





Edge Computing has a similar potential

Digitalization Line – TIA Use Cases



Edge Computing Use Case 14 Data acquisition for cloud services Use Case 7 Virtual Commissioning Use Case 4

Automated execution of engineering tasks
Use Case 1

Automation Planning Use Case 12



Collaborative
Automation Design
Use Case 13

Integrated engineering of kinematics
Use Case 10

Virtual Training
Use Case 11

Line Integration
Use Case 9

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

Artifical 1100011000

Data 001101 Ecosystems

Object oriented programming

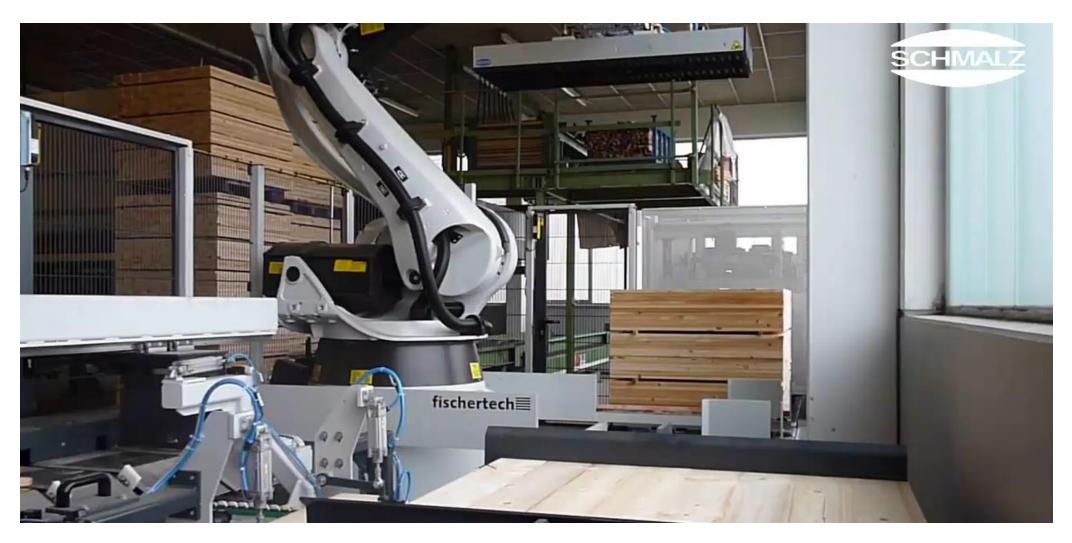
Open Source

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Application for gripping systems: Example OEM Schmalz





Application for gripping systems: Example OEM Schmalz





with predictive maintenance for grippers

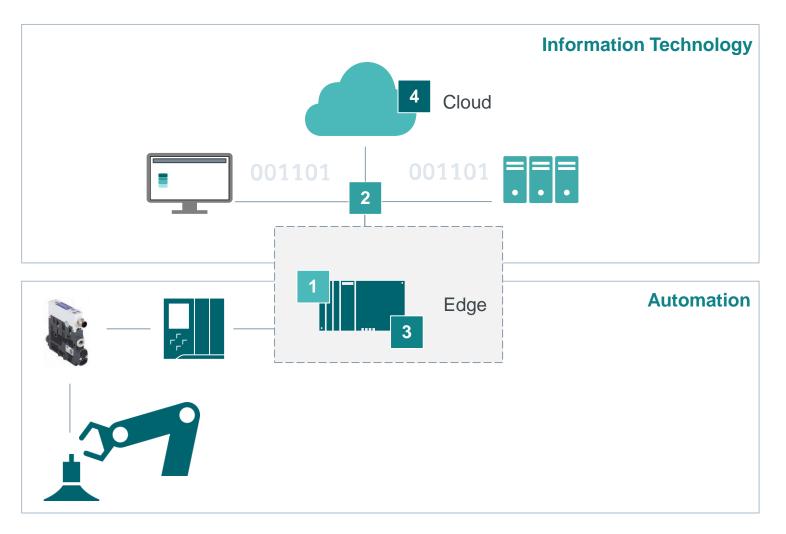


by detecting clogged filters & system leakages



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





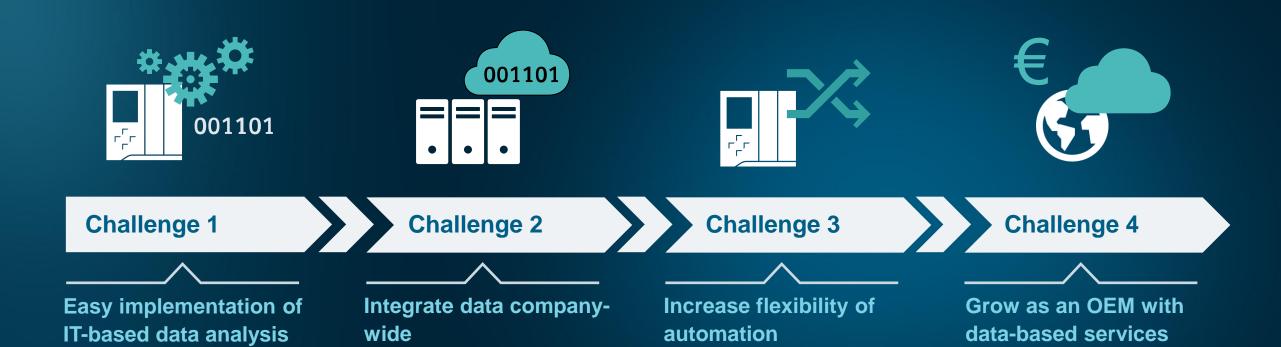
Challenges



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

Address current and future challenges

in automation

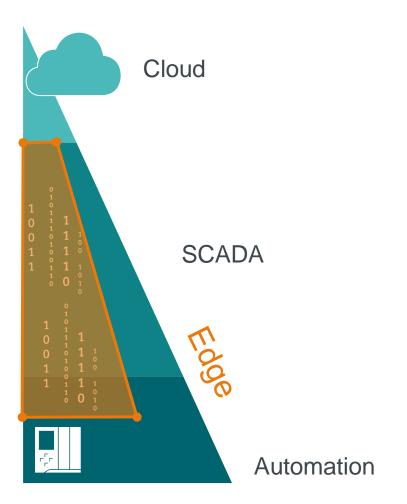




Positioning



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

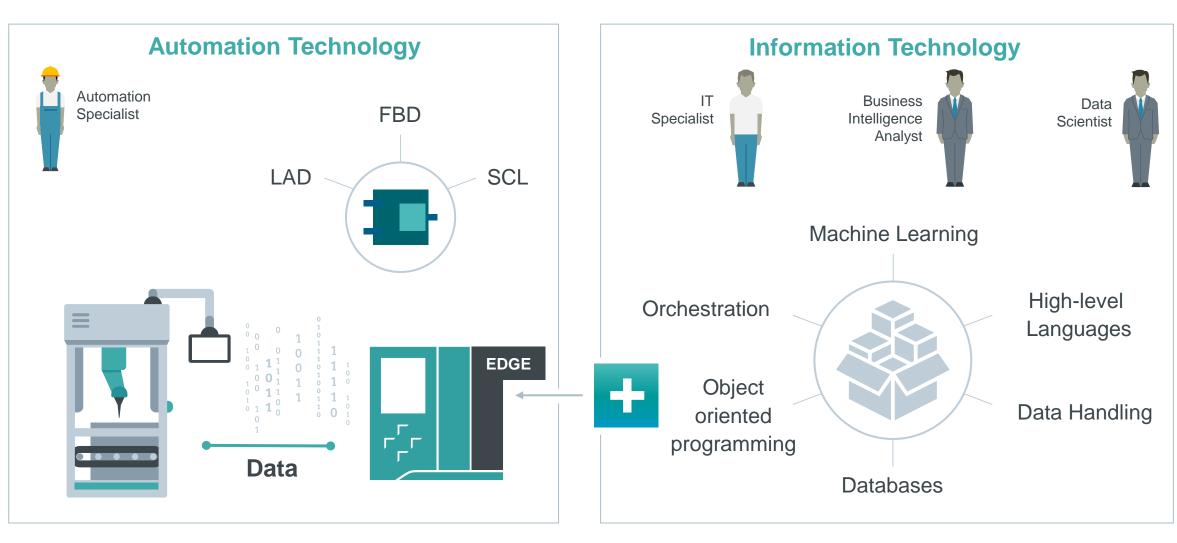
Production/process control

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Edge Computing combines Automation with IT





Siemens Industrial Edge – Concept





MindSphere



Industrial Edge

Applications for intelligent data use based on IT Capabilities



Automation

Secure, future-proof basis for running Industrial Edge applications

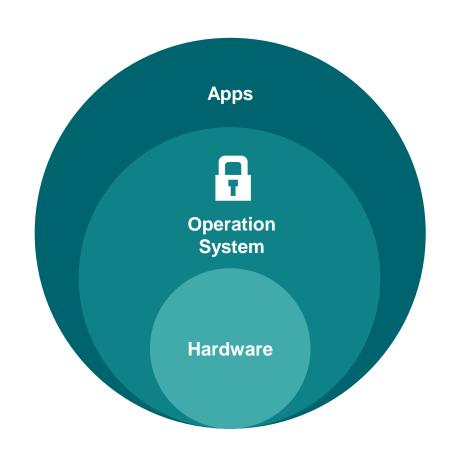




Siemens Industrial Edge – Easy and secure app-based data processing









Siemens Industrial Edge Integration into Automation



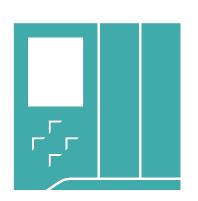
Dedicated Edge Devices







Automation





Future Edge Devices





C



Rack PC



IOT2040B



Open Controller



Unified Comfort Panel



S7-1500 Edge processing

unit



SCALANCE

"We can focus on developing applications, not infrastructure"

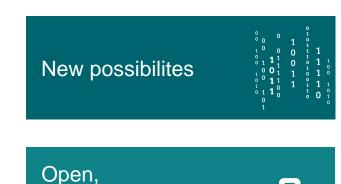




Edge App

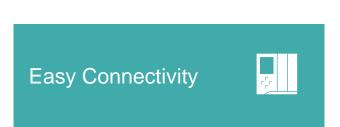






programmable,

- but secure

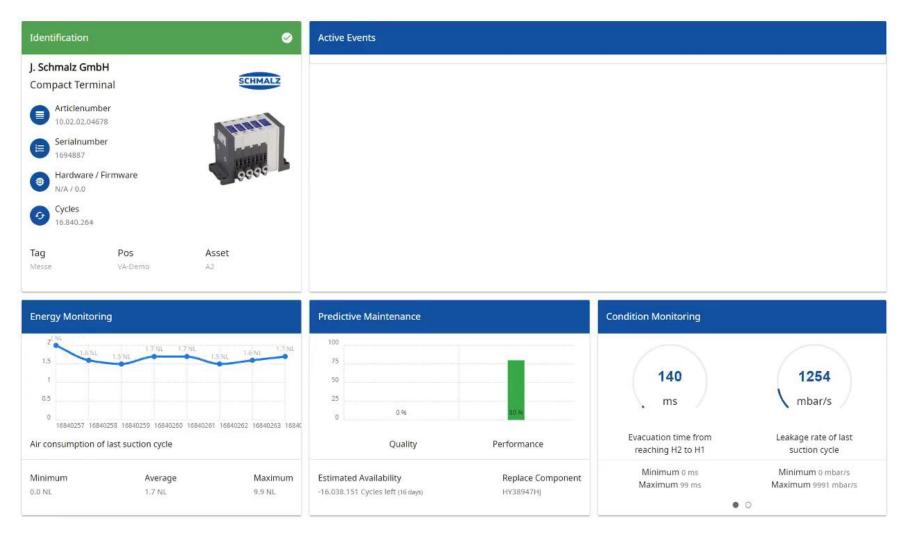


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IT application for preventive maintenance with SIMATIC Edge integrated into automation



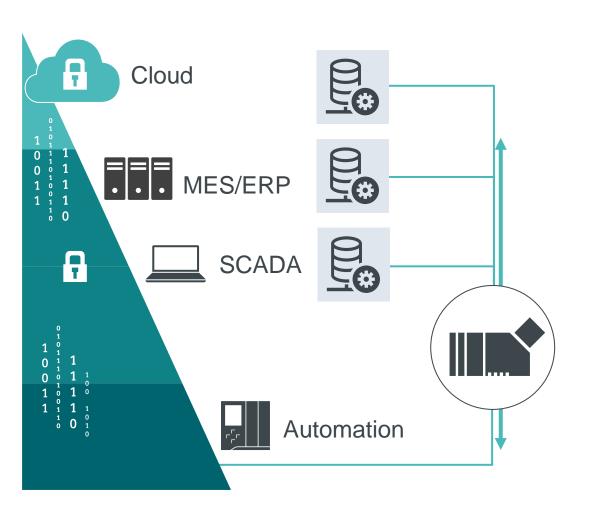


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How can the most diverse data integration requirements be met?





Applications



Global, company-wide access and machine benchmarking



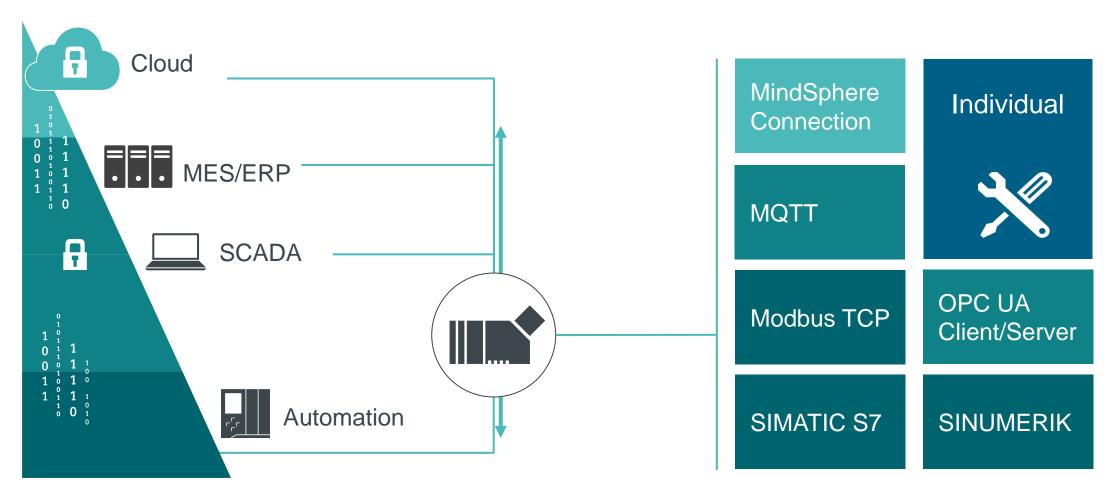
Machine maintenance statistic, spare part purchasing



Machine operation monitoring

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

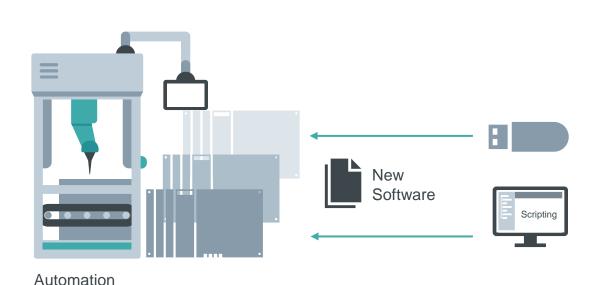






How can devices be centrally managed and updated company-wide?





Applications



Reduce time for software updates and save labor costs





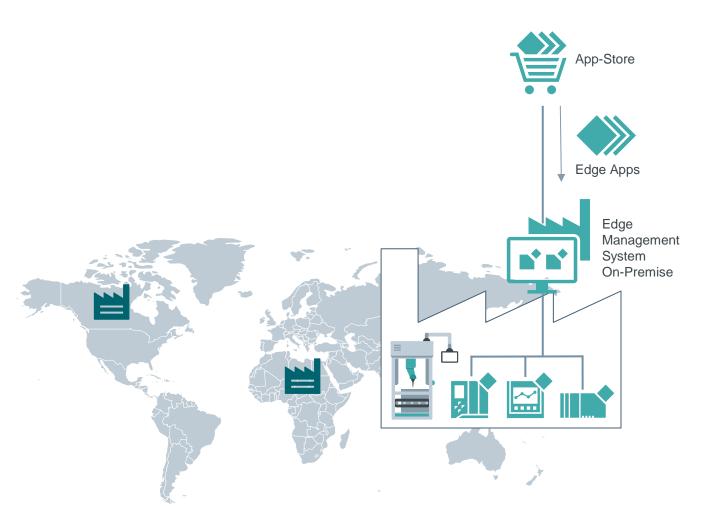
Centrally manage software for globally distributed manufacturing sites



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







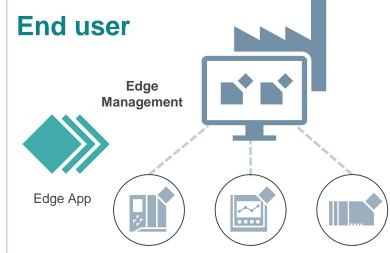












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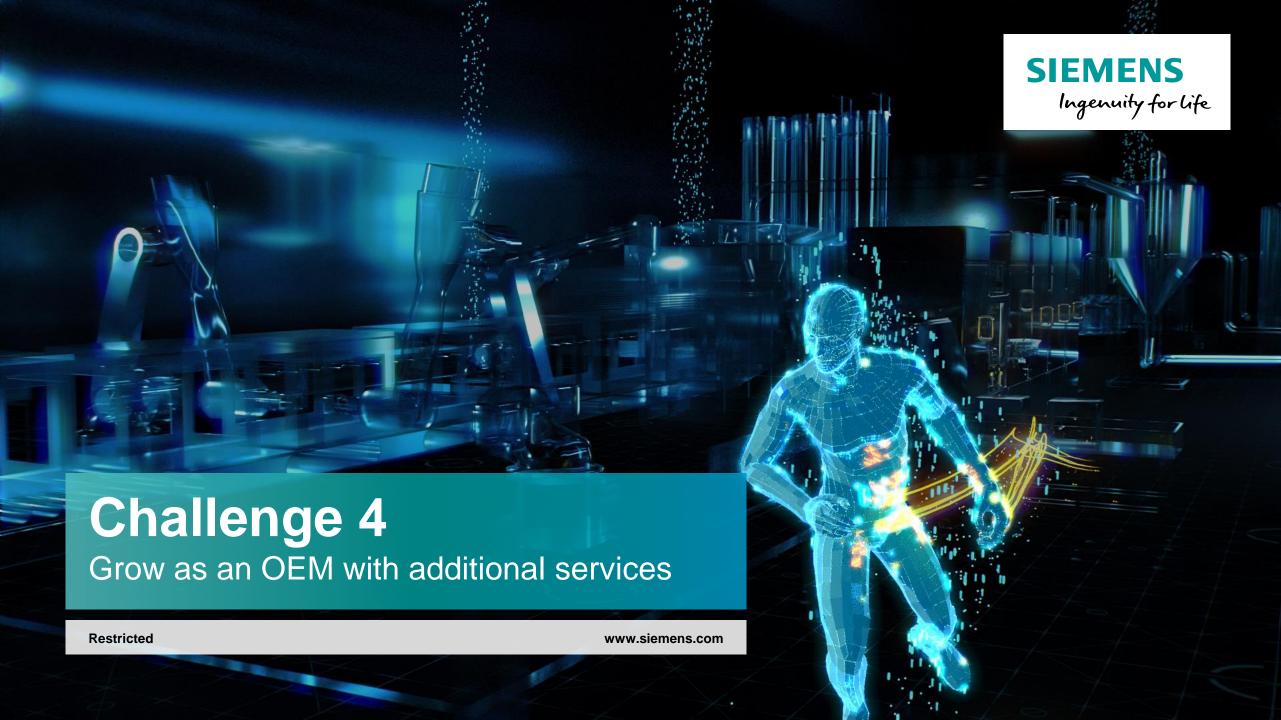


Content Using Node-Red to make edge Apps

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



Live demo: Node-Red Environment



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



Applications

Powerful industry solutions with advanced analytics





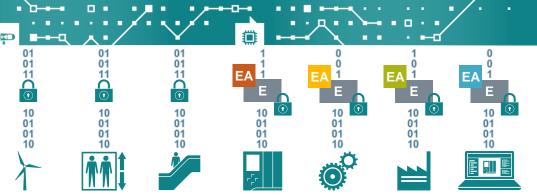
Open PaaS

Develop robust industrial IoT solutions faster with global scalability

Connectivity

Connect products, plants, systems, machines and enterprise applications

MindSphere



Edge Management

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

Edge Apps

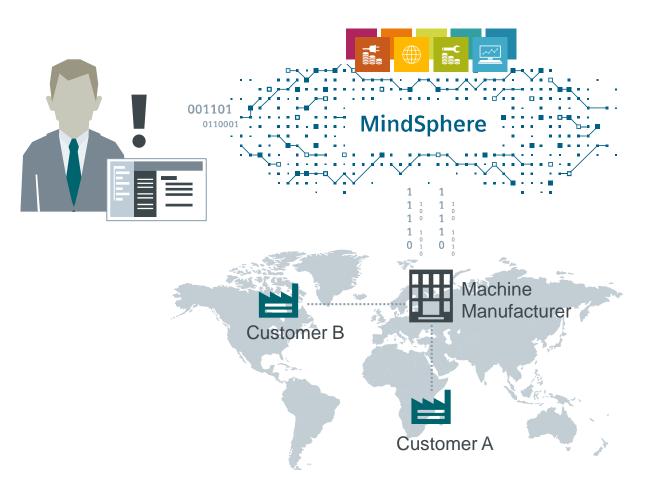
Data processing and connectivity applications

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



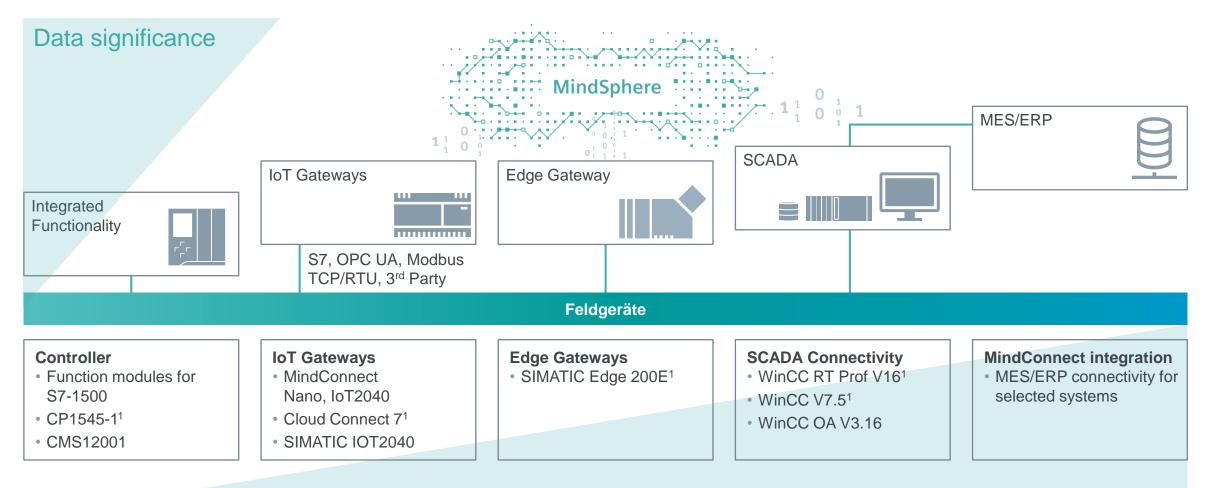
Optimization of machines with benchmarking and learnings from data

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MindSphere offers various options to connect automation

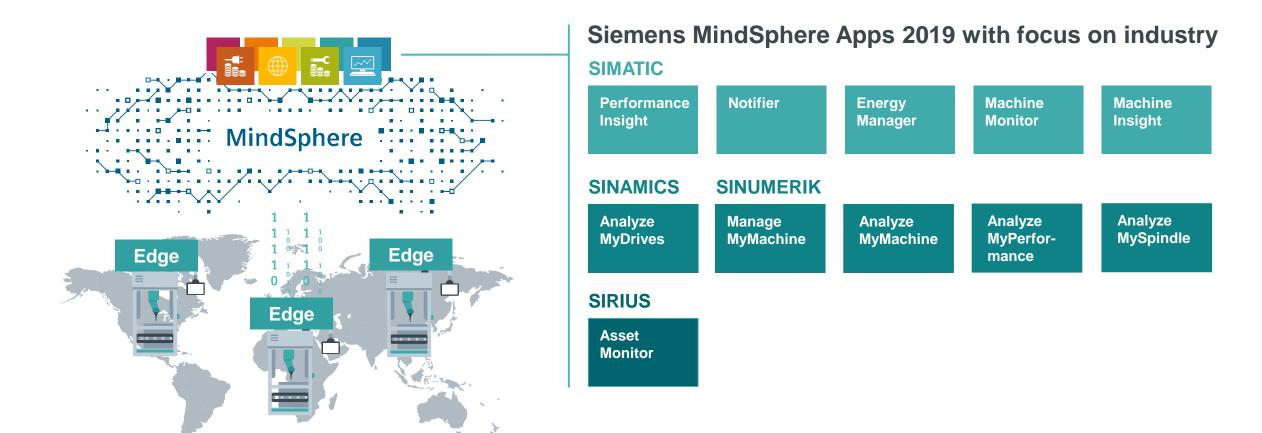




IT Know-How and IT infrastructure of the company

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





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 ITbased data analyses in automation

With SIMATIC and Edge your customers are prepared for Industry 4.0



Challenge 2

Integrate data companywide

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 databased services

Edge and Cloud strengthen you against your competition



Q&A



Digitalization Changes everything

Digitalization Changes everything

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



Speed



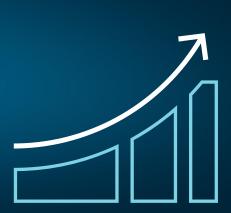
Quality

Efficiency









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

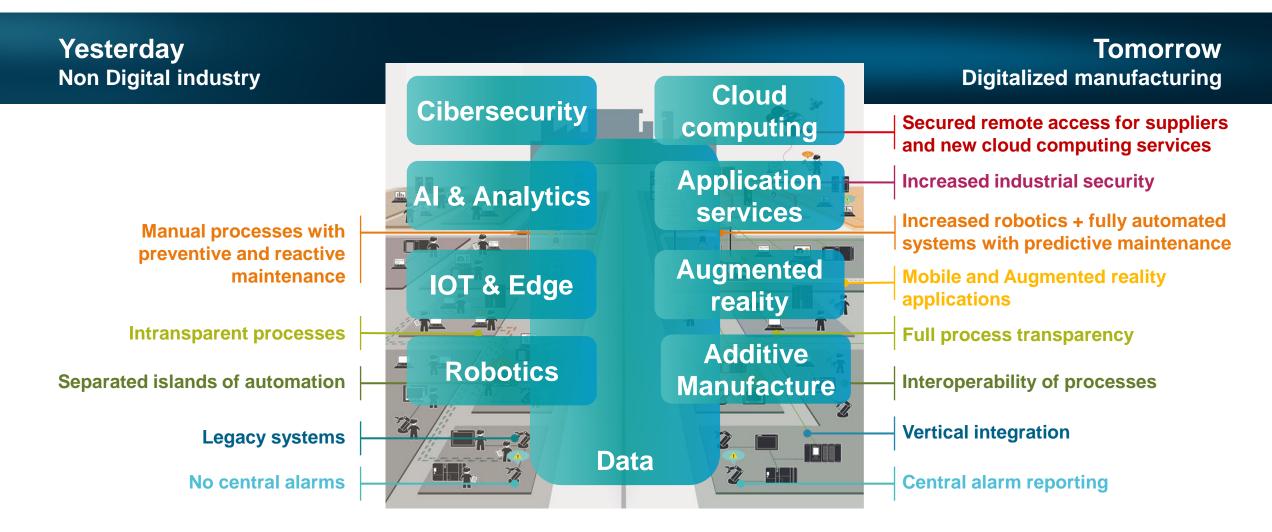


New Business Models - For continuous monitoring and optimization of complete value chain



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





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



Digital Age Business

From Business Inteligence

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

...to Operation Inteligence

- 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

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But how do we implement this change?

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





SIMATIC

Scalable industrial automation systems



SINAMICS

Frequency converter for every drive application



SINUMERIK

Intelligent solutions for machine tools



SIMOTICS

Highly efficient electric motors



SIMATIC PCS 7 SIMOTION

Powerful, compact hardware for process industries



SIRIUS

Modular industrial controls



High-end motion control system



SCALANCE

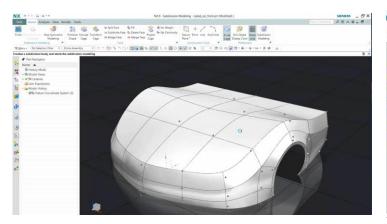
Reliable industrial communication

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







MindSphere

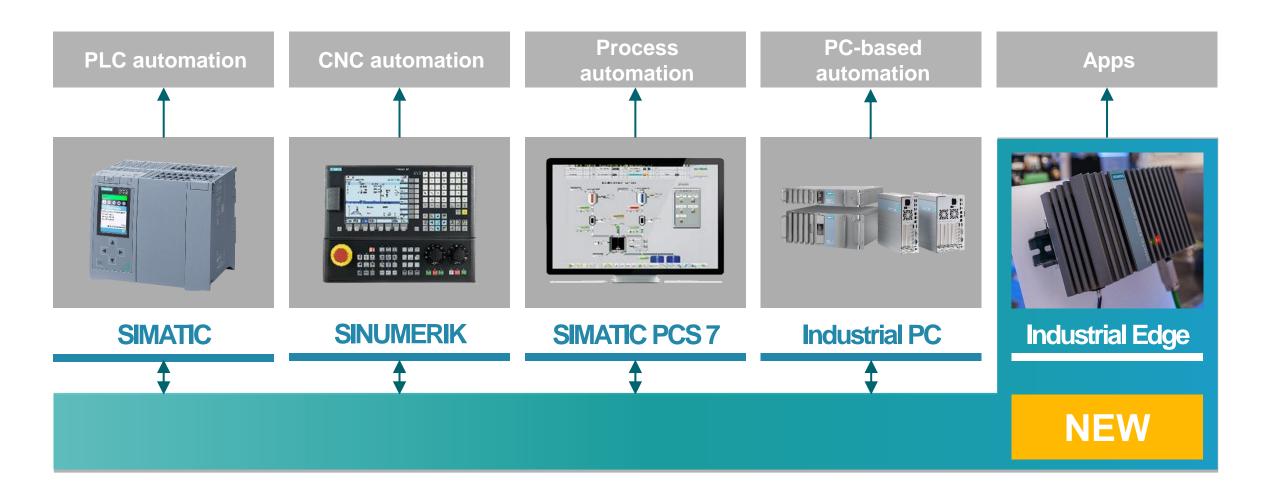
NX CAD	Teamcenter	NX Line Designer/MCD/	Simatic IT	MindSphere Apps
Polarion	Manufacturing	Automation Designer	Camstar	Digital Lifecycle Service
Simcenter	NX CAM / Additive	Simit	WinCC/SCADA	Asset Performance Suite
Mentor Xpedition	Tecnomatix	TIA Portal	CNC Shop floor Mgt SW	
Mentor Capital	Mentor Valor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

Teamcenter, COMOS, XHQ, PlantSight

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Our HW is now enhanced by Edge functionality





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



Applications

Powerful industry solutions with advanced analytics





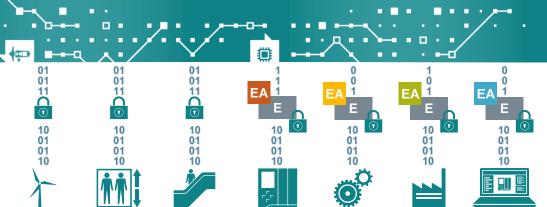
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Edge Management

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

Edge Apps

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

Edge Devices

Secure, future-proof basis for running Industrial Edge applications



iExperience Center 4.0, our solution to support the change

Industry 4.0 digital transformation hub for universities, partners and customers



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





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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 aproach 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













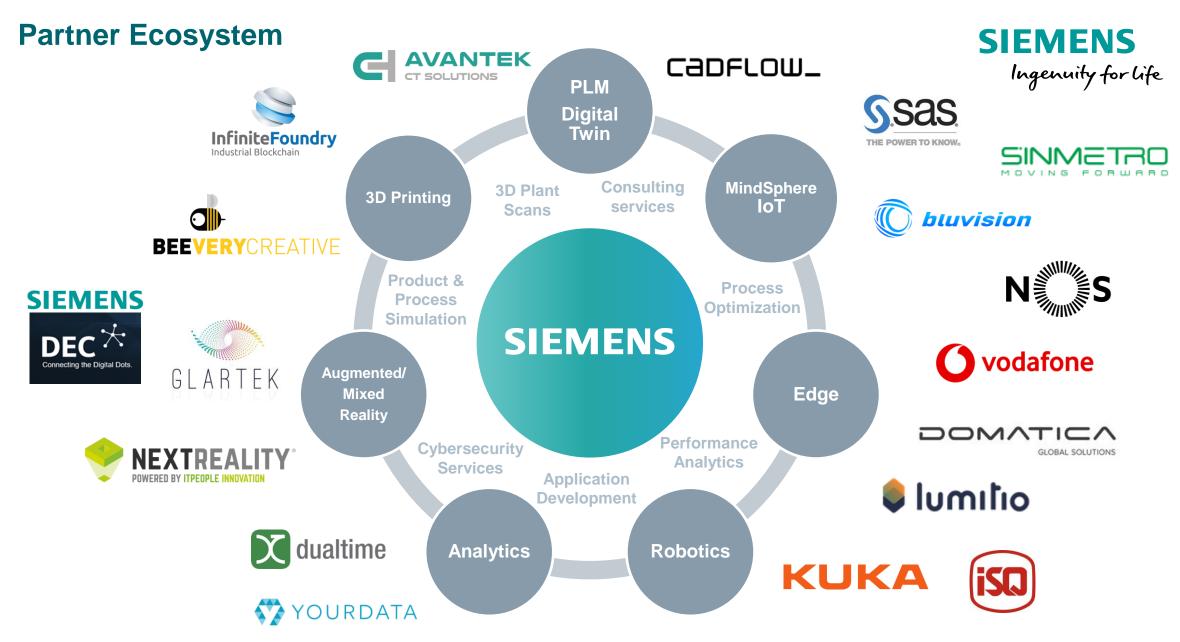












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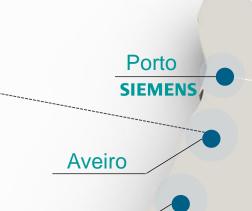
iExperience Center 4.0

Locations





Universidade de Aveiro *



Leiria





Alfragide



Freixieiro



Politécnico Leiria *

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i-Experience Center

Industry

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 highlevel programming languages such as Java



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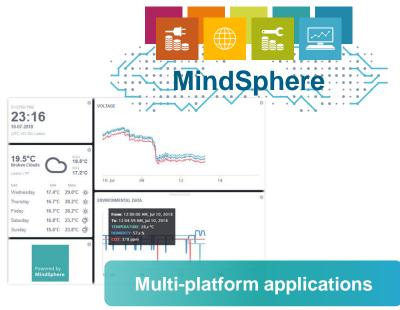
Open source is also gaining room in the industrial arena

Linux

IOT2040 Sensor to Application Edge Gateway









Sensors

Arduino Shields

































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

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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

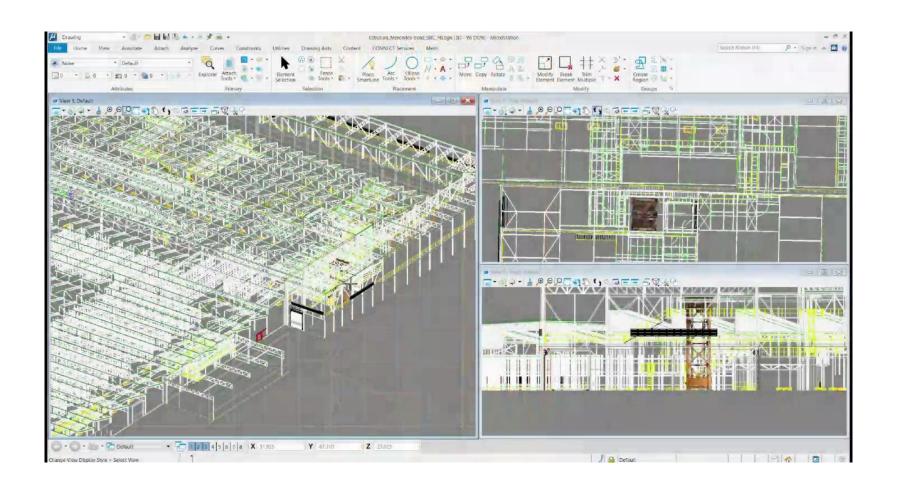


Innovative solutions to go from Real to Digital



Mixer CAD & Render

Mixed post renderized and CAD scenarios

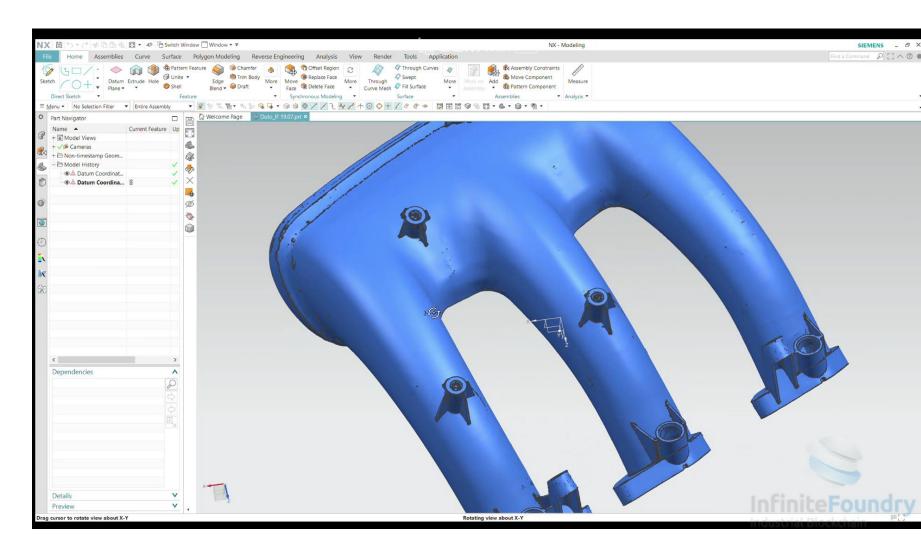


Innovative solutions to go from Real to Digital



PC to CAD

From Point Cloud to CAD drawing



AR to MR solutions to go immersive into applications

Example of Hololens application @iExperienceCenter Alfragide







TxHoloViewer

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





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AR to MR solutions to go immersive into applications Example of Hololens application for maintenance procedure









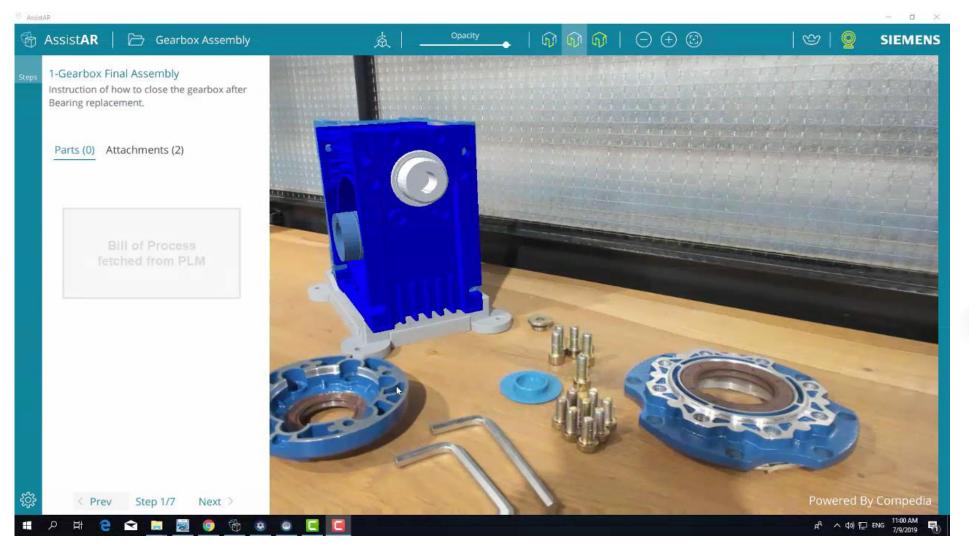


AR to MR solutions to go immersive into applications



SIEMENS
Ingenuity for life

Example of AssistAR application using HR Camera for maintenance operations







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Thank you





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