



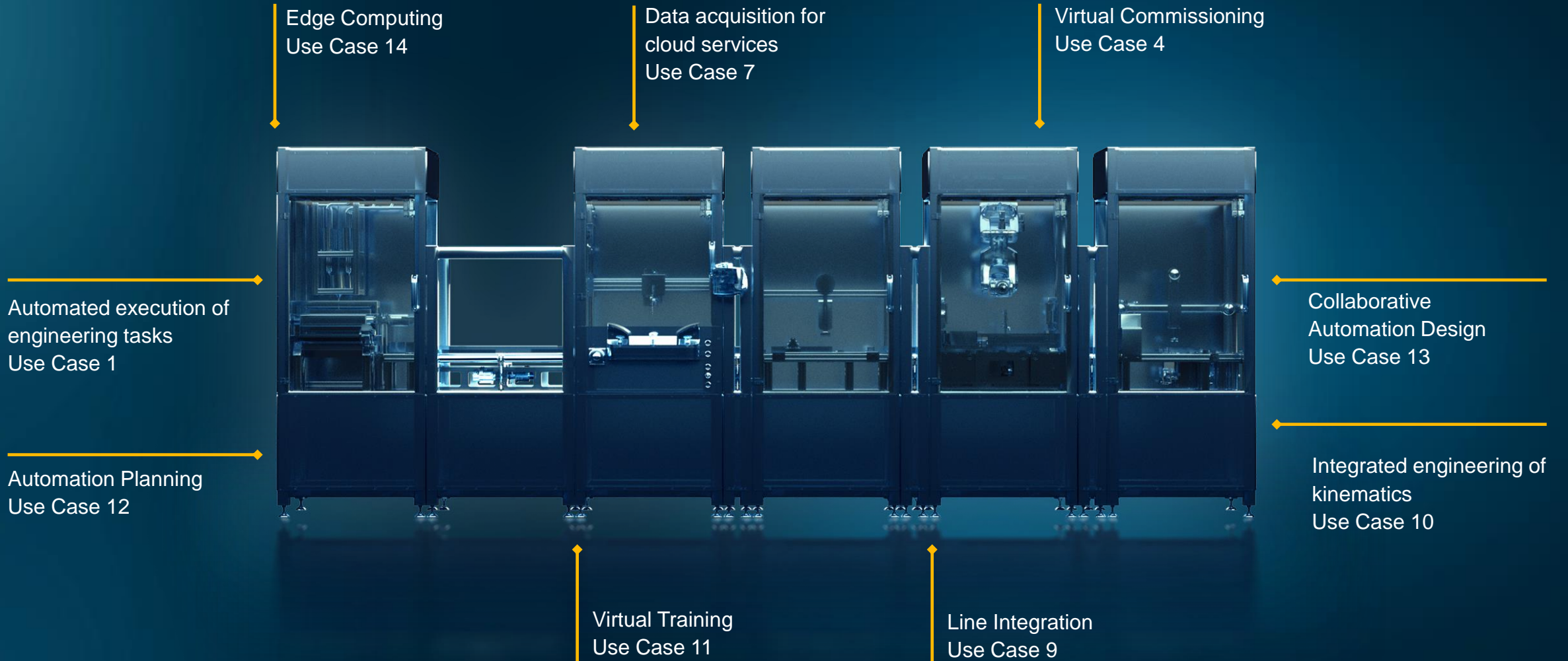
+1000
credits

CHECKING SCORE
LEVEL UP!



Edge Computing
has a similar potential

Digitalization Line – TIA Use Cases



Information Technology transforms Industry

Characteristics Industry Company



- Focus on increasing productivity and output
- Business model depends on hardware

Characteristics IT Company



- Focus on generating value with data
- Business model depends on software

Scalable Software
Provisioning

High-level
Languages

Artificial
Intelligence

Object
oriented
programming

Data

Ecosystems

Open Source

Application for gripping systems: Example OEM Schmalz

SIEMENS
Ingenuity for life



Application for gripping systems: Example OEM Schmalz



**Increasing machine
availability**

with predictive maintenance
for grippers



**Increase
energy efficiency**

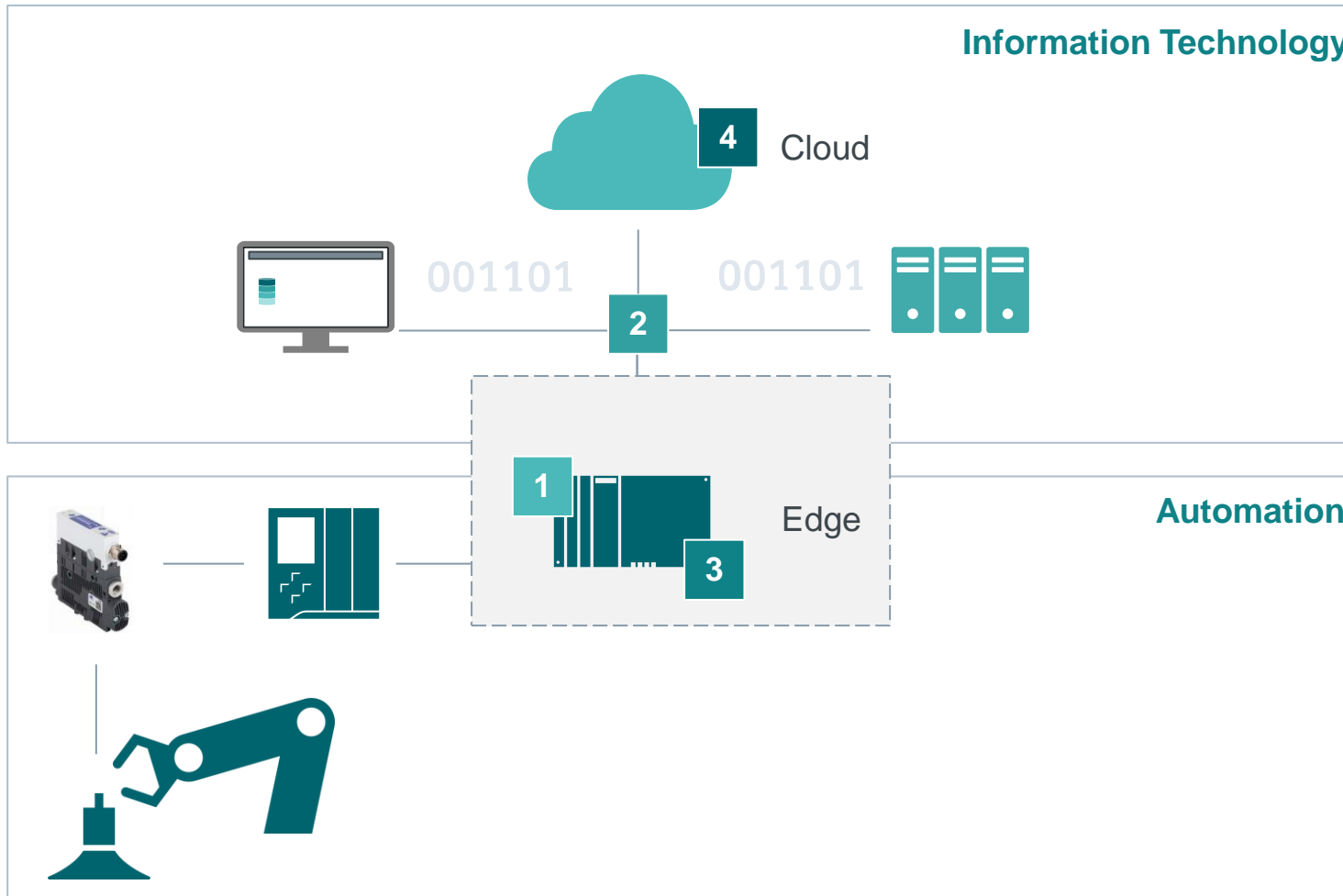
by detecting clogged
filters & system leakages



**Create more
business
by offering**

Data based services
- Based on cloud access

Typical Challenges for OEMs/Sis and End-Users using Schmalz as an example



Challenges



- 1 Process and analyze big data with one single computing system
- 2 Exchange data company-wide with SCADA, MES/ERP and Cloud
- 3 Higher flexibility with a continuous updateability by Remote
- 4 Use customer machine data to generate additional services as OEM

Address current and future challenges



Challenge 1

Easy implementation of
IT-based data analysis
in automation

Challenge 2

Integrate data company-
wide

Challenge 3

Increase flexibility of
automation

Challenge 4

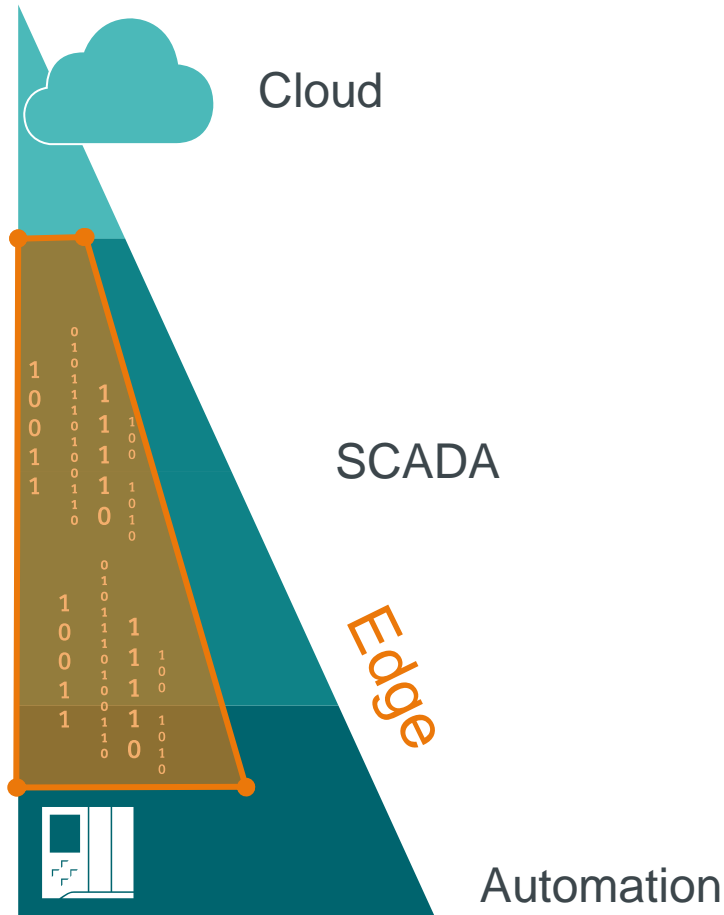
Grow as an OEM with
data-based services

Challenge 1

Easily implement data analytics in automation

Positioning

Technology



Characteristics

MindSphere IIoT Cloud Platform

- Platform (as a Service) for **global** visualization and processing of data on a high-level language basis
- Integration of **IT functionalities** such as long-term data archiving, scalable computing power & software deployment

WinCC SCADA - Mission Critical

- **HMI Software** for controlling and monitoring of processes
- Basic analysis options e.g. KPIs

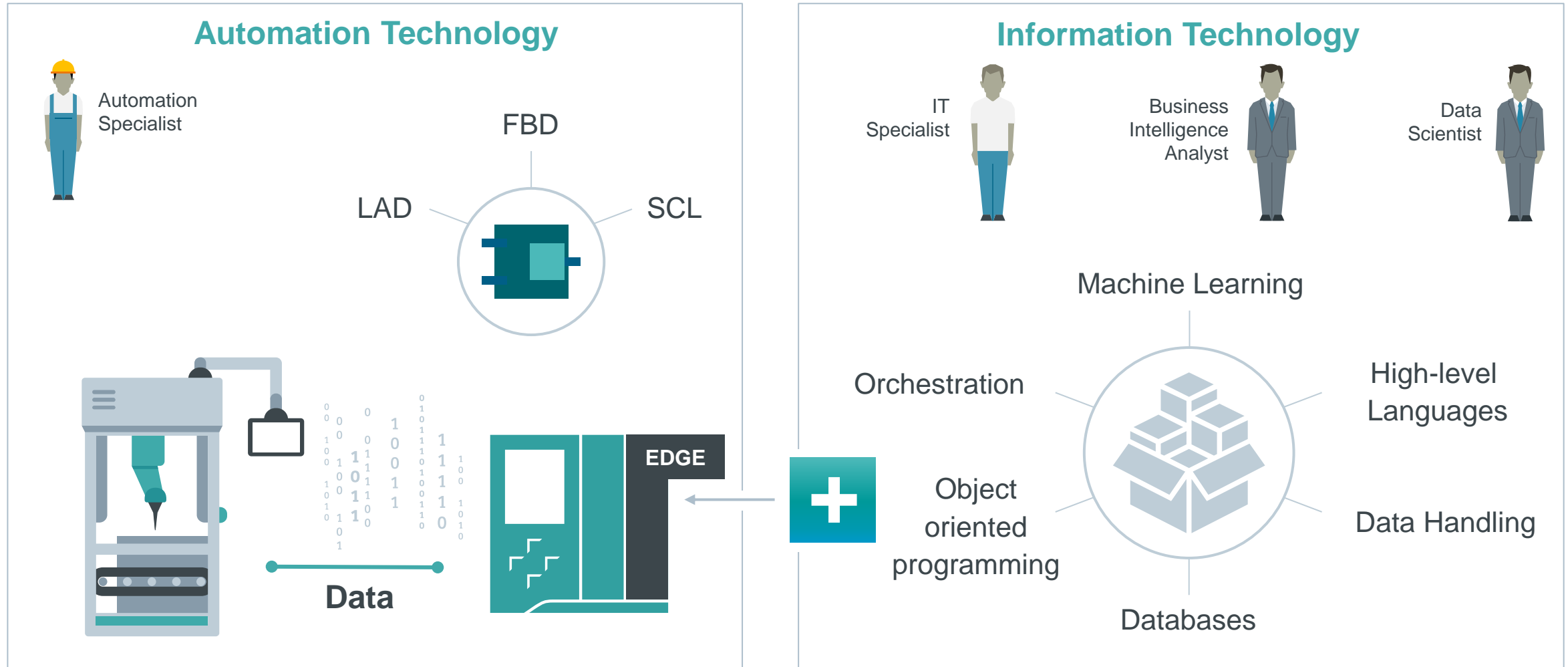
SIMATIC Industrial Edge Computing

- **Open System** of hardware and software for flexible execution of encapsulated, high-level language-based apps
- Intuitive integration of **IT functionalities** for automated collection, processing and exchange of **data**

Automation - Mission Critical

- Production/process control

Edge Computing combines Automation with IT





MindSphere



Industrial Edge

Applications for intelligent
data use based on IT Capabilities



Edge Apps



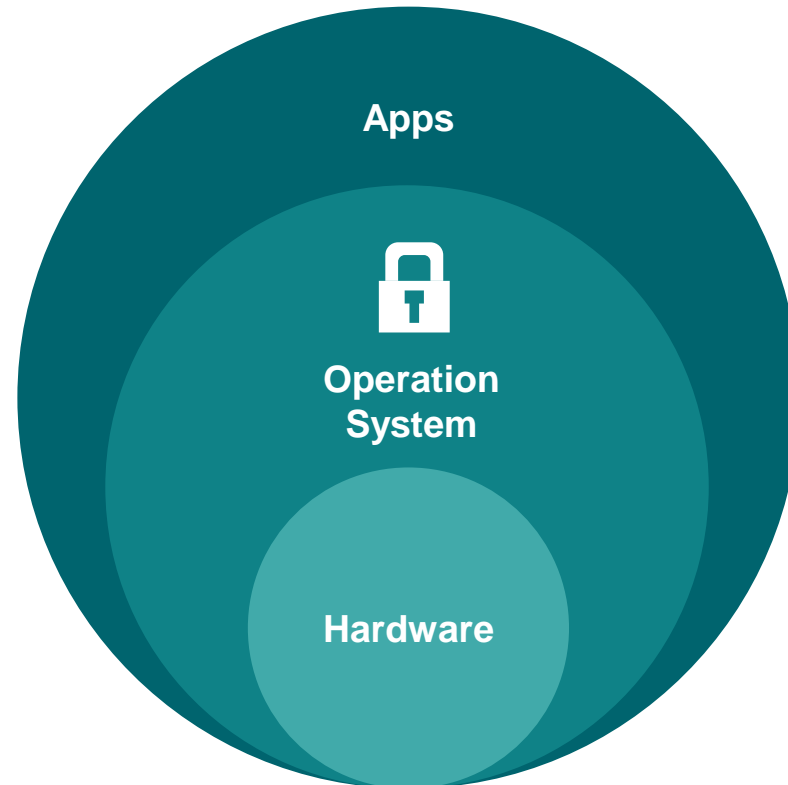
Automation

Secure, future-proof basis for running
Industrial Edge applications



Edge Devices

Siemens Industrial Edge – Easy and secure app-based data processing



New possibilities for
data processing



Security guaranteed
by Siemens



Scalable HW



Siemens Industrial Edge Integration into Automation



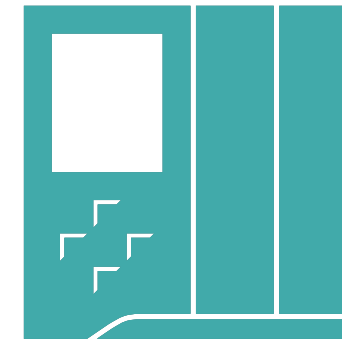
Dedicated Edge Devices



EDGE

Edge-enabled Automation Devices

Automation

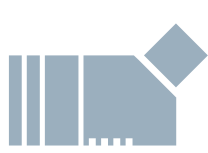


EDGE

Future Edge Devices



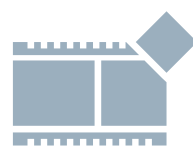
IPC127E



Microbox PC



Rack PC



IOT2040B



Open Controller



Unified
Comfort Panel



S7-1500
Edge
processing
unit

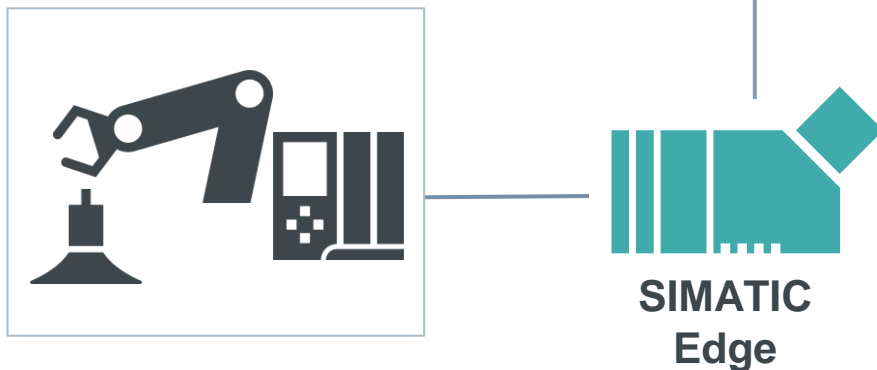
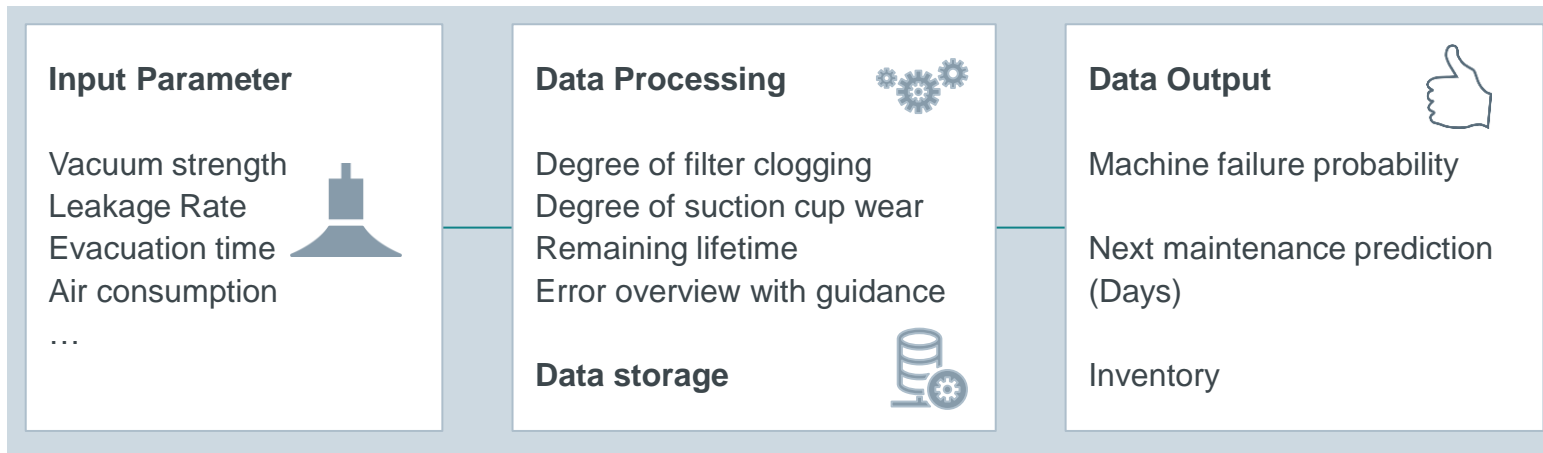


SCALANCE

“We can focus on developing applications, not infrastructure”



Edge App

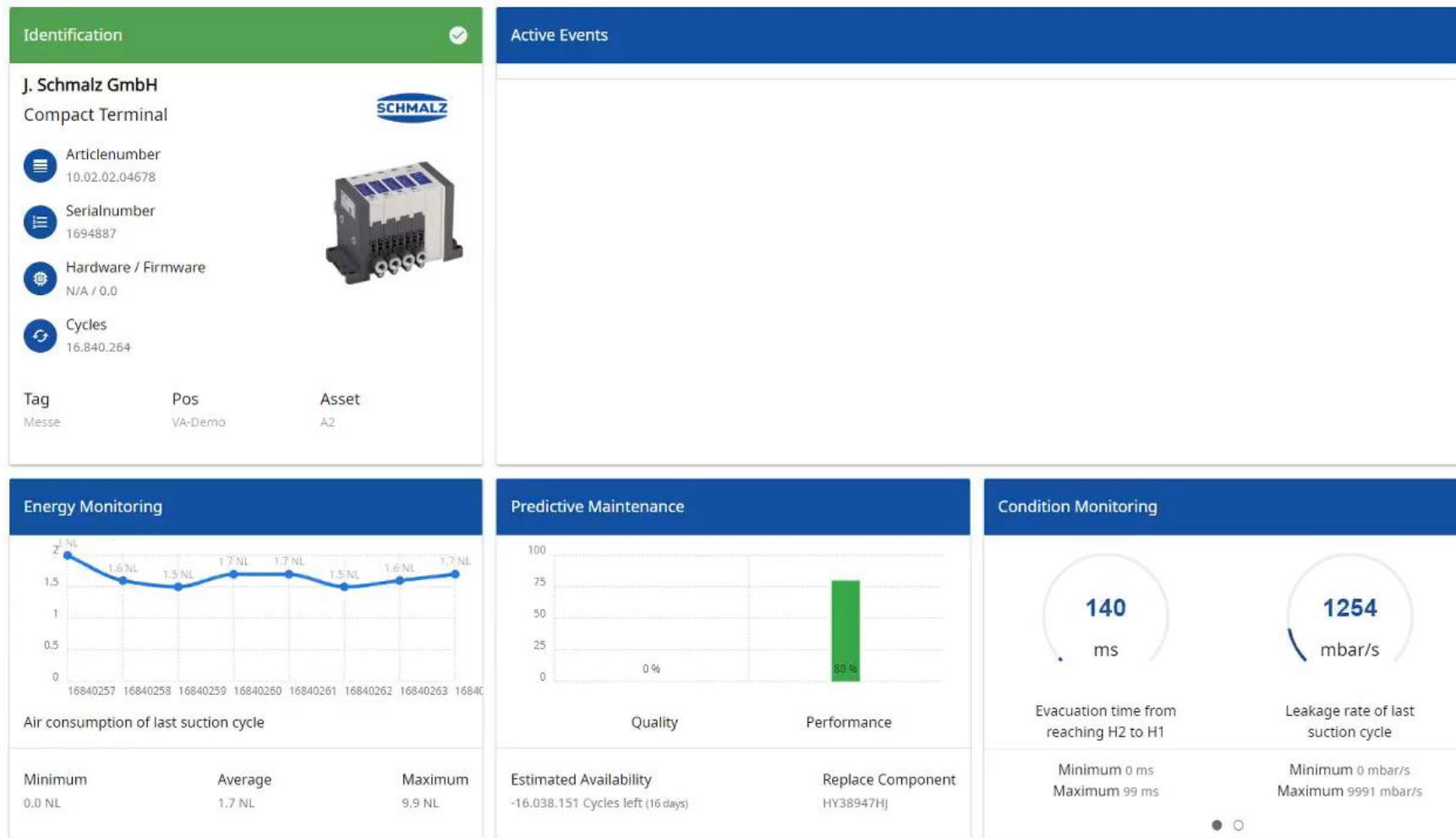


New possibilities

Open, programmable, – but secure

Easy Connectivity

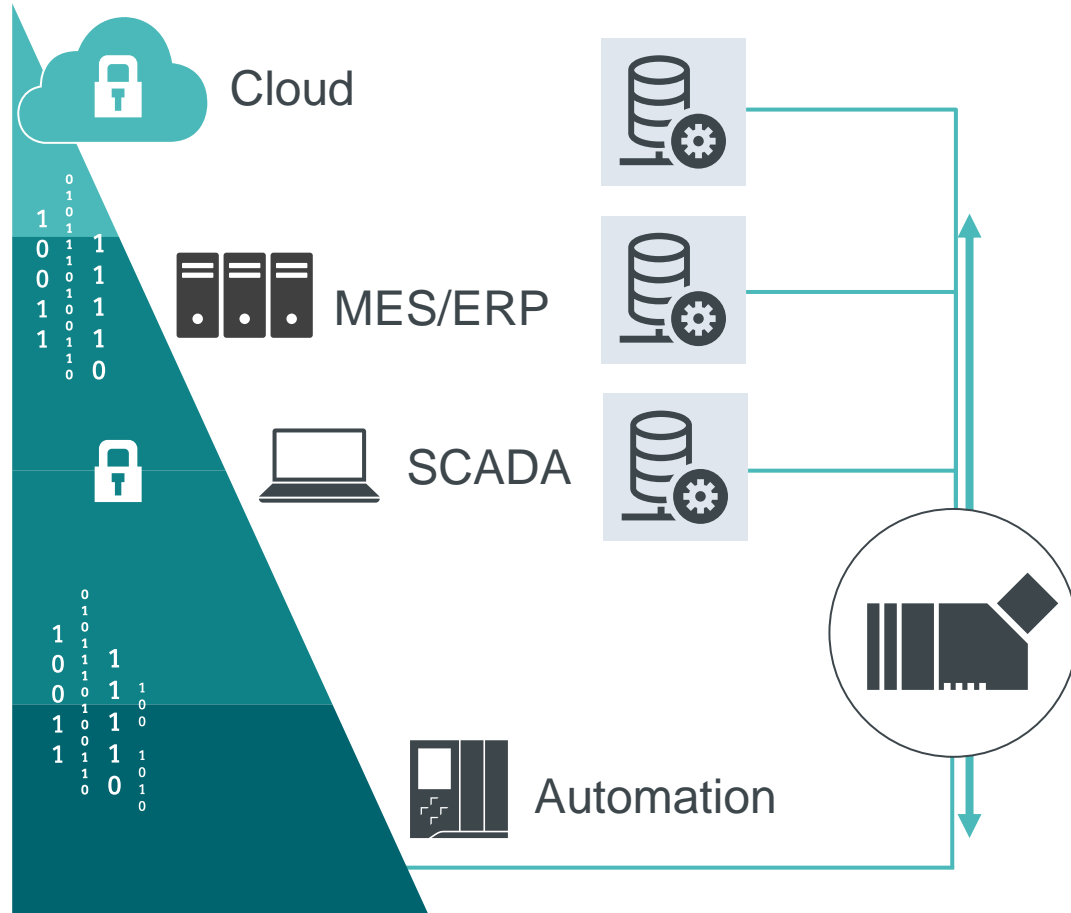
IT application for preventive maintenance with SIMATIC Edge integrated into automation



Challenge 2

Integrate data seamlessly company-wide

How can the most diverse data integration requirements be met?



Applications



Global, company-wide access and machine benchmarking

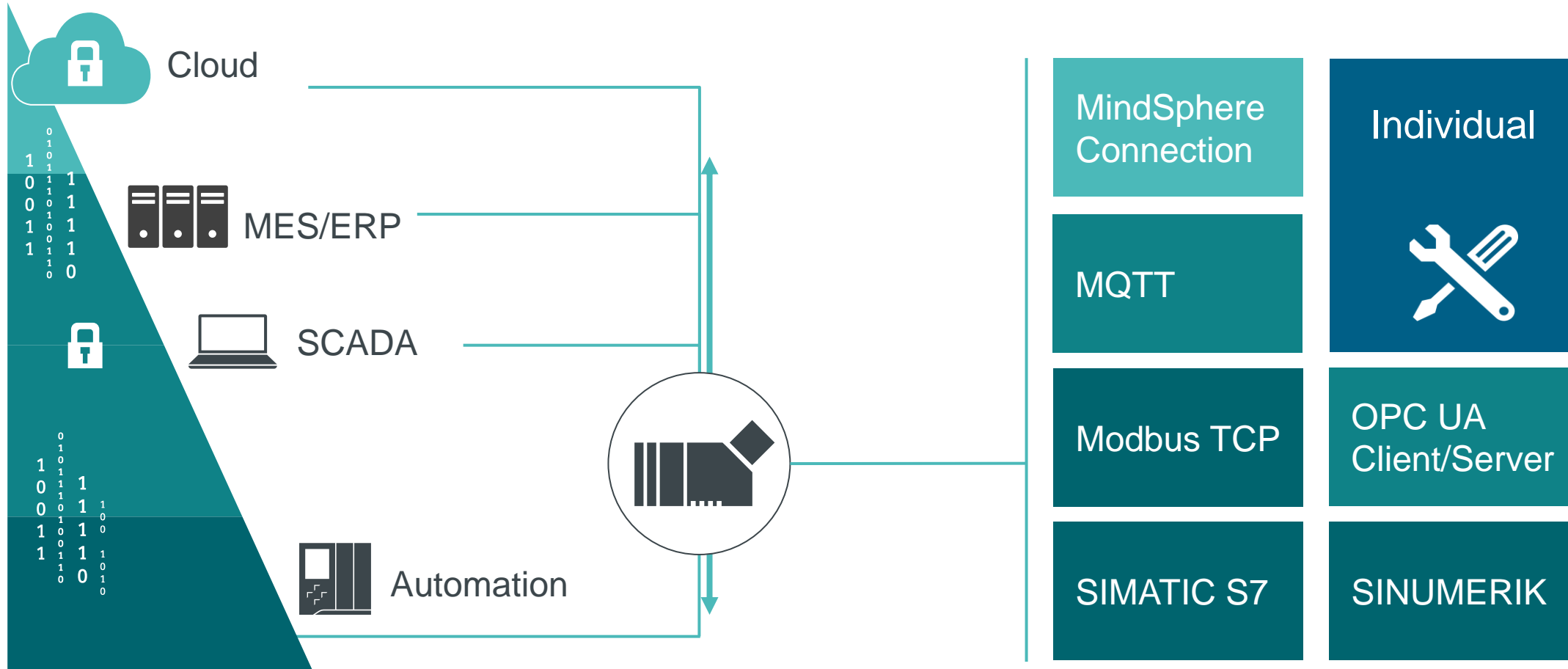


Machine maintenance statistic, spare part purchasing



Machine operation monitoring

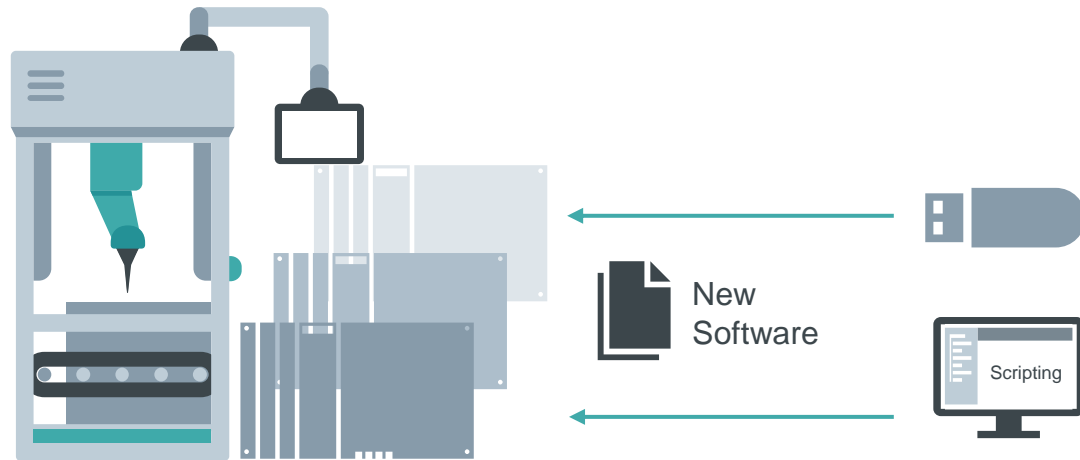
Siemens Industrial Edge – Integrated & customizable connectivity for seamless data exchange



Challenge 3

Increase flexibility of automation

How can devices be centrally managed and updated company-wide?



Automation

Applications



Reduce time for software updates and save labor costs



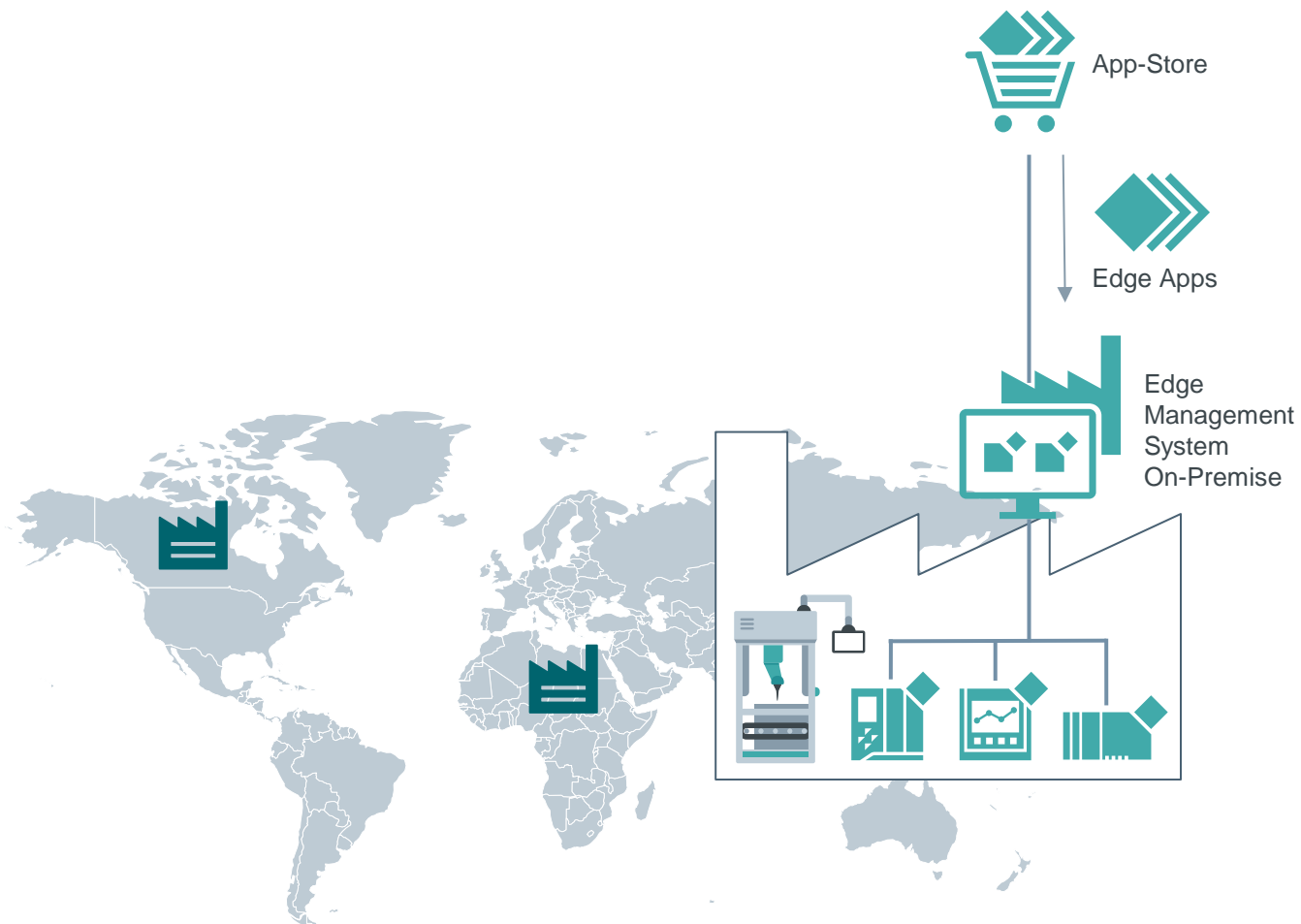
Centrally manage software for globally distributed manufacturing sites



Perform remote updates to adapt machines to future changes

Siemens Industrial Edge – Edge Management

Central instance for managing devices and apps



Exchange Edge Apps via Store



Distribute new apps and updates



Deploy security relevant patches



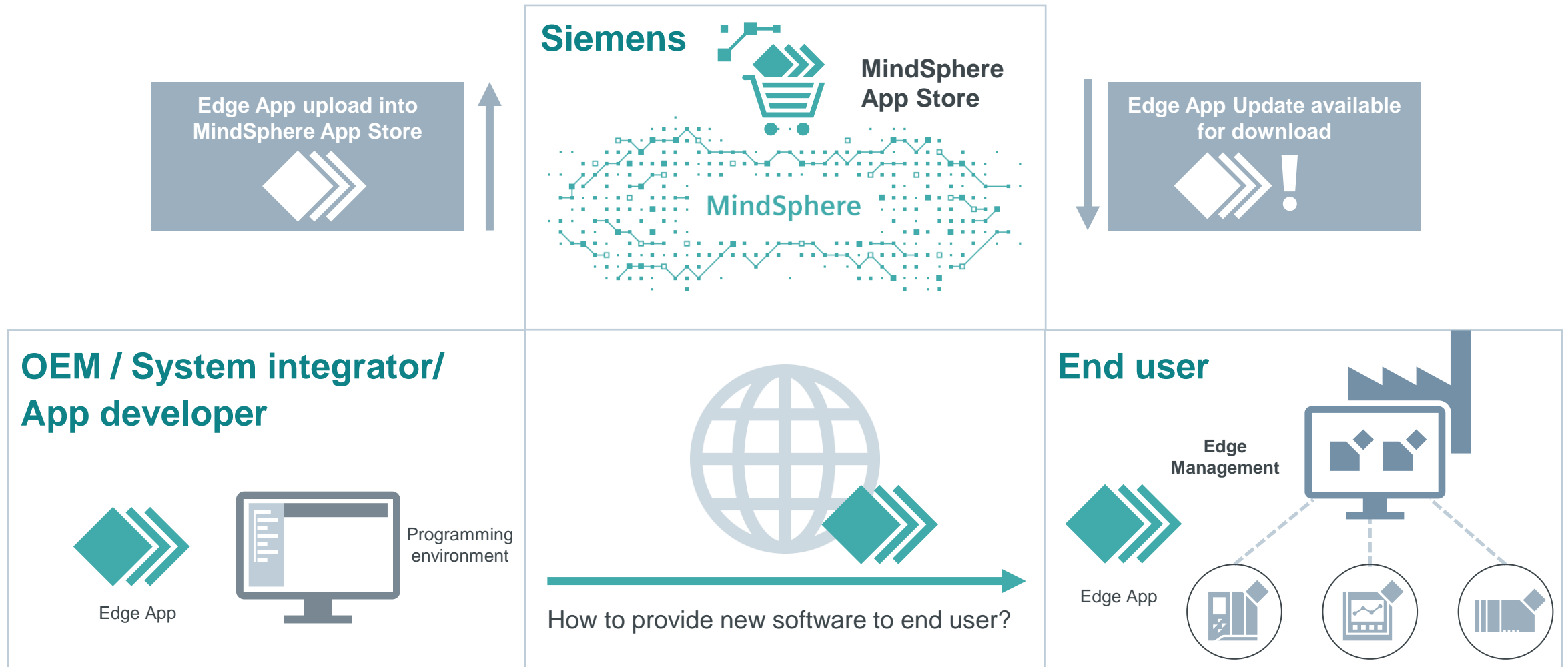
Control and diagnose Edge Apps centrally



Check device status/
diagnostic data



MindSphere and Siemens Industrial Edge ... connect software provider and software user



Content

Using Node-Red to make edge Apps

- Industrial Edge Management
- SIMATIC Edge App: Node-Red



Live demo: Node-Red Environment

Challenge 4

Grow as an OEM with additional services

Access to global machines as foundation for data-based services for your customers

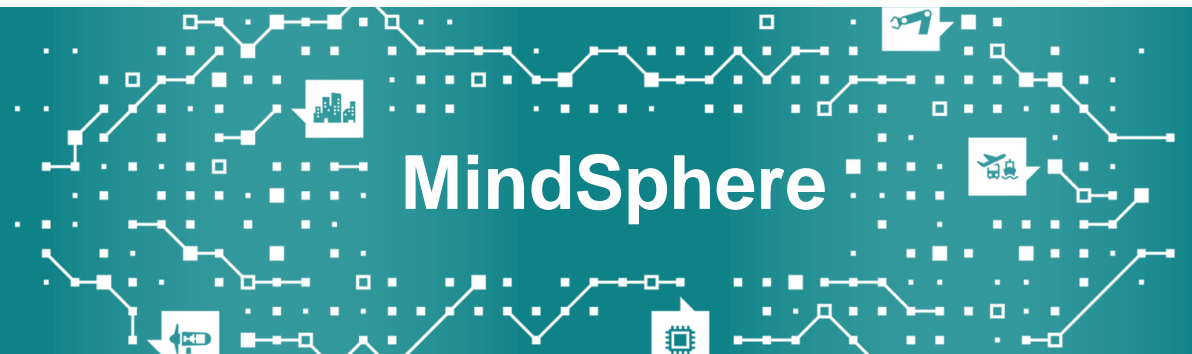
Applications

Powerful industry solutions with advanced analytics



Open PaaS

Develop robust industrial IoT solutions faster with global scalability

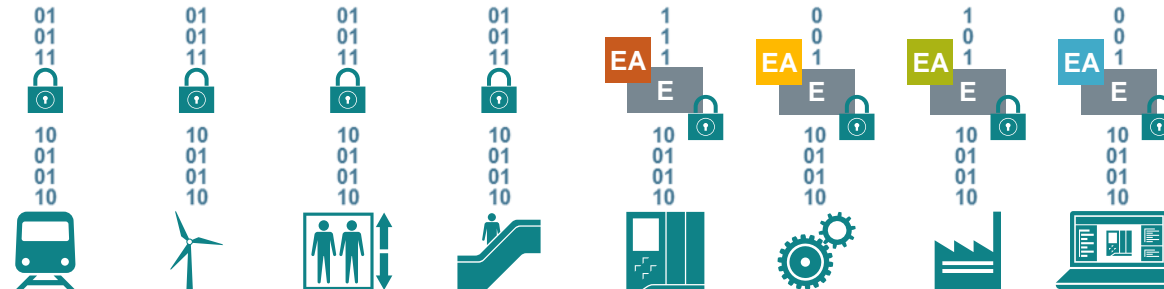


Edge Management

Edge Device Management, Edge App Management, and Edge App Store

Connectivity

Connect products, plants, systems, machines and enterprise applications



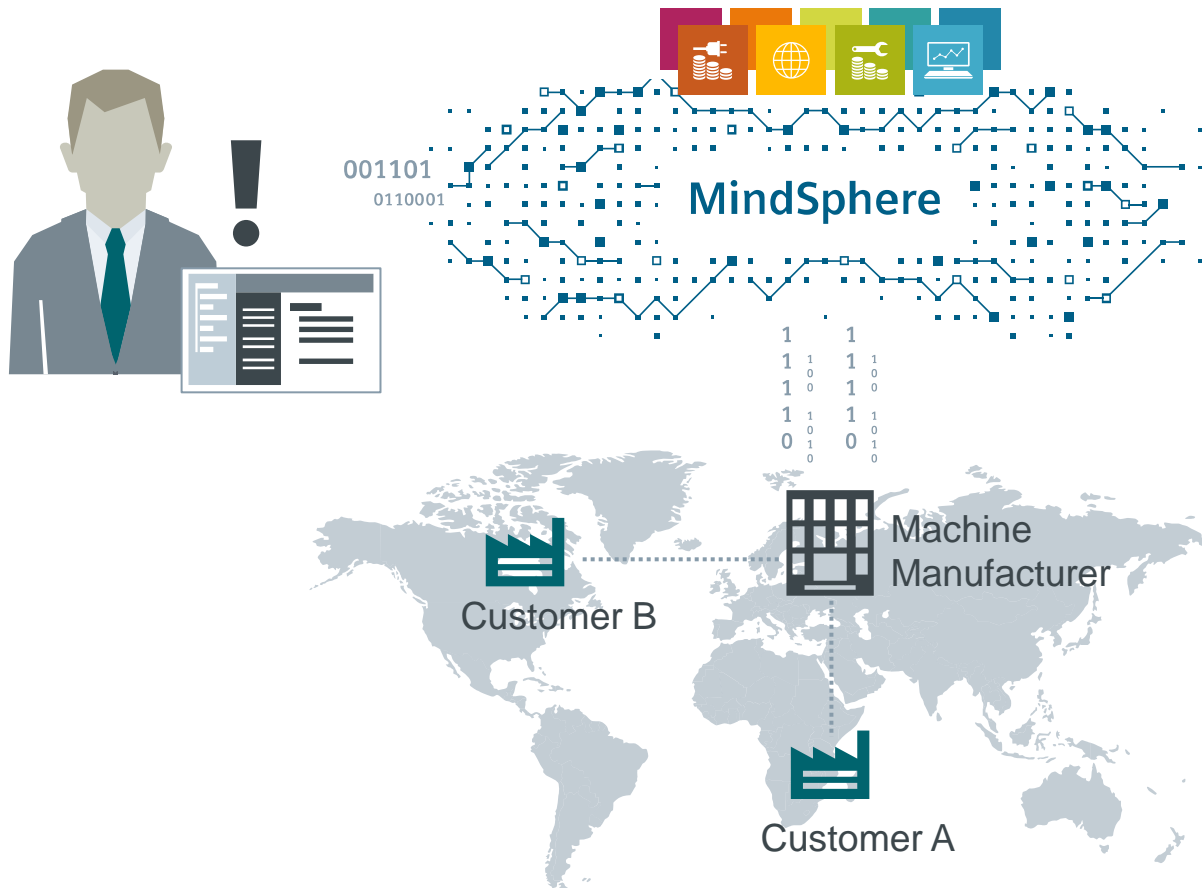
Edge Apps

Data processing and connectivity applications

Edge Devices

Infrastructure
Remote updating
Integrated security and connectivity

Access to global machines as foundation for data-based services for your customers



Applications



Service planning optimization
e.g. by using predictive maintenance



Increase of machine availability through
remote error diagnosis

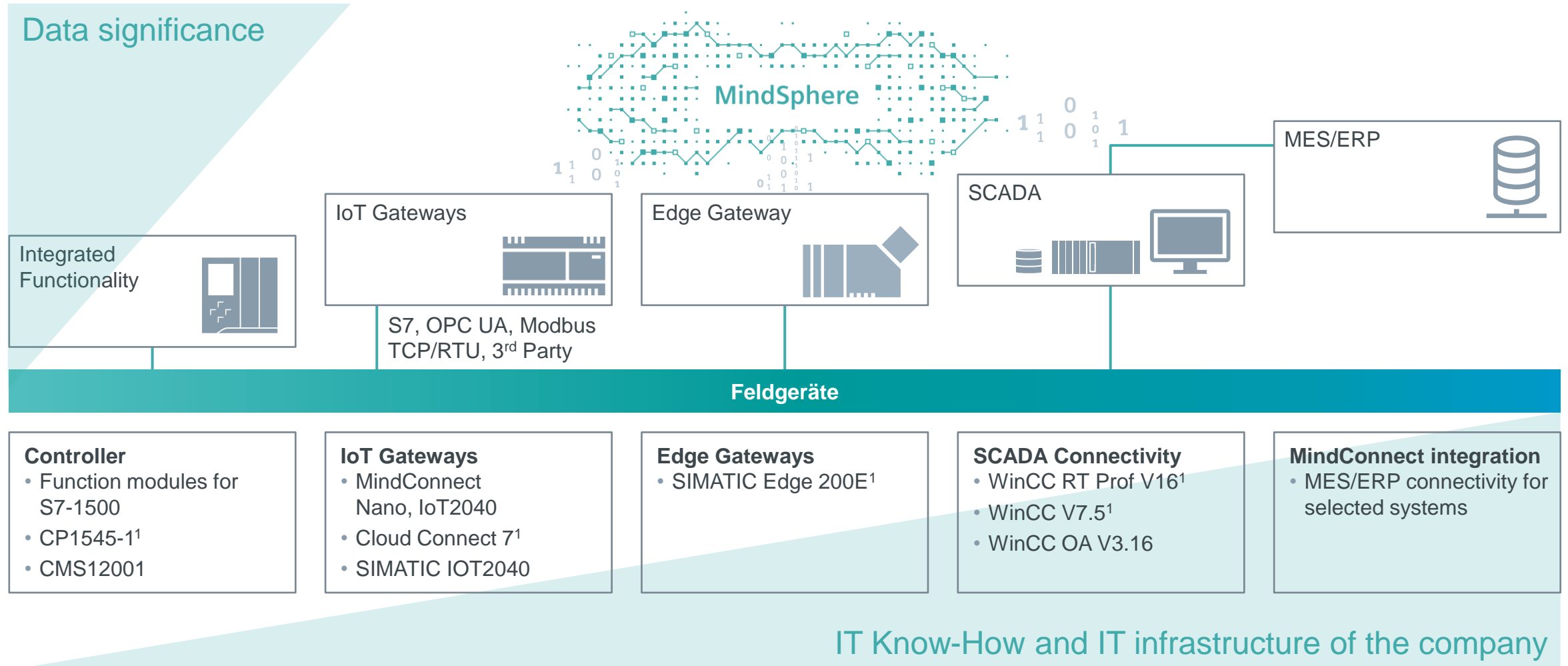


New business models
e.g. spare part services



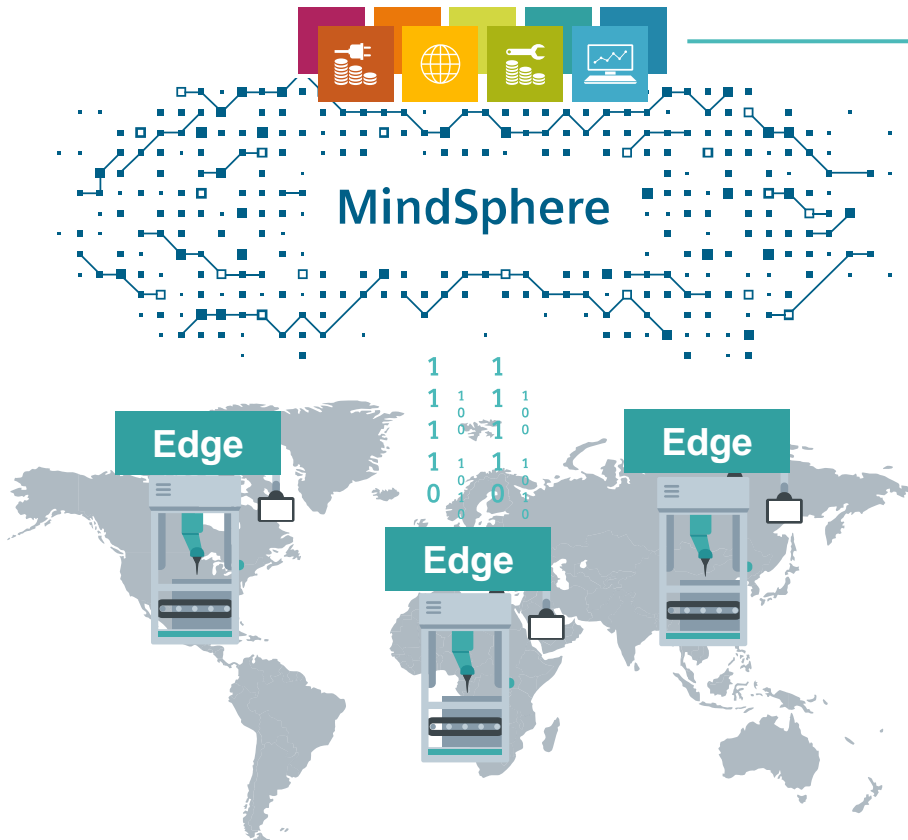
Optimization of machines with benchmarking
and learnings from data

MindSphere offers various options to connect automation



¹ Planned

MindSphere apps enable a global visualization and analysis of machine and component data



Siemens MindSphere Apps 2019 with focus on industry

SIMATIC

Performance Insight

Notifier

Energy Manager

Machine Monitor

Machine Insight

SINAMICS

Analyze MyDrives

SINUMERIK

Manage MyMachine

Analyze MyMachine

Analyze MyPerformance

Analyze MySpindle

SIRIUS

Asset Monitor

Never before has it been so easy to collect and analyze data from globally distributed machines

Content

Monitoring of machine operation worldwide with MindSphere and SIMATIC MindSphere apps



- MindSphere
- SIMATIC MindSphere Apps (Performance Insight)

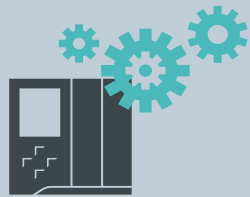
Live Demo

Key Take-Aways for Edge- and Cloud Computing

Challenge 1

Easy implementation of IT-based data analyses in automation

With SIMATIC and Edge your customers are prepared for Industry 4.0



Challenge 2

Integrate data company-wide

SIMATIC Edge is the platform for your customers for all connectivity tasks



Challenge 3

Increase flexibility of automation

Continuous updates provide your customers future proofness



Challenge 4

Grow as an OEM with data-based services

Edge and Cloud strengthen you against your competition



Q&A

Thank you



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siemens.com/digitalization

mindsphere.io

+1000
credits

CHECKING SCORE
LEVEL UP!

Digitalization
Changes
everything

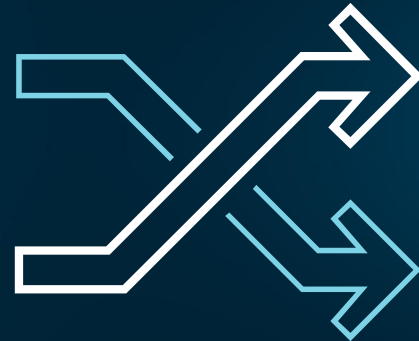
Digitalization
Changes
everything

This means today's Industry is filled with new challenges in order to face customer's requirements

Speed



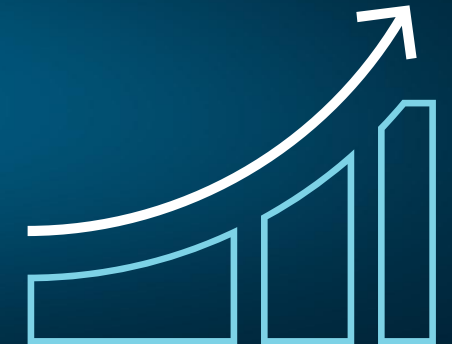
Flexibility



Quality



Efficiency



Security – Encryption | Firewall | Network segregation | Patch | Monitor



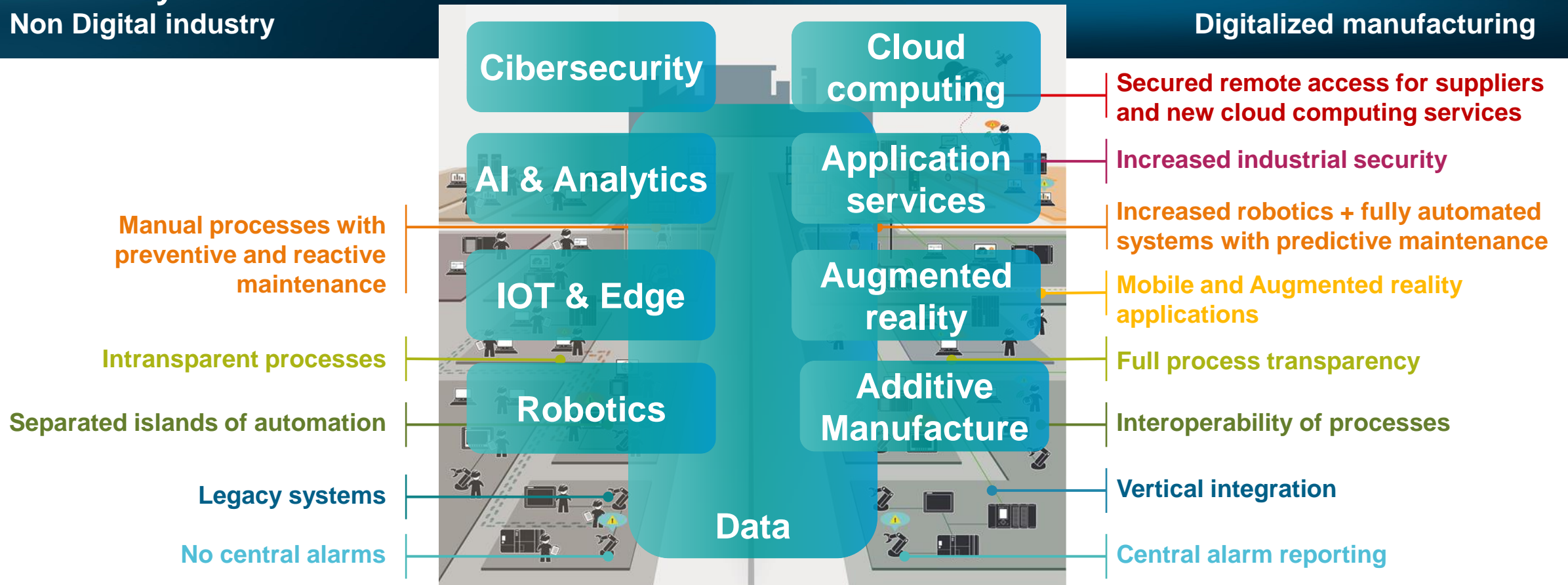
New Business Models - For continuous monitoring and optimization of complete value chain



And new business models in the internet age request new processes and tools

Yesterday Non Digital industry

Tomorrow Digitalized manufacturing



Digital Era opens new potential and market opportunities but also new challenges only addressable with operation intelligence

Digital Age Business

From Business Intelligence

- Analysis of historical data over defined periods of time
- implementation of reactive optimization measures

...to Operation Intelligence

- Continuous analysis of process data
- Continuously optimized and predictive operations with cost effective maintenance services

Cloud computing & Analytics

Globally available data lake for aggregated data of all sorts to be evaluated with Analytics and AI tools towards continuous process transparency and optimization

Digital Twins & Simulation

Digital Data models to evaluate, simulate and optimize with process data

IoT & Edge

Continuous connectivity to operation data flows, from sensor to system to edge operations

**But how do we
implement
this change?**

In order to achieve this change, our standard hardware solutions and platforms

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SIMATIC

Scalable industrial automation systems



SINUMERIK

Intelligent solutions for machine tools



SIMATIC PCS 7

Powerful, compact hardware for process industries



SIMOTION

High-end motion control system



SINAMICS

Frequency converter for every drive application



SIMOTICS

Highly efficient electric motors



SIRIUS

Modular industrial controls

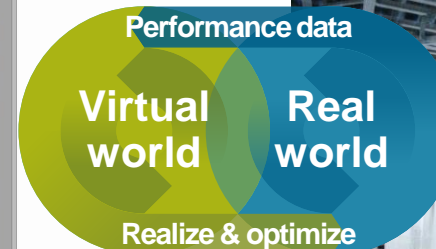
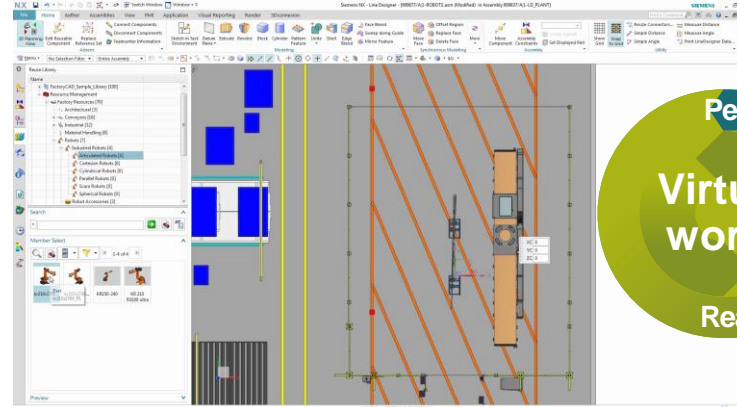
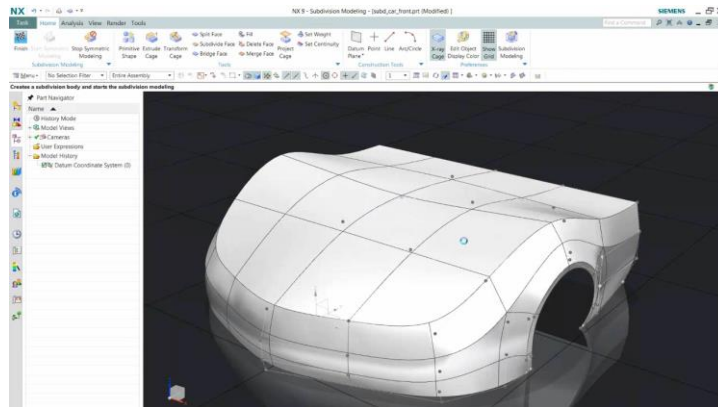


SCALANCE

Reliable industrial communication

Are merging with the software portfolio created over the last 20 years

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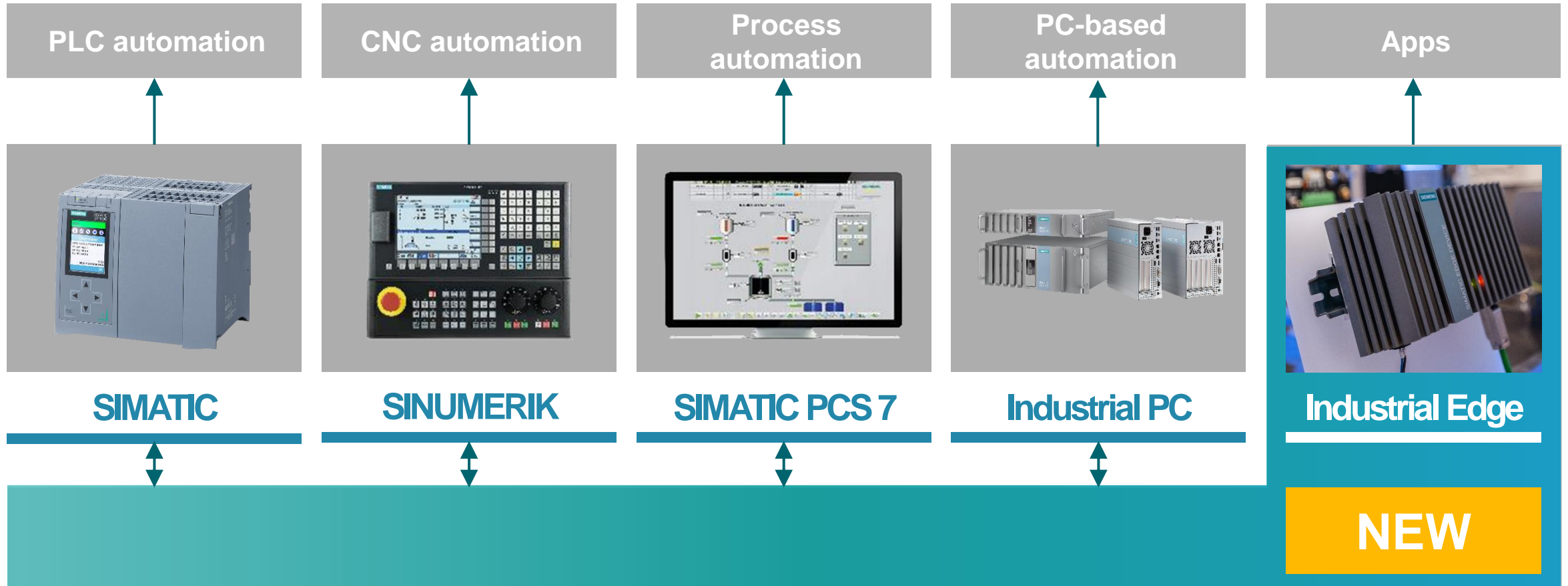
MindSphere

NX CAD	Teamcenter	NX Line Designer/MCD/ Automation Designer	Simatic IT	MindSphere Apps
Polarion	Manufacturing		Camstar	Digital Lifecycle Service
Simcenter	NX CAM / Additive	Simit	WinCC/SCADA	Asset Performance Suite
Mentor Xpedition	Tecnomatix	TIA Portal	CNC Shop floor Mgt SW	
Mentor Capital	Mentor Valor	Simatic PCS7	Edge Apps	Mendix LC Engineering

Teamcenter, COMOS, XHQ, PlantSight

Our HW is now enhanced by Edge functionality

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Using our IoT operating system MindSphere now enhanced by Edge and mendix



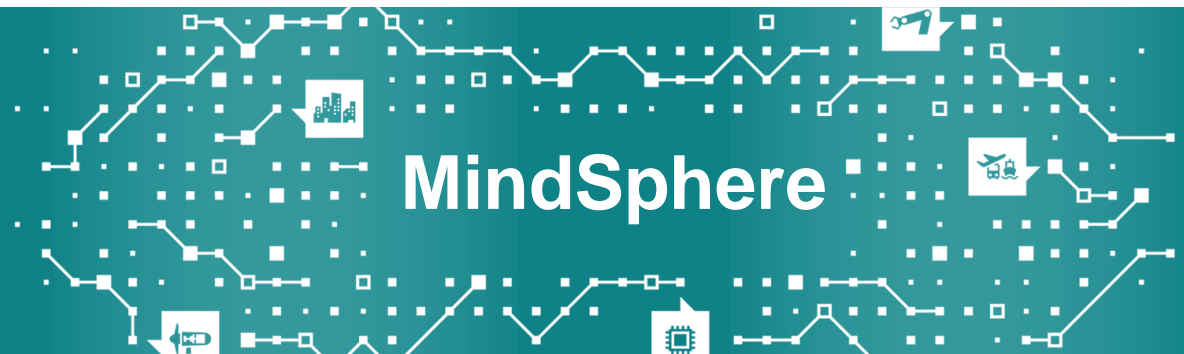
Applications

Powerful industry solutions with advanced analytics



Open PaaS

Develop robust industrial IoT solutions faster with global scalability

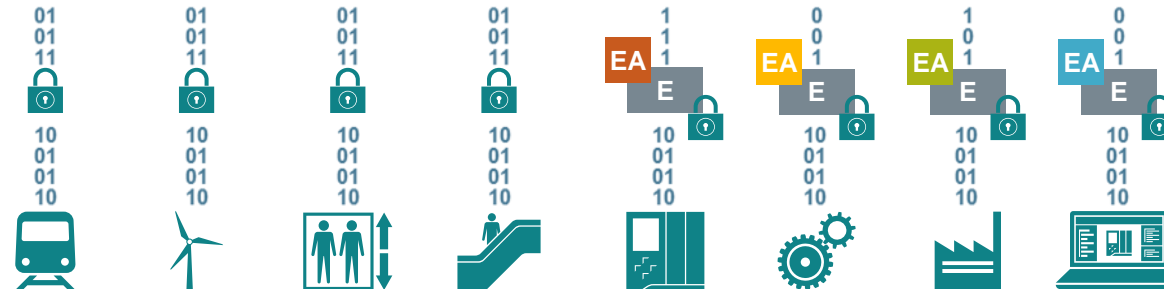


Edge Management

Edge Device Management, Edge App Management, and Edge App Store

Connectivity

Connect products, plants, systems, machines and enterprise applications



Edge Apps

Siemens, partner (OEM), and 3rd-party Edge Apps

Edge Devices

Secure, future-proof basis for running Industrial Edge applications

i-Experience Center

Industry 4.0

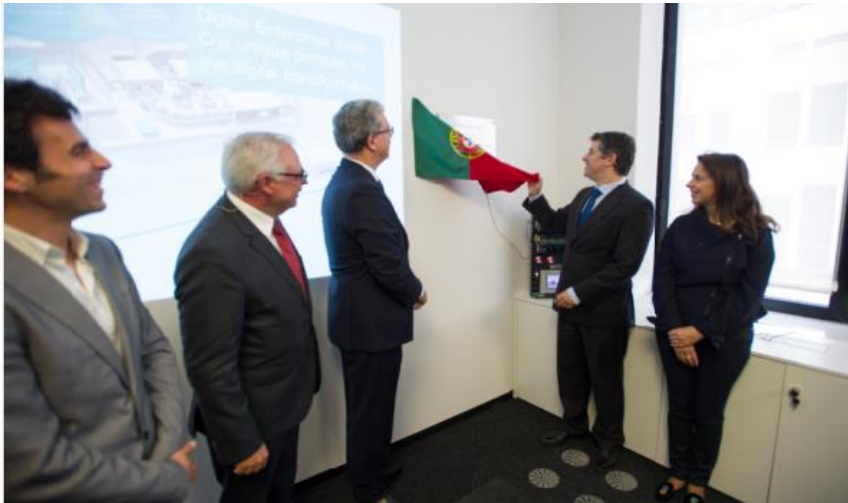
Digital Innovation Hub

Digital Industries

iExperience Center 4.0, our solution to support the change

Industry 4.0 digital transformation hub for universities, partners and customers

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Ingenuity for life



Project Scope

Creation of Digital Innovation Hubs, at Siemens Campus and Universities.

All TIA and Digital Enterprise solutions are available for customers, partners and universities to test and validate added value digital transformation solutions.

TIA Portfolio

TIA Portal, SIRIUS, SIMOCODE, SINAMICS, SIMOTICS, SITOP, SIMATIC, SITRANS, CI, RFID

Network and Cybersecurity

SCALANCE W, X, S, M

IOT & Edge Solutions

SIMATIC IOT2040 (Edge device)
IOT Sensors (BLE, LORA, Wifi)

MindSphere Portfolio

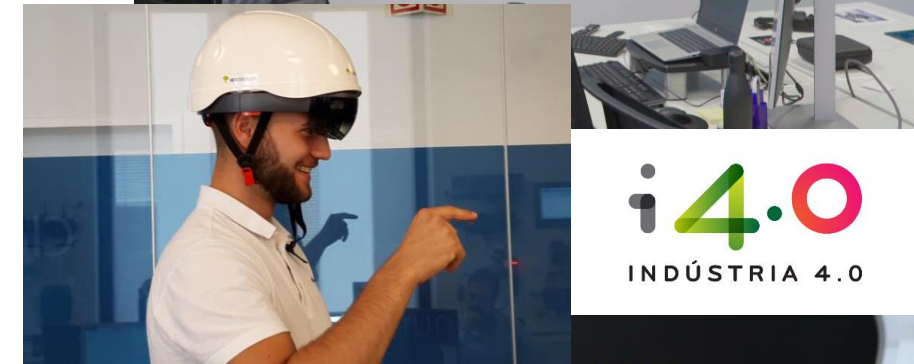
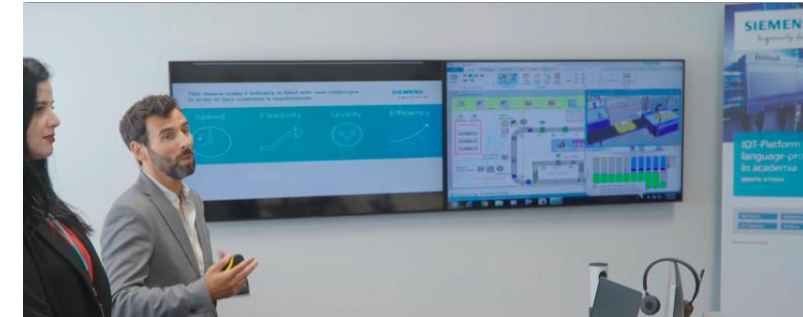
MindConnect IOT2040
MindConnect Nano
MindAccess IoT Value Plan

PLM Portfolio

SolidEdge (3D CAD)
TecnoMatix (Process Simulation)
TeamCenter (Collaborative platform)

Partner Solutions

Edge Applications
3D Printers
Augmented Reality



Powered by

SIEMENS



CADFLOW

iExperience Center 4.0 - Digital transformation lever

Concept



Incubator for new and existing partners to evaluate and co-create added value Digital Solutions for the Portuguese Industrial Market

Universities

Open
Criativity

IT/Consulting Partners
(mostly new)

New Business
Models

OT Partners
(mostly existing)

Delivery
Capacity

Customers
(new and existing)

Requirements

Co-creative approach to new business models, solutions and applications

From small PoCs to mid-size and large Projects

Digital Transformation Enabler

iExperience Center 4.0

Partner Ecosystem for new business models



Develop a new partner ecosystem to enable a fast deployment and easy scale-up of flexible and new *Digital Solutions* for the portuguese industry

Main Focus Areas for potential new partners and business models

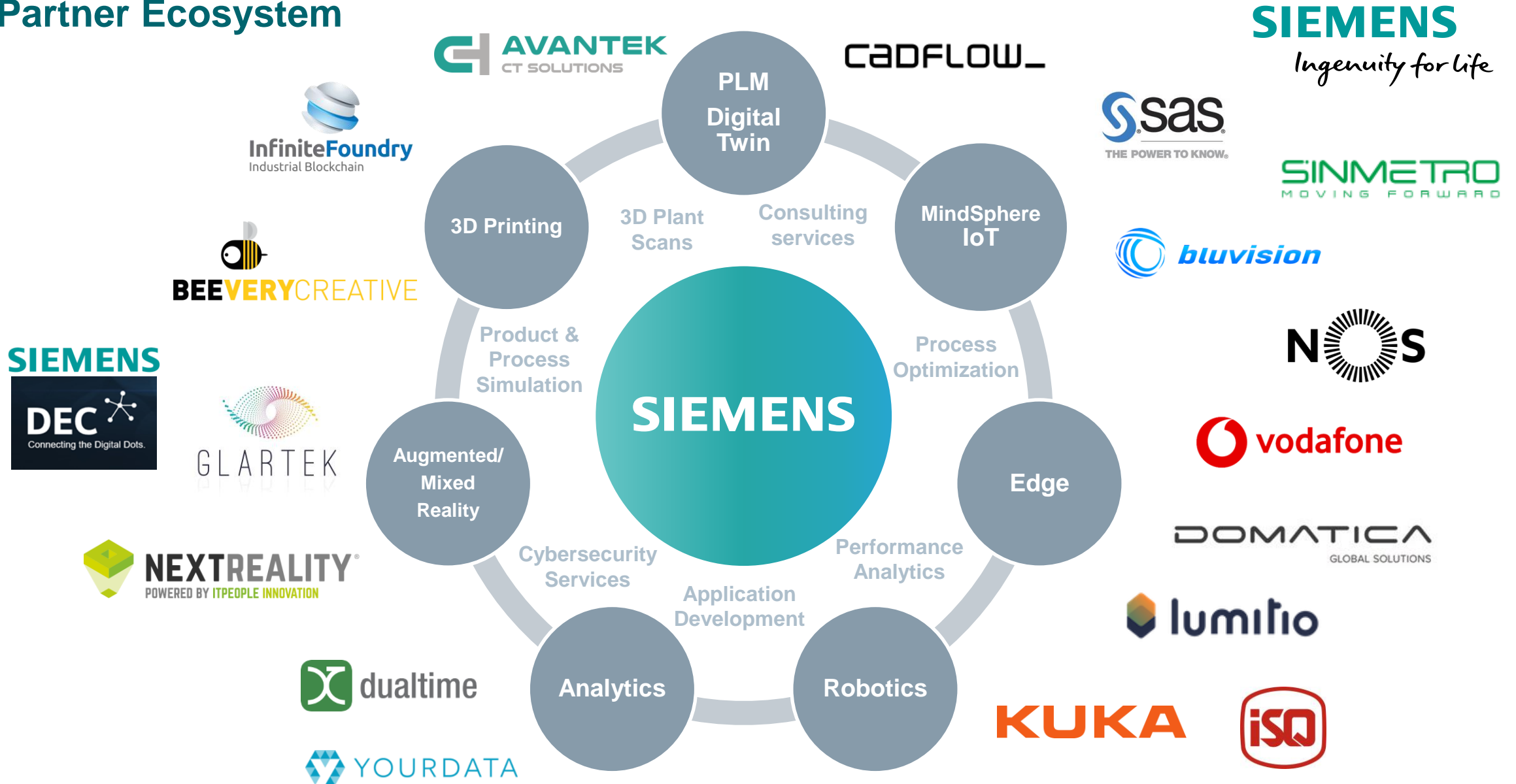
IOT | Edge | Simulation
AR | VR | XR

Application Development |
Analytics (MindSphere)

Industrial Consulting &
Plant Services



Partner Ecosystem



iExperience Center 4.0 Locations

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Universidade de Aveiro *

Porto
SIEMENS

Aveiro

Leiria

Lisboa
SIEMENS



Freixo de Espadros do Grande



Alfragide



Politécnico Leiria *

**New
Products**

SIMATIC IOT2050

The successor of the IOT2040



The intelligent gateway and data collector for industrial IoT applications



Feature / Function

- Multiplied computing power
- TI ARM SoC, 64 Bit Processor
- SIMATIC Industrial OS preinstalled (Full managed Debian-based Linux, 64Bit)
- Graphic Interface
- 2 full USB interfaces
- Arduino shield compatibility
- Internal memory eMMC, with SD card expandable
- Remote Edge functionality preinstalled

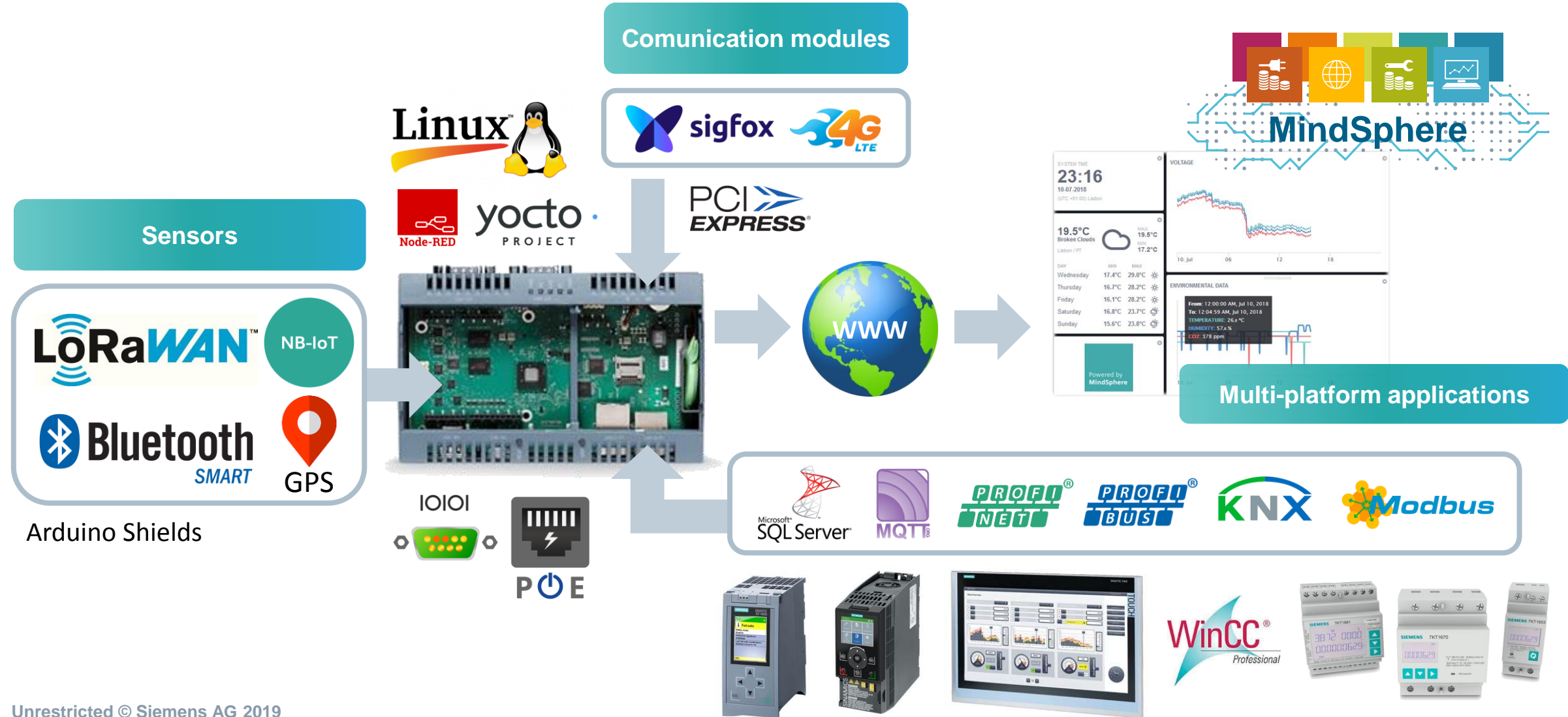
Benefit

- High-performance data compression, implementation of different communication protocols
- Use of existing advantages such as freely available packages, simple update concept, etc.
- Reduced development and maintenance costs
- Professional and "usual" SIMATIC Support
- Visualization of the data streams
- Easy and multiple connection options
- Direct connection to actuators and sensors - no changes to the existing system
- Faster system startup
- Easy integration into Edge solutions
- Programming of data preprocessing in high-level programming languages such as Java

Open source is also gaining room in the industrial arena

IOT2040 Sensor to Application Edge Gateway

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CloudConnect 7

Smartly connecting existing sites



Feature / Function

Data transmission to cloud-based solutions via an open cloud protocol (MQTT)

Trigger management for event-driven and cyclic communication

Device connection via S7 protocol, MPI or ModbusTCP

Supports the connection of the S7 CPU via PROFIBUS and PROFINET

Web-based engineering

Import of the tag tables from STEP 7 projects

Transfer of collected data via OPC UA server

Benefit

▶ Flexibility in the selection of the cloud solution (e.g., MindSphere, MS Azure, IBM Cloud, AWS)

▶ Event-driven communication reduces the network load and the data exchange costs

▶ Expansion of existing installations to include cloud applications without modifications

▶ Investment protection

▶ Easy commissioning

▶ Data management of existing S7 controllers can continue to be used without modifications for a quick and easy configuration

▶ Open data exchange by existing SIMATIC S7 controllers with third-party systems via OPC UA

**New
Solutions**

Industrial Circuit

Realtime collaboration platform (audio/video/docs...)



Siemens platform for video, communications and document /whiteboard sharing, applicable to Remote Support and Service scenarios, and highly skilled technicians can provide timely and capable remote support to unskilled technicians located at the customer's premises, wherever they are, to perform dedicated tasks where this kind of support manifests itself as added value.

With this approach, skilled technicians will be able to respond to various geographically dispersed services, with their 'hands on the ground' other technicians with less expertise (and cost per hour).

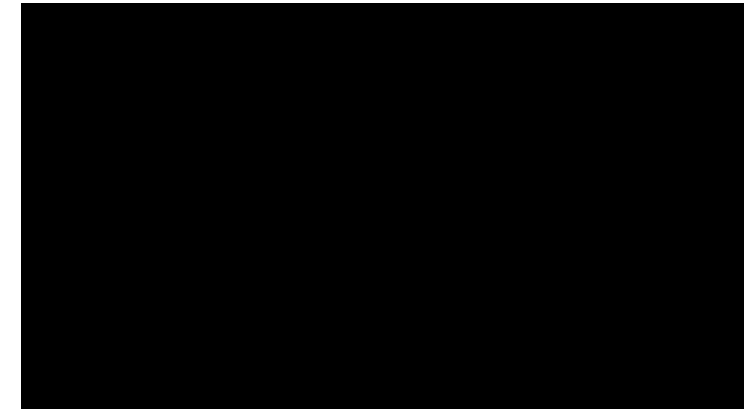
Benefits:

- Higher video resolution and bandwidth (quality of service)
- Easy to use interface ("glove friendly")
- Whiteboard and joint photo annotation
- Better collaboration with non-Siemens users

Applications:

- Remote Client Product Acceptance Tests
- Expert Support and Advanced Troubleshooting for Field Service Engineers
- Expert support and enhanced troubleshooting for shop floor workers

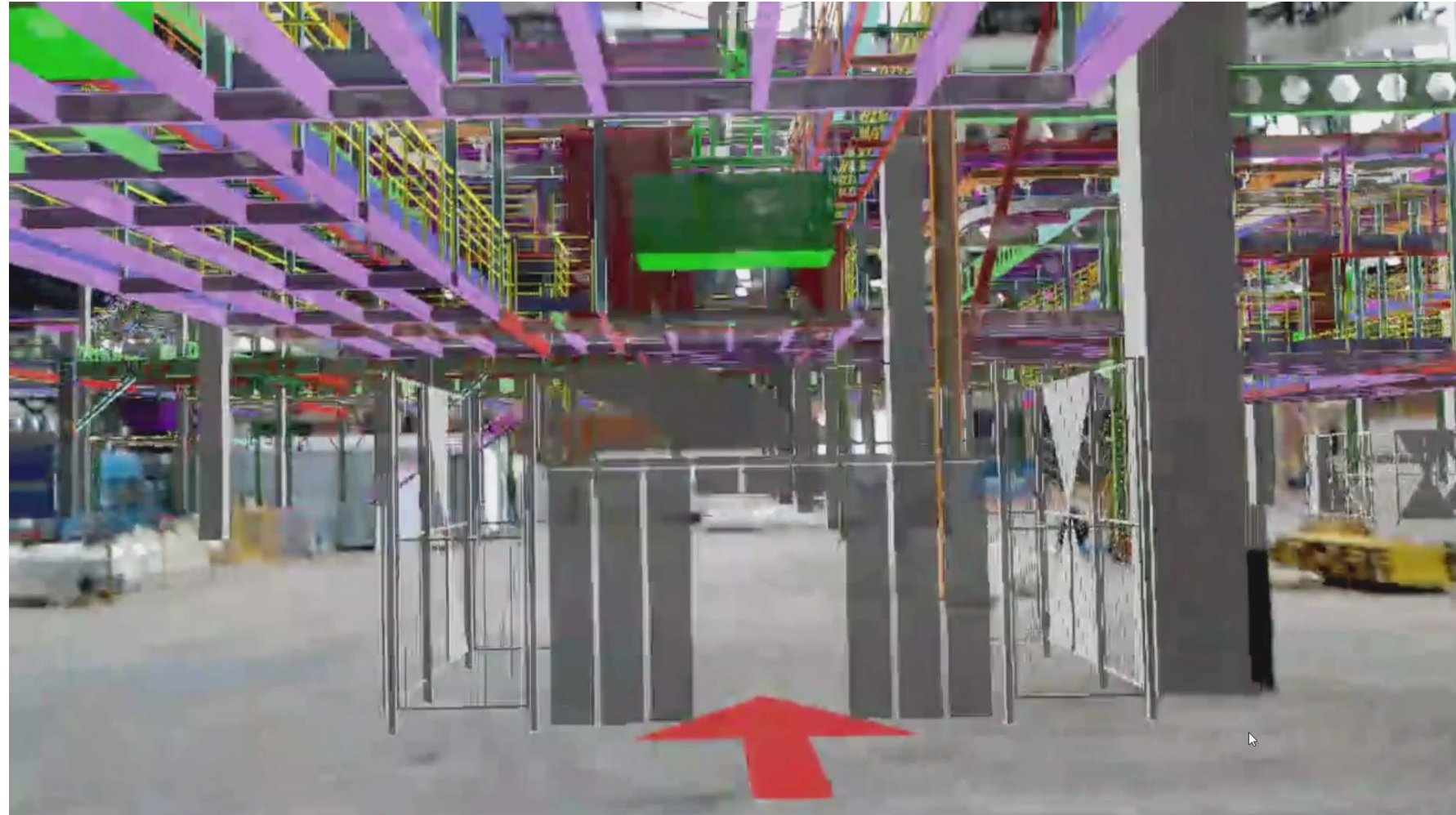
Available for IOS, Android e RealWear HMT-1Smart Glasses



Innovative solutions to go from Real to Digital

Plant & Product Scan

Enabling the creation of digital twin scenarios for virtual and mixed reality solutions in maintenance or operations

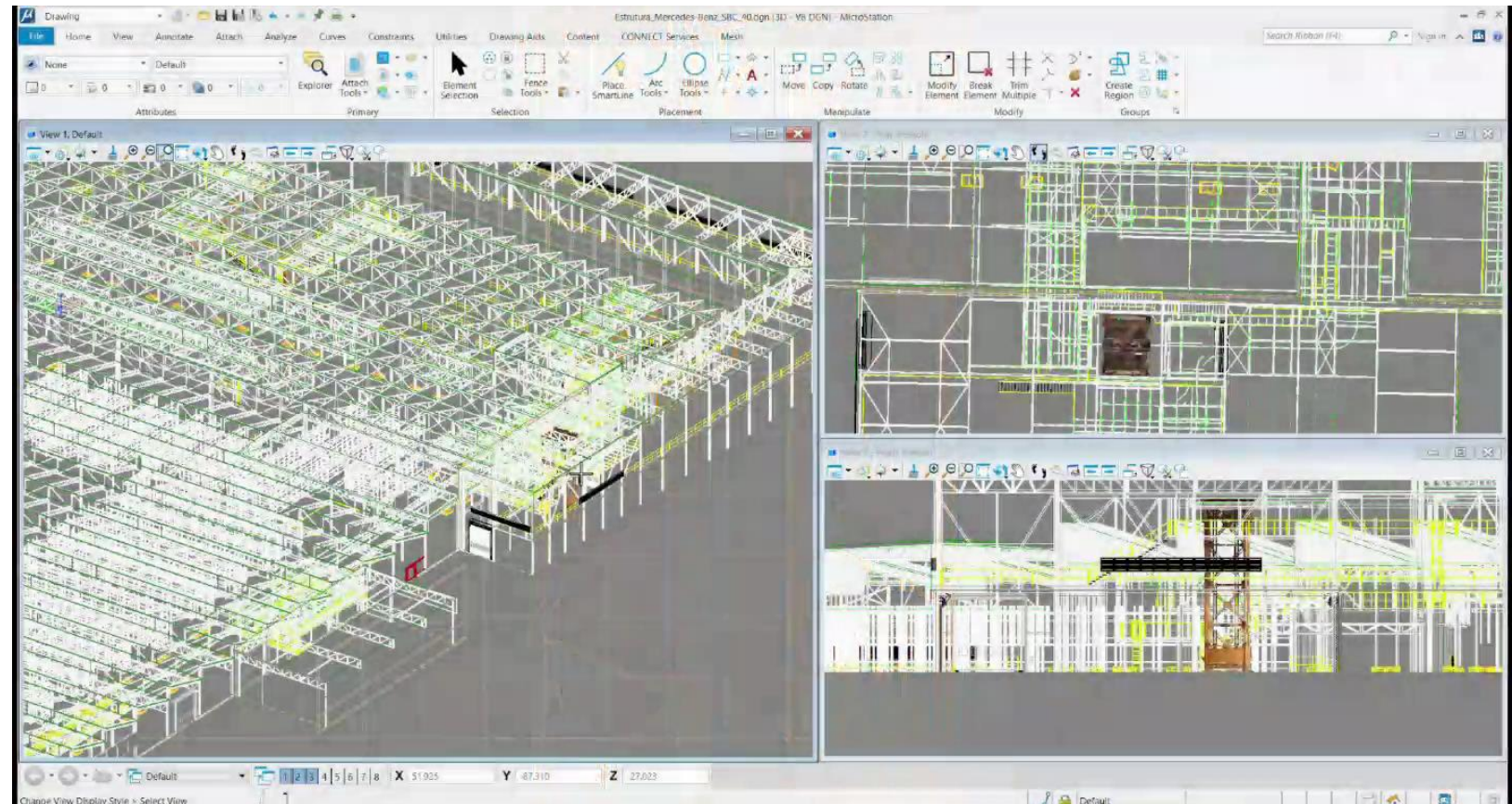


Innovative solutions to go from Real to Digital



Mixer CAD & Render

Mixed post rendered and CAD scenarios

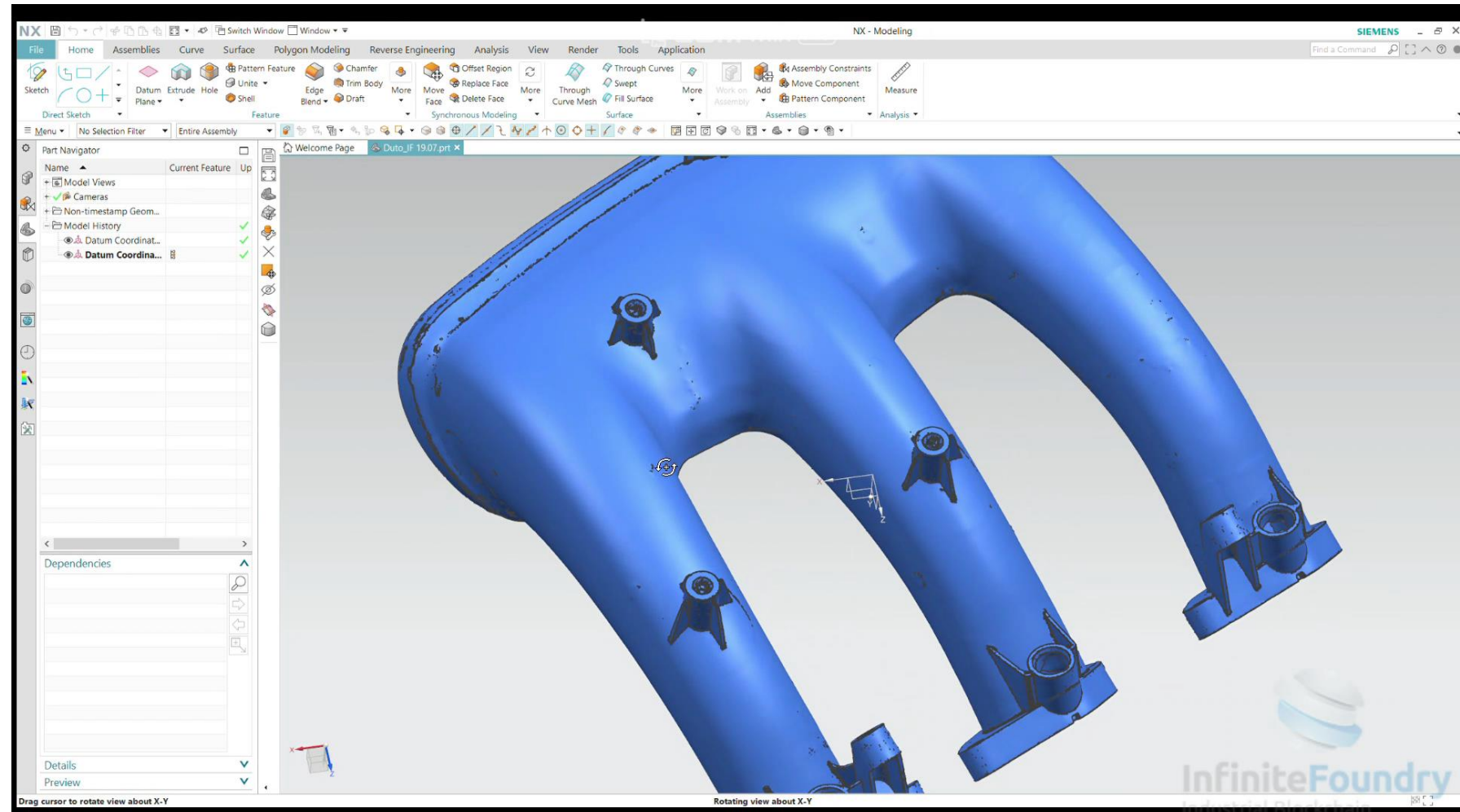


Innovative solutions to go from Real to Digital



PC to CAD

From Point Cloud to CAD drawing



AR to MR solutions to go immersive into applications

Example of HoloLens application @iExperienceCenter Alfragide

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TxHoloViewer

Siemens Product Lifecycle Management Software
Multimedia design > Illustration & graphic design

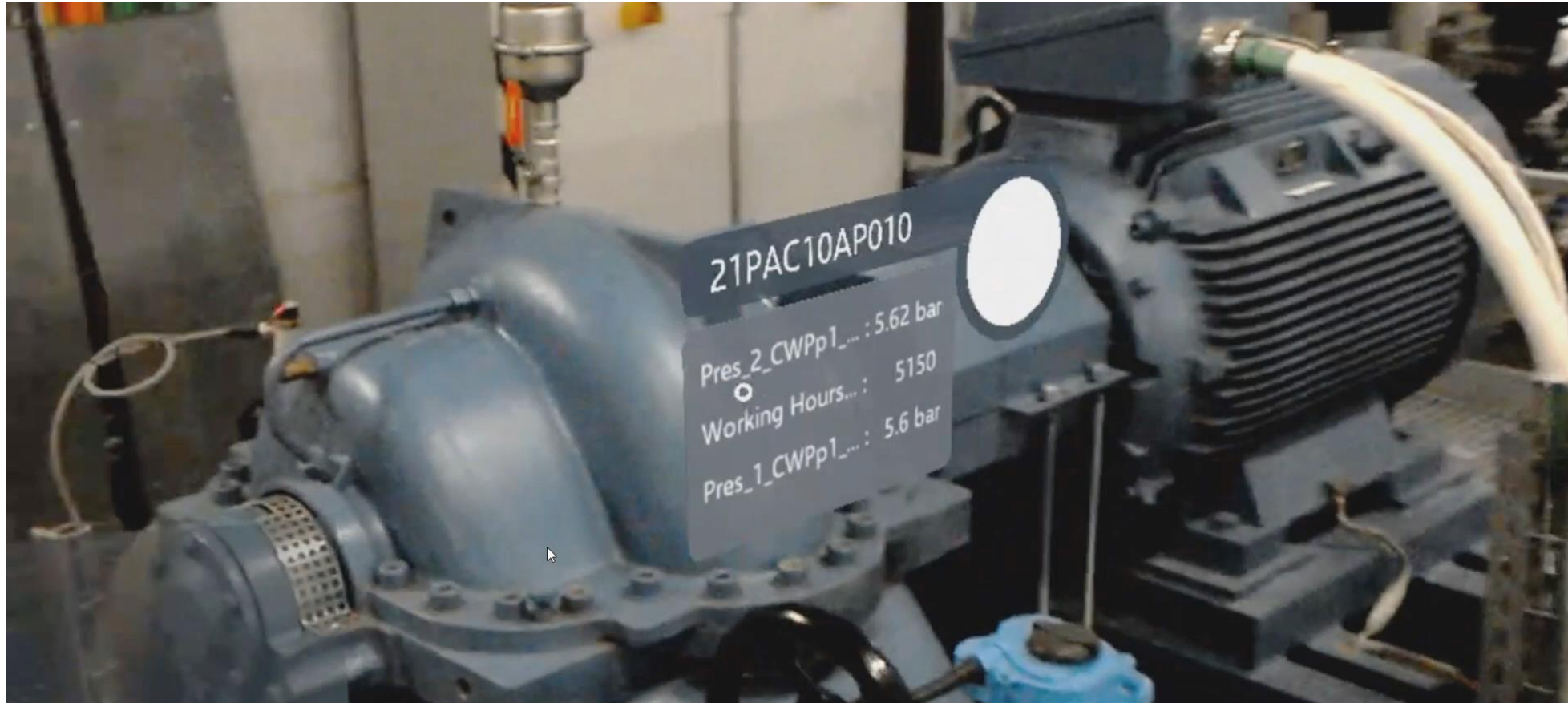


AR to MR solutions to go immersive into applications

Example of Hololens application for maintenance procedure

NEW

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 Microsoft

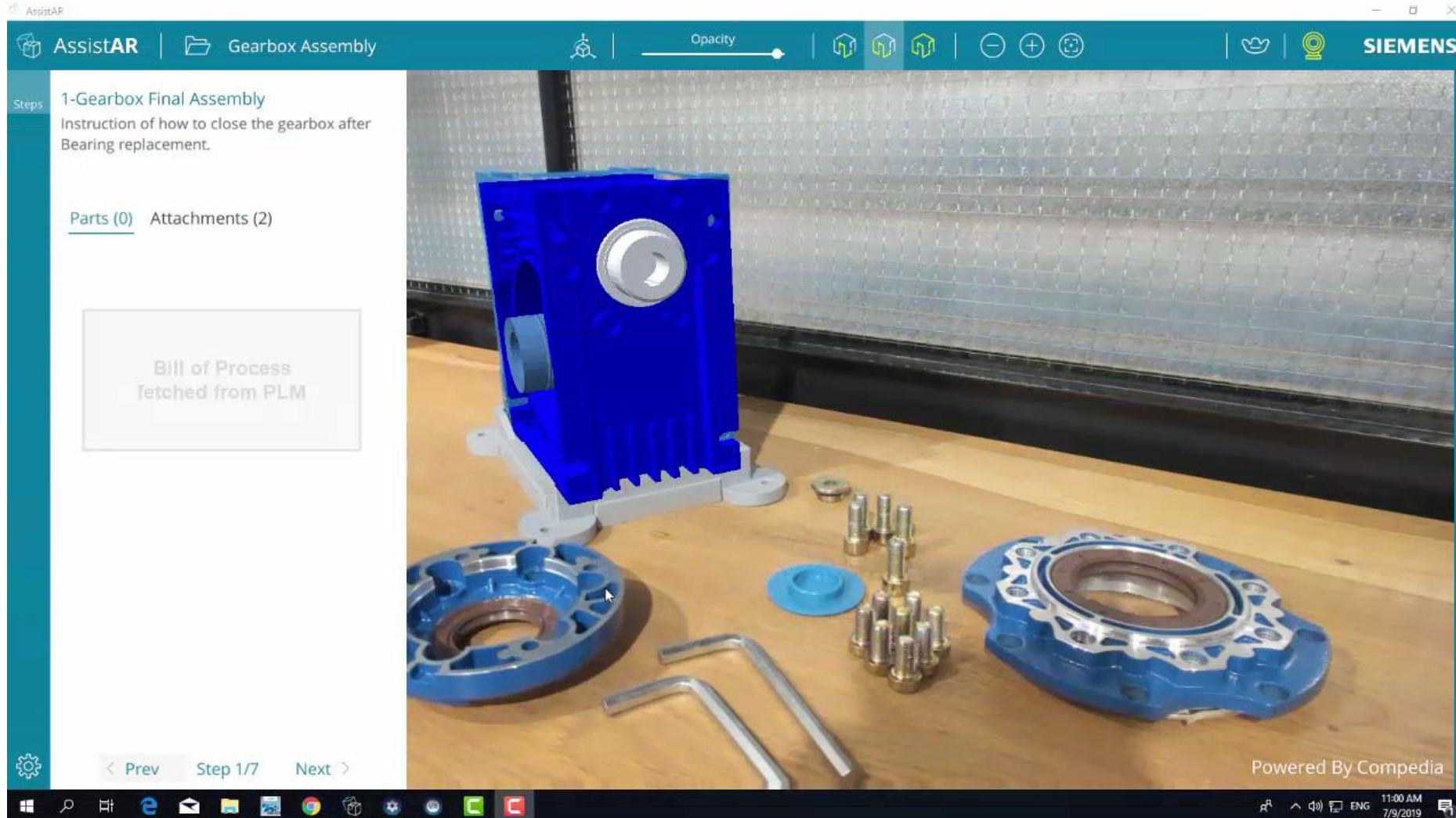


AR to MR solutions to go immersive into applications

NEW

Example of AssistAR application using HR Camera for maintenance operations

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VIVE
htc STEAM VR



Thank you

SIEMENS
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mindsphere.io