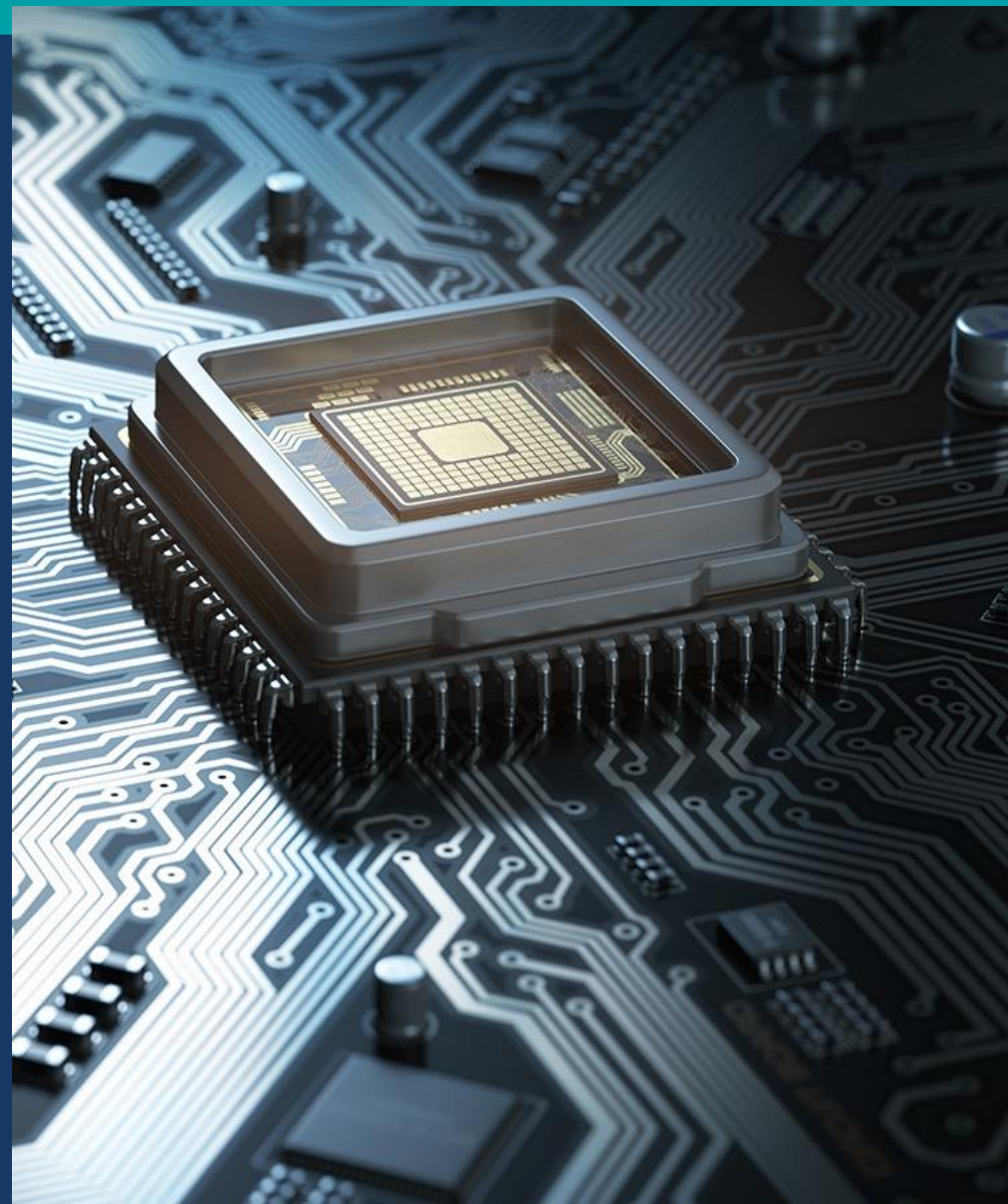
CDT TECH DAY

MAY 28th

Elektronik ve Elektriksel Sistemlerin Üretiminde Entegrasyon

İbrahim Göğüş
Üretim Teknolojileri Direktörü
CDT



CDT TECH DAY

MAY 28th

Connected to Perform

Improving Efficiency, Traceability & Quality in PCB and Harness Assembly

Agenda

- What Does Integration Mean?
- What Are the Challenges?
- Can it Really Be Done?

What Does Integration Mean?

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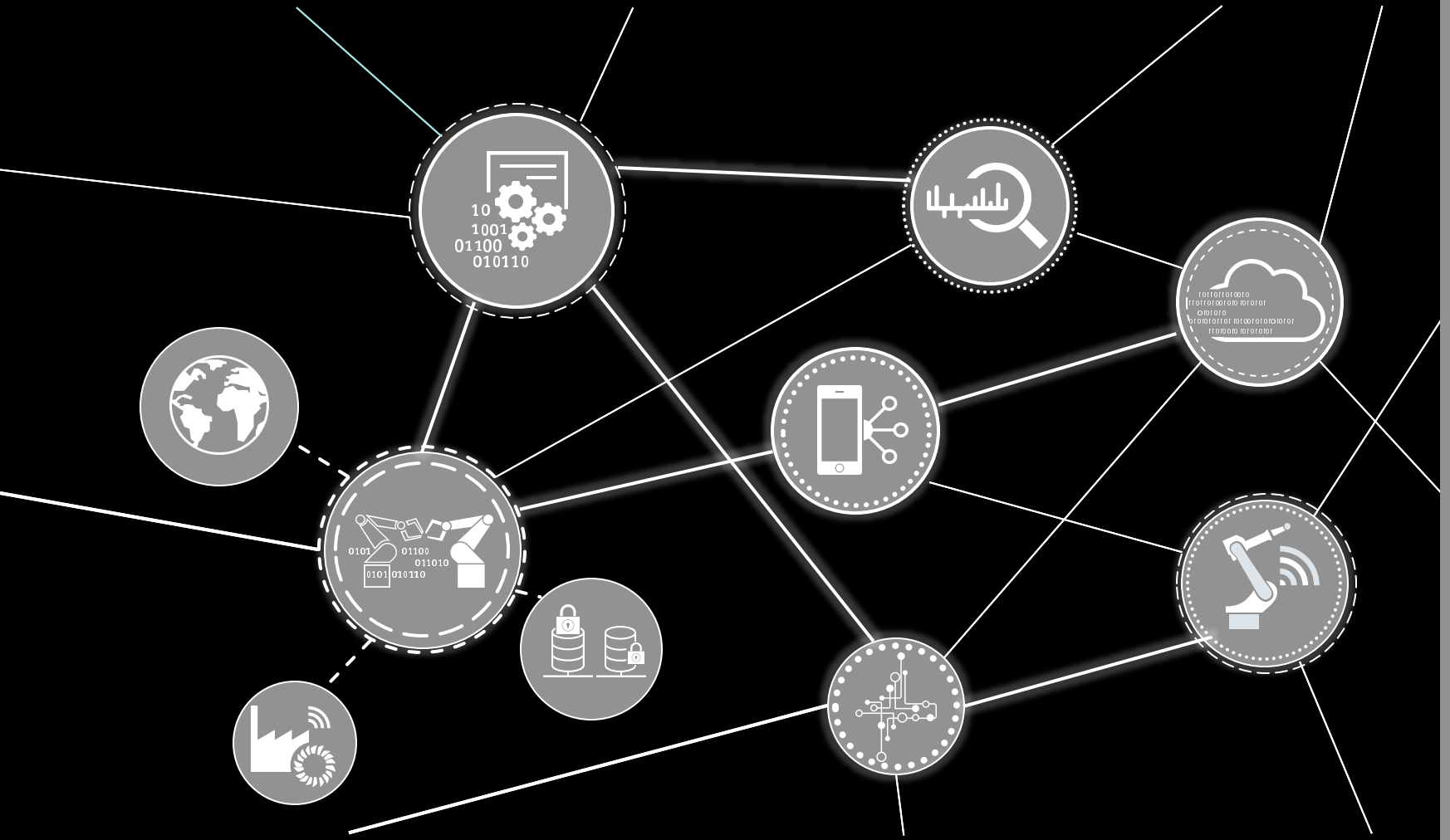
The Meaning of Digitalisation in Manufacturing



Smart Manufacturing is the integration of intelligence in the actual machines, parts, materials, products, buildings and supply chain, and the application of that intelligence within a connected, open end-to-end process and infrastructure. With Smart Manufacturing, data is the master, no longer the system

Forbes

"What do C-Suite executive need to know/understand about Smart Manufacturing"

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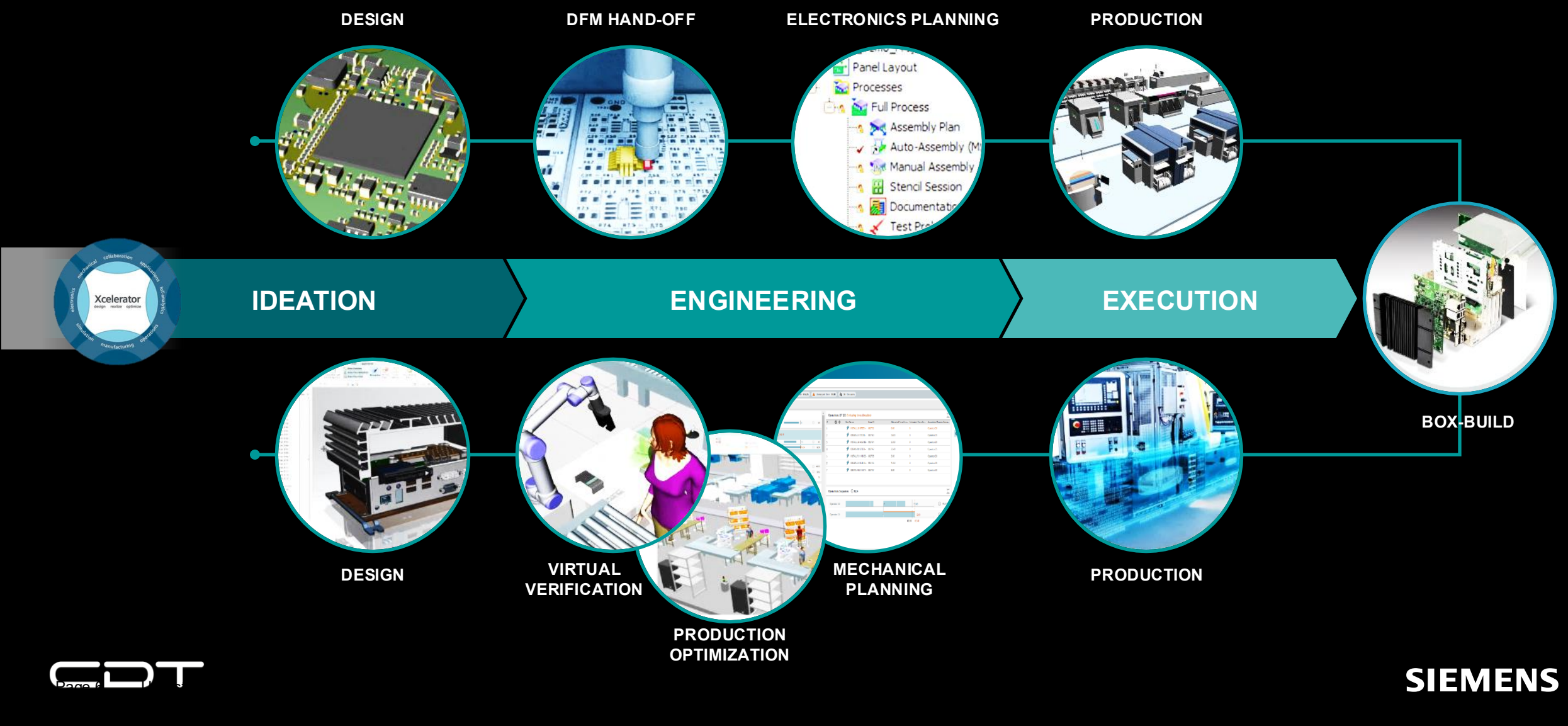
Integration Across Electronic, Electrical & Mechanical Domains



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Vertically Integrated Systems At Every Level

(ISA-95 Enterprise-Control System Integration Framework)

LEVEL 4
ENTERPRISE

ECAD / MCAD

PLM

ERP

Manufacturing Operations Management

LEVEL 3
MES

SCHEDULING

MATERIAL FLOW

DATA ACQUISITION

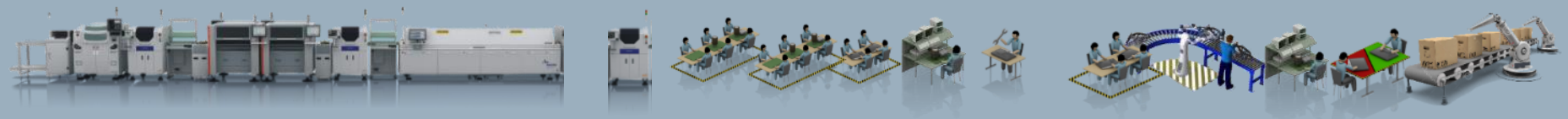
PERFORMANCE TRACEBILITY & QUALITY

ANALYTICS

LEVEL 2

LEVEL 1

LEVEL 0



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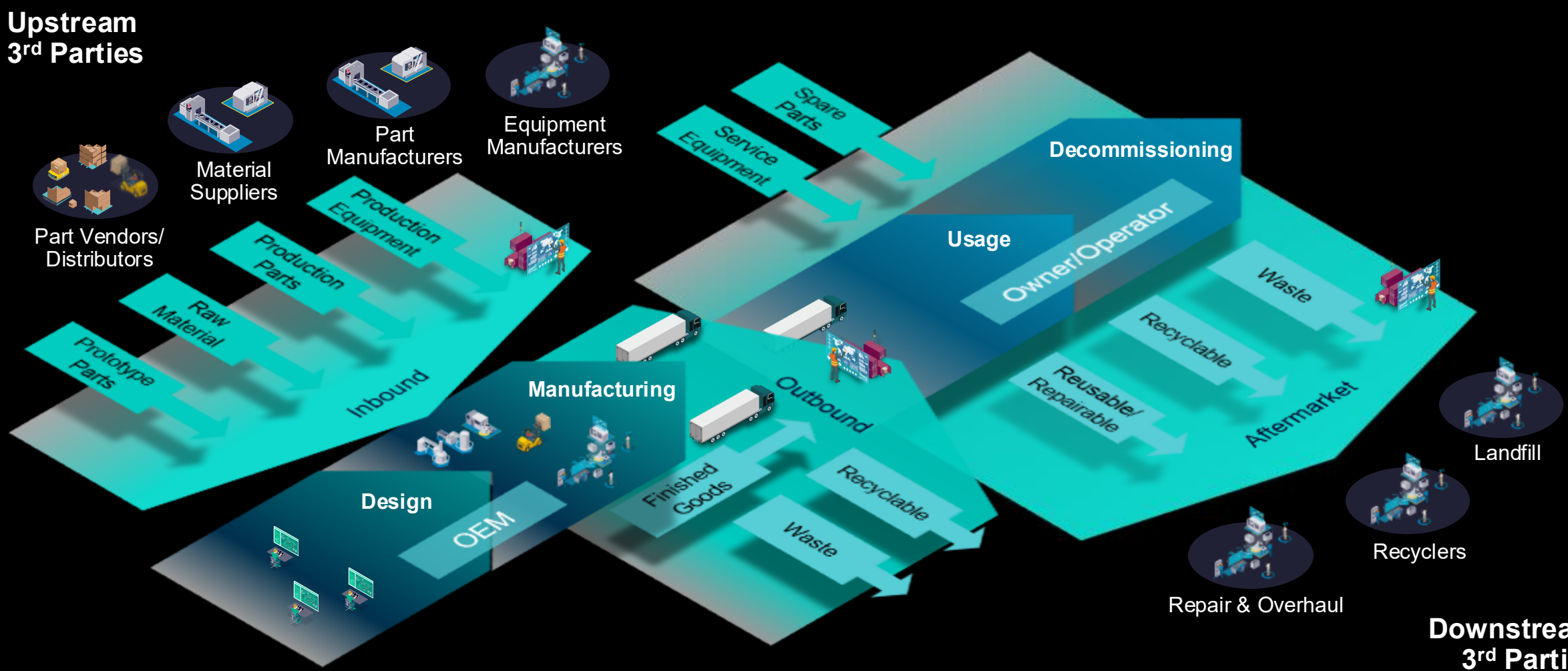
Horizontally Integrated Across the Supply Chain



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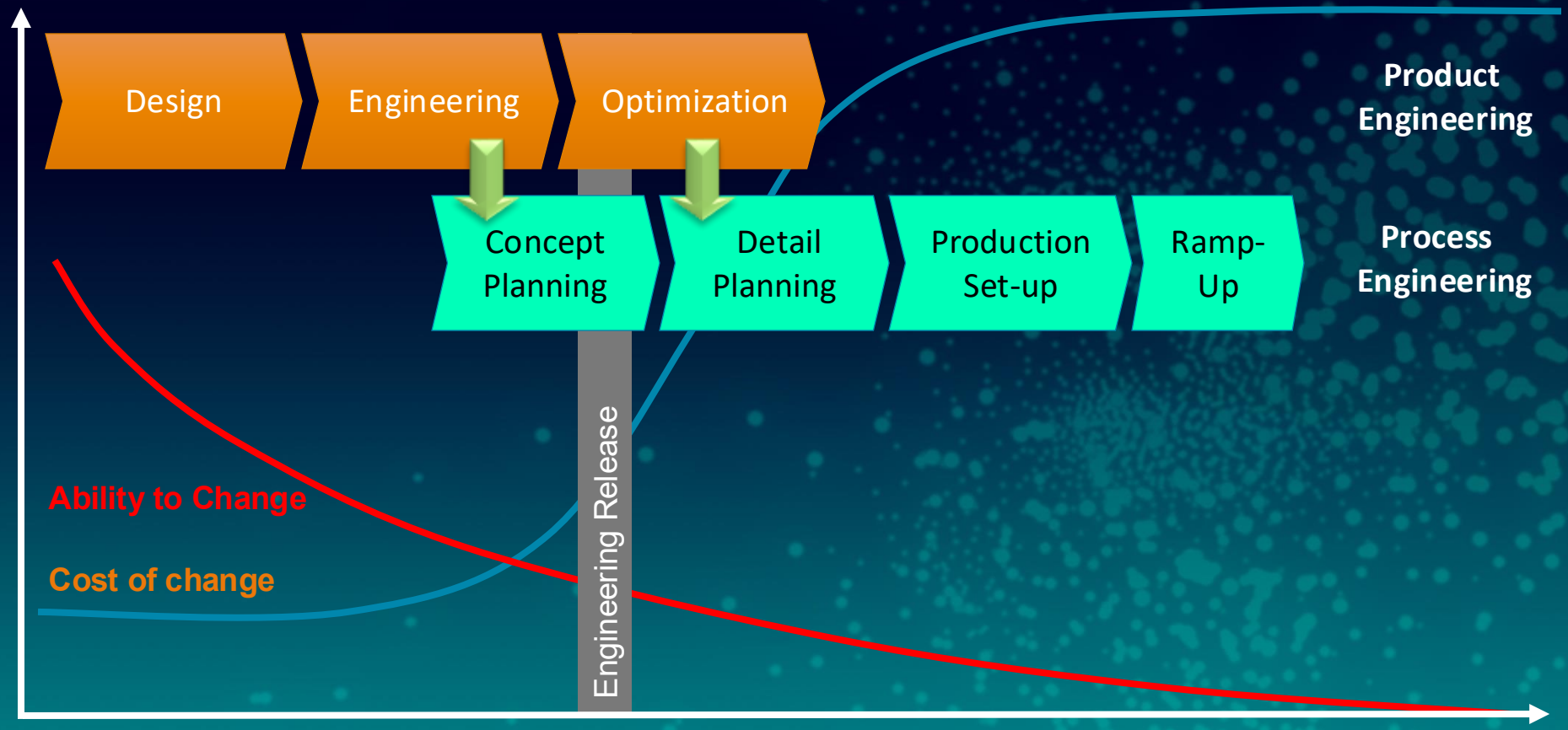
Integrated Across Design & Manufacturing Domains



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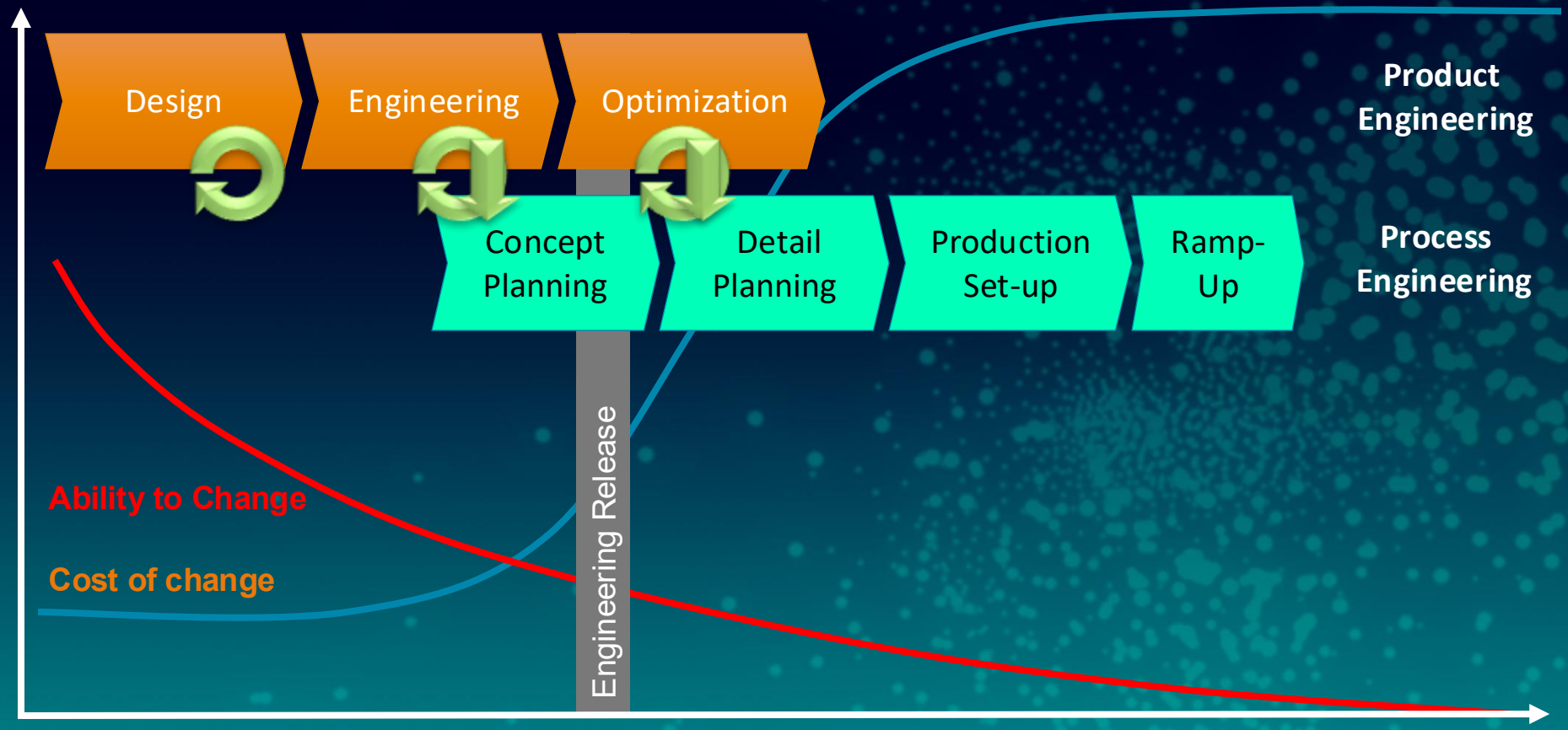
Integrated Across Design & Manufacturing Domains



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What Are The Challenges?

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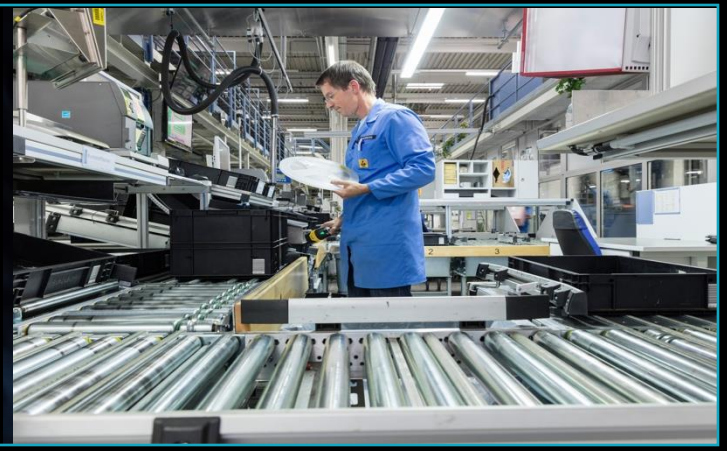
Challenges

Operational / Process Gaps:
Performance Management, Traceability, Quality

Disconnected Enterprise Systems:
ERP, CAD, PLM, MES

Multiple Standards:
IPC2851, ODB++, OML, CFX, OPC UA



No Shopfloor Connectivity:
SMT, Testing, Inspection, Cable Cutting, Manual Assembly

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Impact: Disconnected Silos

PCB Designer

- Designer is located outside the factory
- Lack of DFM knowledge
- Many iterations

Quality Engineer

- Test plan not in sync with assembly plan and product changes
- Difficult to assess quality of the entire product
- No single traceability record

Process Planner

- Product data is complex, outdated, hard to access
- No standardization across sites

Supply Chain Manager

- Component availability
- Low material turnover
- Low predictability
- High scrap rate

Shop-floor Operator

- Different machine interfaces
- Work

IT

- Outdated legacy information systems
- Multiple interfaces to maintain

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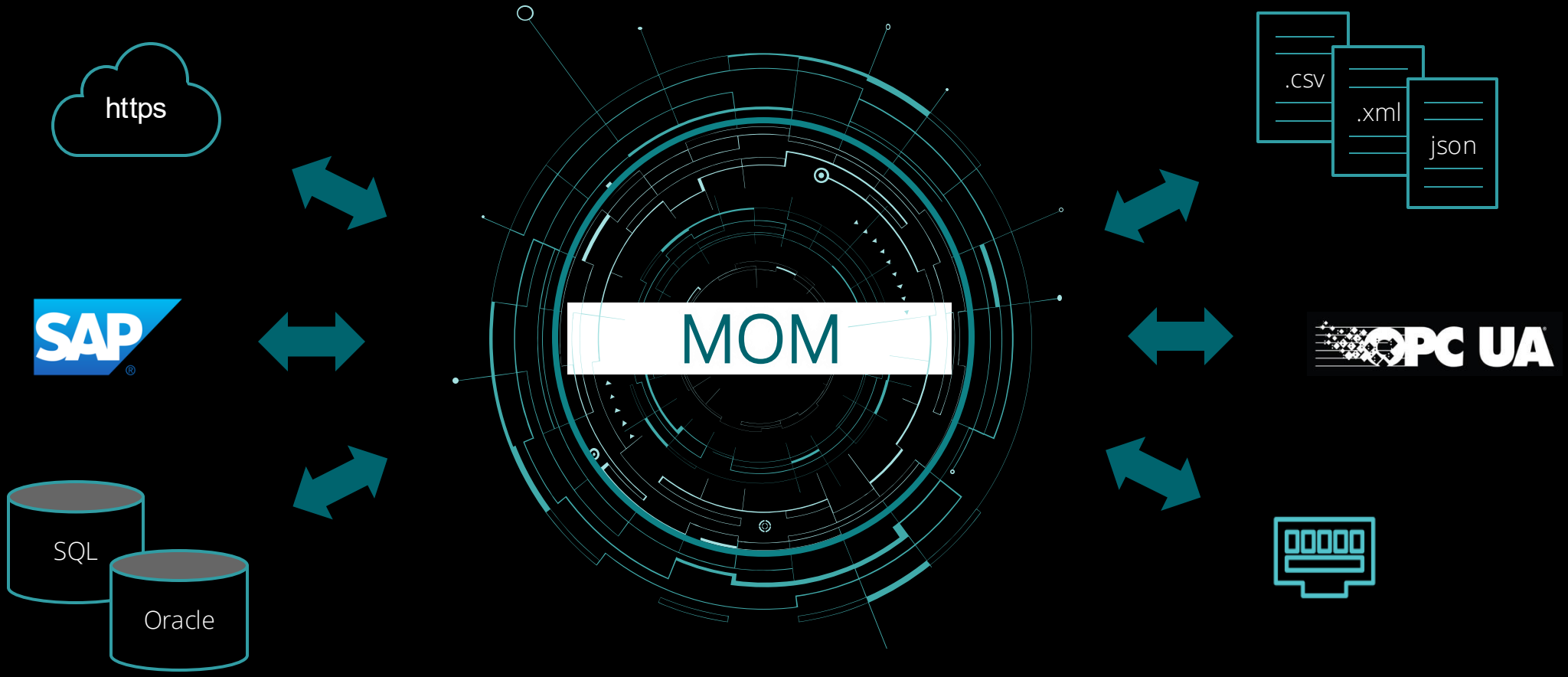
Solution: A State of the Art MOM System



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Solution: With An Integration Platform

Performance

- ✓Low Latency
- ✓Scalable
- ✓High Throughput
- ✓Load Balancing

Reliability

- ✓No Message Loss
- ✓High Availability (Cluster)
- ✓Data Replication
- ✓Secure

Serviceability

- ✓Lightweight
- ✓Few Dependencies
- ✓Simple Configuration
- ✓Realtime Visibility

Flexibility

- ✓Portable
- ✓Edge
- ✓Cloud
- ✓Classic On Premise

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Integration: Foundation of Smart Manufacturing

Improved manufacturing execution

Manufacturing digitalization

Digital Enterprise & Industry 4.0

1
’90s

Stand-alone MES

- Focus on vertical integration
- Rich set of Industry-specific OOTB functionalities
- Real-time data acquisition

2
’00s

Monolithic MOM

- From execution to a broader coverage of manufacturing disciplines
- Scalable solutions, extensibility and code-less configuration
- Data synchronization and contextualization

3
Today

MOM for Smart Manufacturing

- Focus on collaboration through horizontal integration
- Cloud-ready technologies
- Orchestration based on principles of Artificial Intelligence
- Augmented data contextualization through IoT

Can It Really Be Done?

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Digitalization helps us to control the process and be quick and ready to change from one order to the other, compared to programming the machine manually.

Alessandro Ballabio
Production Engineering Manager
ROJ S.R.L

40% Time saved in NPI

20% Increase in output

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Link global product development and production to reduce manufacturing lead time for complex machinery components.

ASM
Global manufacturer of semiconductors & electronics equipment with 10 R&D and 12 production facilities across Asia and Europe.

91%	NC programming time
70%	Part quality improvement
70%	Production efficiency gain

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Harman reduced new product introduction (NPI) time and cost and improved global manufacturing flexibility.

Harman
Based in the USA, established in 1980 and acquired by Samsung in 2017

40%	Time saved in engineering
2x	Faster NPI
$4 m	Annual savings with lean methodology for PCB NPI

Smart Manufacturing Results
Harman

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Improved efficiency to compete with low-cost, offshore manufacturing and leverage proximity to customers as an advantage.

Computrol
Electronics manufacturing services provider for original equipment manufacturers. Based in the USA, established in 1984

100% Digitalized mfg. flow

99% First pass yield

Faster NPI times

Smart Manufacturing Results
Computrol

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We don’t only use our own software and automation tools; we also take advantage of the insights we gain in daily usage and take this information back to R&D to continuously optimize the products.

Siemens has more than **250 factories** worldwide

99.9%	Perfect quality every day
>120	Variations are built per day ~1 product per second
~350	Changeovers per day for **1,200** different products

Smart Manufacturing Results
Siemens Manufacturing Plant, AWS

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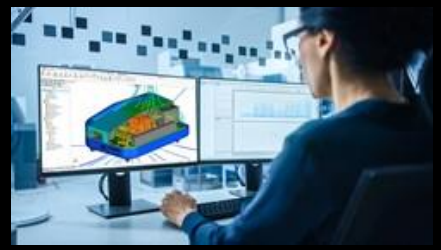
True Integration

Brings Together Engineering & Production Domains

Allows Collaboration Across Mechanical, Electronics & Electrical Systems



Improves Traceability, Quality & Operational Visibility

Enables NPI and Supplier Collaboration

Fundamental to Realising Industry 4.0

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Teşekkürler

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