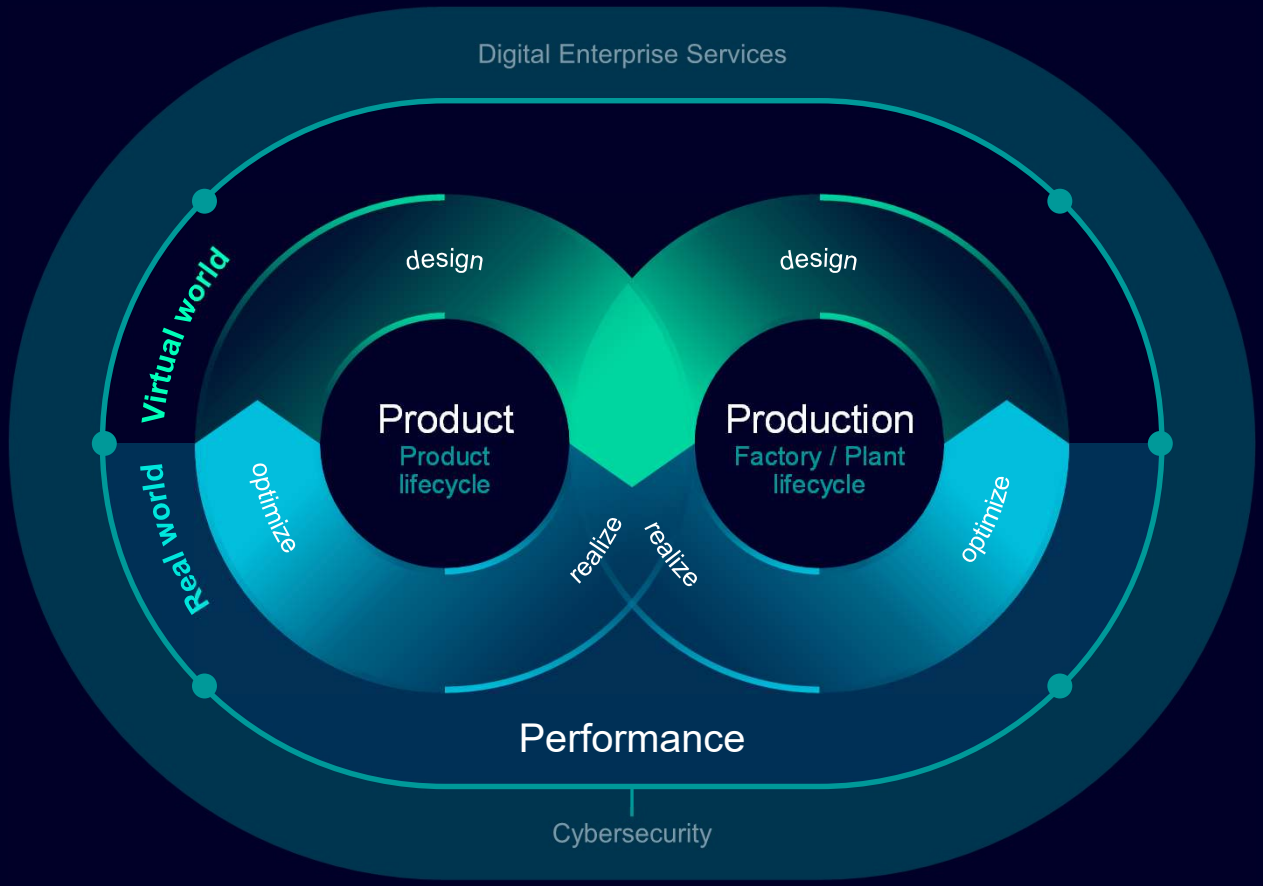


SIEMENS

Bringing together OT and IT

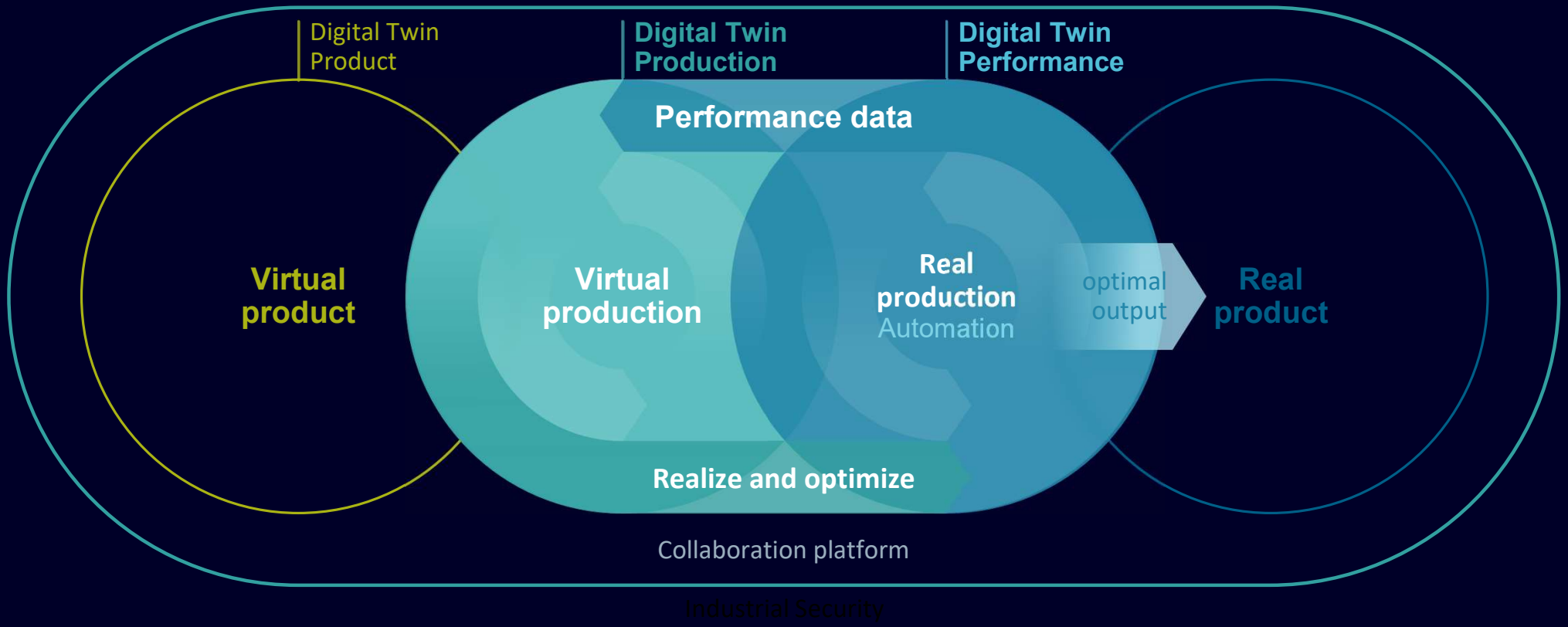


Manufacturing Transformation
… integrating the Real World with the Virtual World



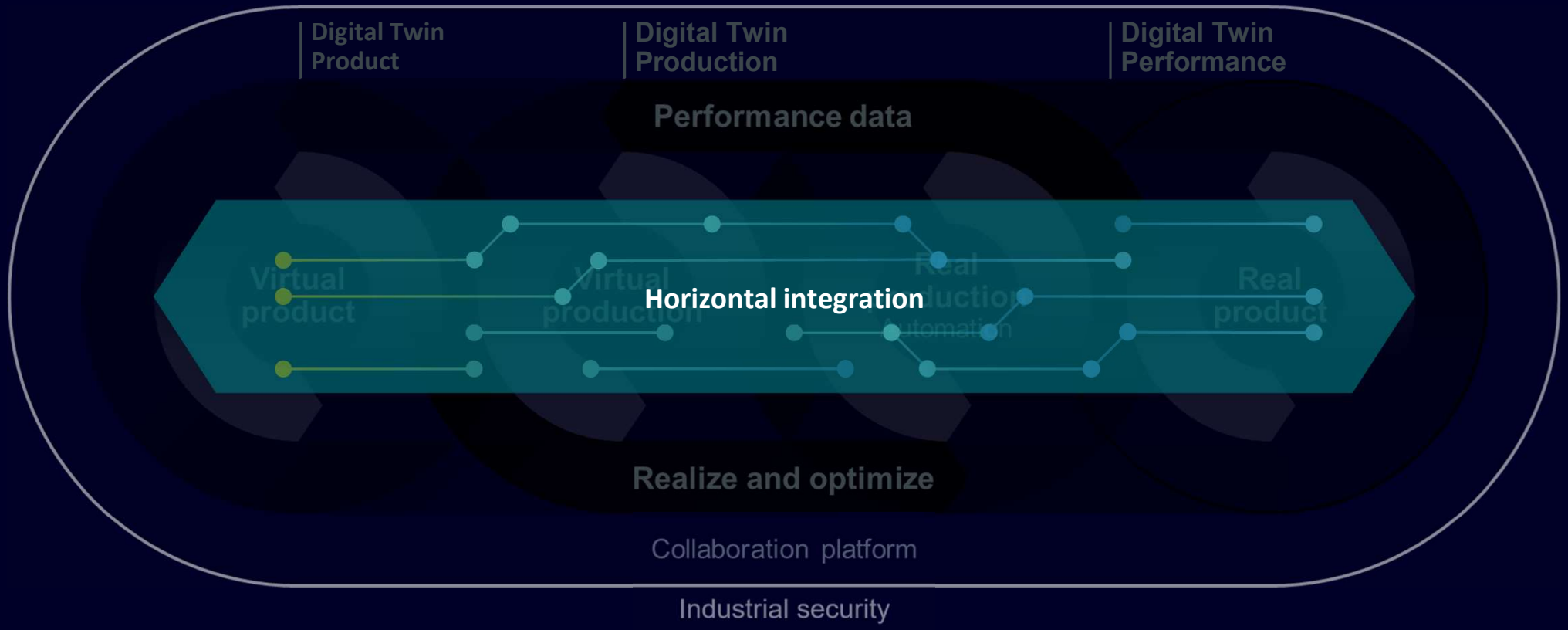
SIEMENS

The Digital Enterprise: basis for continuous optimization



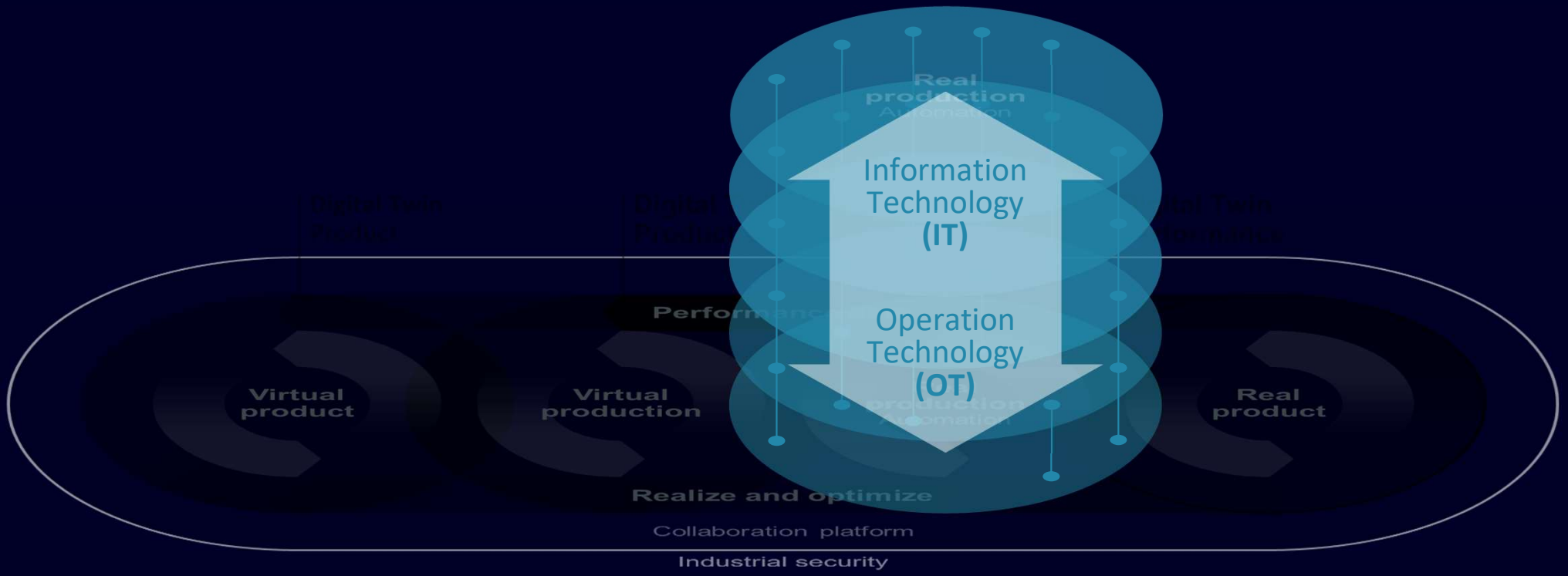
SIEMENS

Enabling the horizontal integration of Digital Twins along the entire value chain



SIEMENS

Driving the Industrial IOT
by vertically integrating OT and IT



SIEMENS

Vertical integration – based on Intelligent sensors & actuators, Modern control technologies, Industrial edge, & open App's for Cloud

Information Technology **(IT)**

Operation Technology **(OT)**

- **Cloud**
- **Software for vertical integration**
- **Edge**
- **Controller / automation platforms**
- **Field devices**

Low-code app development

Communication platforms

Cybersecurity

SIEMENS

Measurement Intelligence enables scalable data analytics which foster speed, flexibility and efficiency in operations

Scalable Ecosystem

Ecosystem of scalable Edge/Cloud use cases

IoT Stack

Application layer
Picking from basket

Integration layer
Enable our partner

Network layer
Connect real & digital

Field layer
Connected sensors

Remote Monitoring
store IQ, serve IQ, Energy Manager, Blockage Predictor, SIWA burst, SIWA leak+ *)

Condition Monitoring
SCM IQ, Performance Insight, Visual Flow Creator, Pump Guardian, Edge Analytics *)

Predictive Maintenance
ASM IQ, AID IQ

Remote Services
Remote Services

Access to deep knowledge of Field Devices and support of customers' operation

P-data HUB IQ

IIH *)

HART COMMUNICATION PROTOCOL, PROFIBUS, FOUNDATION, Modbus, ethernet-apl advanced physical layer, NB-IoT LTE-M, LoRa

Broad portfolio of connected, high quality sensors and actuators for all industries …

Mobile IQ, Pressure, Temperature, Multisensor, IoT sensor, Level, Weighing, Flow, Positioner, Gas Analysis

SIEMENS

Addressing the needs for future automation concepts with second data channel solutions and M&O sensors

Connectivity Layer

Light weight access, semantics, management and condensing of non-core process control data

Monitoring & Optimization

IIoT Multi Sensor
- Vibration, B, T
- Energy

Smart Sensor
- Radar tech LT
- Mag tech FT

Second Surveillance Level

Edge mgmt.

Core Process Control

Field Devices
Stranded Vital Data

DCS

PLC

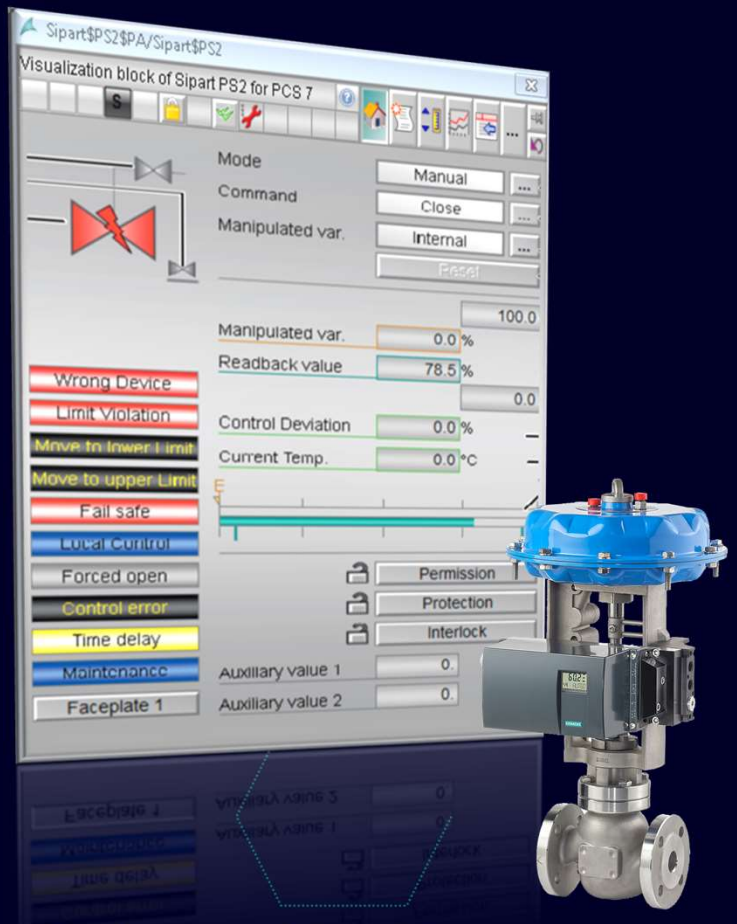
Smart IO

FCS Coriolis Sensor

Options for second data channel; [1] e.g., unique ID, FW, status, diagnosis, auxiliary values; [2] Critical assets e.g., rotating equipment, sensors, analyzers

SIEMENS

SMART IOs – Next level sensor integration
e.g. - Features and Functions Implemented for Valve Positioner



Multivariable information for effective monitoring

- Feedback on Setpoint, Actual Position,
- Control Deviation, Temperature

Additional Functionalities

Partial Stroke test

Full Stroke Test, Step and Multistep Response Test, Valve Performance Step

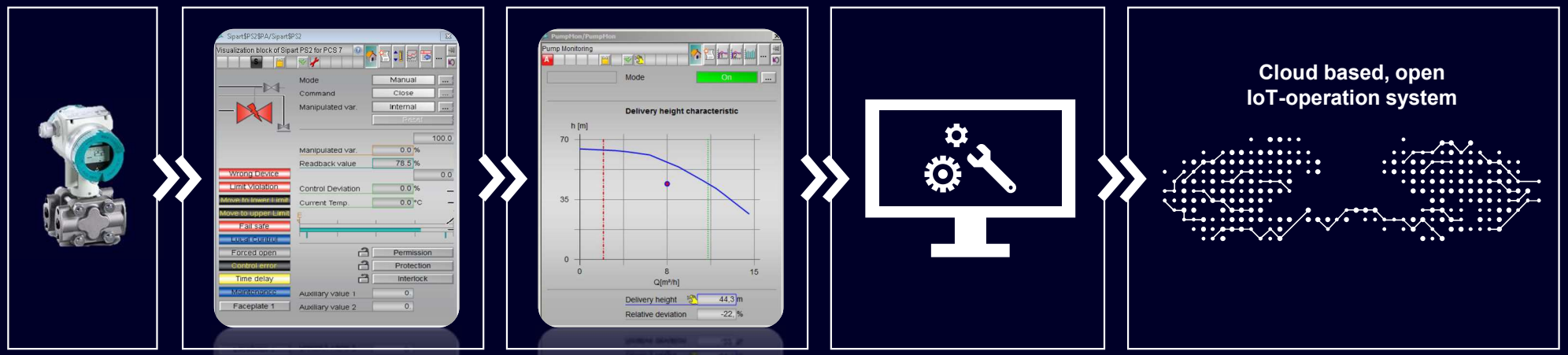
Extended Monitoring	***Predictive Maintenance***
• End Stop Behavior • Response time to open and close • Number of operations / reversals • Temperature inside the positioner	• Predictive Maintenance • Fouling of material • Static Friction • Pneumatic leakage

SIEMENS

Multiple value propositions can be modulated by integrating measurement intelligence >> thru control system >> to an IT application

Smart MI
Instrument

Condition monitoring block for predictive maintenance



Library for easy integration with control system

SMART Maintenance
of plant Assets with
Edge or Cloud technologies

SIEMENS

Predictive Maintenance to ensure seamless production without break downs

Pumps

Early warning of loss of delivery height

Identify Dry Run and Prevents Over Heating

Detect early formation of cavitation

Valves

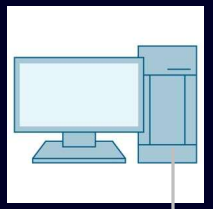
Predictive maintenance by monitoring number of strokes and direction

Early detection of physical damage by monitoring Valve response time

Monitoring of Compressed air leakage

SIEMENS

Plant Maintenance
Managing maintenance while maintaining data consistency



Control system

Maintenance management

Asset information
Ex. Pump running hours, Pressure difference across filters
Event information Ex. Failure / Interlock

XML

1. Cyclic
2. User configurable 'formulae'
3. User configured 'formulae'

Asset management activities
Maintenance: Create & execute digital 'work package' for: 1) Equipment – ex. pump 2) Unit operation – ex. Filtration
Manual log of 'event' based on work package workflow
Preventive & Condition based maintenance

Steps towards executing a CBM deliverable:

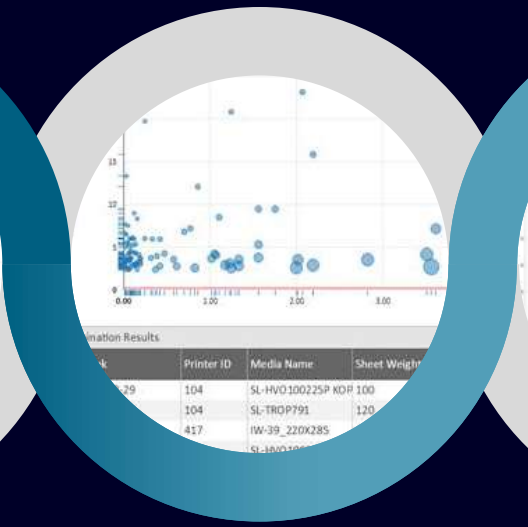
- Define work package
- Define assets / unit-operations
- Data exchange attributes, & exchange frequency
- Admin & Operate tasks

SIEMENS

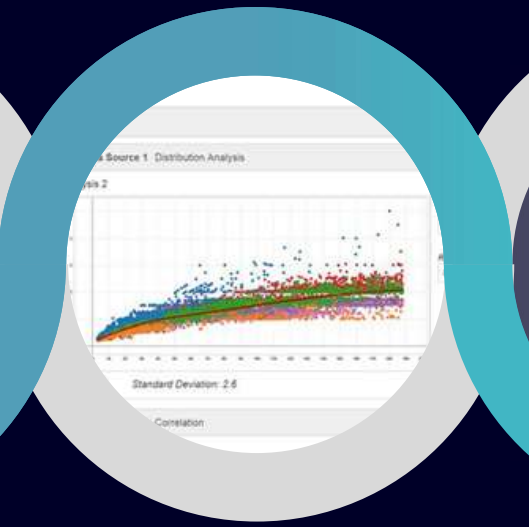
Data is the new oil… When it is analyzed for plant insights

Descriptive
What happened?

Diagnostic
Why did it happen?



Predictive
What happens next and when?

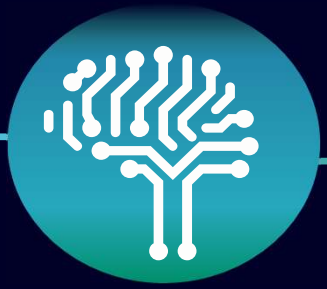


Prescriptive
When this happens, take these steps.

SIEMENS

Integration of Data Driven and Knowledge Driven Approach

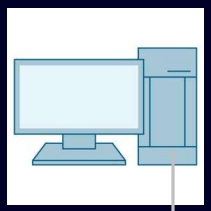
Data Driven Analytics



Knowledge Based Analytics

SIEMENS

Integrating Process control and Data analytics
for data driven Maintenance management



Control system

Maintenance management

Data Analytics engine

	Data analytics topics (Predictive / Prescriptive)
	Ex. Pre-empt maintenance
	Ex. Predict Spare parts / resources

SIEMENS

Operations Intelligence
Turning data into actionable information

Analytics & optimization
- Time series data analytics
- Prescriptive analytics
- Diagnostic analytics
- Descriptive analytics
- Simulation-based optimization

Business & cross-functional systems
- Enterprise resource planning (ERP)
- Health, safety, environment
- Document management systems

Plant systems
- Real-time data (DCS, historians, sensors data, IoT)
- Lab management
- Maintenance management

Engineering systems
- Front end engineering
- Detailed engineering
- Requirements
- Simulation and modeling

Connect → **Aggregate** → **Contextualize** → **Visualize**

- Asset management
- Energy management
- Quality management
- Operations management
- Maintenance management
- KPI management
- Shift handovers and reporting

- Aggregate and contextualize data
- Visualize in real-time
- Make informative decisions

SIEMENS

Enabling Data driven decisions

Business intelligence & operations from one single platform

CEO / Management Dashboard

- Utilization & Efficiency
- Defects & Waste
- Financial Indicators
- Safety & Energy Indicators

- Incidents
- CO2 Emissions

Safety & Environment

Site Production

- Plan vs actual
- QC Reject Rate
- Failure Cost Value

Corporate

Finance Performance

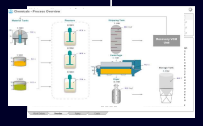
Supply Chain

Sales & Marketing

R &D

Customer/Suppliers
Customer/Suppliers

Human Resources



Manufacturing Operations Process

- Capacity Utilization
- Manufacturing Cycle

Batch Management

- Rejects
- Batch: Plan vs Actuals

Quality Performance

- Capacity Utilization
- QC Reject Rate
- Failure Cost Value

Engineering & Maintenance

- Equipment Utilization
- PM order status
- PM order cost tracking

Facility Management

- Facility Utilization
- Availability
- Room Parameters

Inventor & Warehouse

- Inventory cost Plan vs Actual
- Inventory Aging

Energy Performance

- Energy Cost by Product
- Flaring


SIEMENS
Ingenuity for life
MindTwin
The digital asset portal
© Siemens AG 2018
siemens.com/xhq

Digital Transformation requires solutions to scale and the Integration of technologies and domains across OT and IT

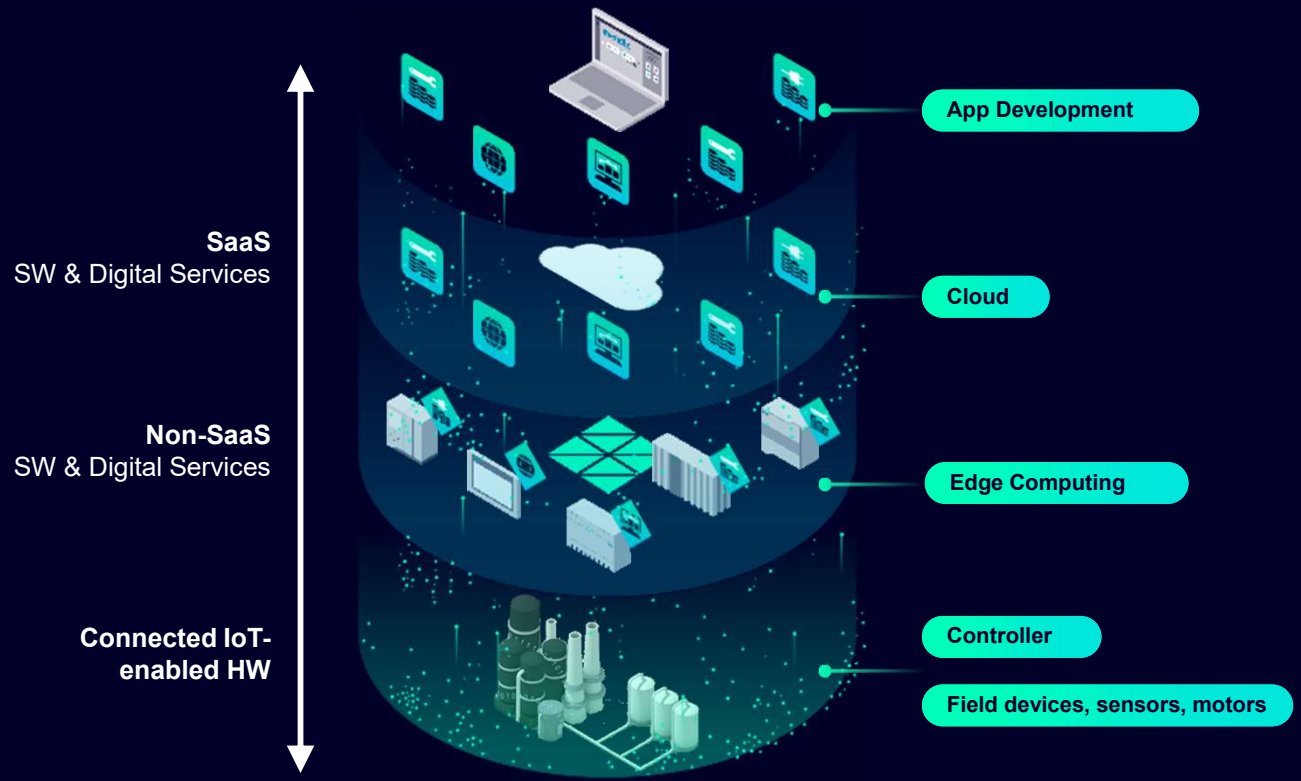
OT and IT convergence to delivery scalable benefits

Leverage solutions that build-up on each other …

… to drive an integrated value-oriented digital transformation through a scalable IT/OT Integration Journey

SIEMENS

Digital Enterprise
building blocks



Tailored Applications

Tailored digitalization solutions for measurements as part of ecosystem.

Integration Layer

to enable easy and fast integration of field devices and IoT Sensors in the digital world.

Connected Field devices & IoT Sensors

to deliver trustable information for processes and asset health conditions

SIEMENS

Contact

Published by Siemens Ltd.

Sachin Kulkarni
Digital Enterprise for Process Industries
RC IN DI PA DE
Thane – Belapur Road
400708 Thane
India

Mobile +91 9987981147

E-mail sachin.kulkarni@siemens.com

SIEMENS

Disclaimer

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

SIEMENS

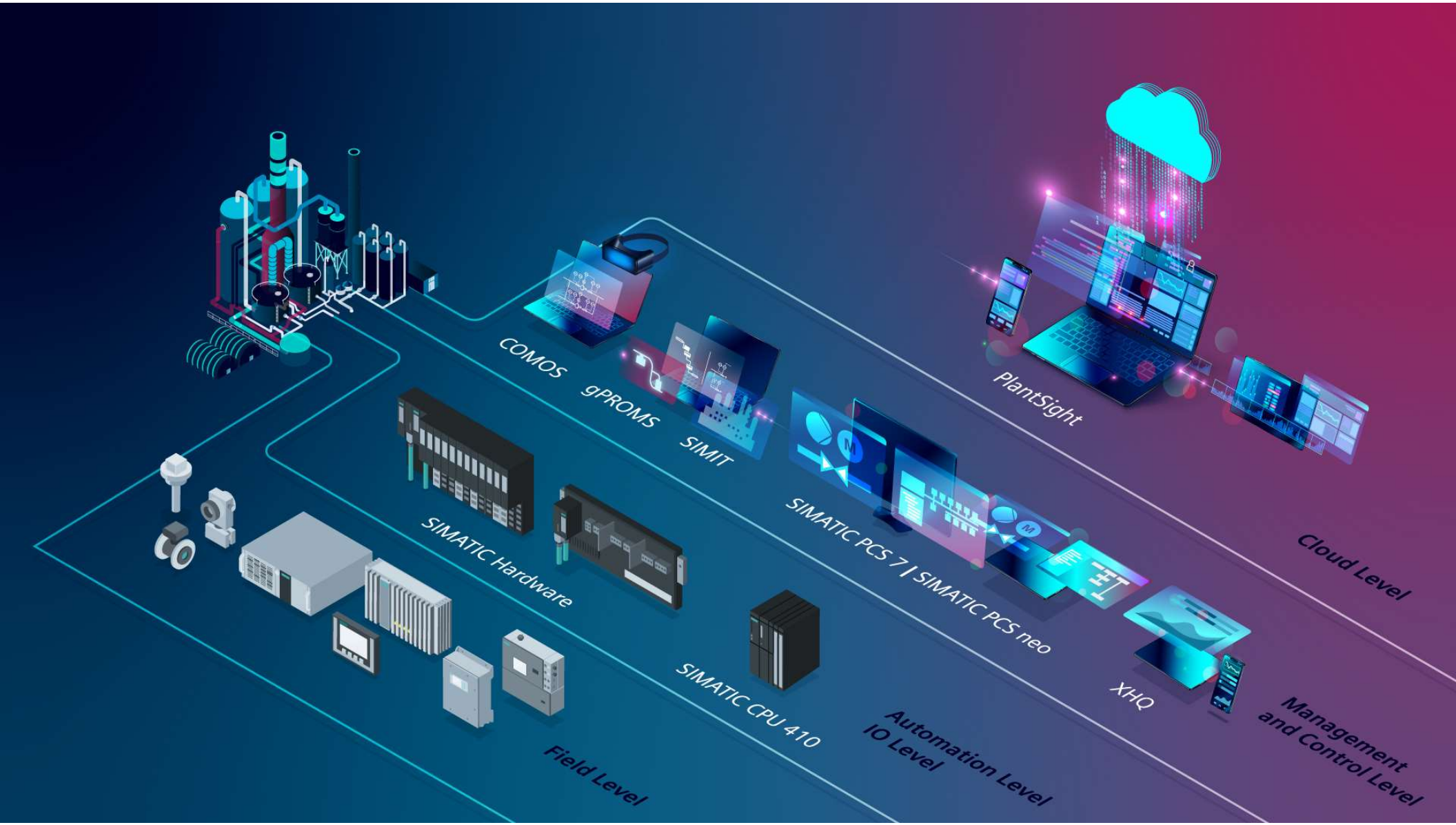
International Society of Automation
Delhi Section

Setting the Standard for Automation™

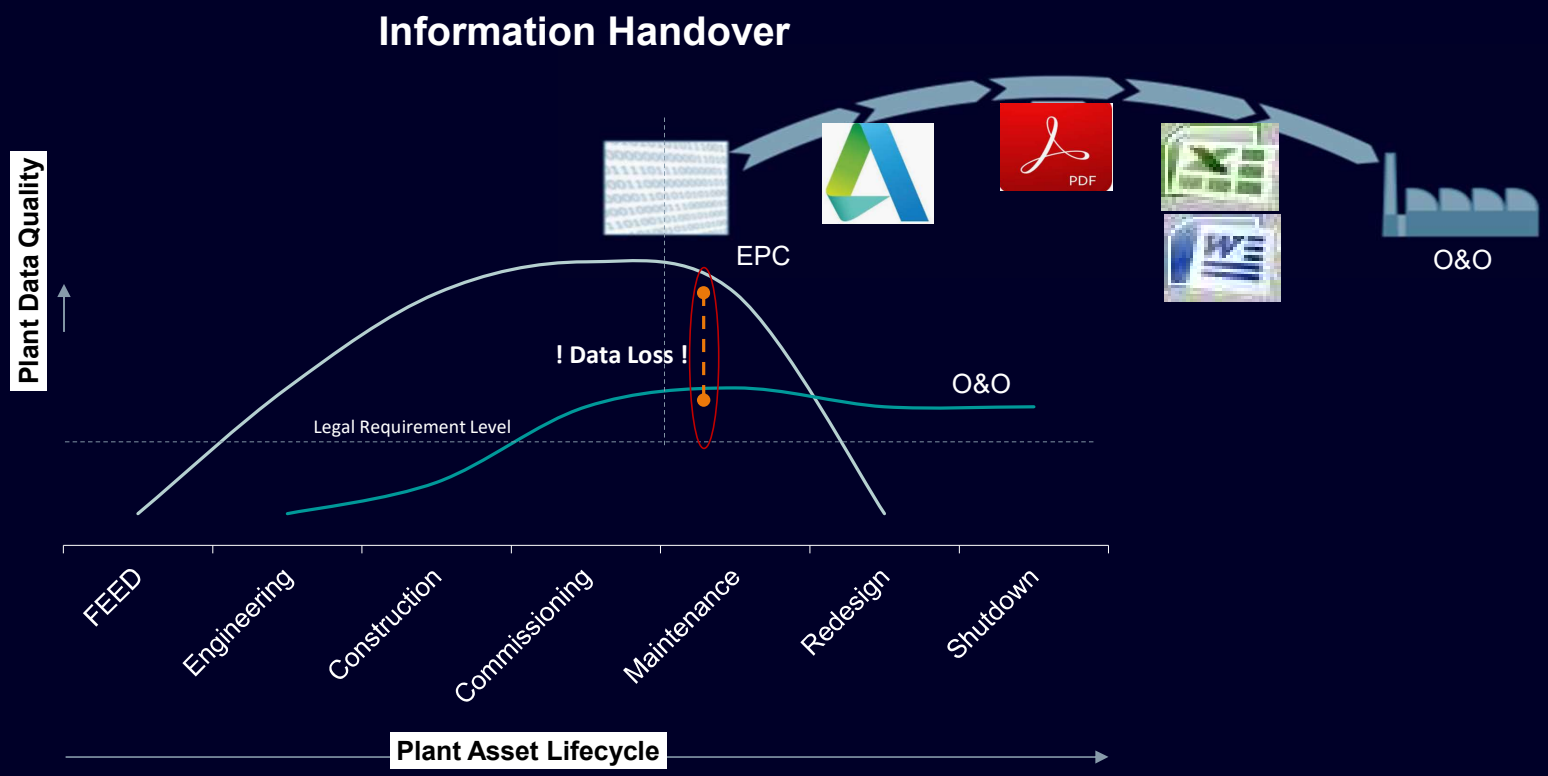
Field to Cloud

Vertical Integration enabling the Digital Transformation in Process Industries

ISA-D: “Fertiliser , Food and Pharma Symposium-2023”

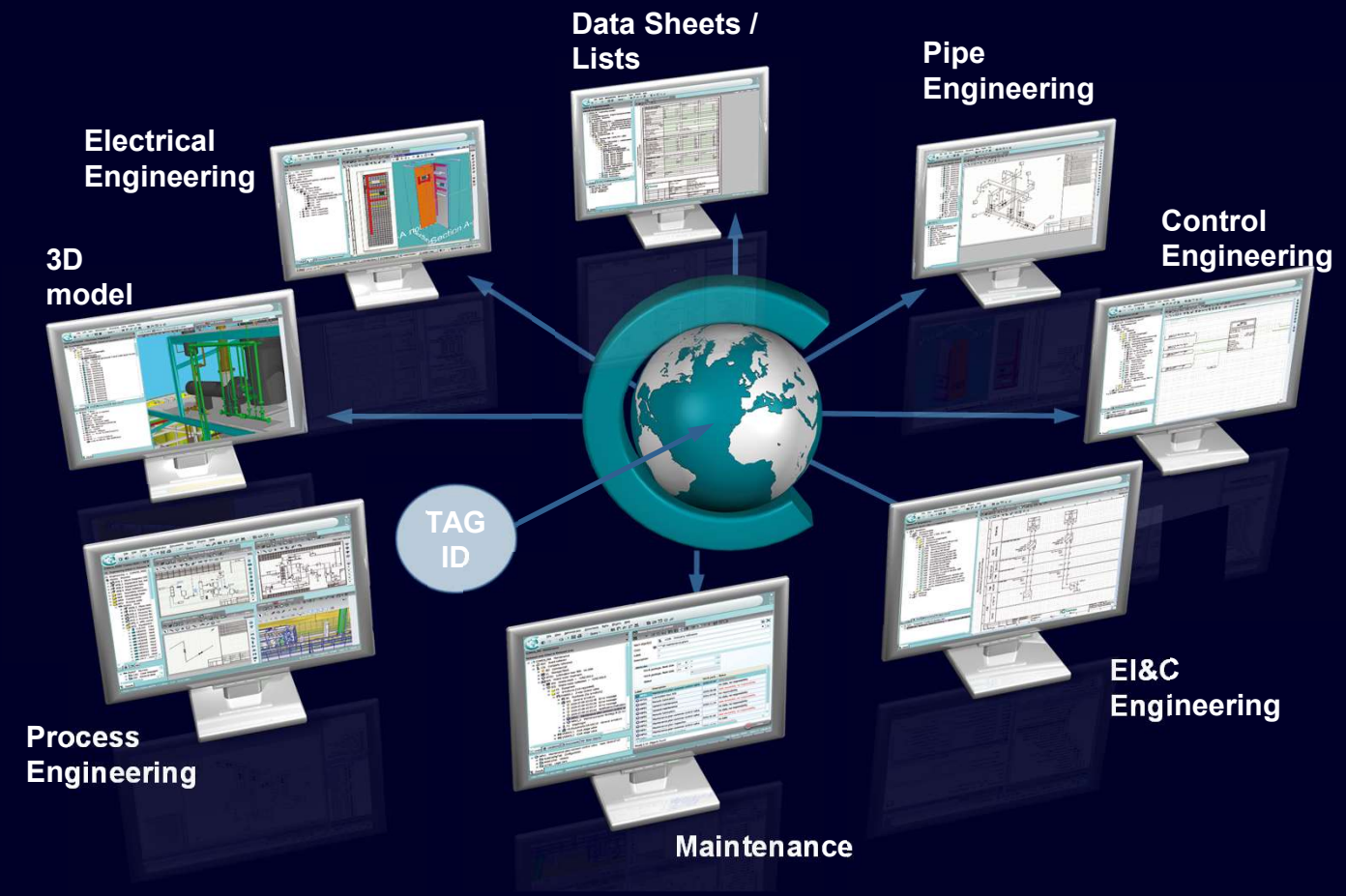

COMOS
gPROMS
SIMIT
PlantSight
SIMATIC Hardware
SIMATIC PCS 7 I SIMATIC PCS neo
SIMATIC CPU 410
XHQ
Field Level
Automation Level
IO Level
Management
and Control Level
Cloud Level

Plant data quality over the entire lifecycle



SIEMENS

COMOS
The right solution for every engineering challenge



- Holistic approach covering the entire plant lifecycle and all disciplines involved
- COMOS offers the right solution for all process design and engineering disciplines:
  1. Process design and Engineering
  2. Electrical, Instrumentation and Control
  3. Integrated automation
  4. Isometrics and Piping
  5. Engineering workflow management
  6. Documentation
- Result is fast, lean, secure, seamless and efficient engineering work processes

SIEMENS