

# Digital Talk Industry

# iExperience Center 4.0

## Digital Transformation Hub



# iExperience Center 4.0

Industry 4.0 Digital Transformation Hub for Universities Partners and Customers



## Project Scope

- Creation of 3 Digital Demo Centers, at Siemens Alfragide and at University Campus in Leiria and Aveiro.
- All TIA and Digital Enterprise solutions are available for customers, partners and universities to test and validate added value Digital solutions.

### ▪ TIA Solutions

- ✓ TIA Portal, SIRIUS, SIMOCODE, SINAMICS, SIMOTICS, SITOP, SIMATIC, SITRANS, IDENT

### ▪ Secured Connectivity Solutions

- ✓ SCALANCE W, X, S, M

### ▪ IOT Solutions

- ✓ SIMATIC IOT2040

### ▪ PLM CAS Solutions

- ✓ MindConnect IOT2040
- ✓ MindConnect Nano
- ✓ IMindAccess IoT Value Pack

### ▪ PLM Solutions

- ✓ SolidEdge
- ✓ TecnoMatix
- ✓ TeamCenter





# Digitalization changes everything

The next trillion dollars will be earned with data – for our customers and for our industries.

*Michael Dell, founder of Dell Inc.*

Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000.

*Pierre Nanterme, CEO Accenture*

The only way producers can meet the essential market and customer requirements is through...

**SIEMENS**  
*Ingenuity for life*

Speed



Flexibility



Quality



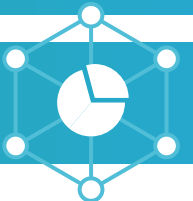
Efficiency



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



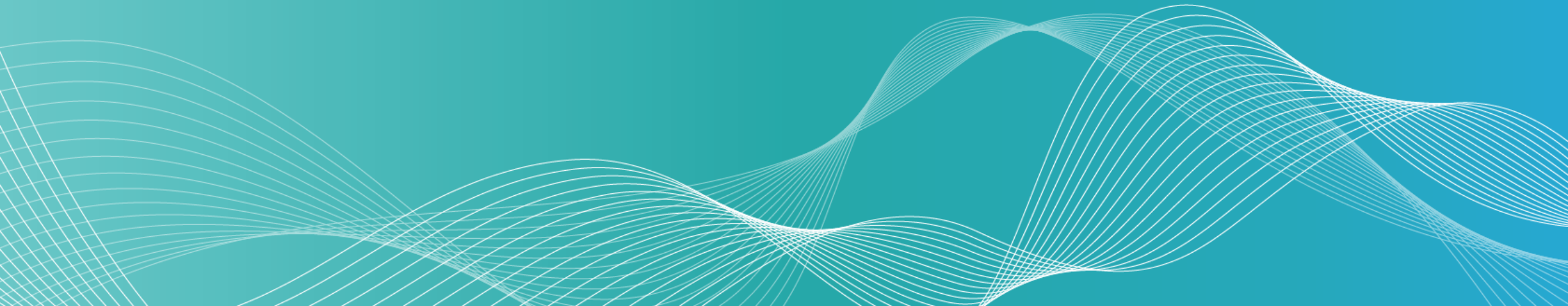
**New Business Models** - For continuous monitoring and optimization of complete value chain



# How can Siemens support the change required for it's Customers

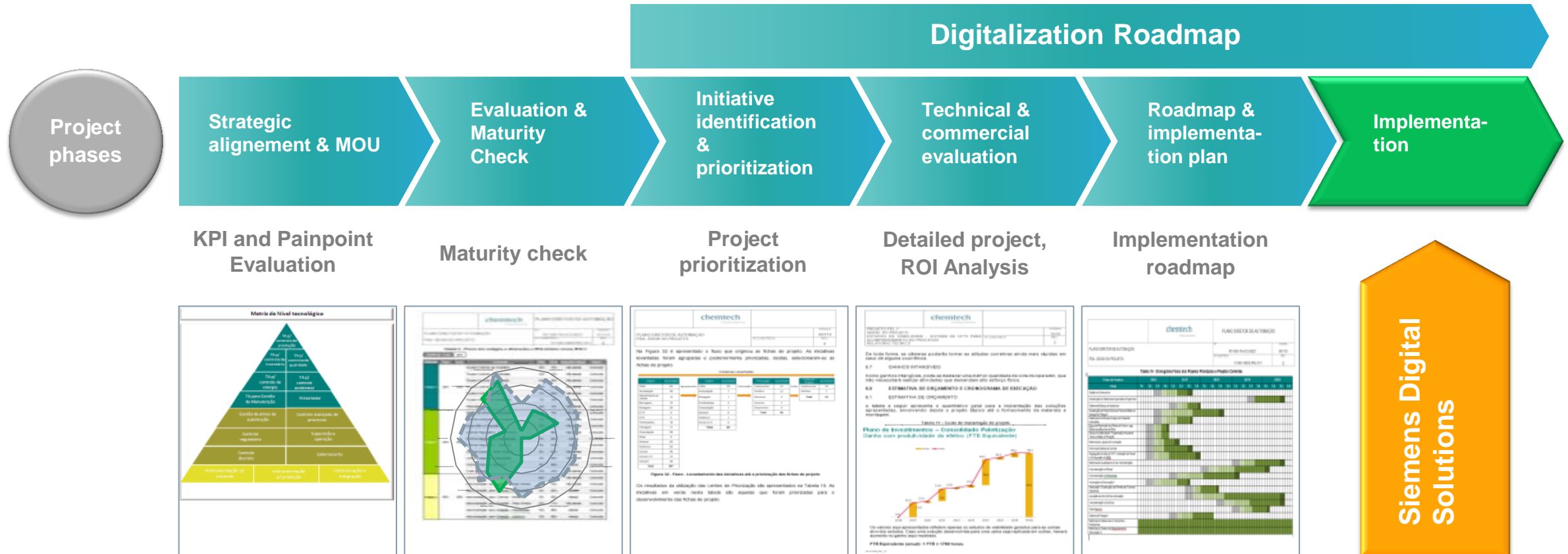


# Holistic Approach



# The roadmap to Digitalization

## A Holistic Approach





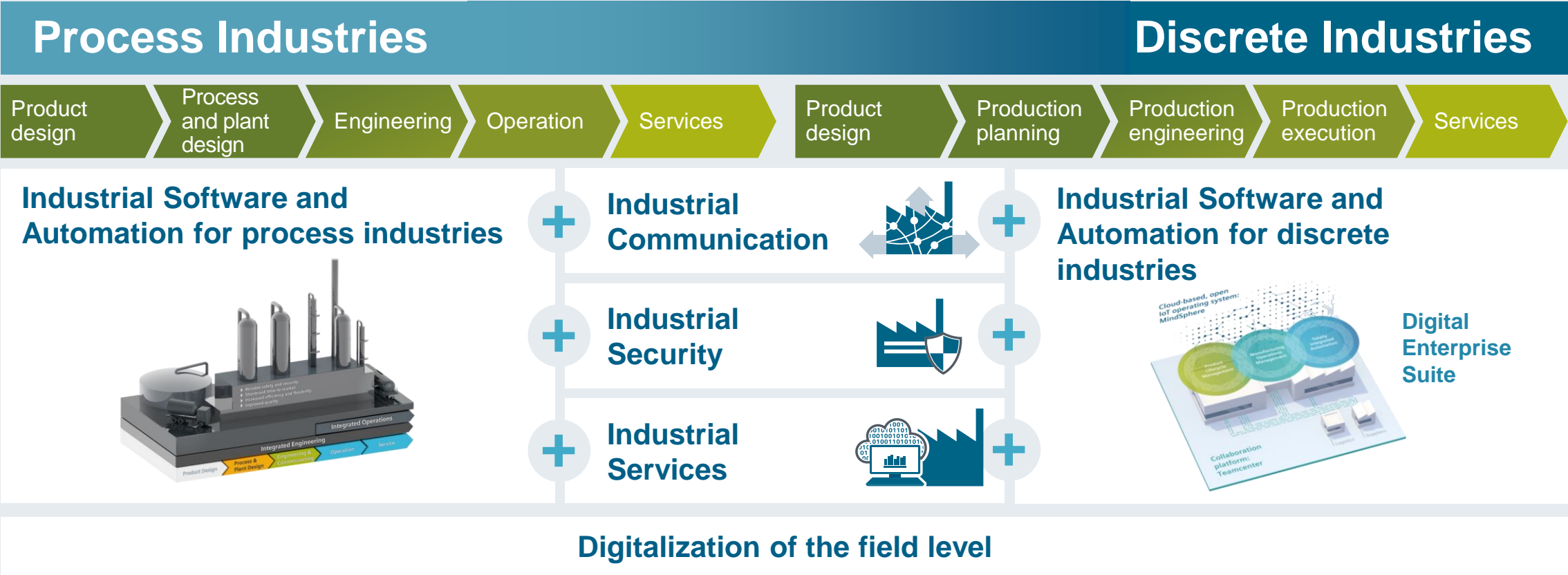
# Digital Enterprise Concept

Abstract white wavy lines on a teal background, creating a sense of motion and digital connectivity.

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



# Digital Enterprise



# Digital Twin

## Discrete Industries



# The most holistic Digital Twin



Design, simulate and verify products digitally, including mechanics and multi-physics, electronics and management of software

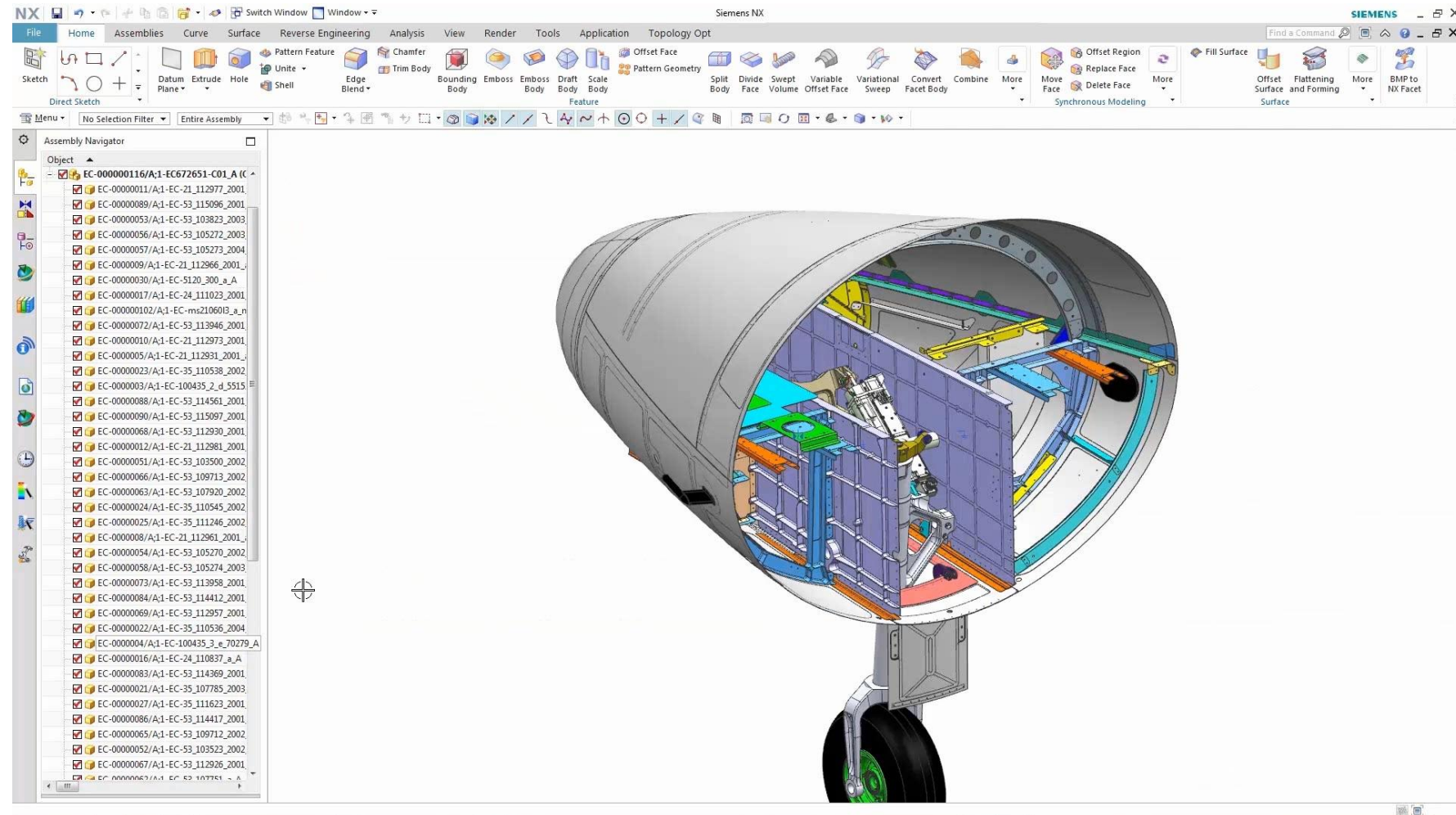


# Digital Twin Product



Design and  
simulate the  
product

NX and Simcenter



Simulate  
the physical  
behavior

Simcenter



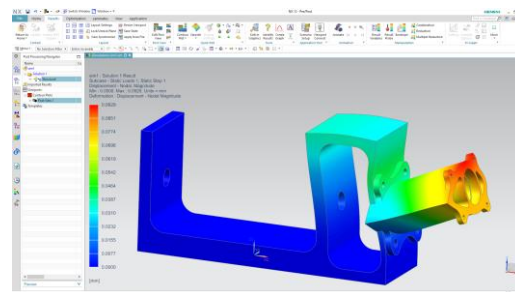
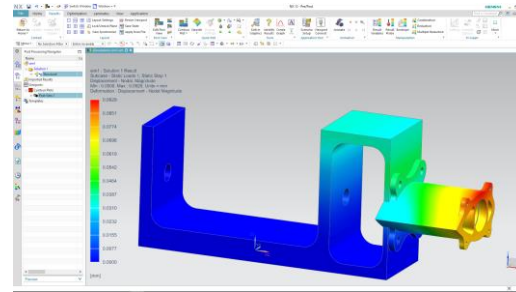
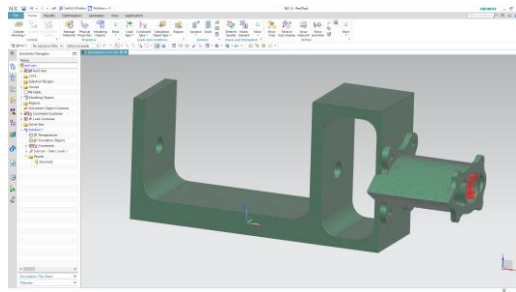
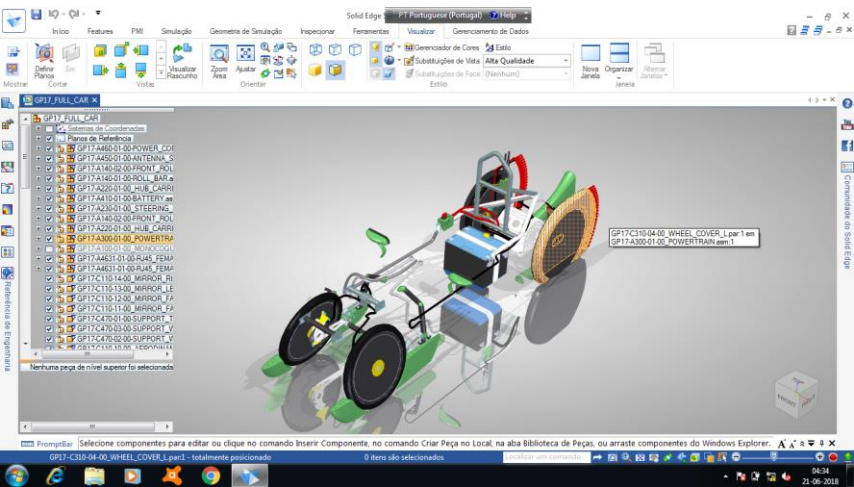
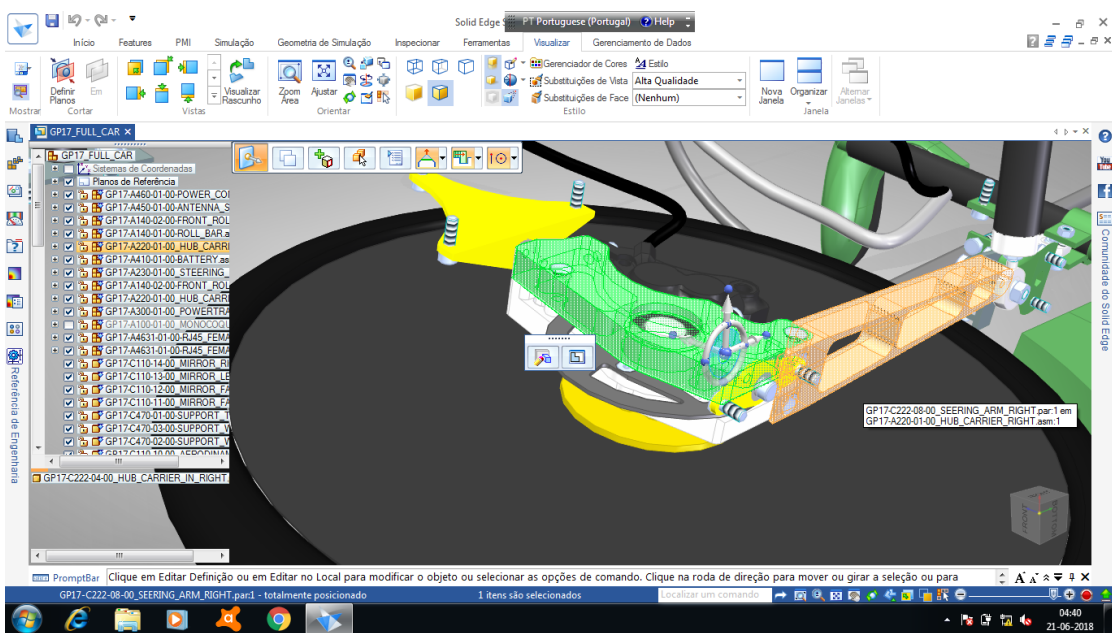
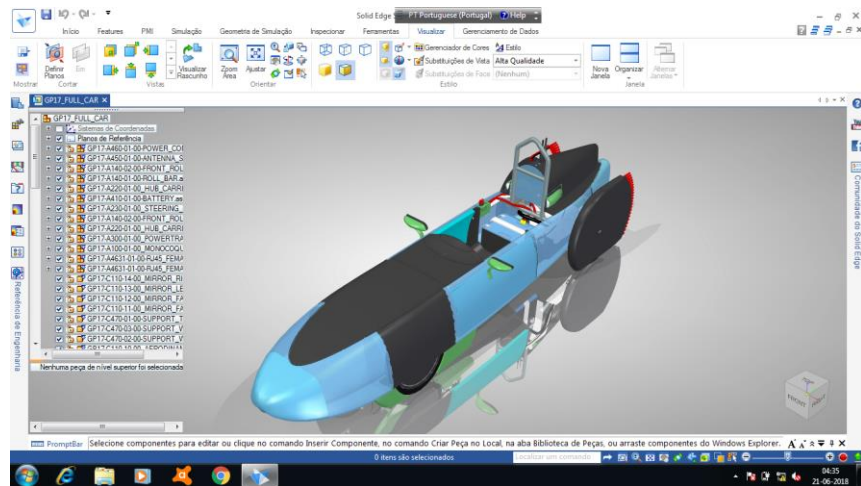




# Digital Twin Product

## PSEM Use Case

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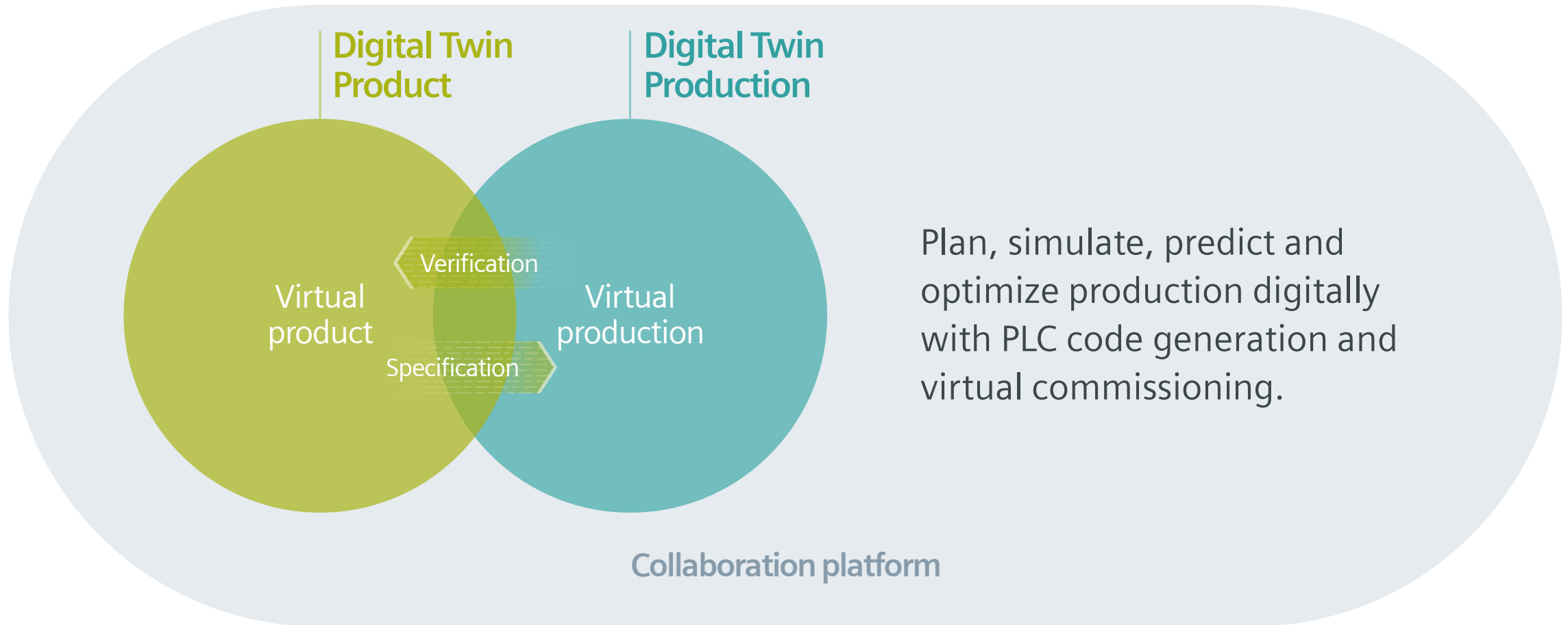


**SOLID EDGE**

PLM Software  
**SIEMENS**  
**NX**



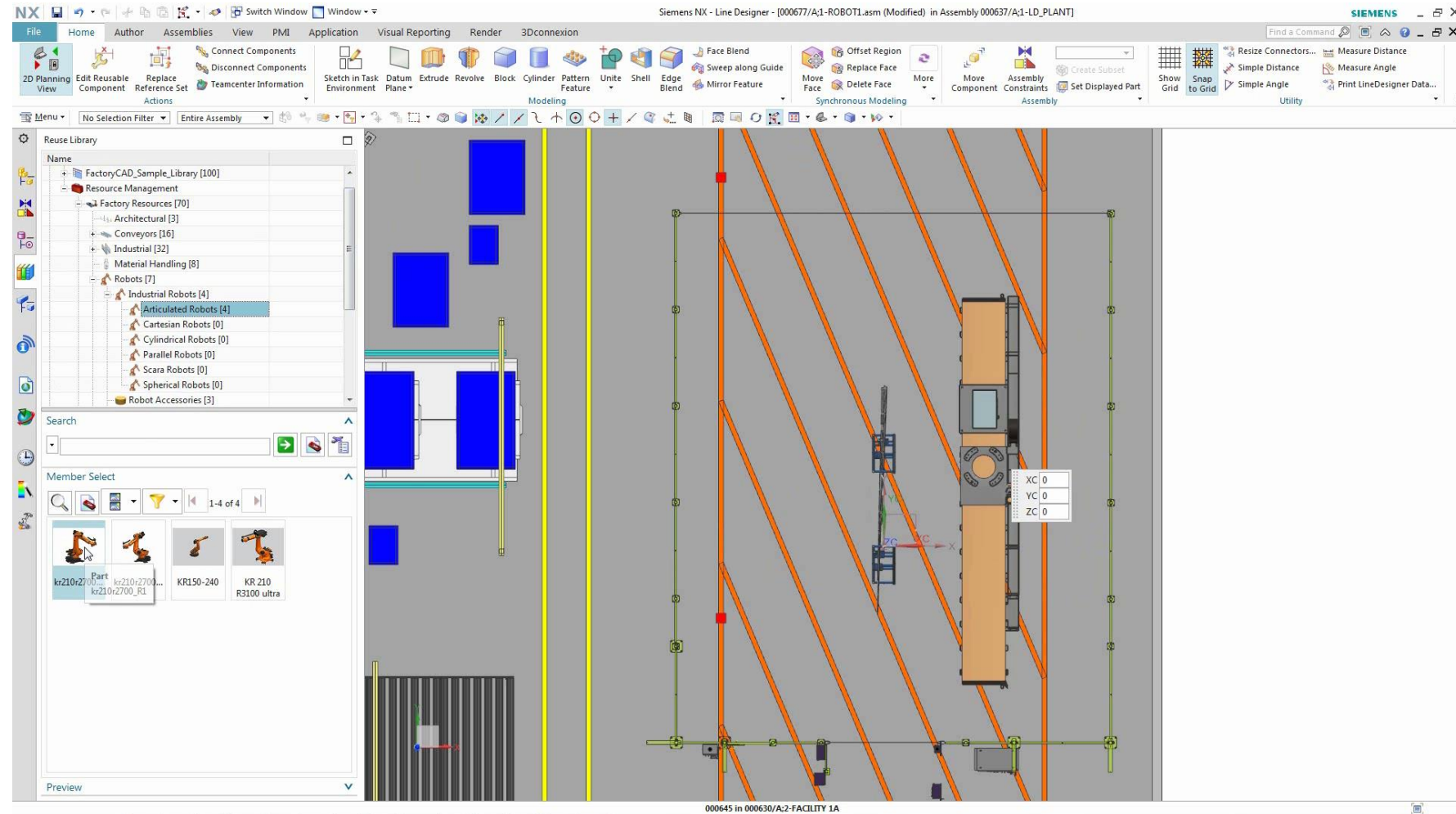
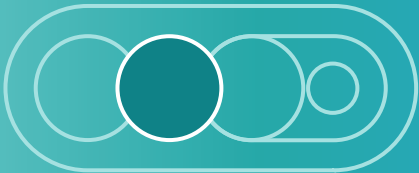
# The most holistic Digital Twin



# Digital Twin Production



Create the  
layout and  
select the  
equipment  
Line Designer

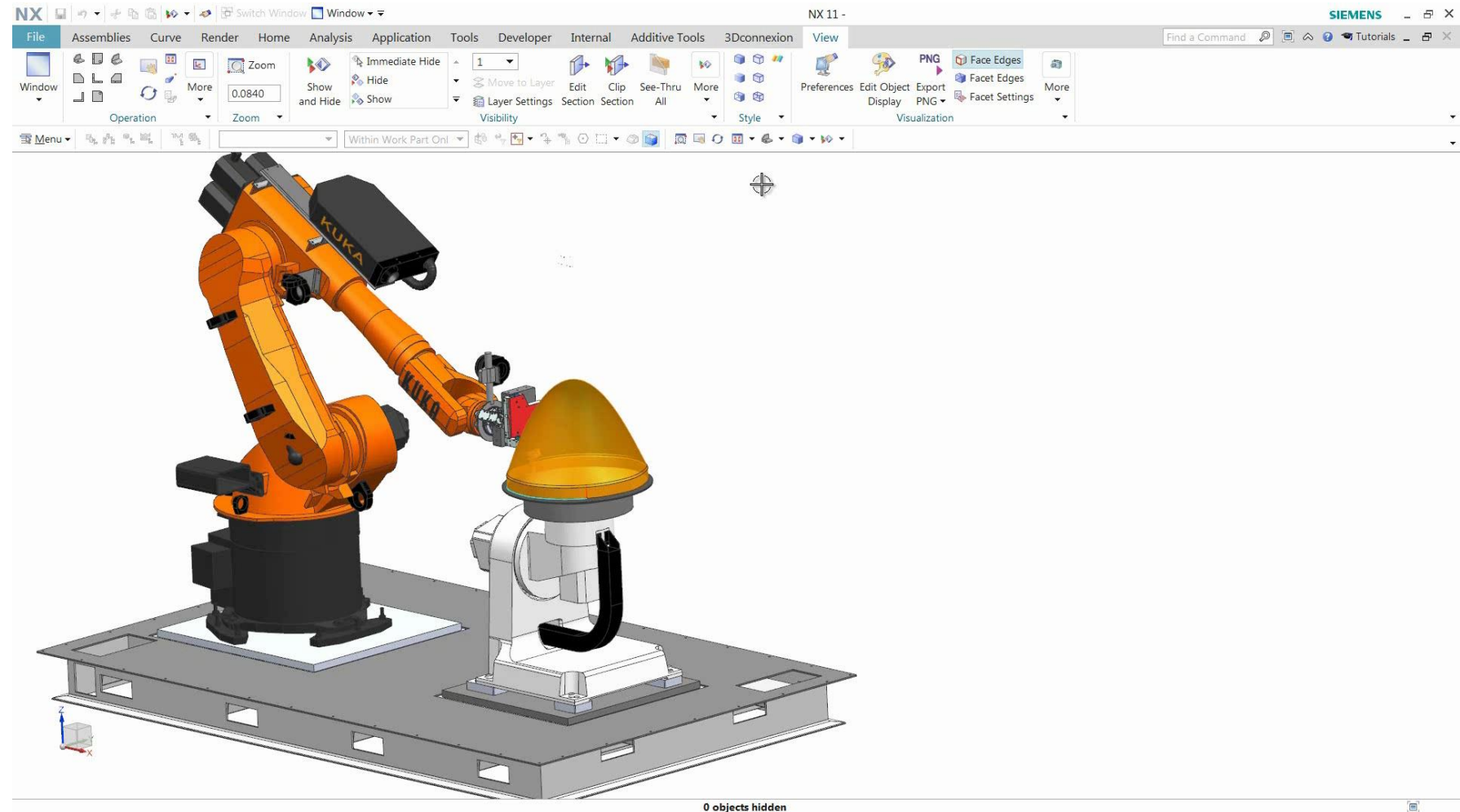
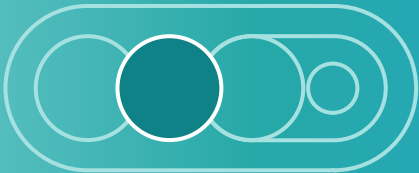


# Digital Twin Production



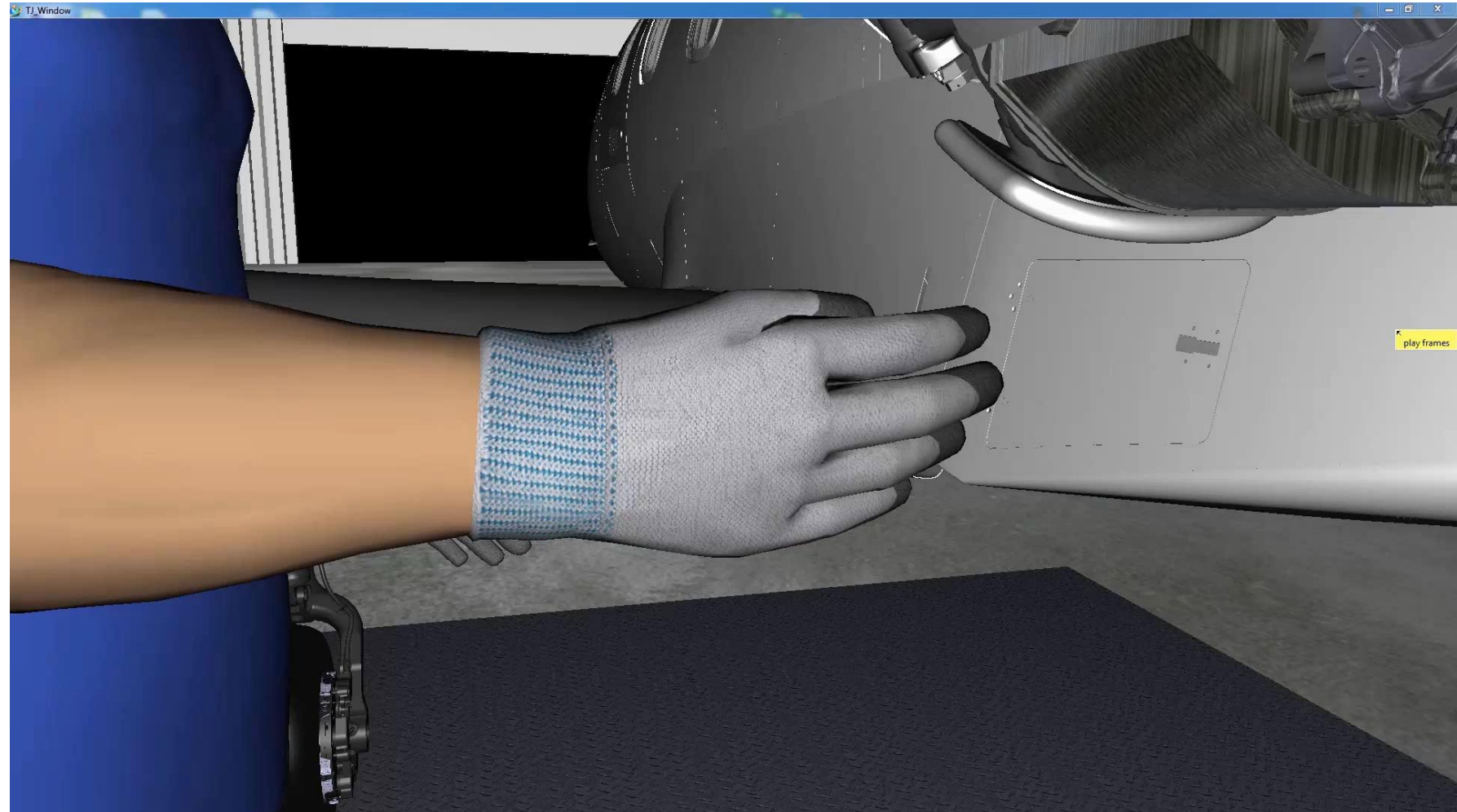
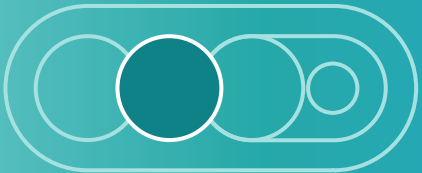
## Simulate revolutionary designs with Additive Manufacturing

NX CAM Robotics and Multi-axis deposition



Simulate  
working  
conditions  
for humans

Tecnomatix  
Process Simulate



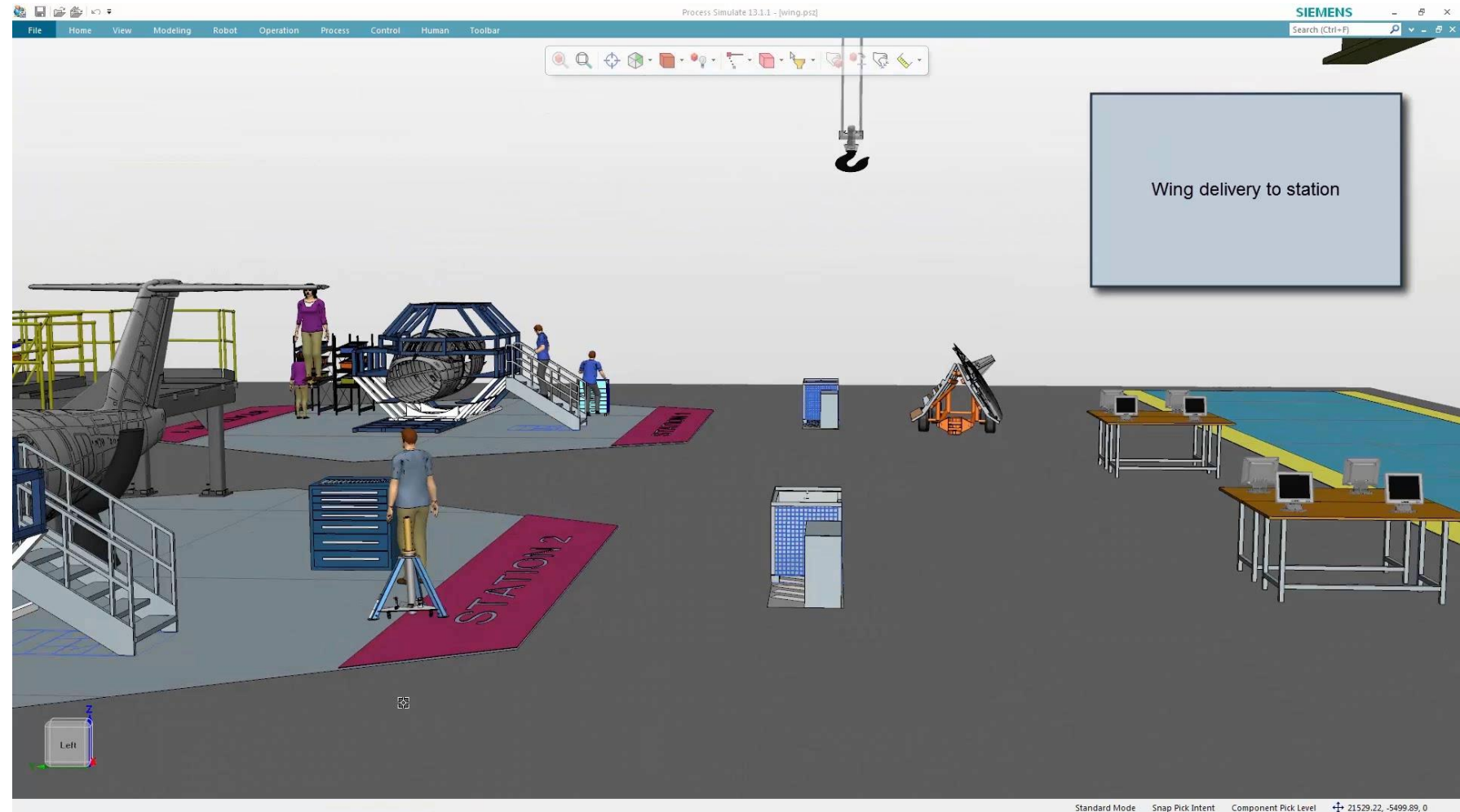
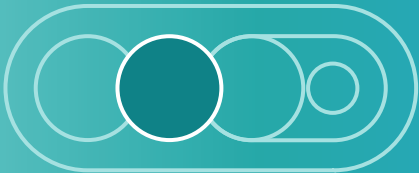


# Digital Twin Production



Simulate and  
optimize  
manufacturing  
assembly  
processes

Tecnomatix  
Process Simulate,  
Teamcenter

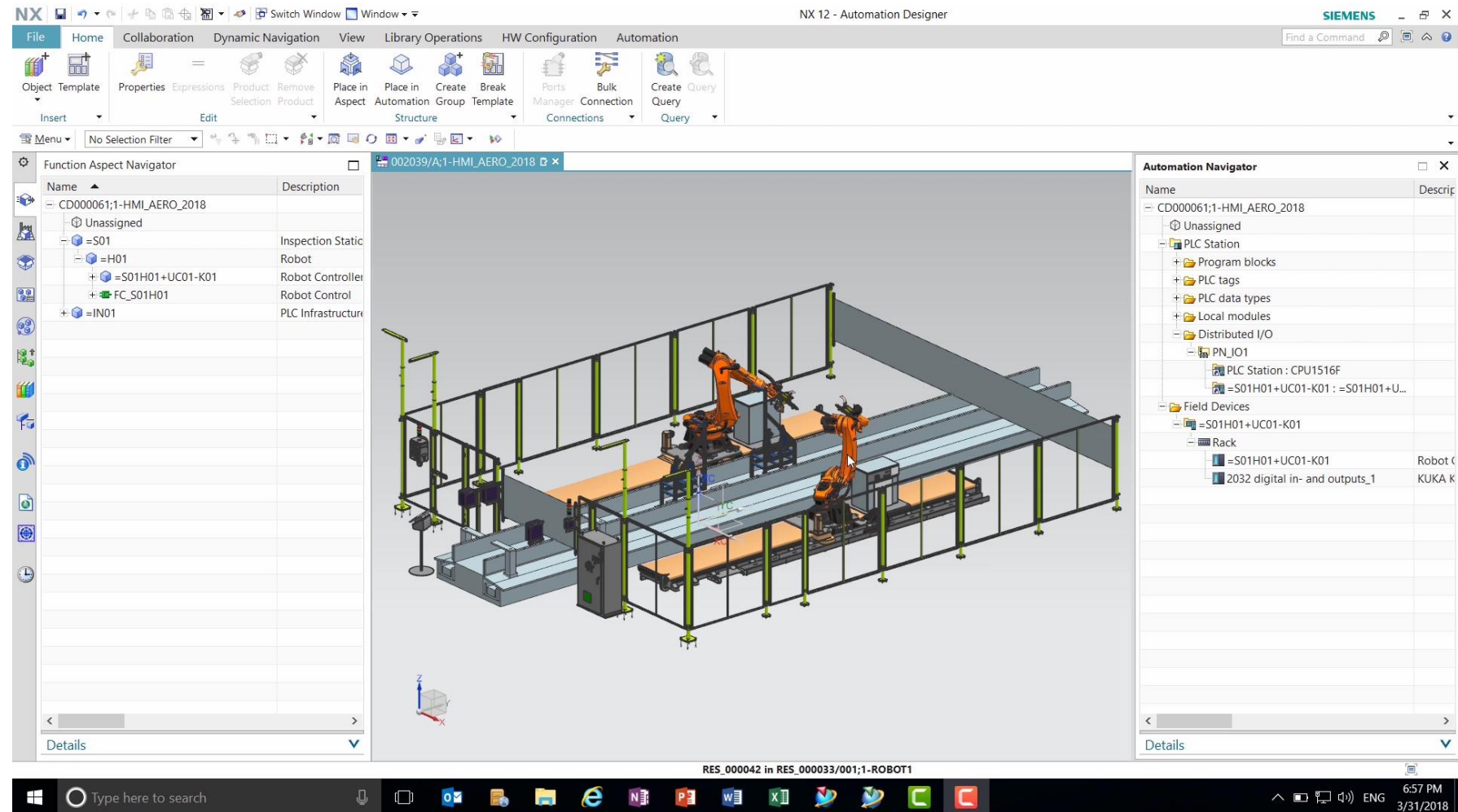
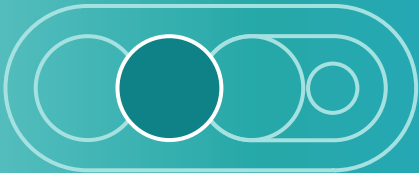


# Digital Twin Production



Generate the  
PLC code in  
collaborative  
automation  
design

Automation Designer

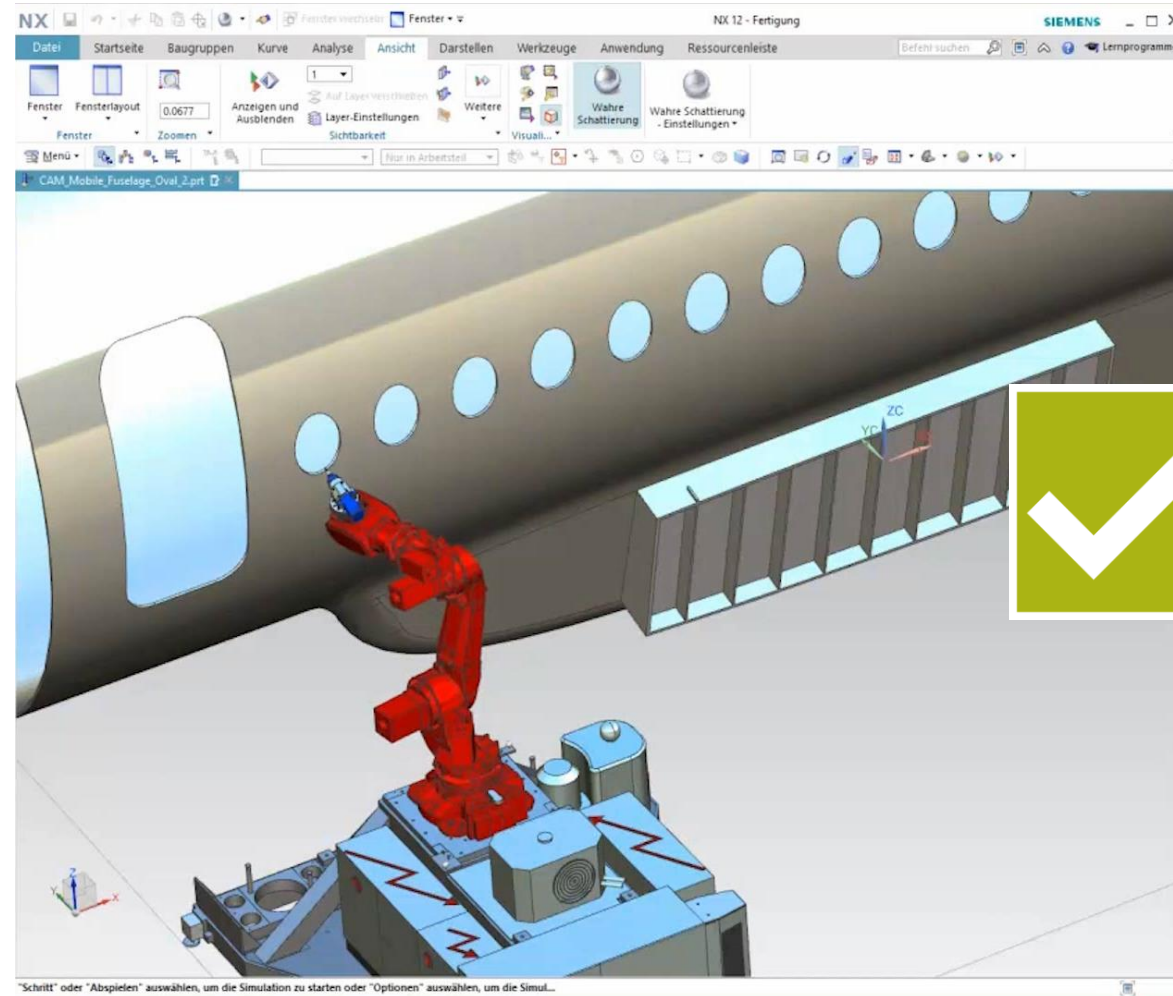


# Digital Twin Production

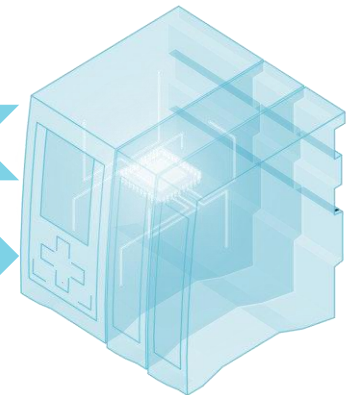
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Validate the  
automation  
code in the  
virtual world

Mechatronics Concept  
Designer, SIMIT,  
PLCSIM Advanced,  
TIA Portal

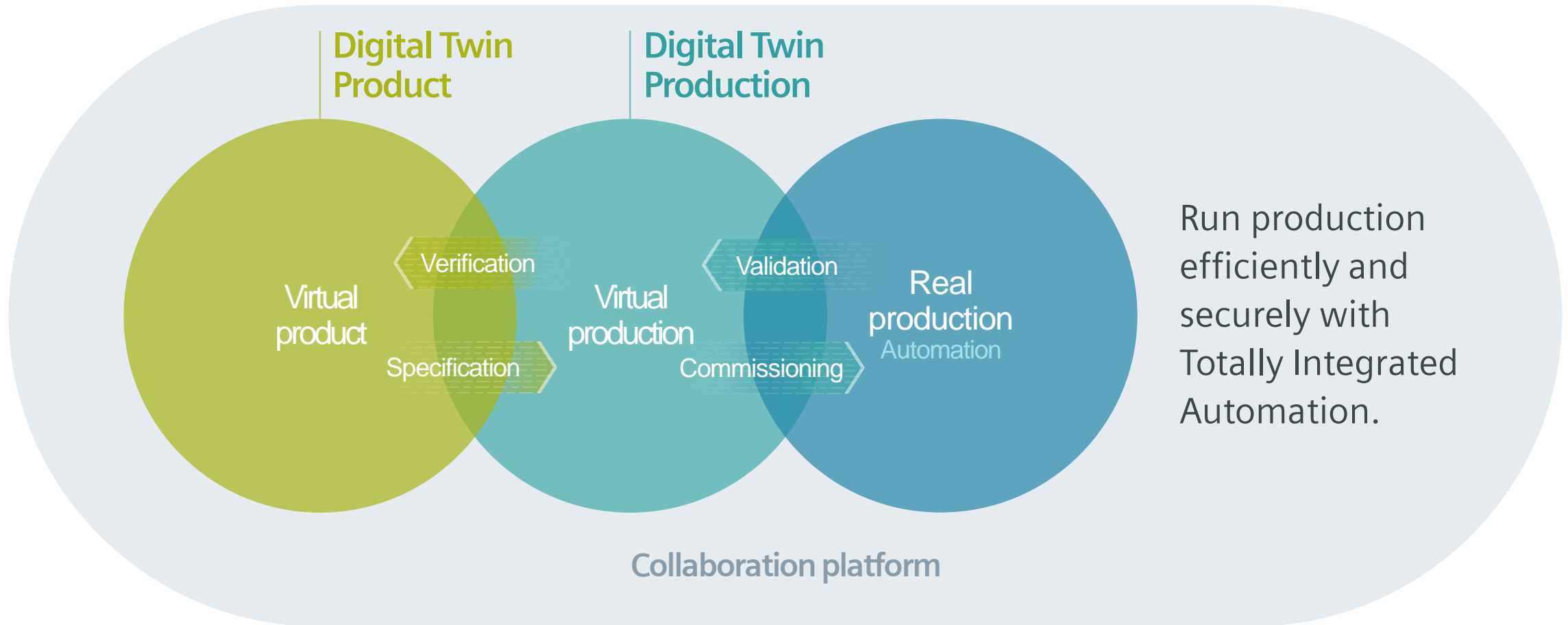


SINUMERIK 840D sl



Digital Twin of  
SIMATIC S7-1500

# The most holistic Digital Twin

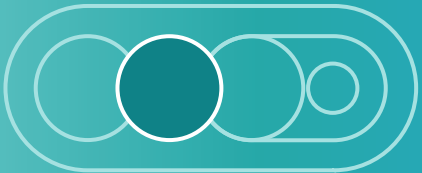




# Real Production

Fast and  
efficient  
engineering  
and  
commissioning

Totally Integrated  
Automation Portal



**SIEMENS**  
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SINUMERIK 840D sl



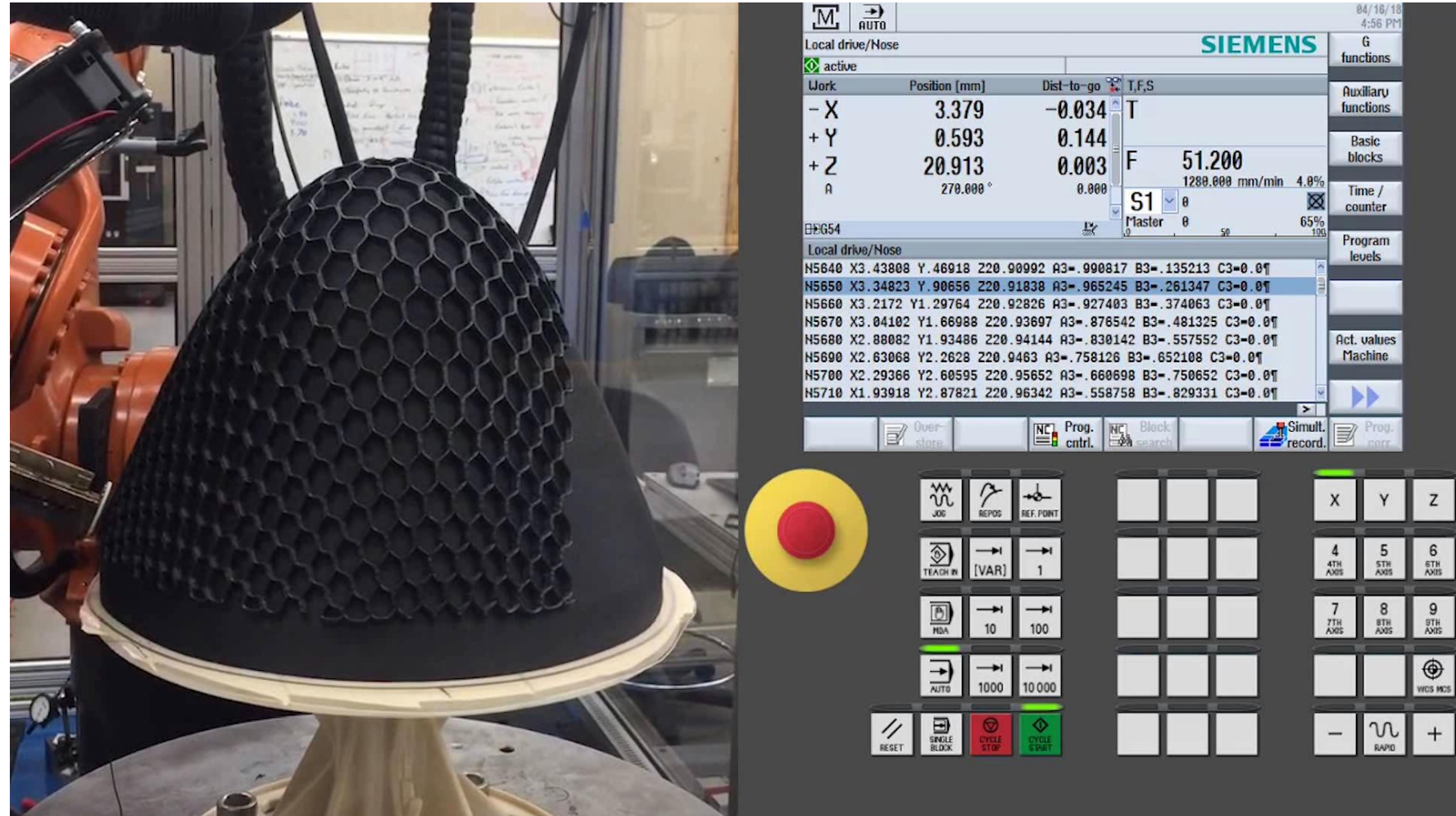
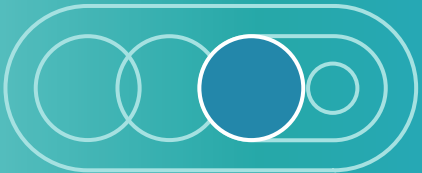
SIMATIC S7-1500

# Real Production

**SIEMENS**  
*Ingenuity for life*

Realize  
revolutionary  
designs with  
Additive  
Manufacturing

Robot control with  
SINUMERIK and SIMATIC

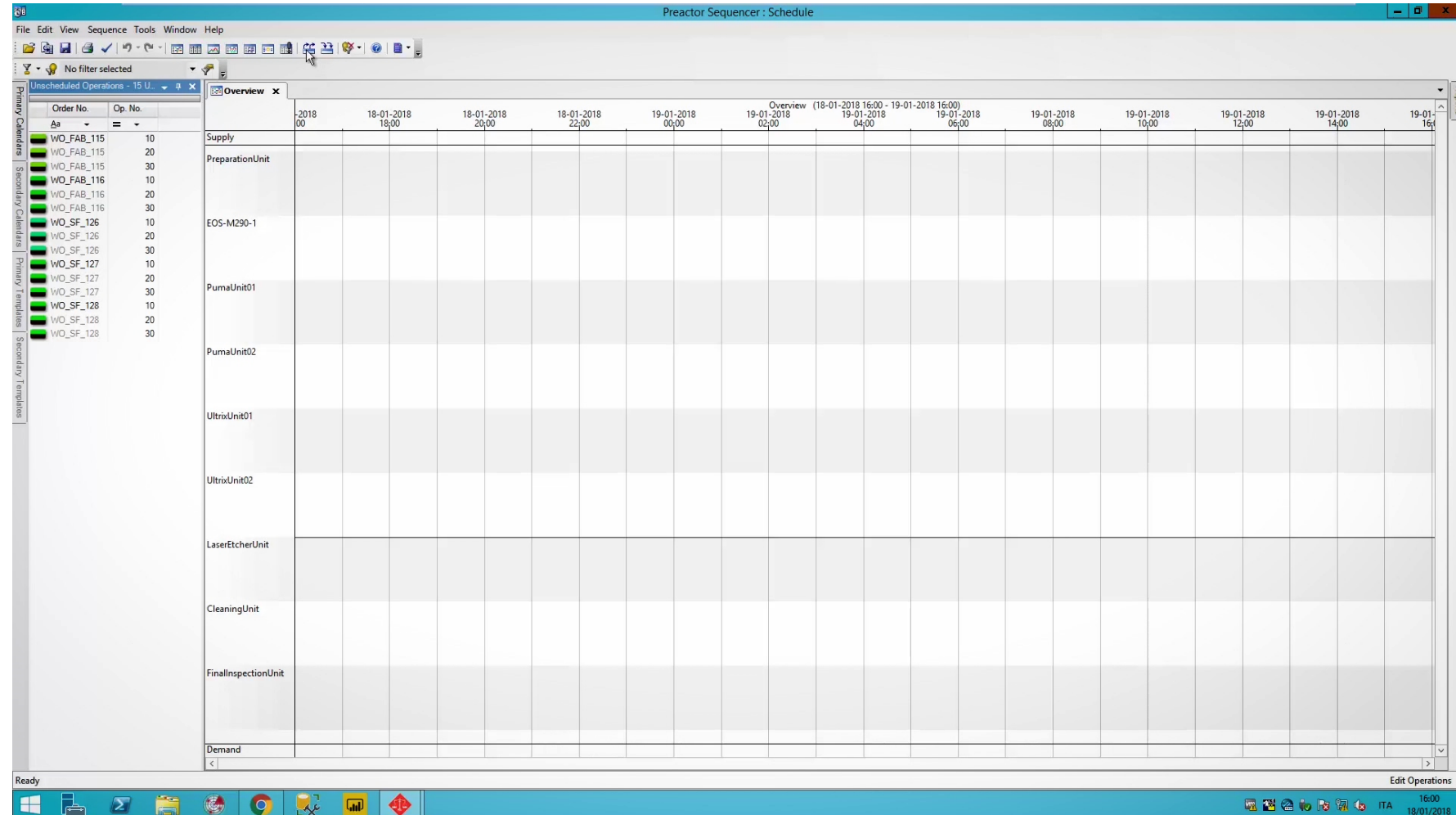
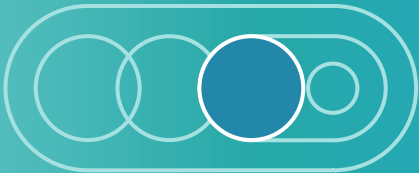


# Real Production

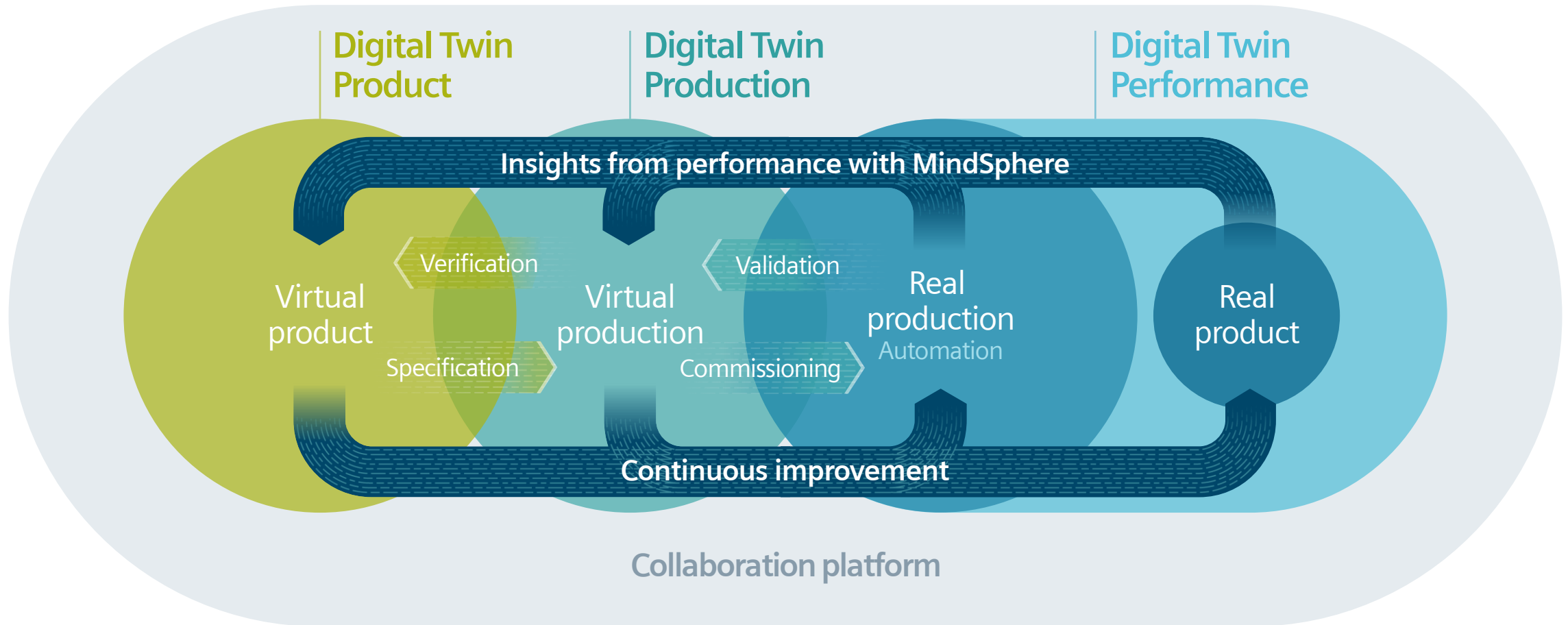


Schedule and  
execute work  
operations and quality  
inspections

SIMATIC IT Preactor,  
SIMATIC IT Unified  
Architecture



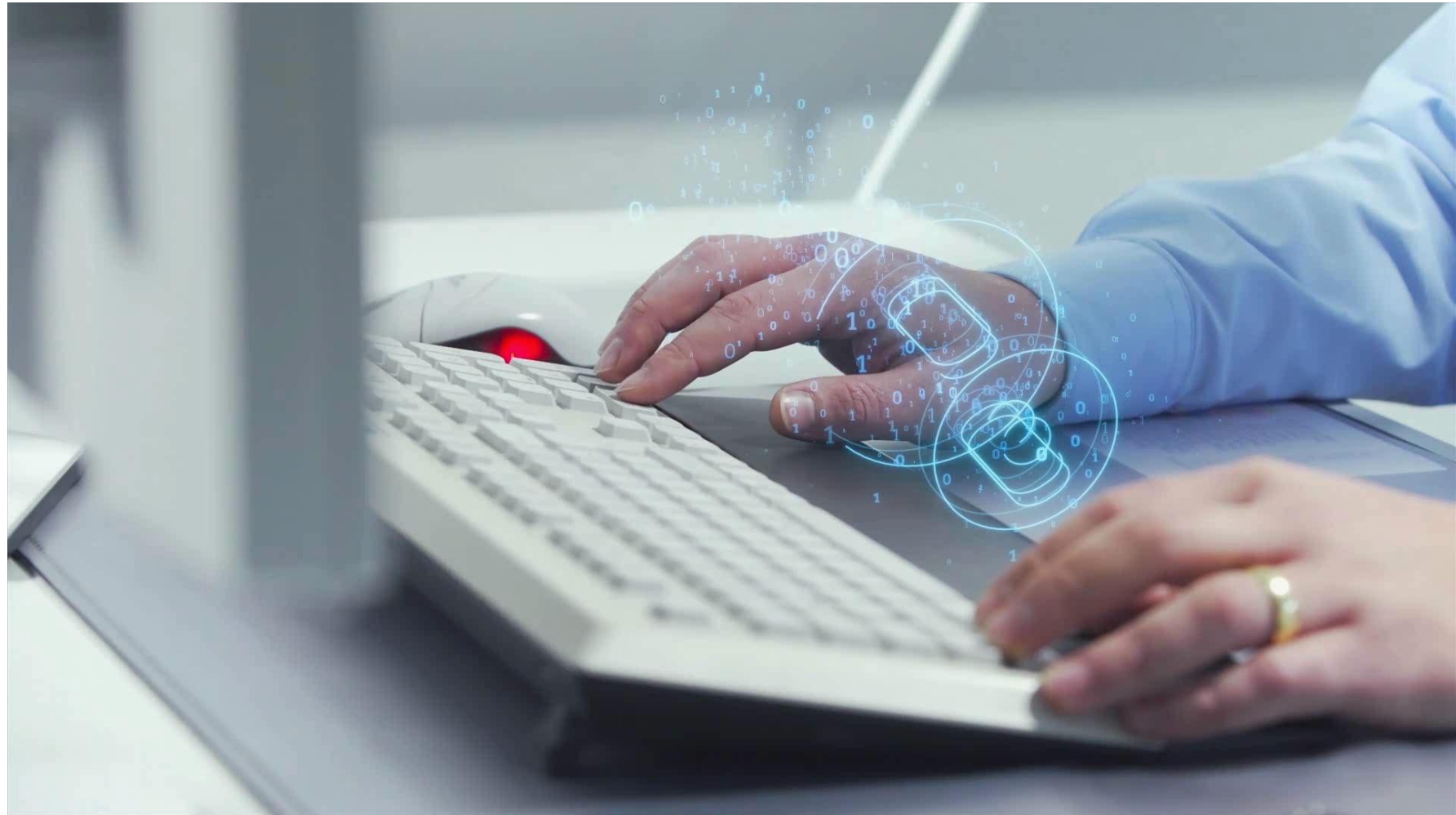
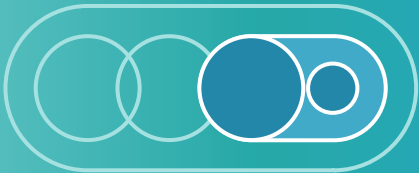
# Feed back insights to optimize the Digital Twin of product and production in real world





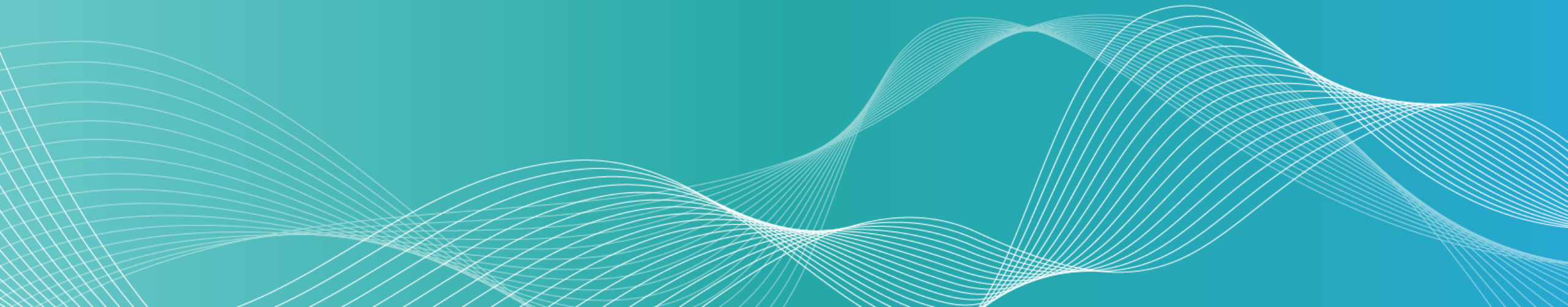
Monitoring of  
all machines –  
everywhere  
and anytime

Manage MyMachines  
based on MindSphere



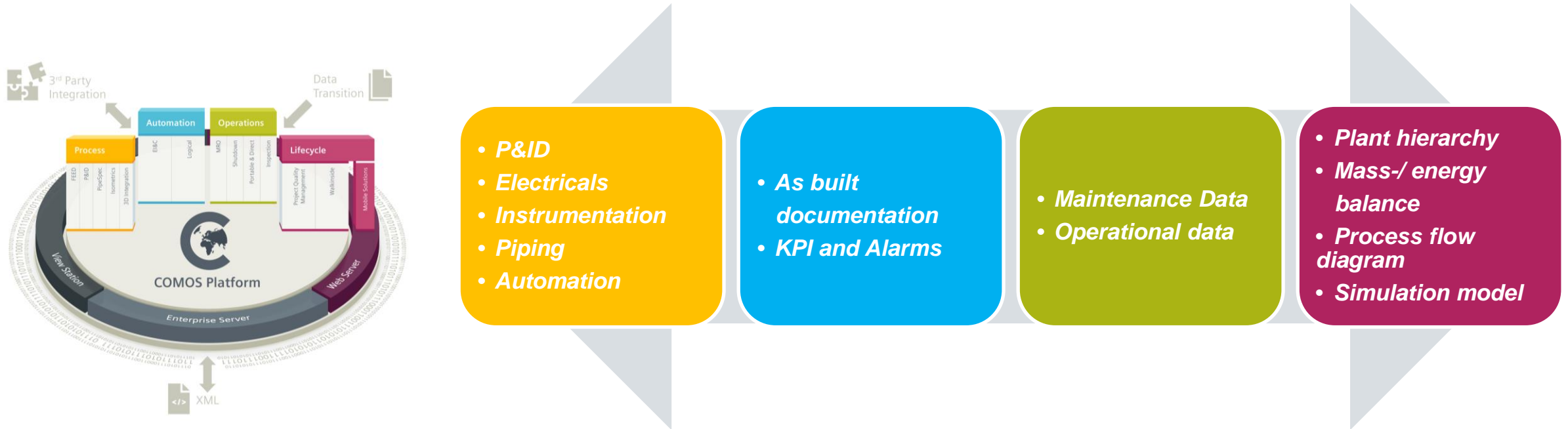
# Digital Twin

## Process Industries



# COMOS collaboration platform provides a common data model to maximize the productivity for the entire plant lifecycle

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Product  
design

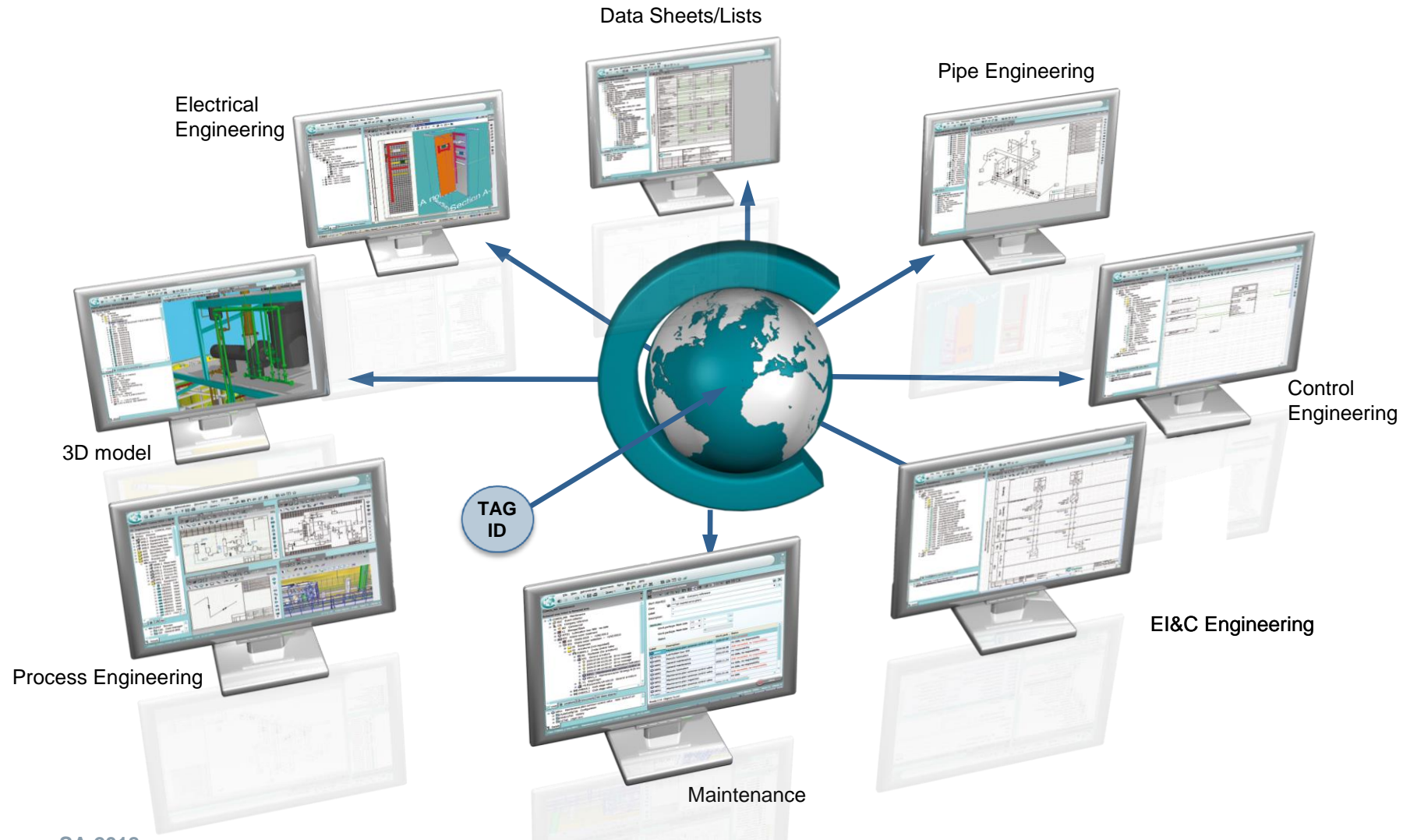
Process &  
plant design

Engineering &  
comissioning

Operation

Services

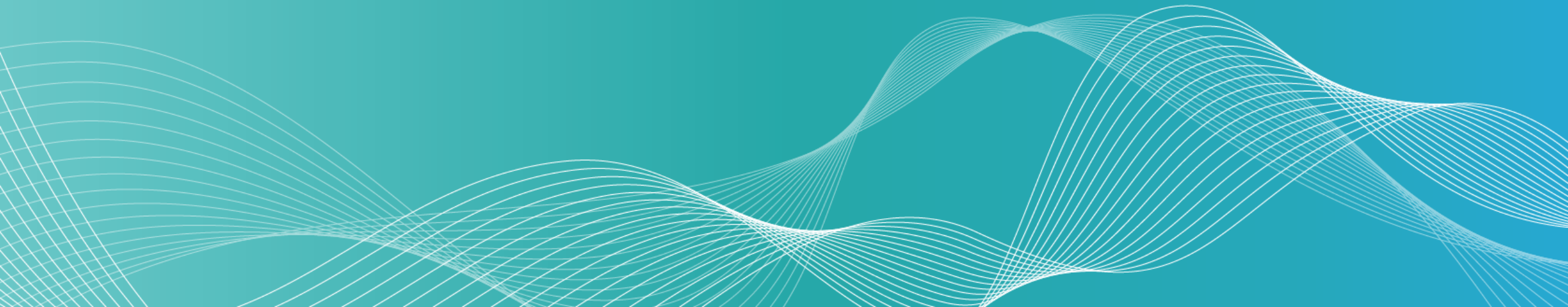
# Harmonized synchronization for all process data sources

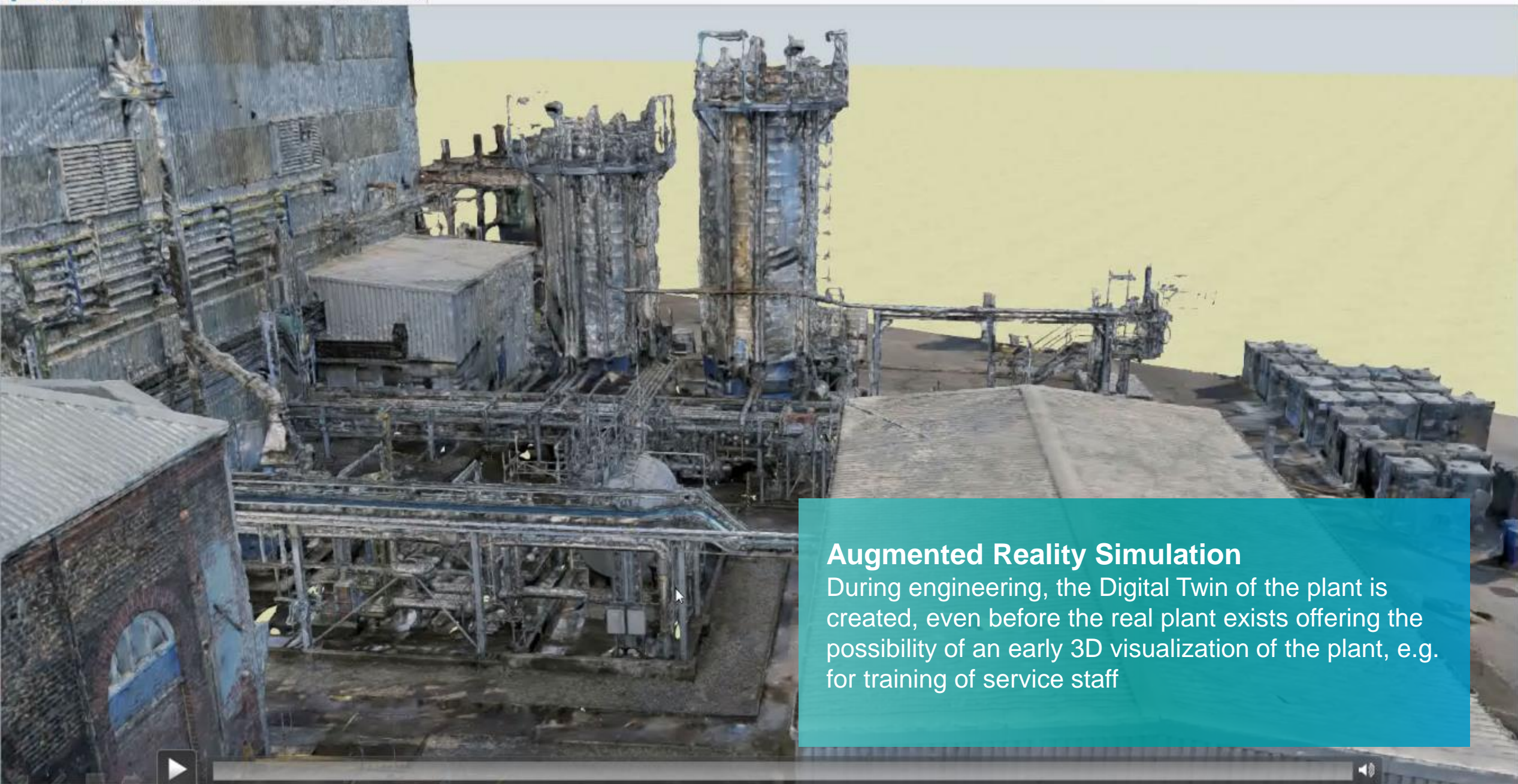




# Augmented Reality

For simulation and training scenarios





## Augmented Reality Simulation

During engineering, the Digital Twin of the plant is created, even before the real plant exists offering the possibility of an early 3D visualization of the plant, e.g. for training of service staff





# MindSphere

Cloud based Open IoT Operating  
System

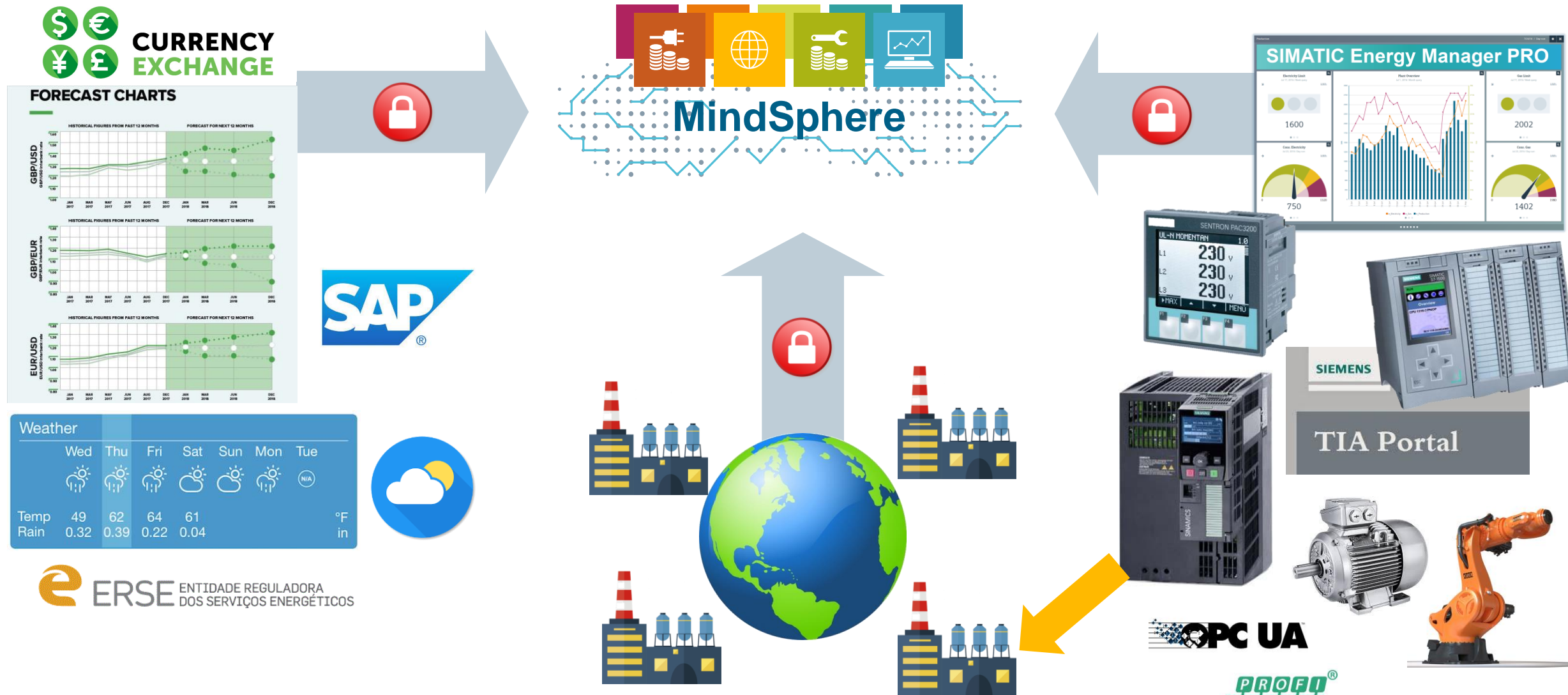


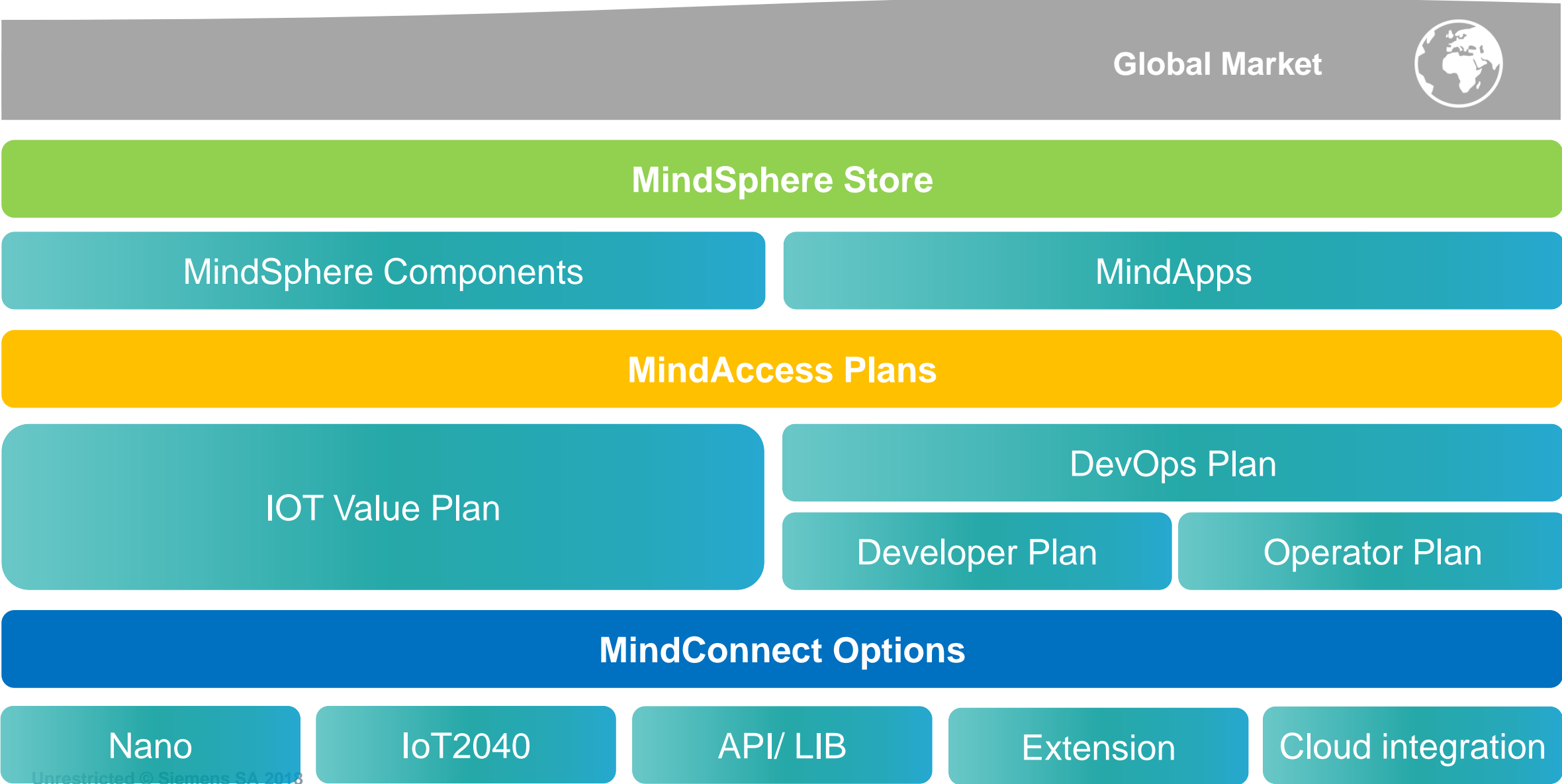


# MindSphere

## The Cloud-based, Open IoT Operating System from Siemens

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# MindAccess Plans





## IOT Value Plan

## Developer Plan

## Operator Plan

### Small

#### Small customers/ OEMs

- 50 user/ 10 subtenants
- 10 Agents (MindConnect)
- Data storage 60GB

#### Small developers

- Test & Develop RAM 2GB
- Number developers 10
- Outbound traffic 60GB

#### Small accounts

- Number operators 5
- Assets types/inst. 5/20
- Outbound traffic 60GB

### Medium

#### Worldwide installed base

- 150 user/ 40 subtenants
- 25 Agents (MindConnect)
- Data storage 300GB

#### System integrators

- Test & Develop RAM 10GB
- Number developers 50
- Outbound traffic 300GB

#### Mid size accounts

- Number operators 10
- Assets types/inst. 25/100
- Outbound traffic 300GB

### Large

#### Big international plants

- 500 user/ 80 subtenants
- 100 Agents (MindConnect)
- Data storage 3TB

#### Software houses

- Test & Develop RAM 20GB
- Number developers 100
- Outbound traffic 600GB

#### Large accounts

- Number operators 25
- Assets types/inst. 50/200
- Outbound traffic 600GB



# MindSphere Apps & Components



# Applications for MindSphere are powerful industry applications addressing challenges and creating value

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*Ingenuity for life*

## Applications for MindSphere

**Fleet Manager**  
Das Kontrollzentrum für Ihre MindSphere

**Control Performance Analytics**  
Verwandeln Sie Ihre wertvollen Informationen in Anlagenweite Transparenz und effiziente Optimierung

**Active Security**  
Das Management-Tool für industrielle Automatisierung und Steuerungssysteme

**Create your own App**  
Individuelle Anwendungen für MindSphere erstellen

**Atos – Mobile Production**  
Aktuelle Daten für Ihr Dashboard mit IBeacon

**Accenture – Shop Floor Maintenance**  
Ursachenanalyse und präventive Wartung für Fertigungsstraßen

**Der schnelle Service**  
In Kombination von Anlagen und der Fleet Manager, um die Details Ihrer Anlagen zu verstehen und die Systemerträge Ihrer Maschine zu steigern.

**Ein Bild sagt mehr als Millionen Daten**  
Diese App ist die ideale Tool, um Ihre Maschinen zu visualisieren. Sie ermöglicht Ihnen, Boards individuell zu gestalten. Nutzen Sie die verschachtelte Zusammenhänge in den Daten, um Optimierungspotenziale zu identifizieren. Visualisierungen lassen sich nahtlos in andere integrieren. Ihre individuellen Reports und Sie auch als Apps an Ihre Kunden weitergeben.

**Automatische Updates im Vorbeigehen**  
Mit IBeacons wird Ihr Dashboard auf dem IP-Sie sich in der Fertigung einer Maschine nähert, immer über aktuelle Informationen zur Produktion und Anlagenperformance. Durch Abgleich mit der Datenhistorie identifiziert die App Zusammenhänge zwischen den Sensordaten und definierten Schwellenwerten. Nach einer „Anlernphase“ nutzt die App dieses Wissen, um Wartungen zu veranlassen, bevor einzelne Maschinen für sie festgelegte Schwellenwerte überschreiten, und vermeidet so ungeplanten Stillstand oder Abweichungen von den vorgegebenen Toleranzen.

**Beheben Sie Fehler, bevor Sie auftreten**  
Das hochentwickelte Analyse-Tool nutzt Daten auf Produktionsebene, um Maschinenausfälle vorherzusagen. Dabei nutzt die App Messwerte verschiedener Sensoren wie Motorleistung und -spannung sowie Motor- und Fließbandgeschwindigkeit. Durch Abgleich mit der Datenhistorie identifiziert die App Zusammenhänge zwischen den Sensordaten und definierten Schwellenwerten. Nach einer „Anlernphase“ nutzt die App dieses Wissen, um Wartungen zu veranlassen, bevor einzelne Maschinen für sie festgelegte Schwellenwerte überschreiten, und vermeidet so ungeplanten Stillstand oder Abweichungen von den vorgegebenen Toleranzen.

**Ihre Vorteile**  
• Höherer Fertigungs-Output  
• Konstant hohe Produktionsqualität, bei der jedes Teil exakt den vorgegebenen Spezifikationen entspricht

**Maßgeschneiderte Angebote**  
Ihr Feedback liefert Ihnen wertvolle Hinweise auf Verbesserungspotenziale bei der Gestaltung Ihres Dashboards. So können Sie gezielt auf Nutzenebenen eingehen und genau die Informationen erhalten, die Ihre Kunden brauchen.

**Alles, was ich wissen will, auf einen Blick**  
Ich habe meine Produktion immer dabei. Das hilft der Produktion und spart Geld – weil ich zu jedem Zeitpunkt genau weiß, woher Energie mehr benötigt wird, die Ihre Kunden brauchen.

**and many more ...**

## MindSphere Store

**MindSphere**  
Contact us for more information regarding MindSphere - the cloud-based, open IoT operating system.

**MindSphere Applications**  
Get in touch with the future.

**Assembly Line Self Optimizing App**  
Delays in the production process are cost inefficient and lead to profit loss. The target is to find an order sequence, which avoids delays and minimizes the production time.

**Bluzone By Bluvision**  
Bluvision provides the next generation location based RTLS with sub 1-meter accuracy, and condition monitoring solution with machine learning for assets, using an end-to-end ecosystem that includes sensor beacons, Bluetooth to WiFi gateways (Blufis) and the Bluzone app.

**Industry**  
• Machinery & Plant Construction  
• Others  
• Aerospace  
• Automotive Manufacturing  
• Food & Beverage  
• Chemical Industry  
• Pharmaceutical Industry  
• Oil & Gas  
• Power Utilities

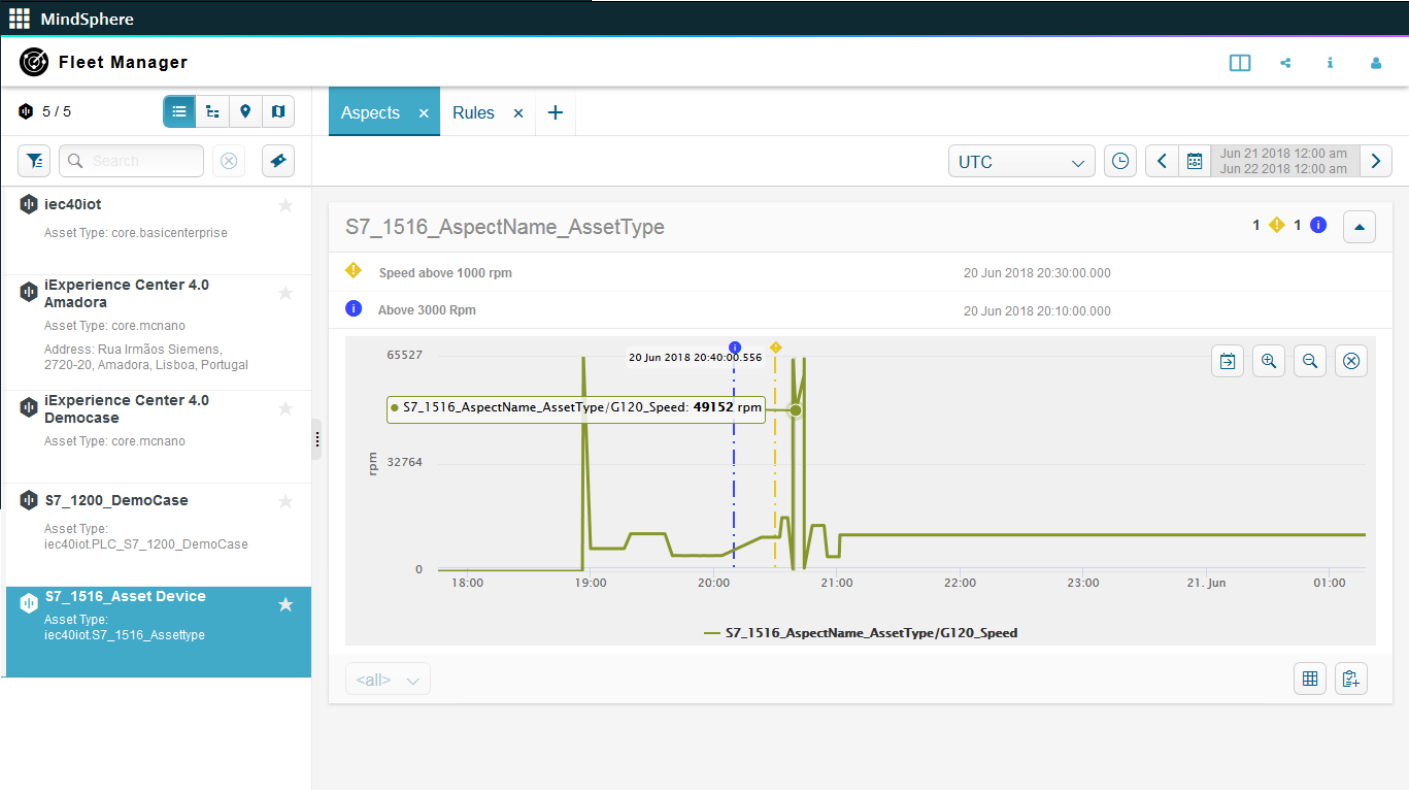
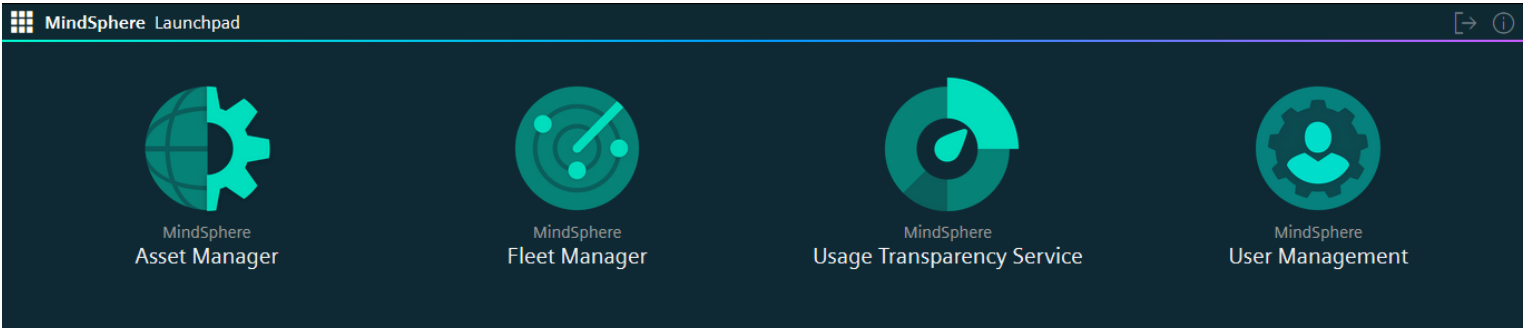
**Developed By**  
• Third Party  
• Siemens

**Use Case**  
• Analytics  
• Maintenance  
• Quality  
• Product Lifecycle Management  
• Fleet Manager

Hundreds of Apps are in development by Siemens, partners and customers

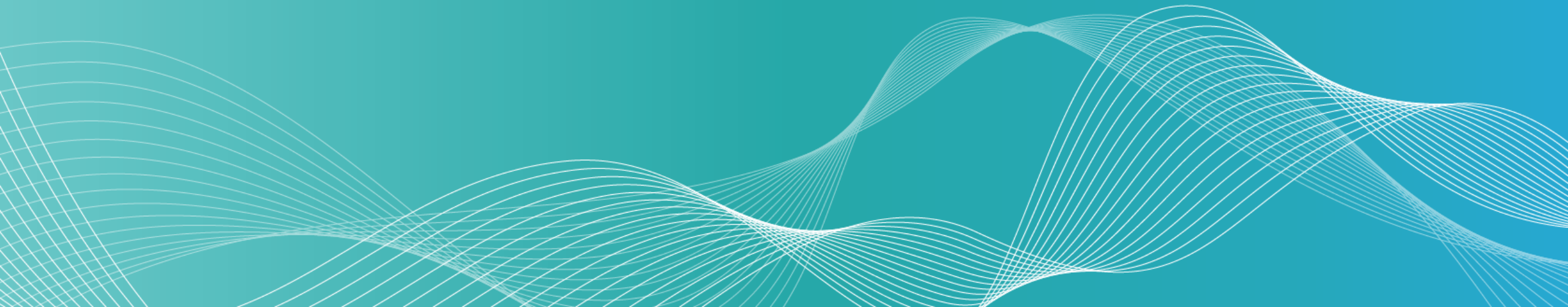
MindSphere Store, the MindSphere marketplace, is online and growing over time

# MindSphere Demo



# IoT Solutions

Simple, Smart, Scalable





# SIMATIC IOT2040

The intelligent Gateway for industrial IoT Applications



## SIMATIC quality

Designed for 24/7 operation  
in industrial environment

## Automation.ConnecTed

Easy connection to automation level  
with PROFINET\*) and openness to  
cloud based solutions

## Performance & Deterministic

Intel Quark® CPU and 1 GB RAM as well as x86-  
deterministic and battery buffered real-time-clock



## Openness

Free programmable in high-level  
languages (e.g. Java, C++) via  
various IDEs (e.g. Eclipse) and  
compilers for Yocto Linux

Protocol  
Conversion  
Gateway

Data  
Concentra  
tor/ Cloud  
Connector

MQTT IoT  
Applications  
Driver

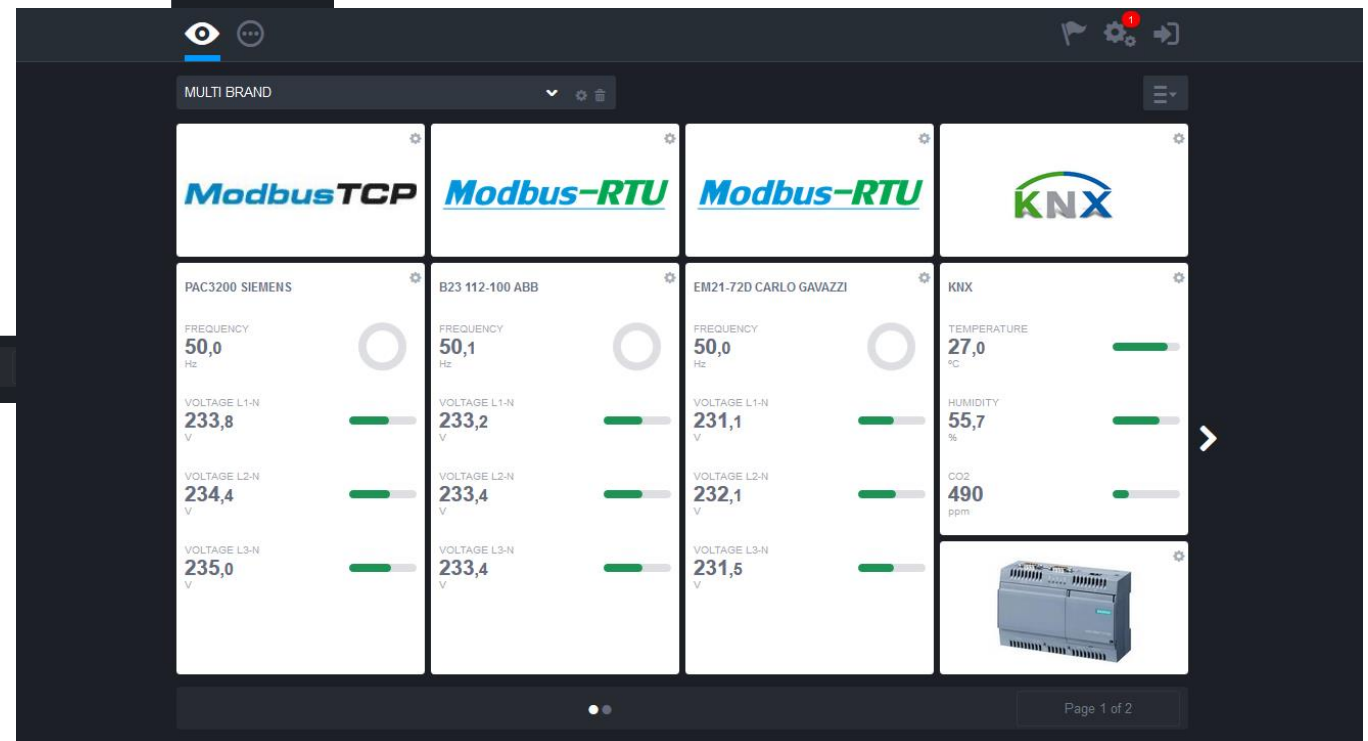
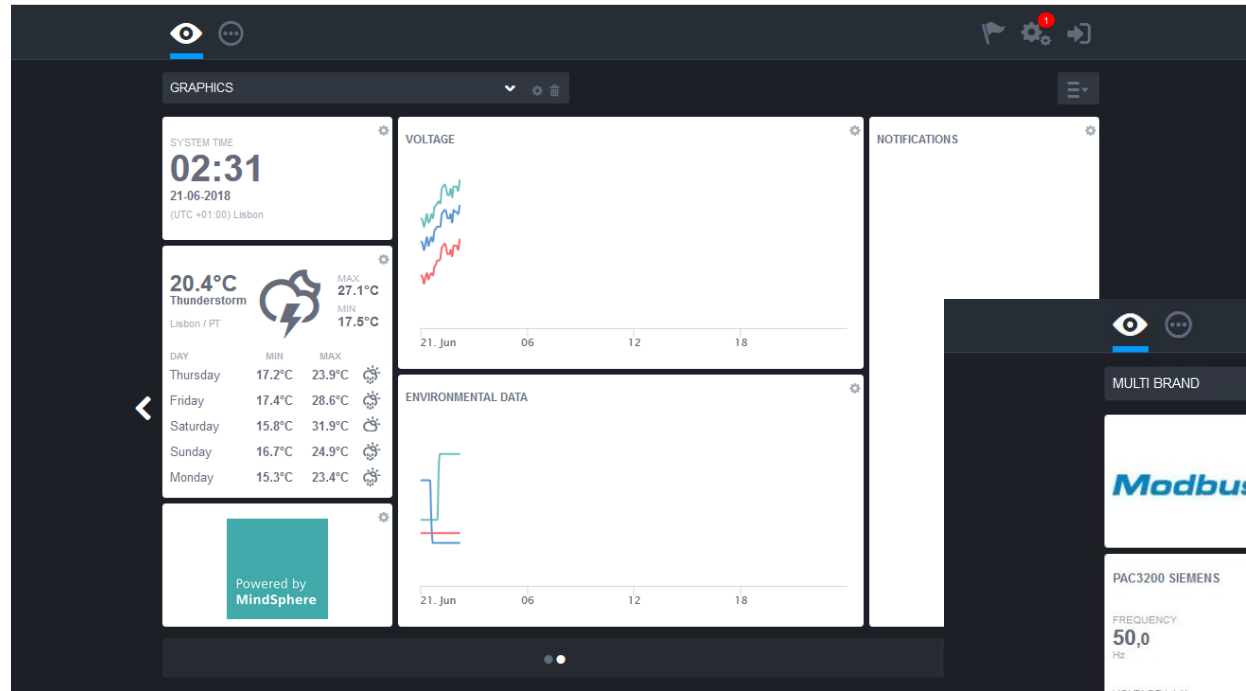
## Expandability & Connectivity

With mPCIe, Arduino Shields and  
various standard interfaces &  
available protocol drivers

# SIMATIC IOT2040 Demo

Demo application as multiprotocol data aggregation device

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*Ingenuity for life*

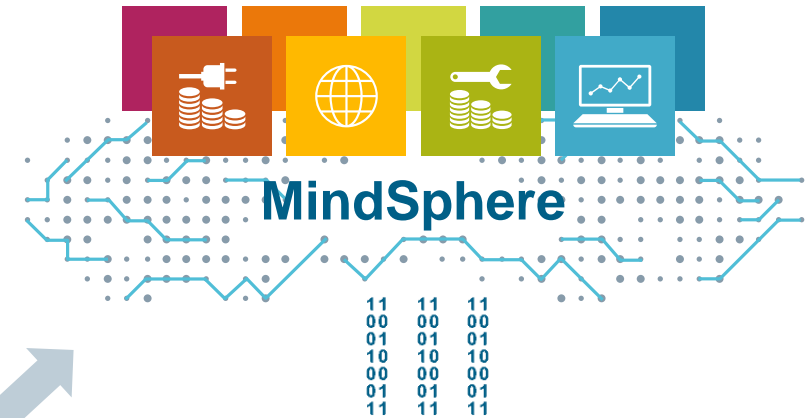


# MindSphere Partner

## Small IoT Applications

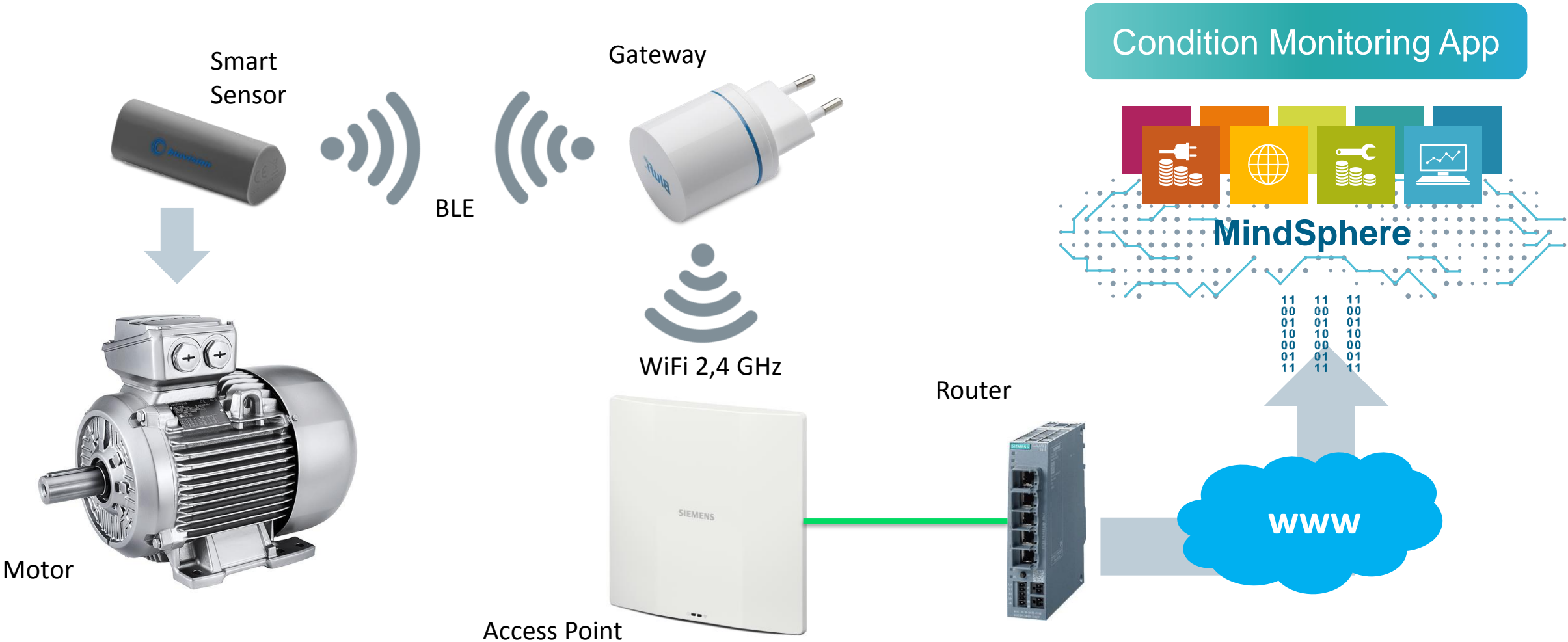


- **Smart Real Time Location**
- **Smart Condition Monitoring**  
Machine Learning based
- No physical infrastructure
- Battery powered gateways for outdoor applications
- BLE Sensors
- Battery up to 9 years
- Equipment agnostic
- 3 axis motion monitoring (x,y,z)
- Pattern Evaluation
- Fast and simple ramp-up and implementation



# MindSphere Partner

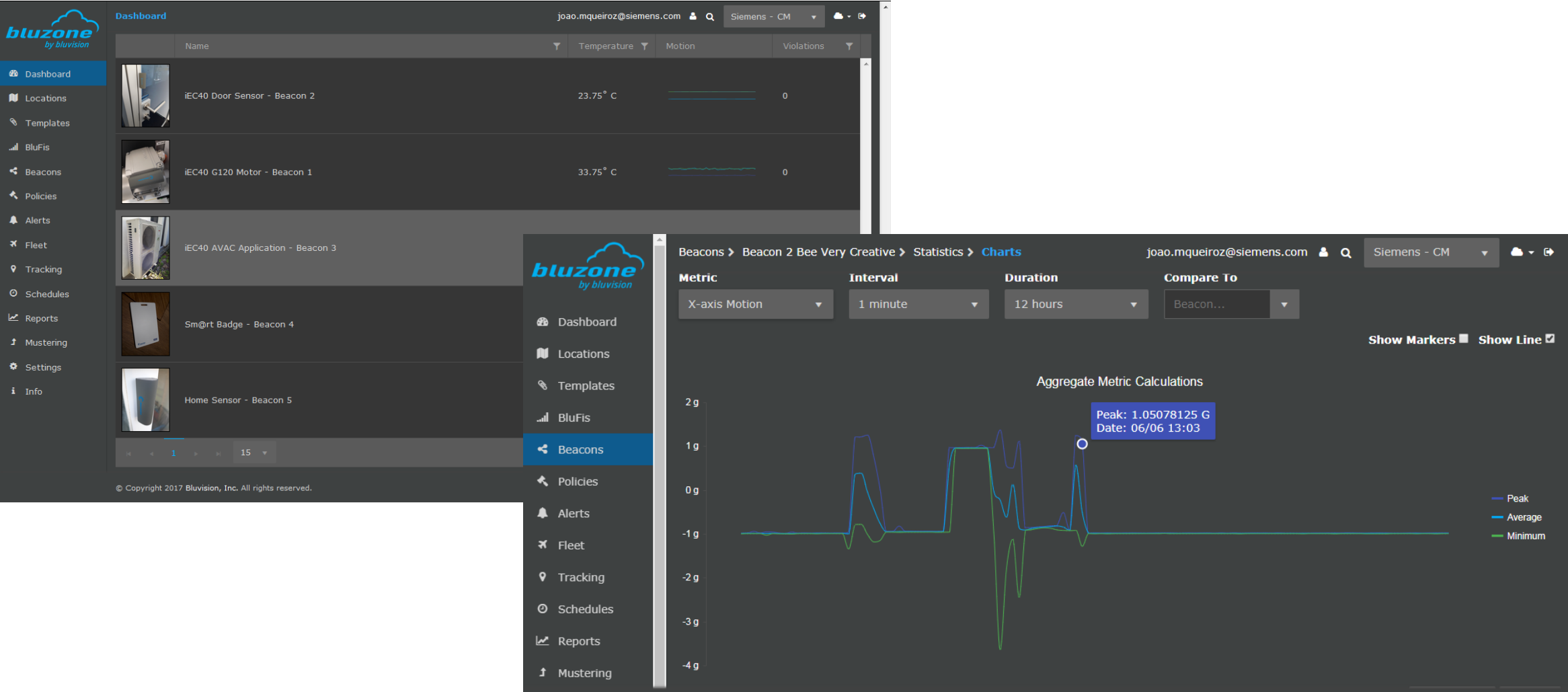
## Condition Monitoring Application





# MindSphere Partner Demo

## Condition Monitoring Application



Make the  
future **yours**



# Thank you



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**Digital Enterprise Coordinator**  
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Email. [joao.mqueiroz@siemens.com](mailto:joao.mqueiroz@siemens.com)

[siemens.pt](https://www.siemens.pt)

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

[mindsphere.io](https://mindsphere.io)