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Plattform Industrie 4.0 and Siemens
Driving the digital transformation

Pasquale De Leo & Thomas Hahn, Siemens
June 2017 | Turin

Digitalization changes everything

The world is becoming more digital ...also in industrial environments – taking into consideration of the installed base, lifetime and processes

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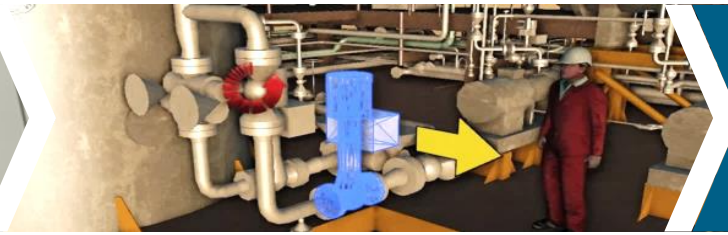
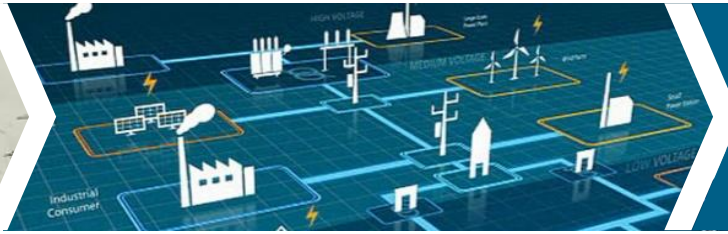
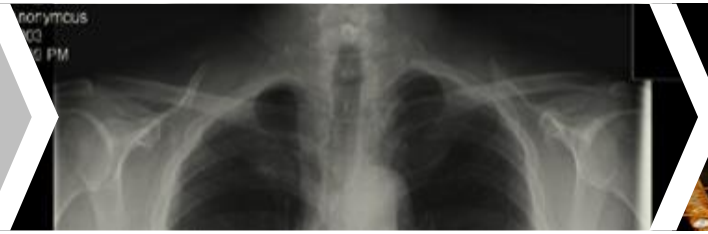
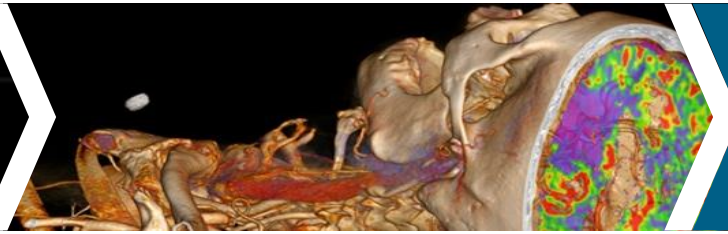
Manual machine configuration			Virtual commissioning
Large power plants			Virtual power plants
X-ray photography			Digital imagine and analysis
Fixed maintenance intervals			Predictive maintenance

Holistic view is needed!
Digitalization impacts business models, value creation processes, products

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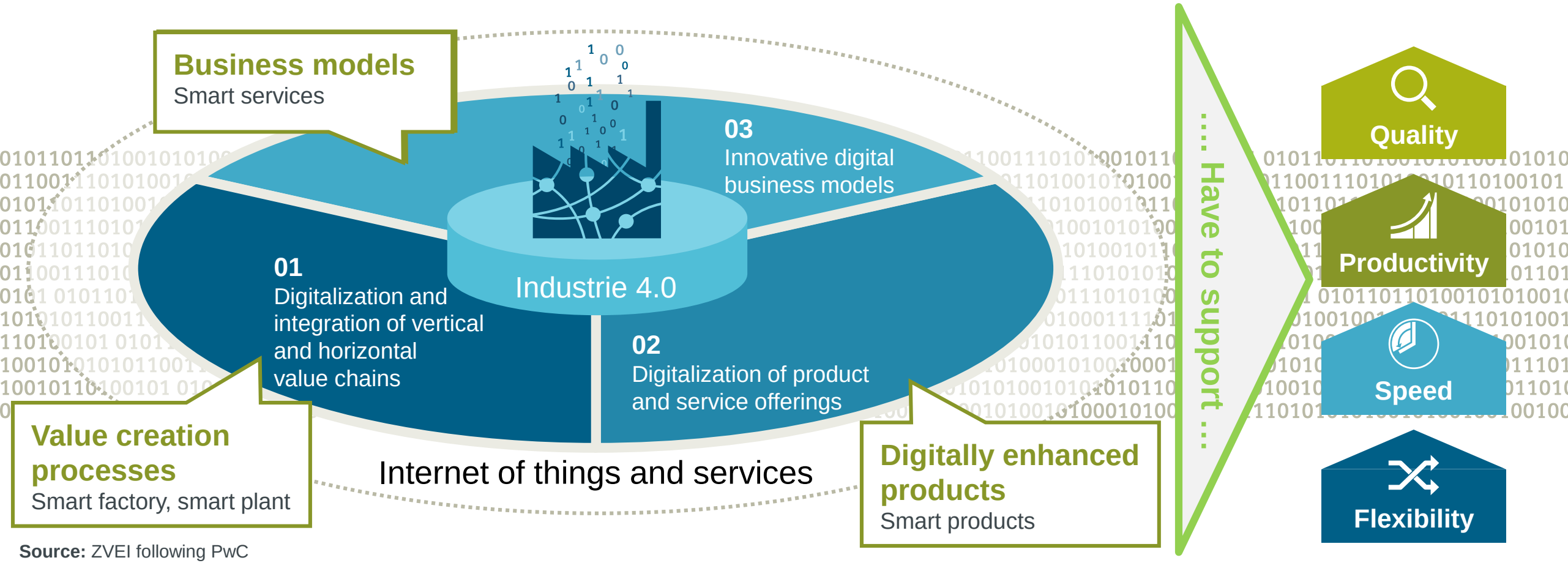

Source: ZVEI following PwC

What is a possible way to address the challenges?
Plattform Industrie 4.0 perspektive

Future projects in the Demand Area Communication of the “Forschungsunion”

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Development of ten future projects in the demand areas climate/energy, security/safety, mobility, health/ nourishment and communication to assure that Germany has a pole-position in solving the global challenges

“Industrie 4.0”

Smart Factory: **Manufacturing sites** in Germany are guided **into a new era** by **merging** of technical processes with business processes via ICT

Umsetzungsforum Industrie 4.0, Berlin, October, 2012,
Plattform Industrie 4.0, HMI April 2015

“Smart Service Welt”

Using secure **cloud infrastructures** and provisioning of new service platforms are the basis for **internet economy** in Germany

CeBIT, April, 2015
Hannover April 2017

“Autonome Systeme”

- **Industrial production,** in the context of a much more flexible automation and adaptive production according to Industrie 4.0
- **road and rail transport,** in the context of enabling flexible, affordable, safe and environmentally- and climate-friendly mobility and logistics
- **smart homes,** in response to the desire for improved energy efficiency and also as a key enabler of enhanced security and of assistance and care in an ageing society
- use of **autonomous systems in hostile environments,** for example for rescue operations, working underwater or decommissioning nuclear power plants

CeBIT, April, 2017

Plattform Industrie 4.0
The digital transformation needs a broad-based foundation

… is a project of and for society as a whole …

… which requires close cooperation among the private sector, academia, politics, trade unions and associations …

… and needs to be translated into practice and be implemented right now.

The Platform Industrie 4.0 provides support for the coordinated and organized transition to the digital economy in Germany.

Source: Plattform Industrie 4.0

The Working Group
Five thematic priorities

Reference architectures, standards and norms

Chair:
Kai Garrels,
ABB STOTZ-KONTAKT GmbH

Research and innovation

Chair:
Johannes Diemer,
DXC Technology

Security of networked systems

Chair:
Michael Jochem,
Robert Bosch GmbH

Legal Framework

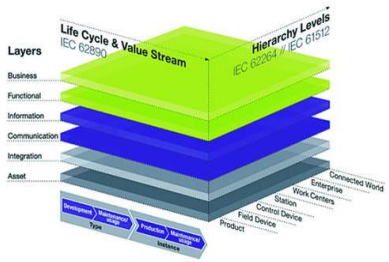
Chair:
Dr. Hans-Jürgen Schlinkert,
ThyssenKrupp

Work, education and training

Chair:
Konrad Klingenburg
IG Metall

Source: Plattform Industrie 4.0

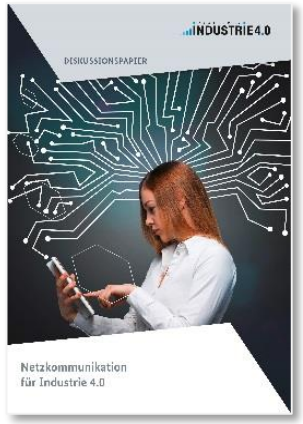
Working Group
Reference architectures, standards and norms



Reference Architectural Model Industrie 4.0 (RAMI4.0) – An Introduction
Guideline

Structure of the Administration Shell
Working Paper

Interaction Model for Industrie 4.0 Components
Discussion Paper



Network-based communication for Industrie 4.0
Discussion Paper

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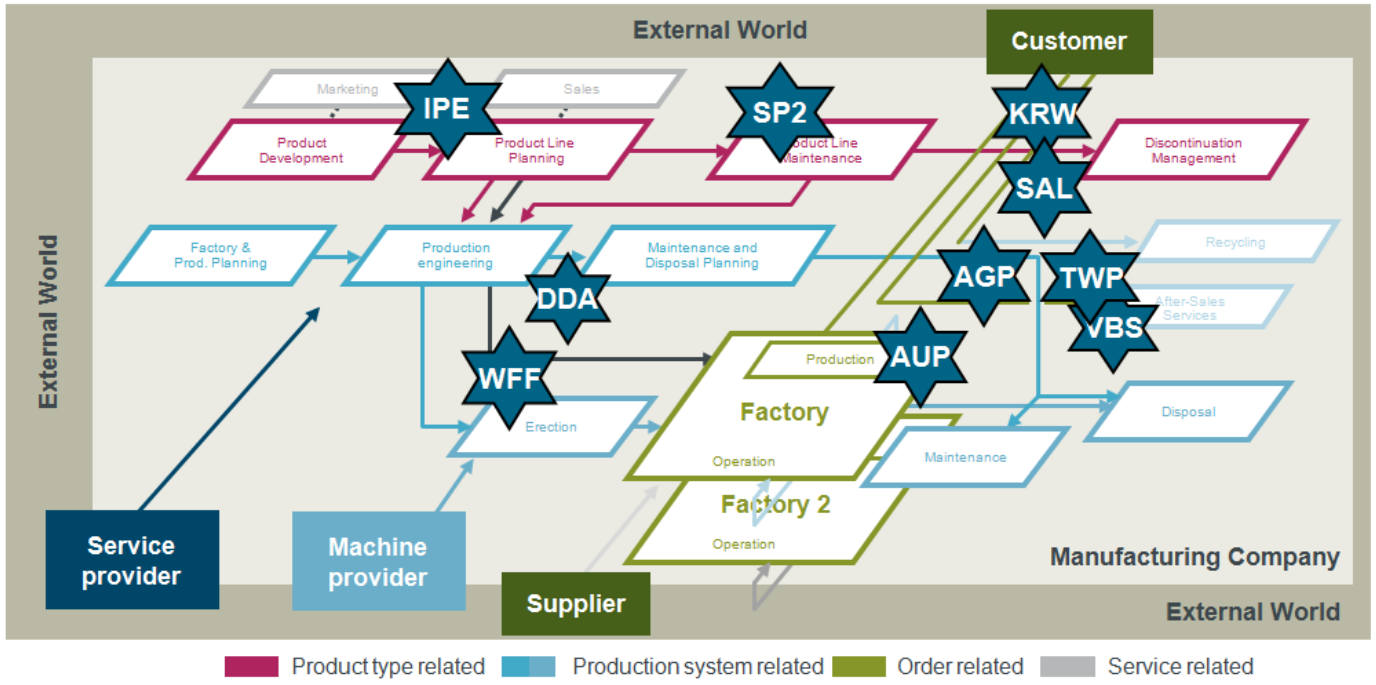
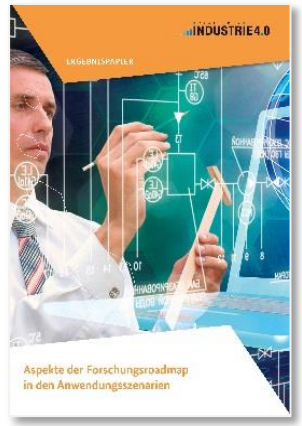
VDMA's activities in the development of OPC UA Companion Specs
Position paper and Workgroup

Source: Plattform Industrie 4.0, VDMA

Working Group
Research and Innovation





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Research Roadmap Industrie 4.0 including Application Scenarios

Exemplification of the Industrie 4.0 Application Scenario Value-Based Service following IIRA Structure

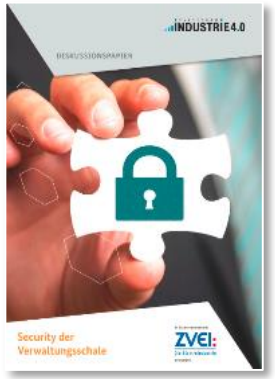
Source: Plattform Industrie 4.0

Working Group
Security of networked systems

IT-Security in Industrie 4.0

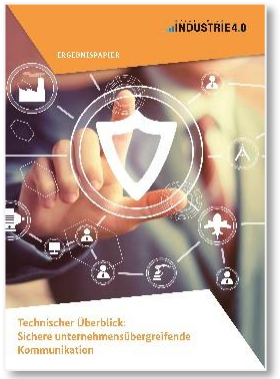
IT-Security in Industry 4.0 fields of action for operators

I4.0-Security in Education and Training



Security in the Administration Shell (yet, only available in German)

Technical Overview: Secure Identities



Technical Overview: Secure cross-company communication

Security in RAMI 4.0

Source: Plattform Industrie 4.0

The Online-Library
Access to all relevant information

Results

Source: Plattform Industrie 4.0

Expert knowledge

The Online-Library offers a **systematic access** to Industrie 4.0.

Results of the Plattform Industrie 4.0 and partners are available as **specifications, compendiums and documents** and can be **downloaded**.

Expert knowledge available.

Available documents

All publications can be downloaded from the Online Library of Plattform Industrie 4.0

www.plattform-i40.de/I40/Navigation/EN/InPractice/Online-Library/online-library.html

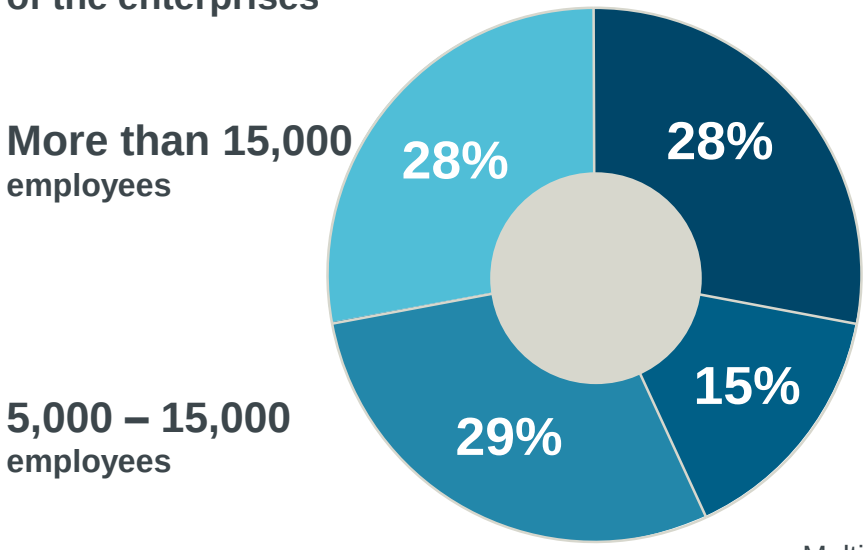
Examples of applications and products
Where Industrie 4.0 is already being practiced today

>260 **examples** of Industrie 4.0 applications and products …

Source: Plattform Industrie 4.0

… from **large and small enterprises in a wide range of different industry sectors.**

Number of employees
of the enterprises



Multiple choices possible

Examples for international cooperation
Around the globe Plattform Industrie 4.0 initiated cooperation

Industrial Internet Consortium (IIC)

Referenzarchitekturen angleichen
für mehr Interoperabilität

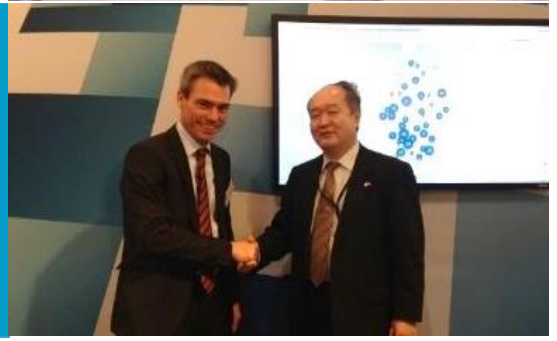
Cooperation with China

Alliance Industrie du Futur Frankreich

#Digitalassieme: Industry 4.0 Plan with Italy

Digitising European Industry

Robot Revolution Initiative Japan
Plan with Italy



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Source: Plattform Industrie 4.0

Holistic approach is needed

Setup a strong triangle for Recommendations, Testing and Standardization

PLATTFORM INDUSTRIE 4.0

Recommended actions

SME mobilization

International cooperation

STANDARDIZATION COUNCIL INDUSTRIE 4.0

Initiation of cross-sector standards

Coordination of national / international standards

Strengthen the international collaborations

LNI4.0

Network of test centers

Practical testing

Validated input for standardization

Source: Plattform Industrie 4.0, Labs Network Industrie 4.0, Standardization Council Industrie 4.0

Siemens
Digital Enterprise Suite

We address Digitalization with a holistic approach

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Value creation processes

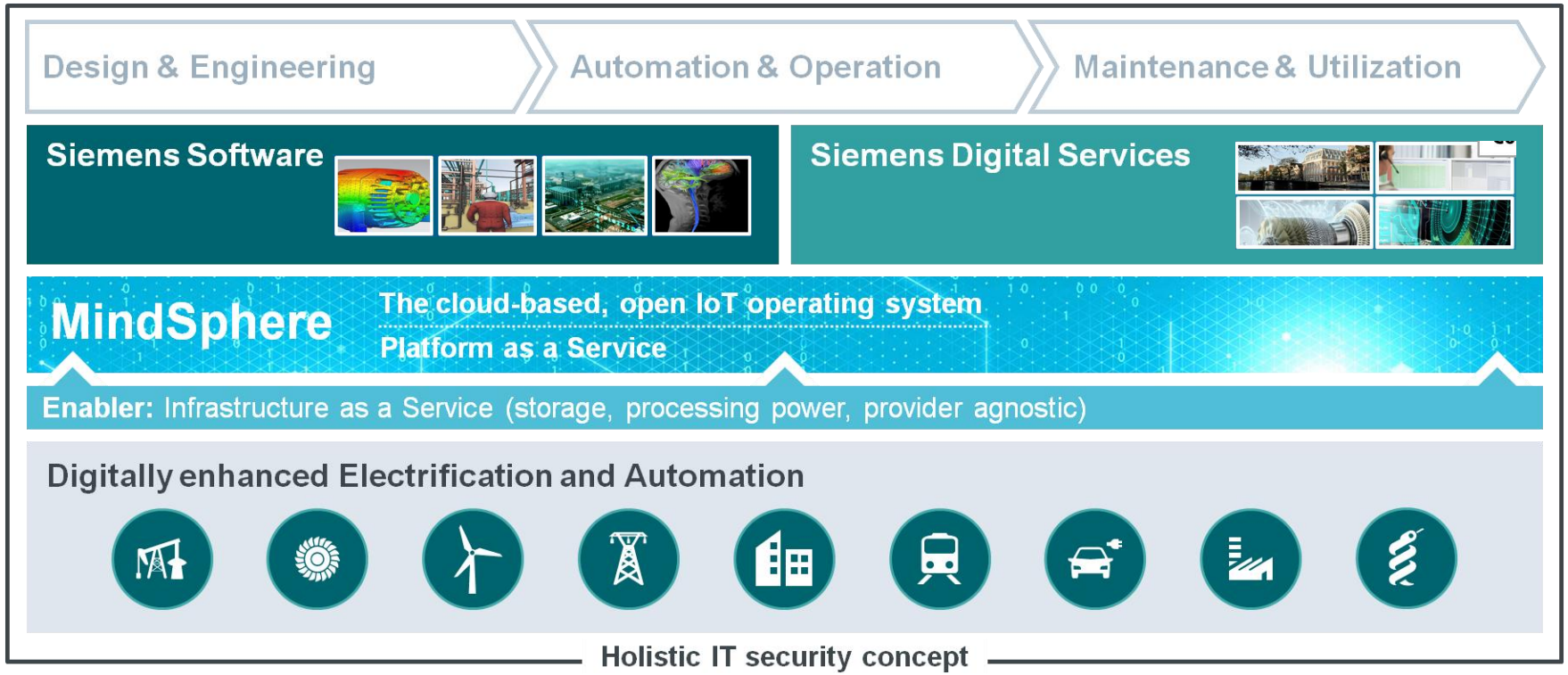
Smart factory, smart plant

Digitally enhanced products

Smart products

Business models

Smart services



Data analytic supports availability of CERN's LHC

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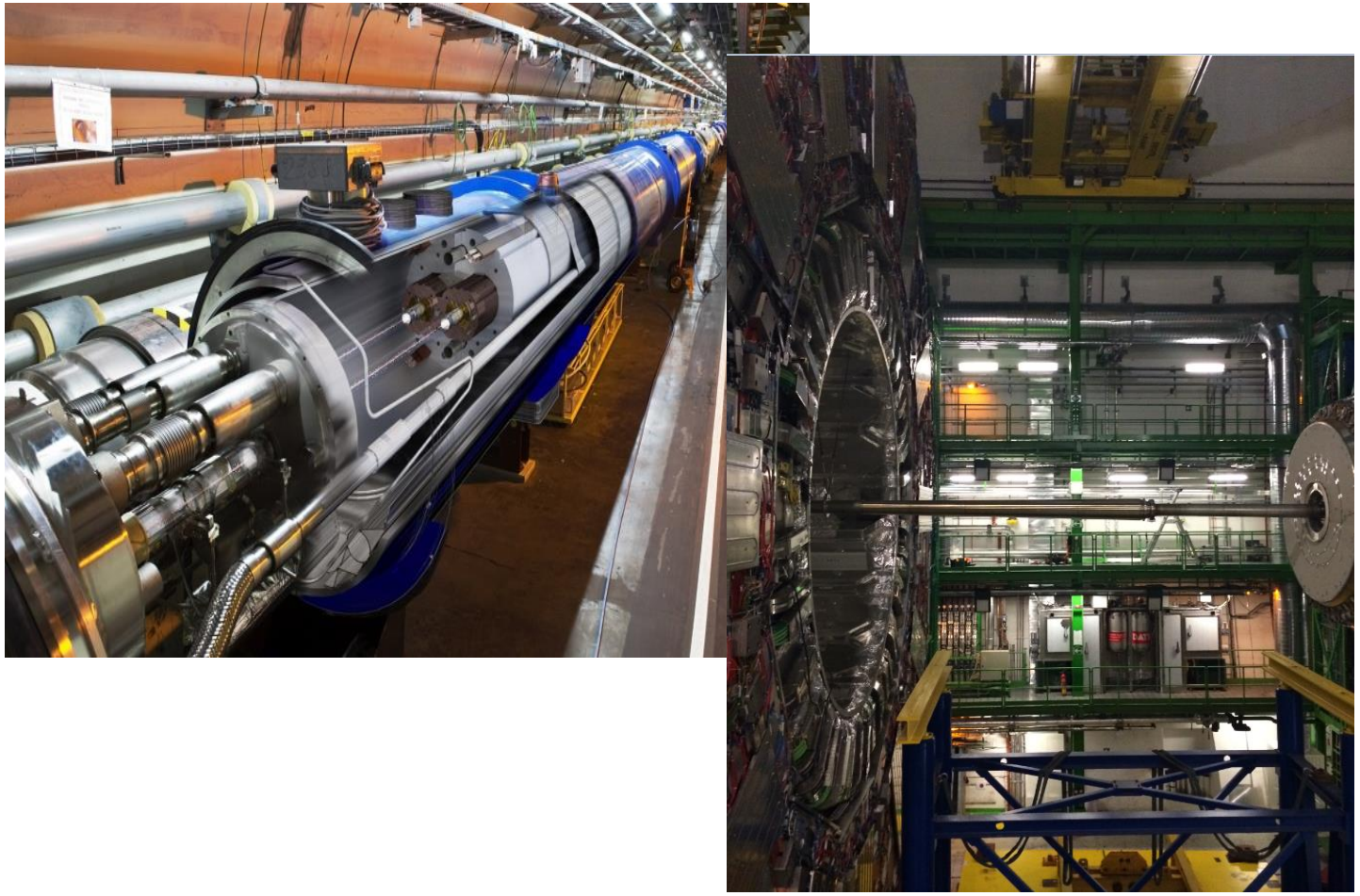

Increase operating hours

Challenge

99.9999991% the speed of light

The biggest detectors ever …
… 600 million collisions per sec

Solution

Huge supervisory system and hundreds systems controlling the production

With rule and pattern mining methods increase operating hours

Source: CERN

With Siemens' integrated technologies, Maserati was able to reduce development time while increasing production output

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Reducing the time to market

30% shorter development time

Close integration of suppliers

Enhancing flexibility

Ghibli available in

70,000

combinations

Increasing efficiency

3 times

more cars produced than before

Integration of two new assembly lines into existing factory

1 Product design	2 Production planning	3 Production engineering	4 Production execution	5 Services
NX CAD NX CAE LMS CD-adapco Star-CCM+ Teamcenter	Tecnomatix Teamcenter	SIMATIC	SIMATIC SIMATIC IT SINUMERIK SCALANCE SITOP SIRIUS	Uptime and sparepart services

The Operating System for the Internet of Things: MindSphere positioning inside the Digital Enterprise Suite

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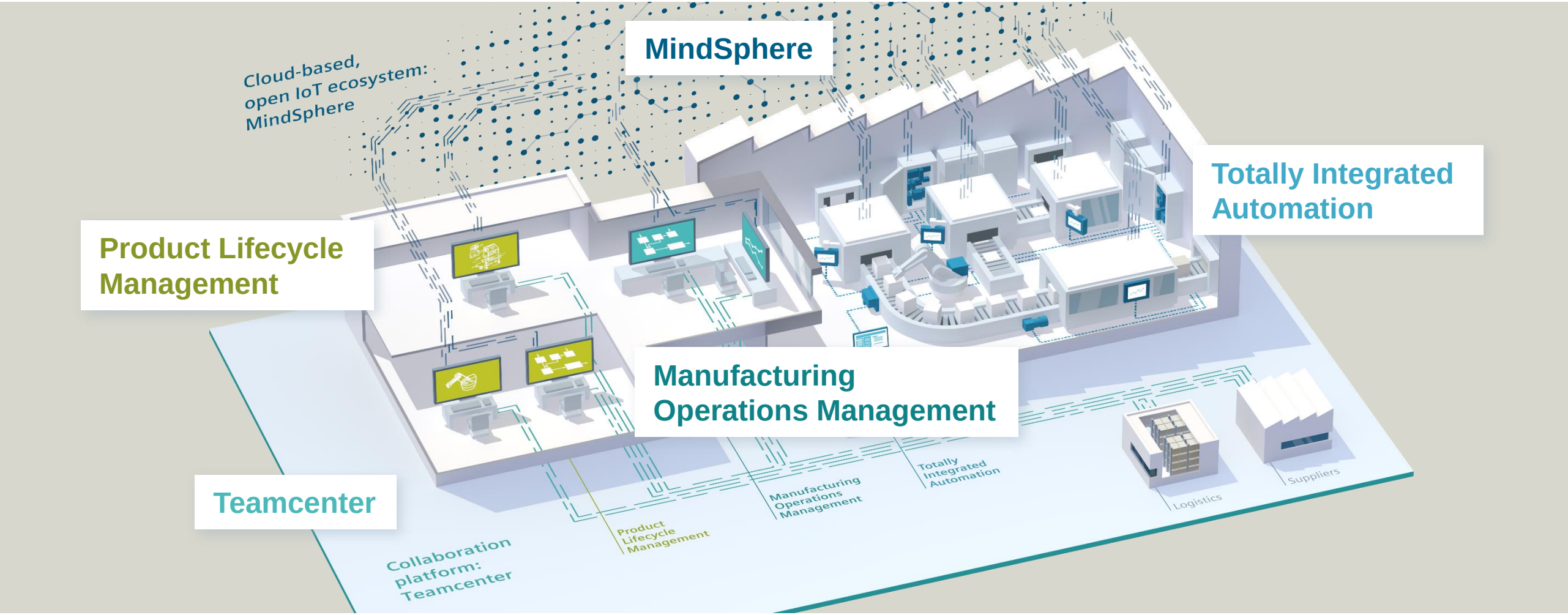

Data-driven services based on MindSphere enable new business

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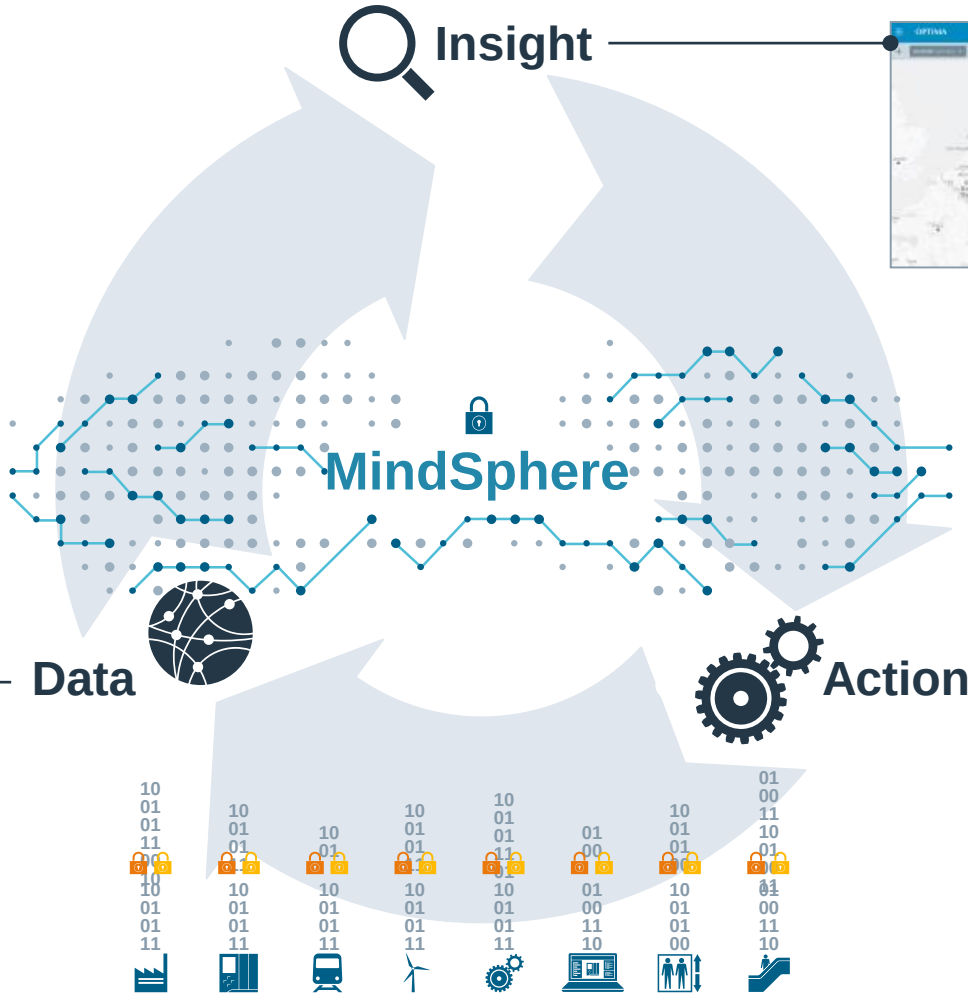
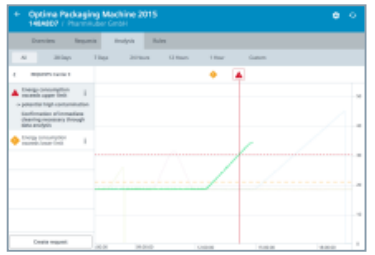
MindSphere – The cloud-based, open IoT operating system

Virtual World

Real World



Configure data collection as well as **connectivity** quickly and easily



Gain immediate **insights** on whole fleet as well as individual assets using own, Siemens or partner apps

Transform insights into actionable results to **increase uptime and efficiency**

MindSphere@Siemens EWN: Data available in one platform, accessible for data analytics and connected business processes

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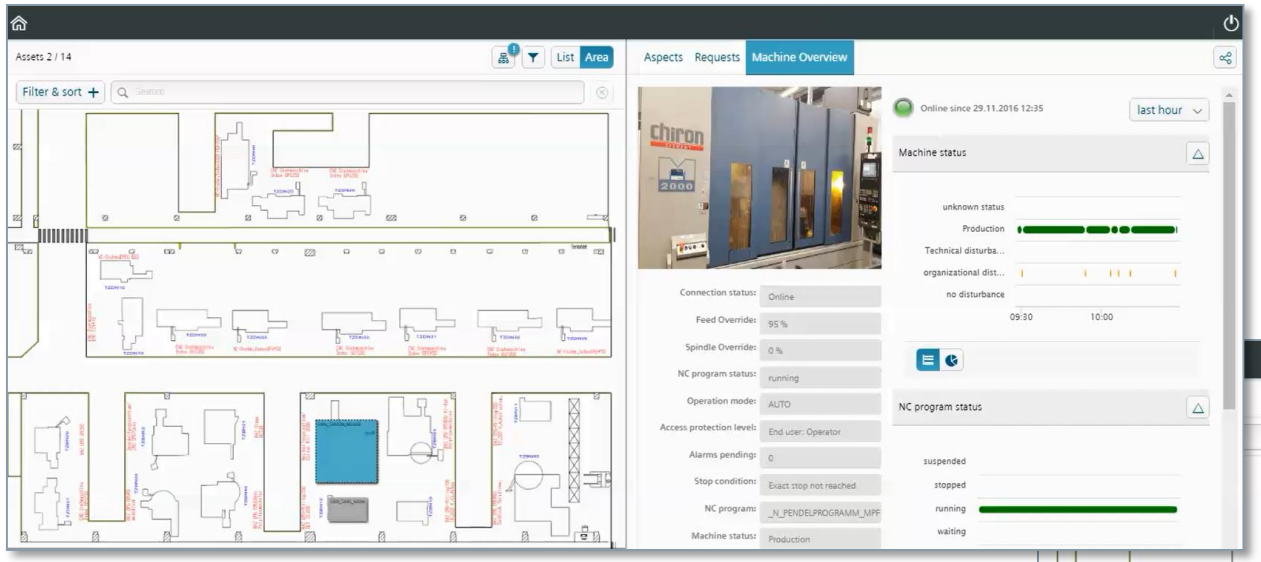
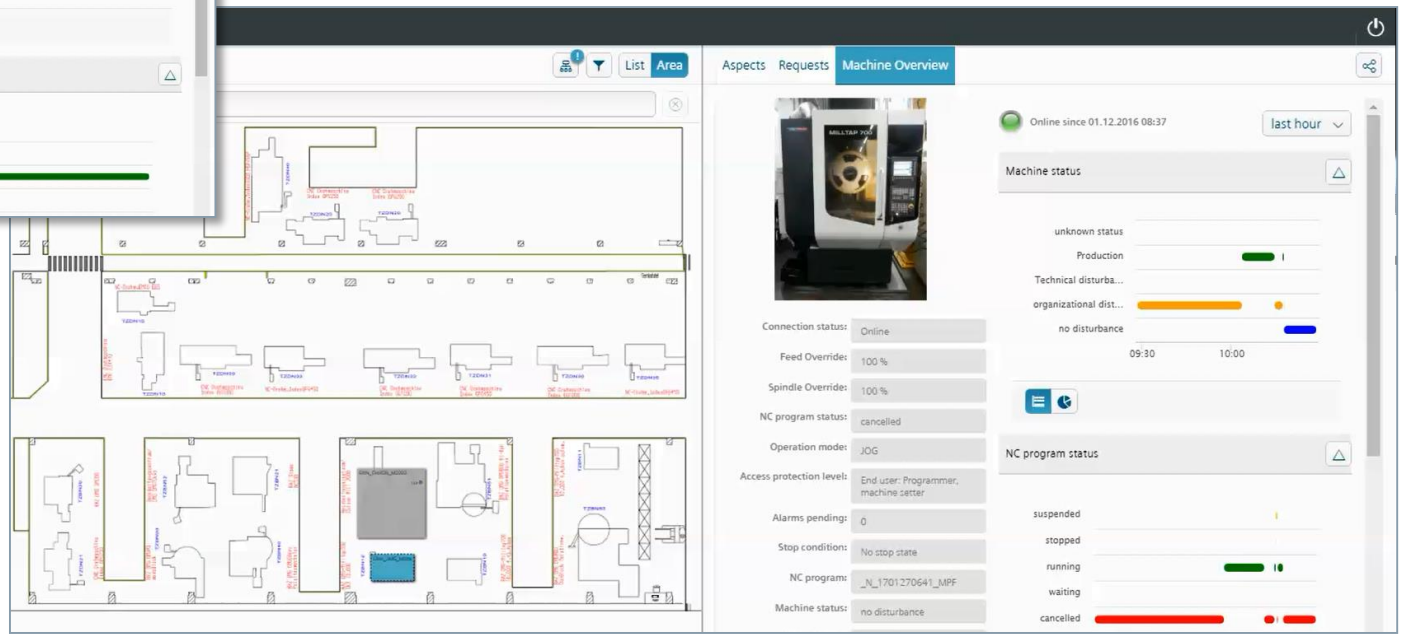


Benefits

+ **no homegrown** data acquisition **solutions**
+ **global transparency** on production KPI
+ secure collaboration platform with **external experts**



- ✓ Connection of **productive** machine tools to MindSphere, robotic turning center and rotor mounting station
- ✓ Machine **utilization** and productivity data **analysis**
- ✓ Direct **user feedback** interviews and application requirements

Thank you!

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