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Driving the Digital Enterprise for discrete industries

Indranil Lahiri
President & CEO, Siemens Malaysia

Our customers have essential requirements

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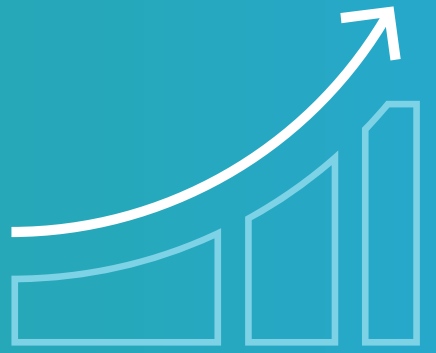
Speed

Flexibility

Quality

Efficiency



Security

Siemens Integrated Production for Maserati

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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

With Siemens' integrated technologies, Bausch + Ströbel realized digitalization across the entire machine lifecycle

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30% shorter engineering time

Increased flexibility

Consistent, end-to-end digitalization with the **Digital Twin**

Our holistic approach
Specific for product manufacturers and machine builders

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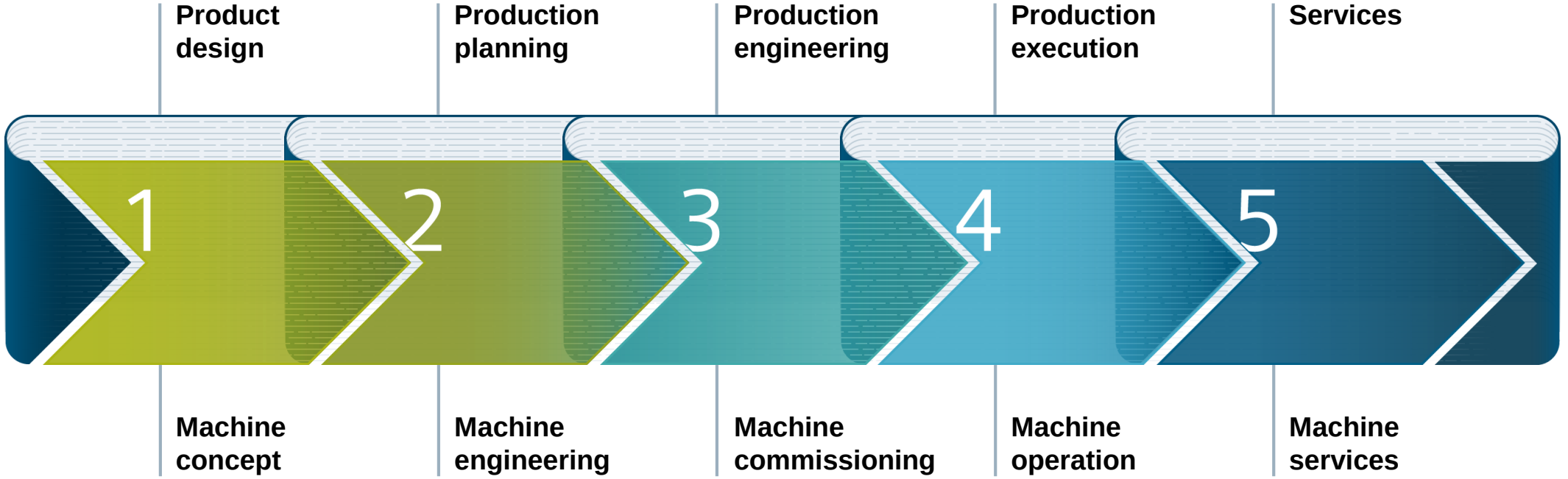
Product manufacturer perspective



Machine builder perspective

Create a powerful Digital Twin of the entire value chain

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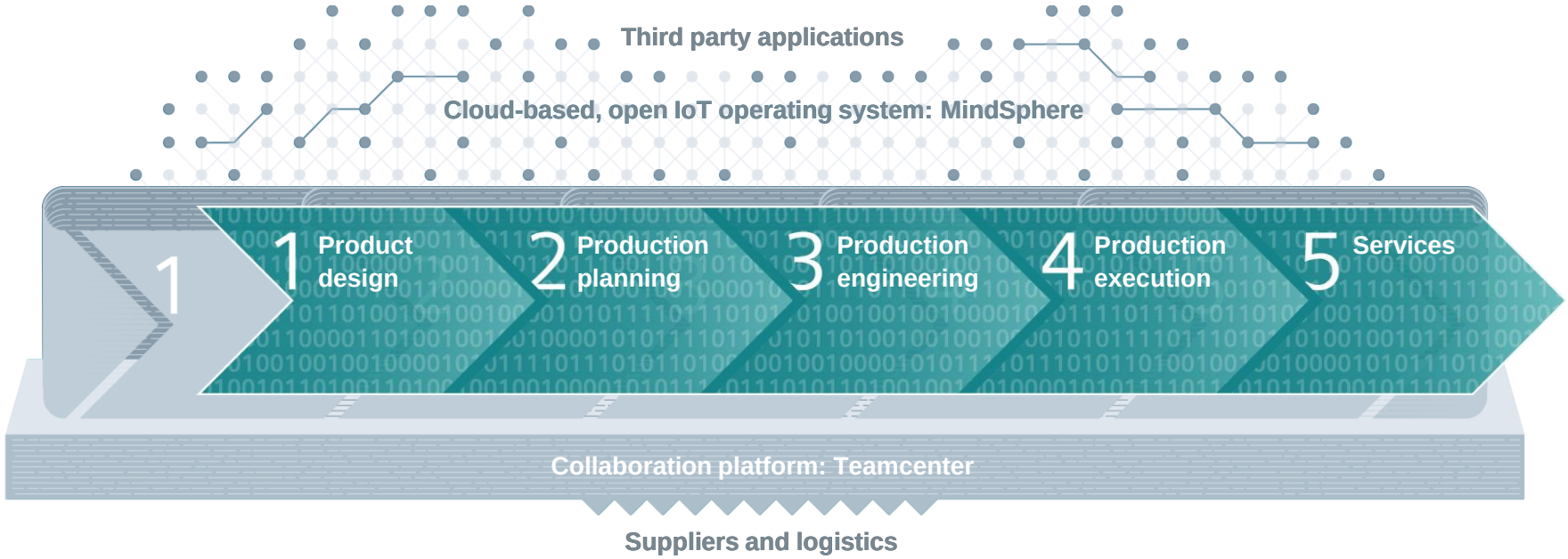


A vital part
of the airplane:
the radome
Avionics protection
Antenna protection
Prone to impacts

The most holistic Digital Twin

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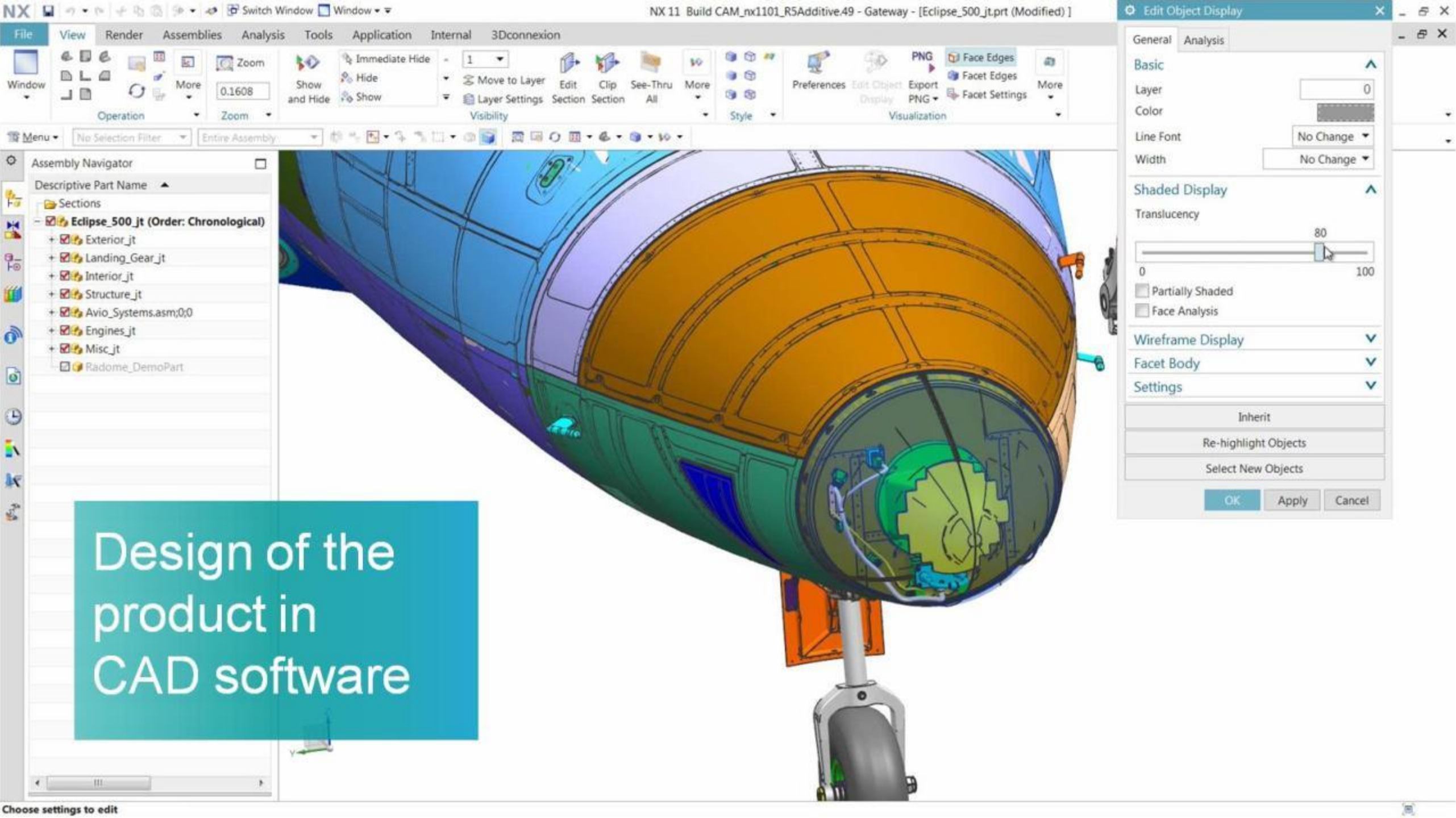
Design, simulate and verify products digitally, including mechanics and multi-physics, electronics and management of software


NX 11 Build CAM_nx1101_R5Additive.49 - Gateway - [Eclipse_500_jt.prt (Modified)]
File
View
Render
Assemblies
Analysis
Tools
Application
Internal
3Dconnexion
Window
Operation
Zoom
0.1608
Show and Hide
Immediate Hide
Hide
Show
Move to Layer
Layer Settings
Edit Section
Clip Section
See-Thru All
Visibility
Style
Preferences
Export PNG
Face Edges
Facet Edges
Facet Settings
Visualization
Assembly Navigator
Descriptive Part Name
Sections
Eclipse_500_jt (Order: Chronological)
Exterior_jt
Landing_Gear_jt
Interior_jt
Structure_jt
Avio_Systems.asm;0;0
Engines_jt
Misc_jt
Radome_DemoPart
Edit Object Display
General
Analysis
Basic
Layer
Color
Line Font
No Change
Width
No Change
Shaded Display
Translucency
80
0
100
Partially Shaded
Face Analysis
Wireframe Display
Facet Body
Settings
Inherit
Re-highlight Objects
Select New Objects
OK
Apply
Cancel
Design of the product in CAD software
Choose settings to edit

Simcenter 11 - Pre/Post - [(Simulation) Radome_DemoPart_Step0_Analysis_fem1_sim2.sim (Modified)]

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File | Home | Results | Laminates | View | Analysis | Application | Developer

Find a Command

Return to Home | Context

Layout Settings | Save State | Lock/Unlock Plane | Apply from File | View Synchronize — Layout

Edit Post View | Set Result | Identify Results | Create Graph — Post Processing

Animate — Animation

Result Variables | Result Probe | Envelope | Combination | Reduction | Multiple Reduction — Manipulation

Impact simulation at the product

Menu | No Selection Filter | Entire Assembly

Animation

Animate: Iterations

Iteration Value Type: None

Start Load Case: Initial Time Step

End Load Case: Time steps

End Iteration: Increment 14, Time = 2.588e+000 s

Step: 1

Number of Frames : 15

Full-cycle

Synchronize frame change for all post views

Synchronized frame delay (mS): 200

4

OK | Apply | Cancel

Increment 14, 2.5875 sec

Imported Results

Viewports

Fringe Plots

Post View 7 (MASTER) Di

1D Elements

2D Elements

3D Elements

Other Elements

Annotations

Templates

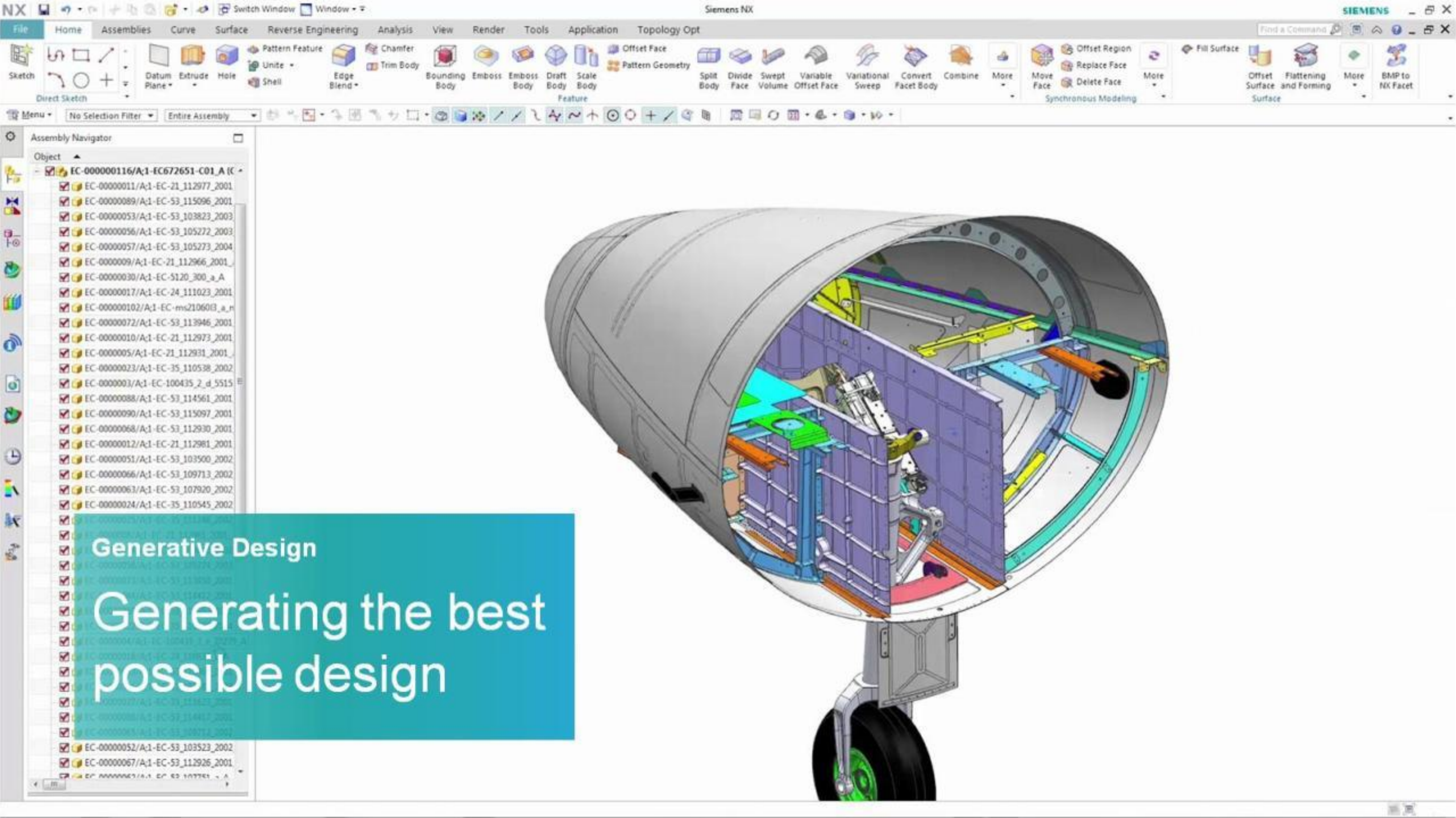
Preview

Radome_DemoPart_Step0_Analysis_fem1_sim2 : implicit_non_linear Result
Time steps, Increment 3, 0.6 sec
Displacement - Nodal, Magnitude
Min : 0.000, Max : 6.317, Units = mm
Deformation : Displacement - Nodal Magnitude
Animation Frame 4 of 15

16.14
14.79
13.45
12.10
10.76
9.41
8.07
6.72
5.38
4.03
2.69
1.34
0.00

Units = mm

Choose Animation Options


Generative Design
Generating the best possible design

The most holistic Digital Twin

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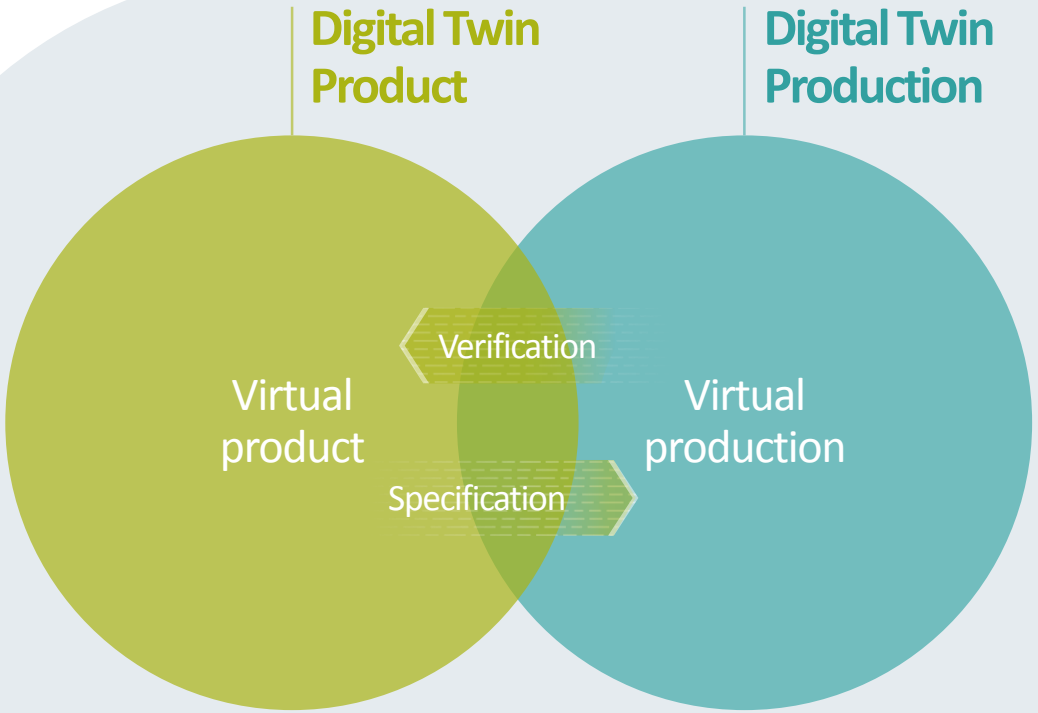
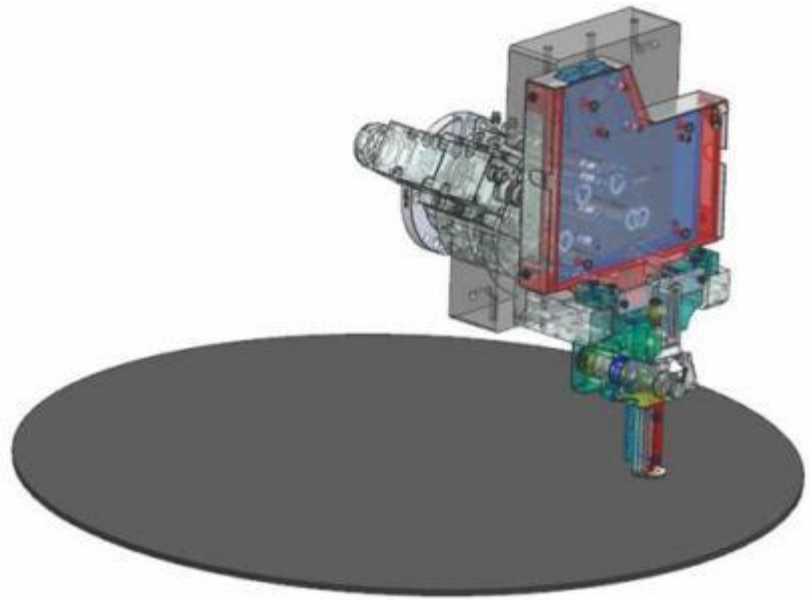


Plan, simulate, predict and optimize production digitally with PLC code generation and virtual commissioning.

Validation of the manufacturing process



The most holistic Digital Twin

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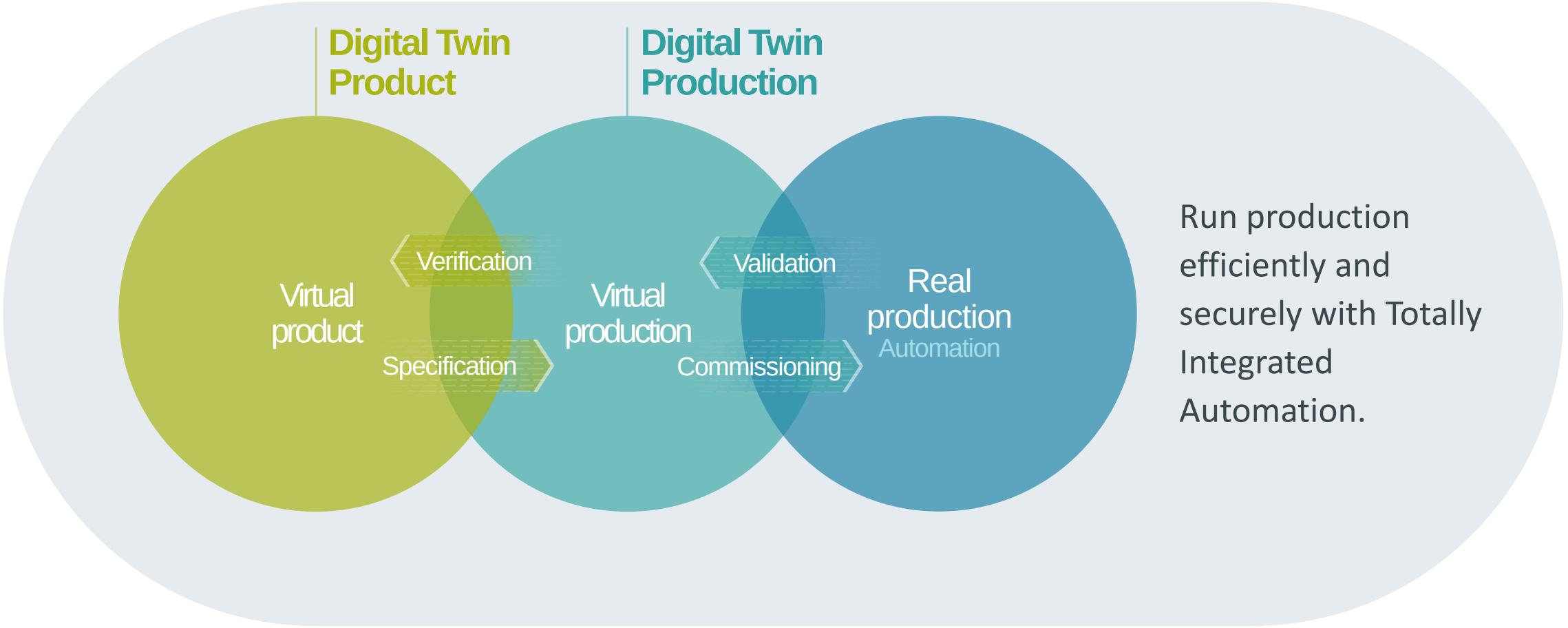
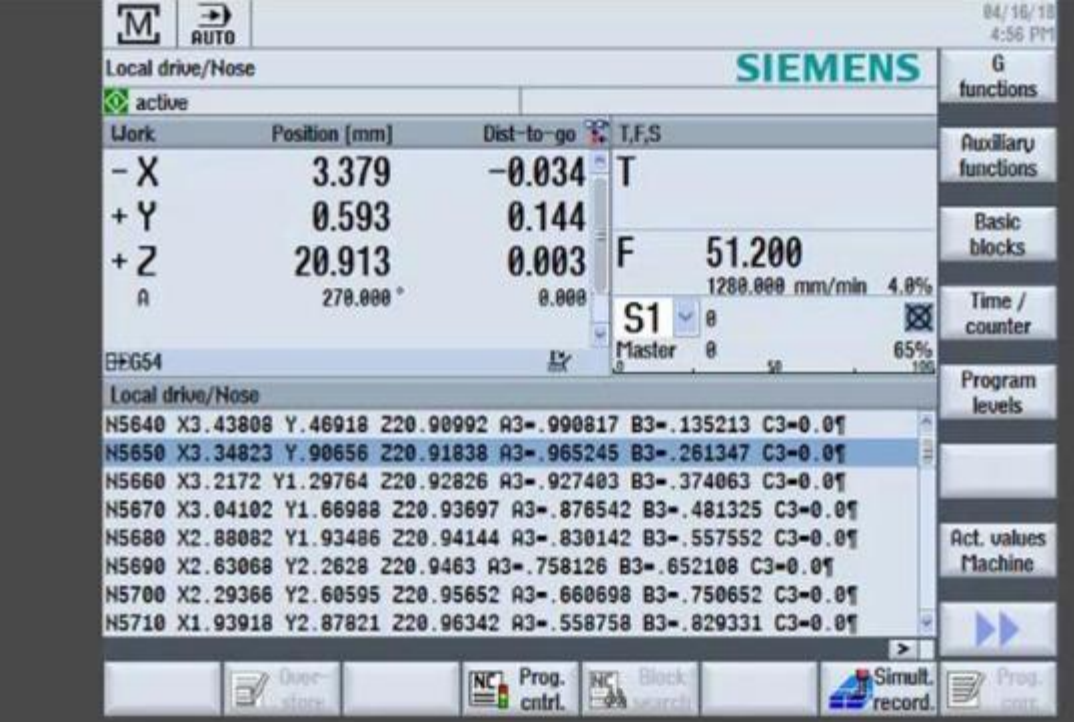


Run production efficiently and securely with Totally Integrated Automation.



Robot-enabled, multi-axis additive manufacturing

The most holistic Digital Twin

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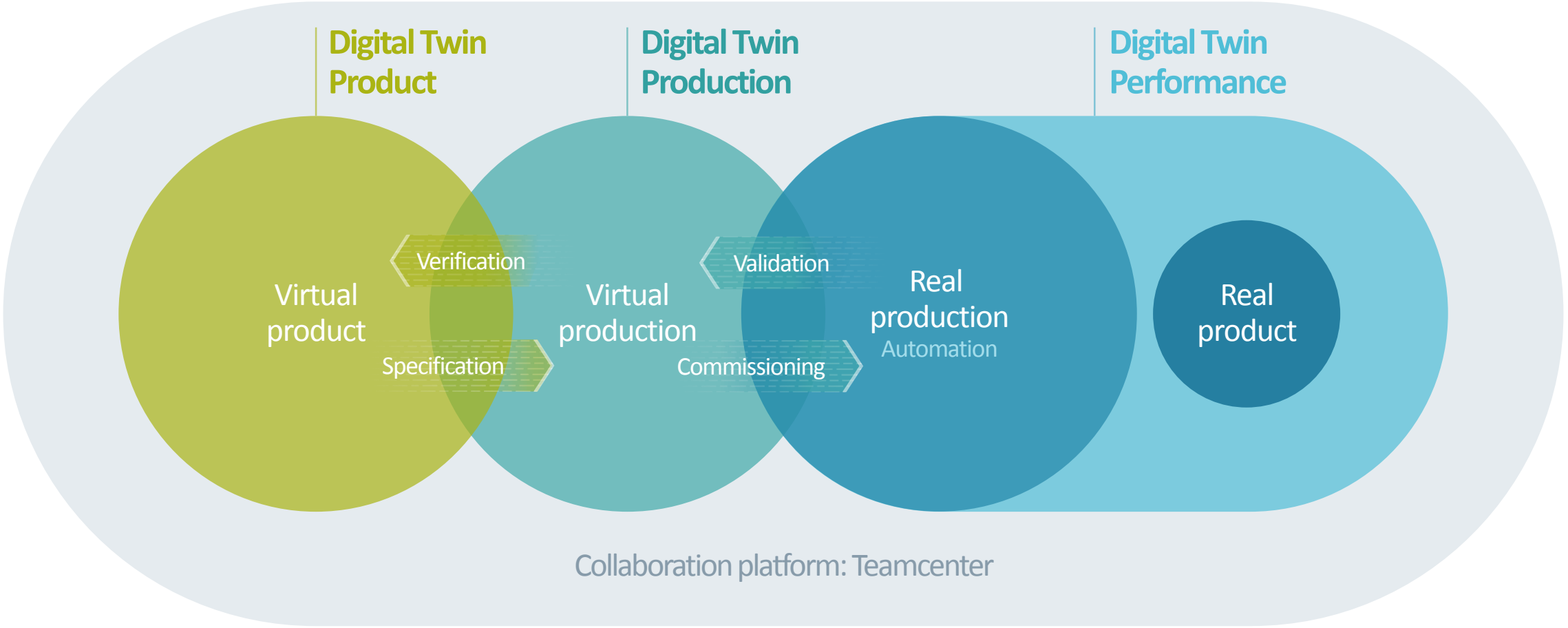


Runtime optimization of production and product through data analysis

MindSphere – the cloud-based, open operating system for the Internet of Things from Siemens

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MindApps

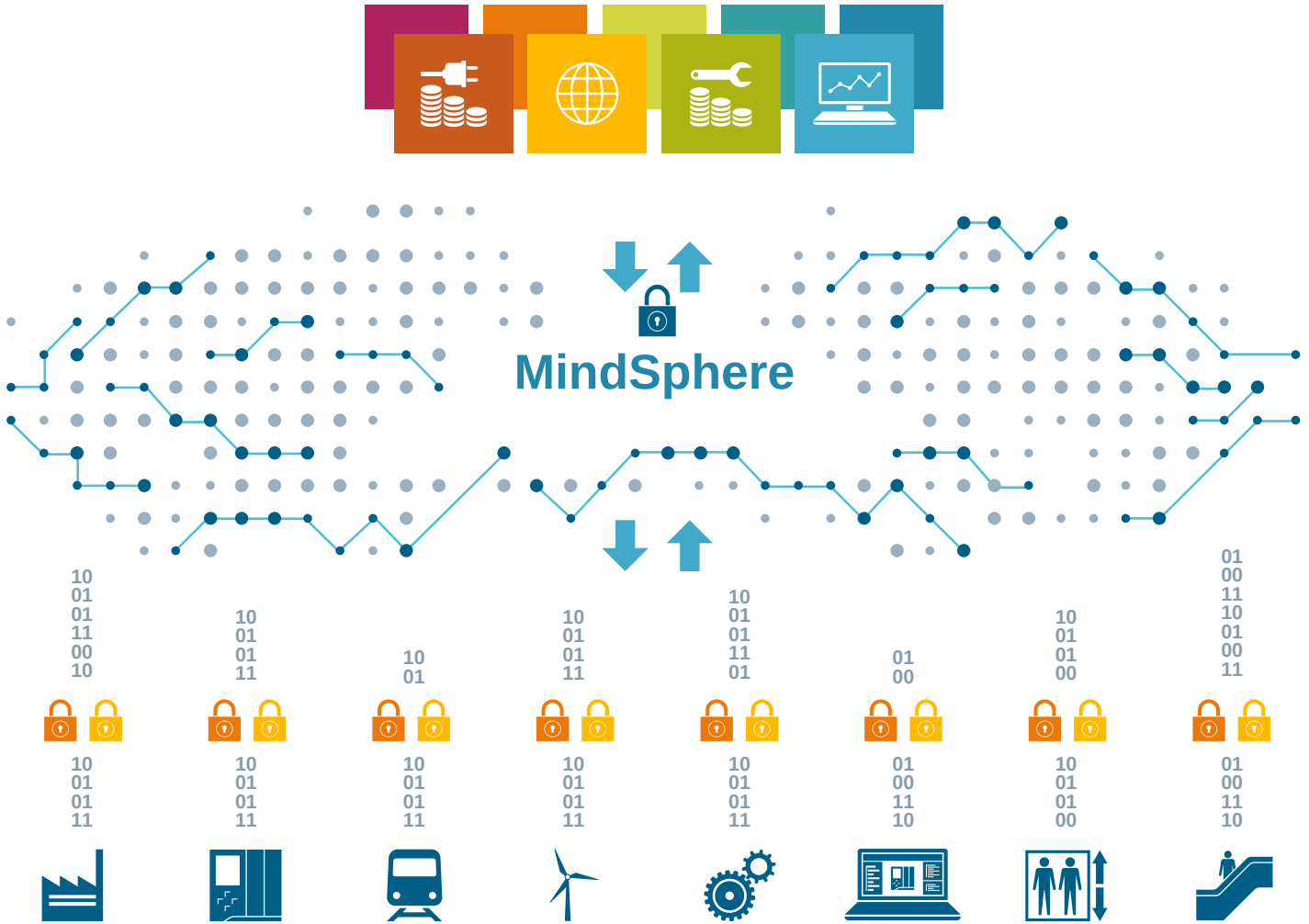
Asset transparency and analytical insights into machines, plants, fleets and systems

MindSphere

Various cloud infrastructures: Public, private or on-premise

MindConnect

Secure plug and play connection of Siemens and third-party products



Continuous evolution to improve product and production

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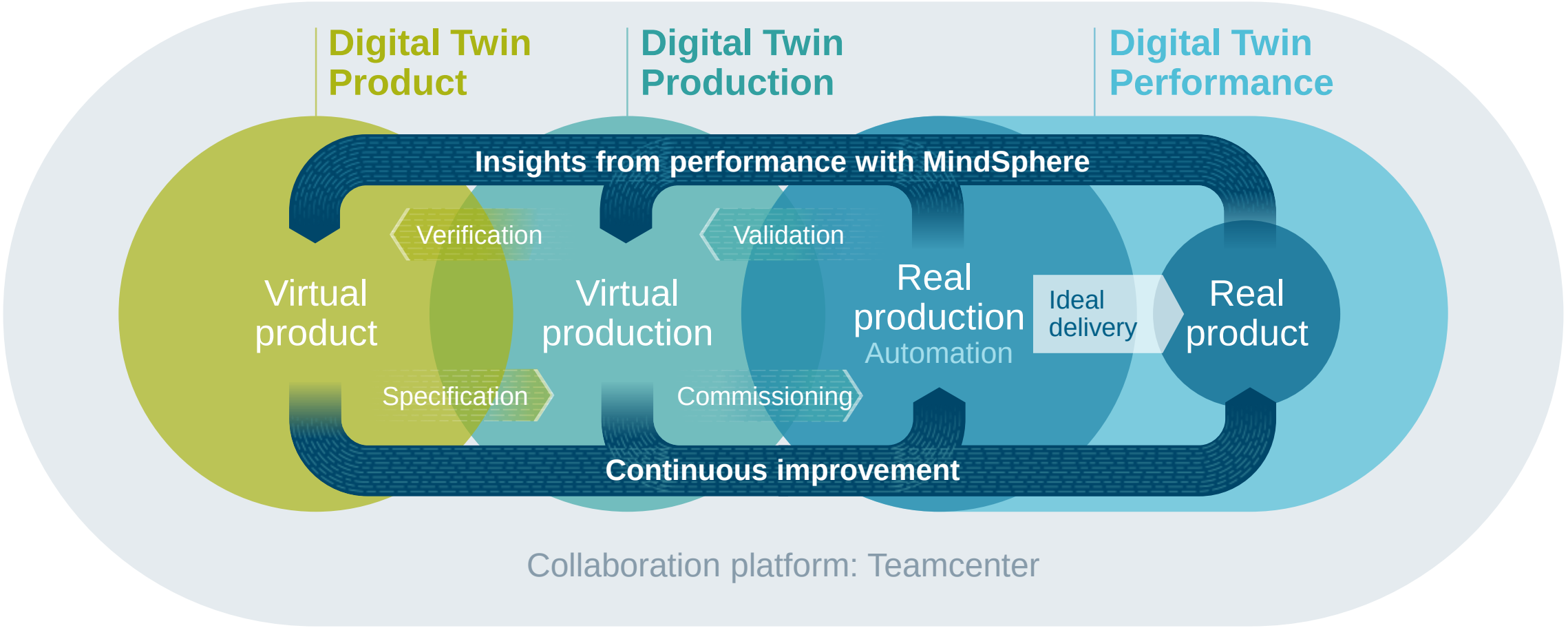

What is happening in the B2B environment and how does this help to create new business opportunities?

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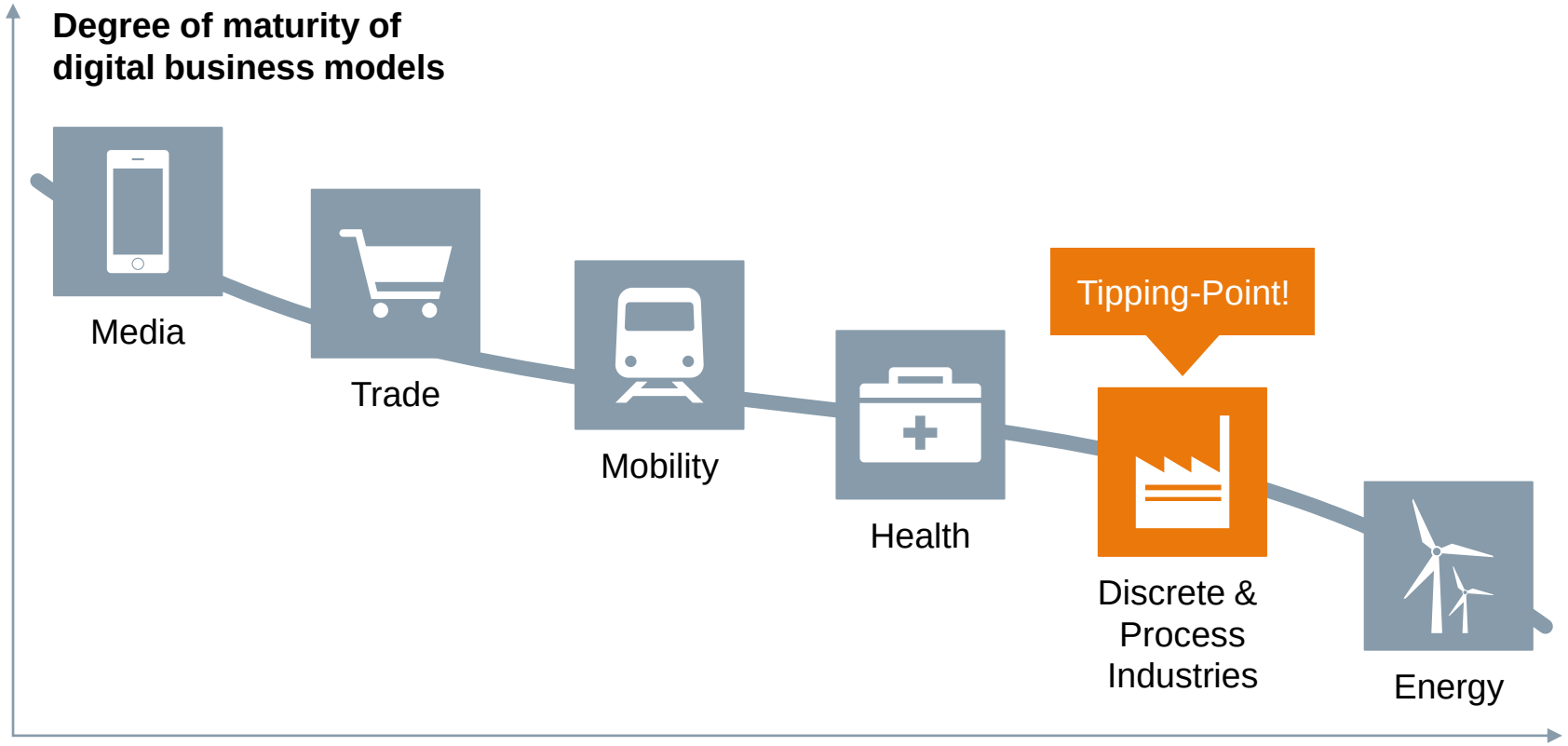
1 Technical Drivers

Digitalization, Sensors, Connectivity, Bandwidth, Computing Power, Data Capturing and Storage, Clouds, Analytics …

2 Business Drivers

New Business Models, Ecosystem concept and Paradigm shift: From product-focused to user-centric mindset …



Source: Based on “Smart Service Welt” report/Accenture visualization

We’re seeing an increasing Digitalization of industries

Industrial Cyber Security builds on innovation…

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… during production and testing

… along lifecycle and for data-based business models

… during operation and service

Penetration Test Automation

IoT Public Key Infrastructure

SiESTA®

Access Management for public clouds

Secure data connectors

DCU

Small footprint IoT Crypto-graphy

Zero touch security

Security Analytics Platform – Artificial Intelligence for Security

Automatic response - Malware containment

Industrial firewall – deep packet inspection

Future automation systems – characterized by more flexibility, autonomy and effortless engineering

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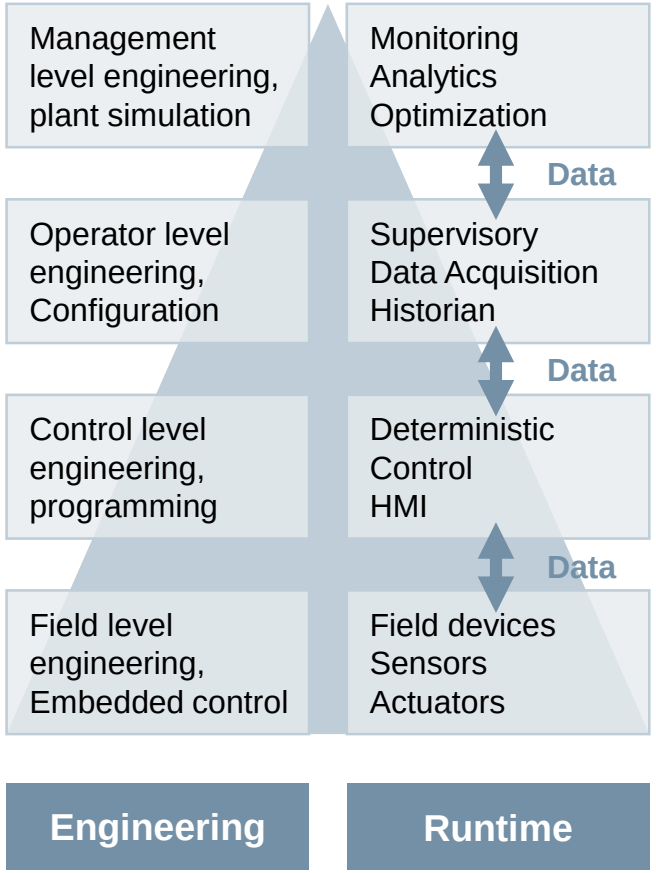
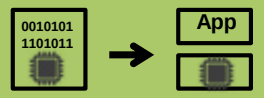
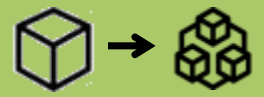
Automation today



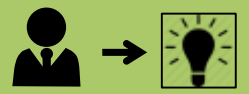
Technology trends



HW-independent execution of SW functions (virtualization)



Modularization and **decentralized control** with ‚plug & operate'

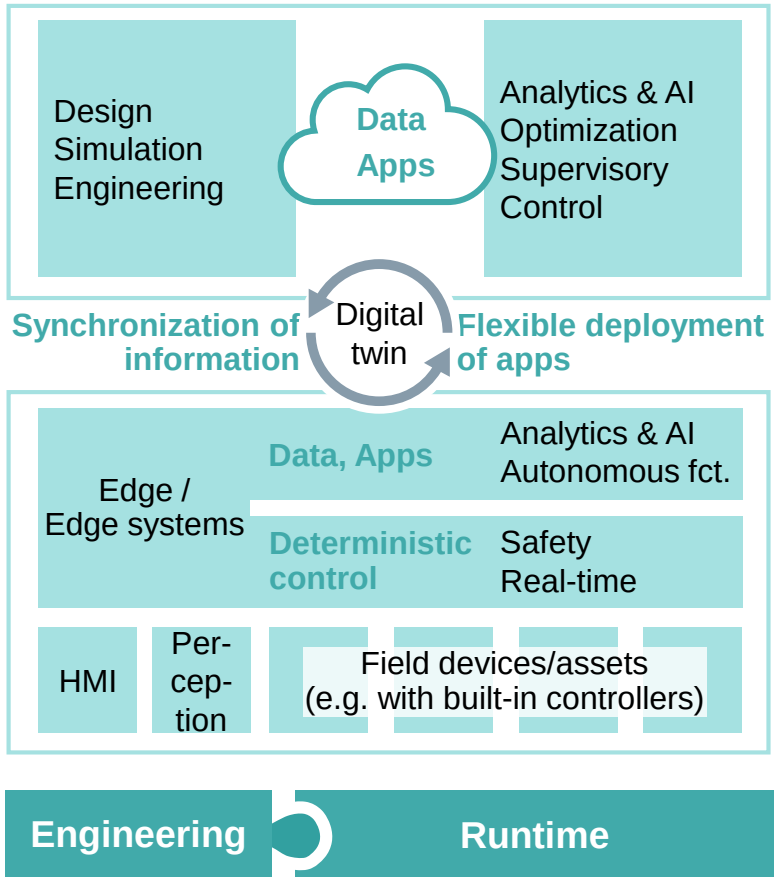


Autonomous and **collaborative functions**

Based on technology drivers:

- IoT connectivity
- Artificial intelligence
- Pervasive computing

Automation tomorrow



Germany’s approach to drive the fourth industrial revolution – Plattform Industrie 4.0

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PLATTFORM INDUSTRIE 4.0

Building on the strengths

of the German industry and Mittelstand (SMEs)

Close cooperation among the private sector, academia, politics, trade unions and associations on thematic priorities …

Reference architectures, standards and norms 1	Research and innovation 2	Security of networked systems 3
Legal framework 4	Work, education and training 5	Digital business models 6

Holistic process to address strategy, testing and standardization – Example Germany

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PLATTFORM INDUSTRIE 4.0

Building on the strengths

of the German industry and Mittelstand

Close cooperation among the private sector, academia, politics, trade unions and associations on thematic priorities: Reference architectures, research, security, legal aspects, work and education, platform economy

Digital Transformation

STANDARDIZATION COUNCIL INDUSTRIE 4.0

Coordinating approach to global standardization

Orchestration of cross-sector standards; strengthen international standardization cooperation in EU/worldwide

LNI4.0 LABS NETWORK INDUSTRIE 4.0

Helping to find the right place for testing

Providing the access to the appropriate test lab; testing before productive use and standardization

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

Europe has a common approach to drive digitalization for manufacturing industry with more impact on global level!

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Trilateral cooperation between France, Germany and Italy started 2017 in Turino:

PIANO INDUSTRIA 4.0

PLATTFORM INDUSTRIE 4.0

Alliance INDUSTRIE DU FUTUR

Shared Action Plan published

- Roadmap cooperation on Digitizing the Manufacturing Industry filed
- Joint activities on EU-Level (Digitizing European Industry)
- Synchronized approach on global standardization

Core areas of cooperation

1 Standardization and reference architectures

Lead: Standardization Council Industrie 4.0 (Germany)
Goal: Synchronized approach to global standardization

2 Engagement of SMEs and test beds

Lead: Piano Industria 4.0 (Italy)
Goal: Help esp. SME to get access to test labs

3 Policy supporting group

Lead: Alliance Industrie du Futur (France)
Goal: Political messages and input e.g. towards regulation

All “Industrie 4.0” initiatives around the world are active with architectures, standardization, use cases and testing

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Plattform Industrie 4.0 cooperates with all these initiatives worldwide

World	  	and India, Australia South Korea … and others
Europe	  	and NL, UK, Denmark, Czech Republic …
… and within G20/B20		

Industry must transform on a global scale – reaching out for international collaboration

Source: Misc.

Siemens Digitalization Hub in Singapore to Boost Smart Nation Effort

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Singapore government sets up first of its kind Digitalization Hub in July 2017 in collaboration with Siemens

60 specialists at present from different disciplines: Data scientists, solution architects, software engineers, domain specialists

To expand to 300 digitalization experts by 2022

For businesses to tap onto the country's digital ecosystem to co-develop innovative digital solutions in IoT and IR4.0

4 Pillars of Focus: Urban Infrastructure Hub. Digital Center for Oil & Gas. Industry 4.0 Hub. Healthineers Digital Hub

Siemens partners with Singapore companies & universities on major projects

Fourteen Company Core Technologies to lead in Innovation

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Additive Manufacturing	Cybersecurity	Future of Automation
Autonomous Robotics	Data Analytics, Artificial Intelligence	Materials
Blockchain Applications	Distributed Energy Systems	Power Electronics
Connected (e)Mobility	Energy Storage	Simulation and Digital Twin
Connectivity and Edge Devices		Software Systems and Processes

Data Analytics & AI – combining a comprehensive set of technologies with our domain know-how

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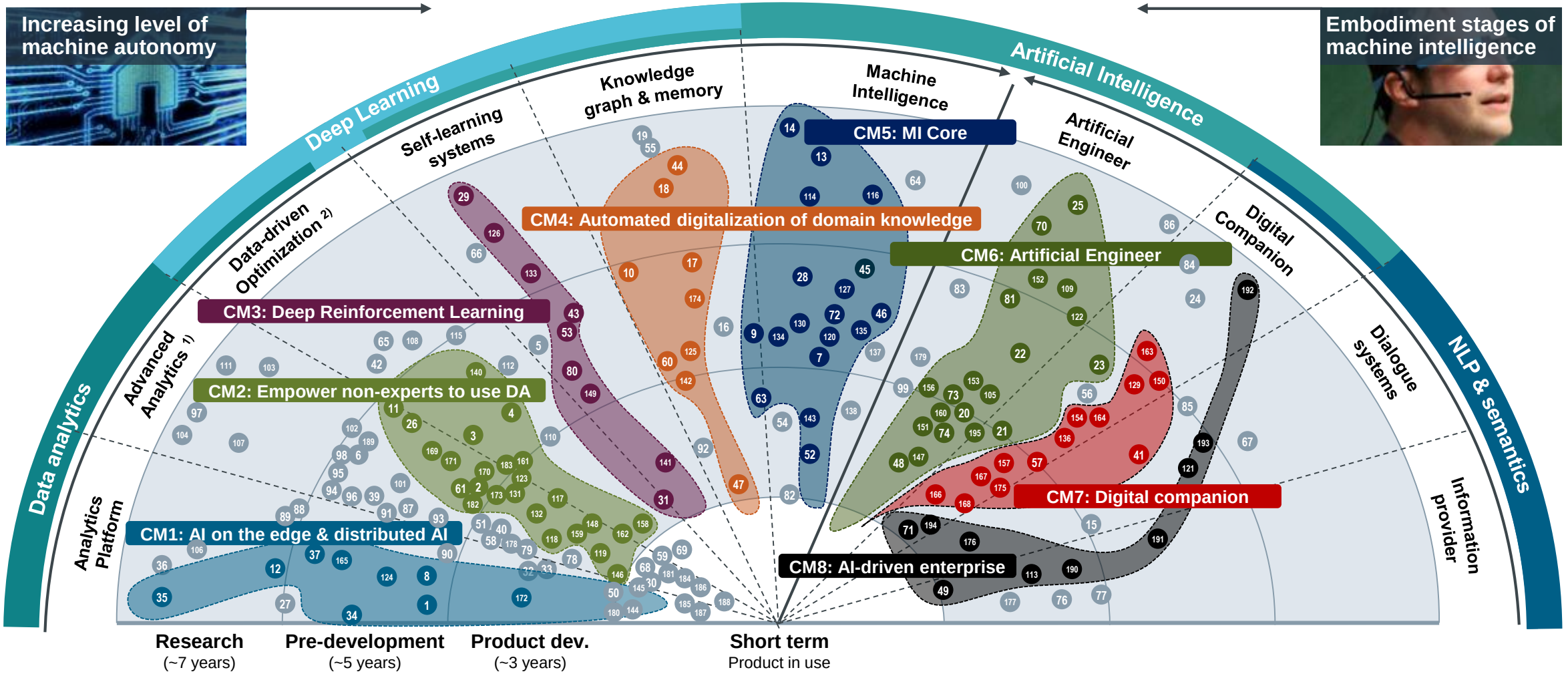

1) Including descriptive, predictive and diagnostic analytics

2) Corresponds to prescriptive analytics

Smart Manufacturing in Malaysia

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What It Entails

Transformation of entire systems in terms of:

- Production of goods
- Management of work processes
- Transparency and optimization

What Malaysia Is:

- One of the world's leading manufacturing countries per capita
- Manufacturing contributes 22% to Malaysia's GDP in the last 5 years
- SMEs make up 97% of the country's manufacturing sector

Source: MITI Draft National Industry 4.0 Policy Framework

Ease of Doing Business by Countries' Comparison (2017)

Malaysia: Ranking **24**
Taiwan: Ranking **15**
China: Ranking **78**

Source: The World Bank

Global Manufacturing Competitiveness Index 2016

- Malaysia is ranked **17th** out of **40** countries

Global Innovation Index 2017

- Malaysia is **8th** in Asia, **37th** globally out of 127 countries

Source: MITI Draft National Industry 4.0

- ✓ Under Pakatan Harapan's Alternative Budget 2018, is to provide an allocation of **RM58.35bil** or 23% for Development Expenditure alone.
- ✓ From this sum, **30% i**s to be set aside for grants to develop human capital and skills

- ✓ Pakatan Harapan's Alternative Budget 2018 mentioned a RM5bil annual allocation for IR4.0 ecosystem.
- ✓ When IR4.0 is fully integrated, it can replace automated jobs now performed by foreign workers, thus reducing our dependence on them, while locals can be 'retrained' for higher-paying, higher-skilled jobs.

Factors for promising digitalization & Smart Manufacturing. Some thoughts …

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Digitalization needs technology …

... core concepts are digital twin and smart data

... but use digitalization to improve your value proposition by generating customer benefits

Digitalization facilitates new business model opportunities …

… join ecosystems established by IoT platform provider

… use international collaboration opportunities


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Thank You