Increasing Operational Efficiency with Lean Manufacturing and Industry 4.Now

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» Live Showcase

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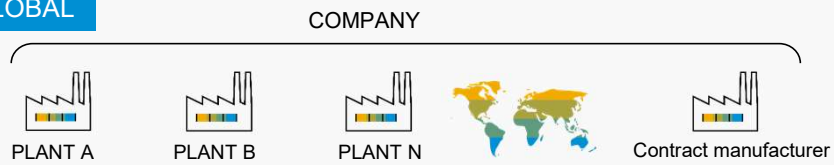
Challenges in Manufacturing

Silos, disconnected systems and manual processes across manufacturing

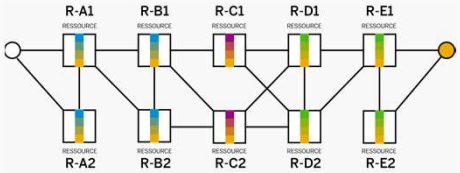
GLOBAL



Lack of **data transparency** for consistent **performance measurement** across plants and contract manufacturers

PLANT

Resource network and modular manufacturing



Hard to optimize **existing labor and equipment capacity** to deliver on production plan to meet demand. Lack of agility to adopt **modular and hybrid manufacturing**.

LINE

Manually intensive production line and machine operation with automation silos.

ASSET

Inconsistent and low **asset uptime** and performance. No integrated actors and sensors.

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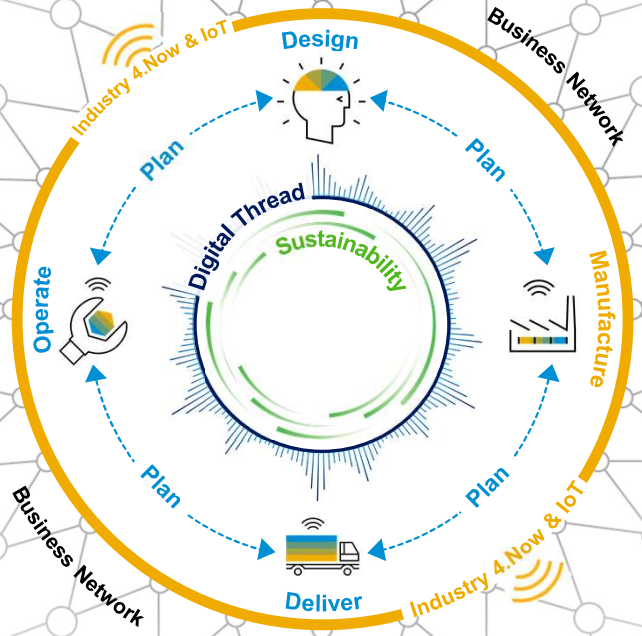
Achieving a Resilient Supply Chain from Design to Operate



Synchronized Planning

Planning as a continuum across the supply chain

Industry 4.Now

Automate for productivity

Business Network

Connect for next-level business collaboration

Sustainable Supply Chain

Circular Economy for zero waste

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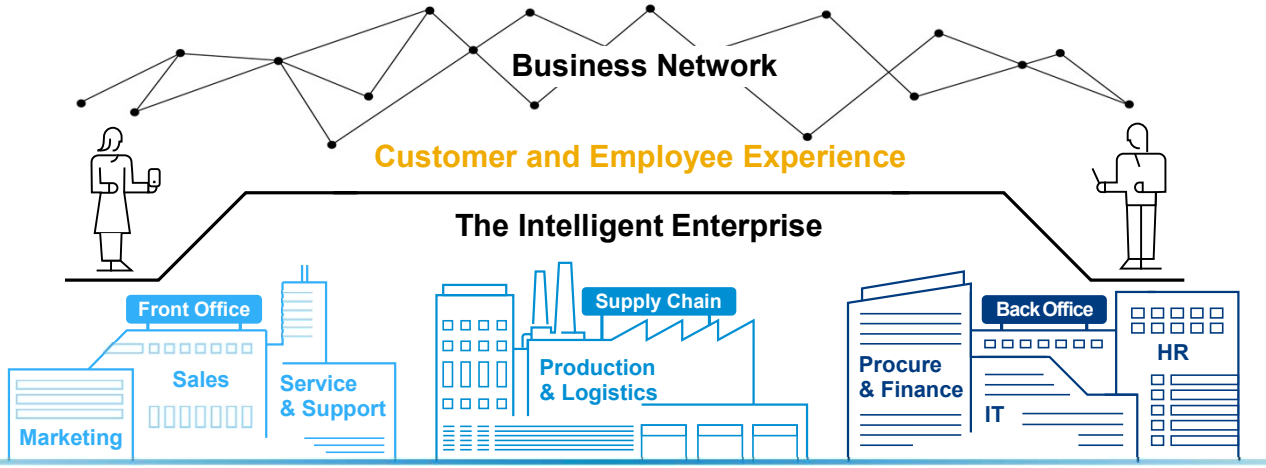
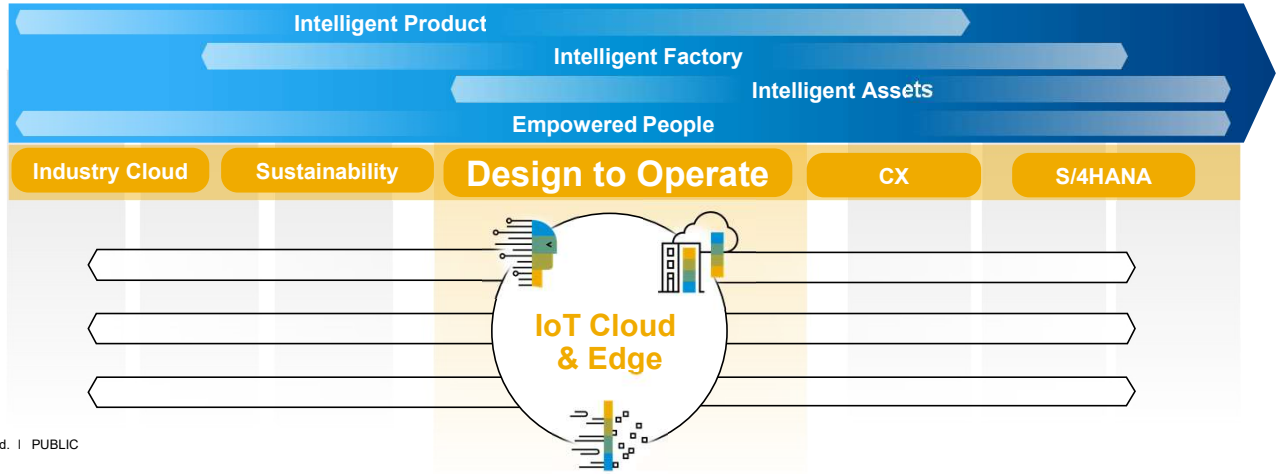
Industry 4.0 – by SAP

Leveraging Intelligent Enterprise Technologies and Applications



INDUSTRY4.NOW
by SAP



Technology Enablers

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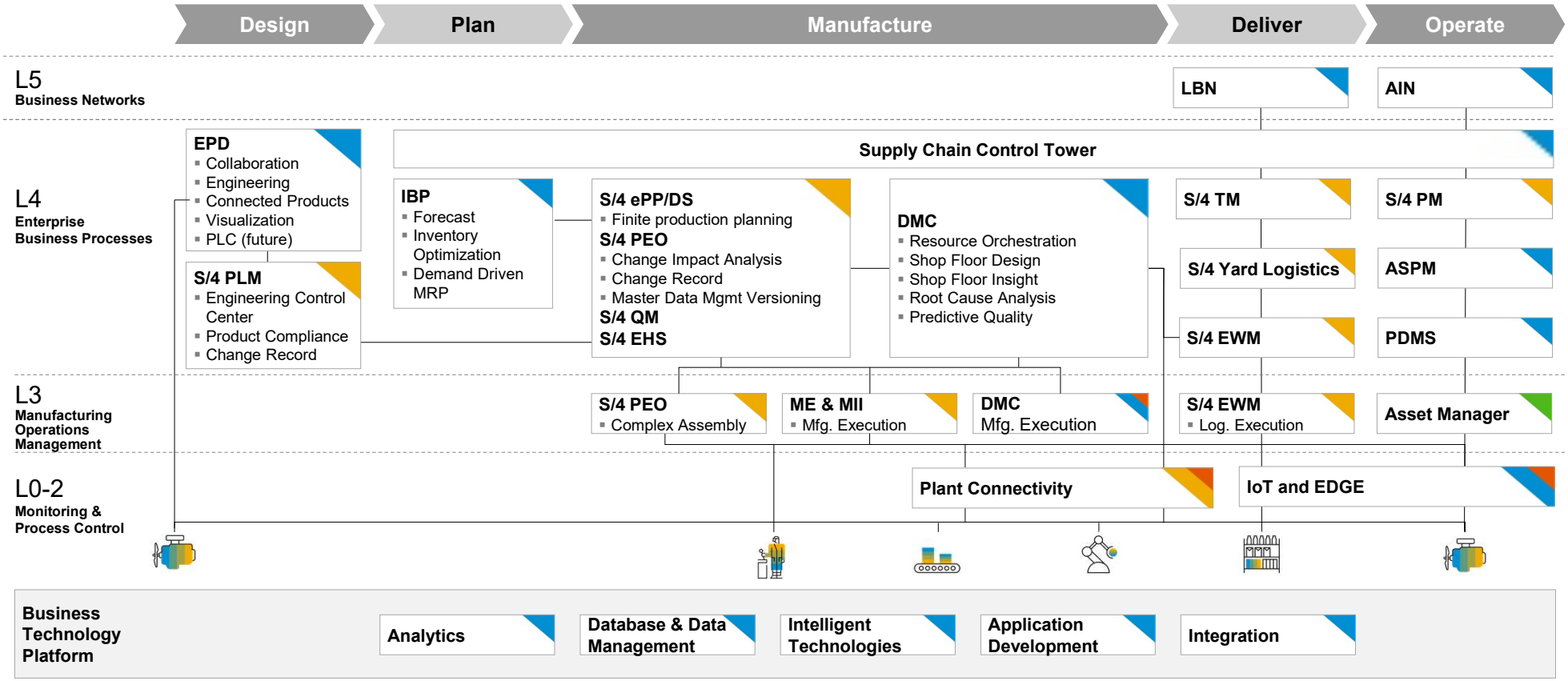
SAP Design to Operate: High Level Building Blocks



Abbreviations:
EPD: Enterprise Product Development; **PLC**: Product Lifecycle Costing; **PLM**: Product Lifecycle Management; **IBP**: Integrated Bus. Planning; **ePP/DS**: Detailed Scheduling; **PEO**: Production Engineering and Operations; **ME**: Mfg. Execution; **MII**: Mfg. Integr. & Intelligence; **PM:** Plant Maintenance; **EHS:** Environmental Health and Safety; **DMC**: Digital Mfg. Cloud; **PCo**: Plant Connectivity; **LBN**: Log. Bus. Network; **TM**: Transp. Management; **YL**: Yard Logistics; **EWM**: Ext. Warehouse Mgmt.; **AIN**: Asset Intelligence Netw.; **ASPM**: Asset Strategy and Performance Mgmt.; **PDMS**: Predictive Maintenance; **QM:** Quality Management

Legend:
Deployed on Mobile
Deployed in the Cloud
Deployed On Premise
Deployed on the EDGE

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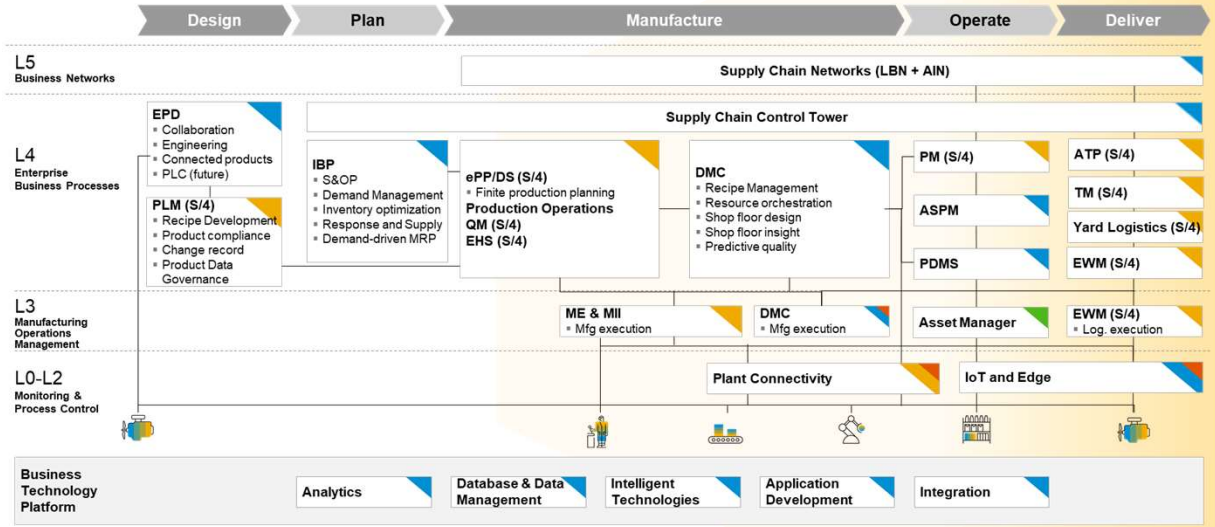
Intelligent Factory



SAP Digital Manufacturing Cloud (DMC)

- Manufacturing Insights
- Manufacturing Execution
- Quality Problem Solving

SAP Manufacturing Suite

- SAP Manufacturing Integration and Intelligence
- SAP Manufacturing Execution
- SAP Plant Connectivity

SAP S/4HANA Manufacturing

- for Production Engineering and Operations
- for Planning and Scheduling
- for Quality Management
- for Environmental, Health & Safety

SAP IIoT

- for Manufacturing with Smart Sensing
- for Logistics with Smart Sensing
- for Assets in Customer service and Plant Maintenance

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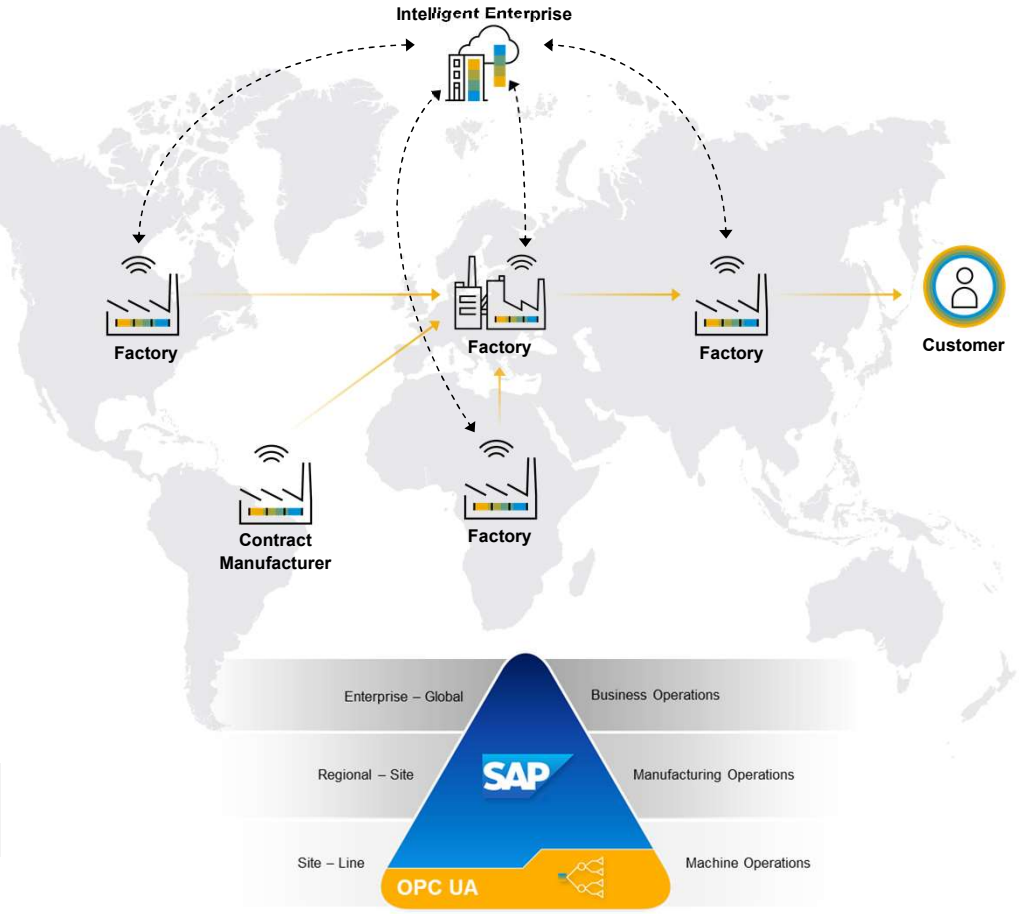
Intelligent is responsiveness

- Collaboration with factories in real time across plan-to-deliver processes increases resilient supply chain
- Better Supply Chain visibility enables improved fill rates, decreased buffer stock, real-time costing and on time delivery
- Transition from push to pull model enables reduced lead times
- Standard automated processes drive productivity improvements and product-portfolio rotation
- Responsiveness and supply continuity enables scaling and time to value
- Faster more efficient **execution** improves throughput, increases quality, and reduces waste



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SAP’s Perspective of Lean

- Lean is a methodology and a discipline
- Lean Manufacturing seeks to **eliminate waste**
- The first step is to identify non value-added rework & bring it into the sunlight
- Ability to produce a wide variety of products on any given day without the need to forecast demand
- **Cost** not Price determines **Profit**
- Everything begins and ends with **Performance Measurement**

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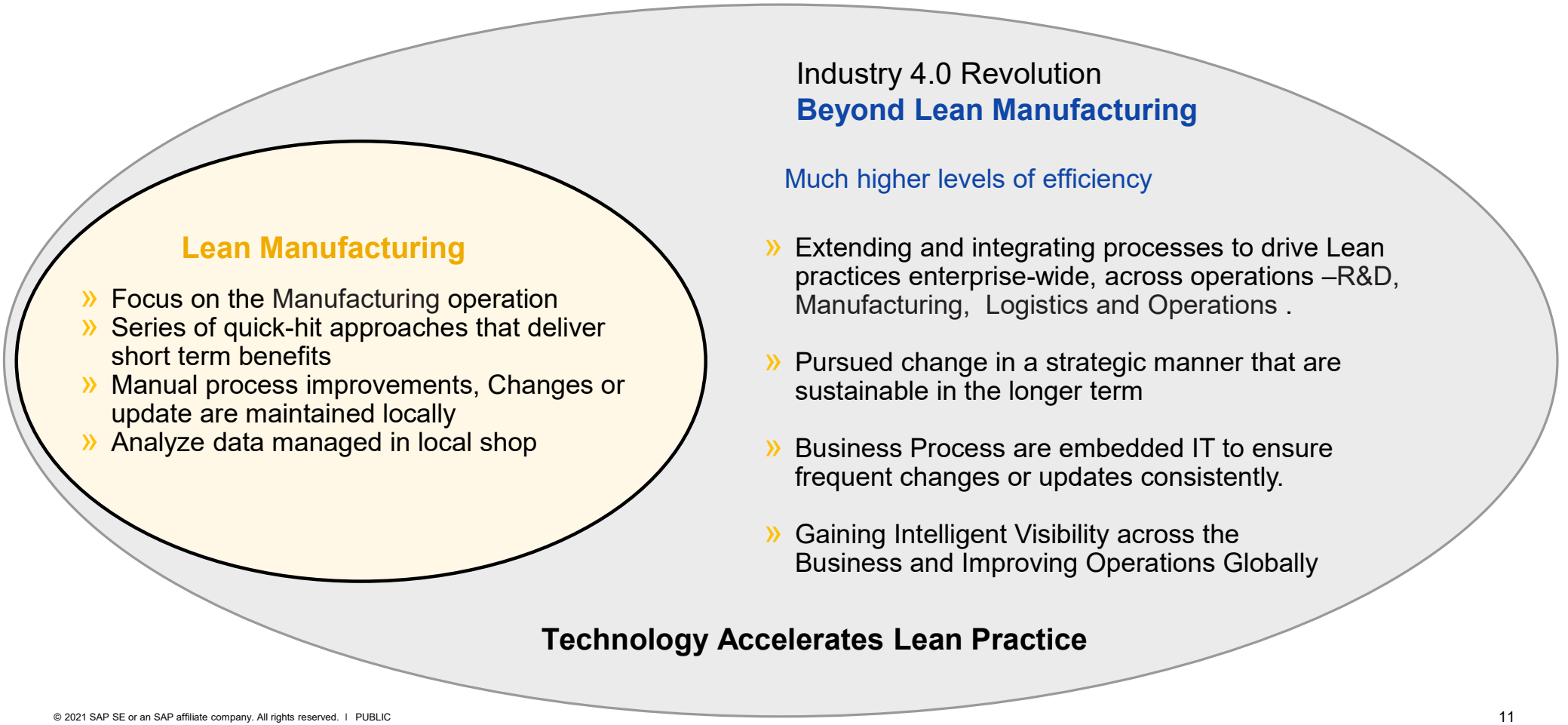
Beyond Lean Manufacturing: Industry 4.0



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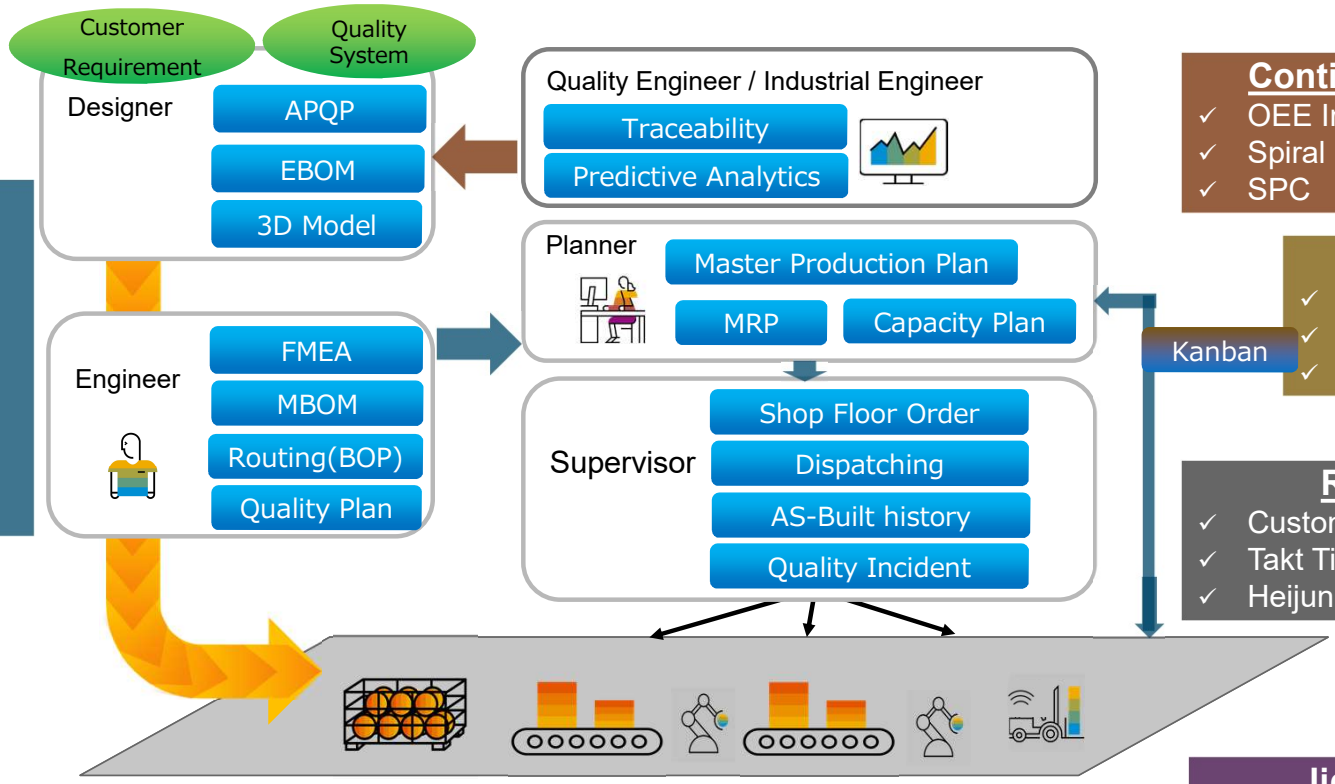
How does SAP S/4HANA Manufacturing Support Lean Manufacturing

Standardized Processes



Standardized Processes
- ✓ Process Design
- ✓ Quality Engineering
- ✓ Customized Products
- ✓ Utilization Rate
- ✓ Cycle Time

Continuous Improvement
- ✓ OEE Insights
- ✓ Spiral up PDCA
- ✓ SPC

Kanban
- ✓ Kanban Board
- ✓ Supplier Collaboration
- ✓ Automated Triggers

Reliable Delivery
- ✓ Customer Demand Driven
- ✓ Takt Time
- ✓ Heijunka - Load Leveling

Kaizen - Product Optimization
- ✓ Just in Time
- ✓ One Piece Flow
- ✓ Autonomous Distributed

Jidoka - Automation
- ✓ Poka-Yoka Error Proofing
- ✓ Root Cause Analysis
- ✓ Real-time Problem Solving
- ✓ Counter Measures

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How SAP Enables Lean Manufacturing

- **Kaizen** – Continuous Improvement for quality products & elimination of waste
- **Jidoka** – Automatic Line Stop to assure quality products
- **Muda, Mura, Muri** – The elimination of Waste through KPI reports
- **Pack Out Quantity** – right products in right containers
- **Poka-Yoke** – Error Proofing to assure quality products
- **Standardized Work** – assures the manufacturing process is being followed to assure quality products and compliance
- **Kanban –** Just in time delivery of materials
- **4M's** – Material, Machine, Man, Method
- **PDCA** – Plan, Do, Check, Act
- **Six Sigma** – Define, Measure, Analyze, Improve, Control

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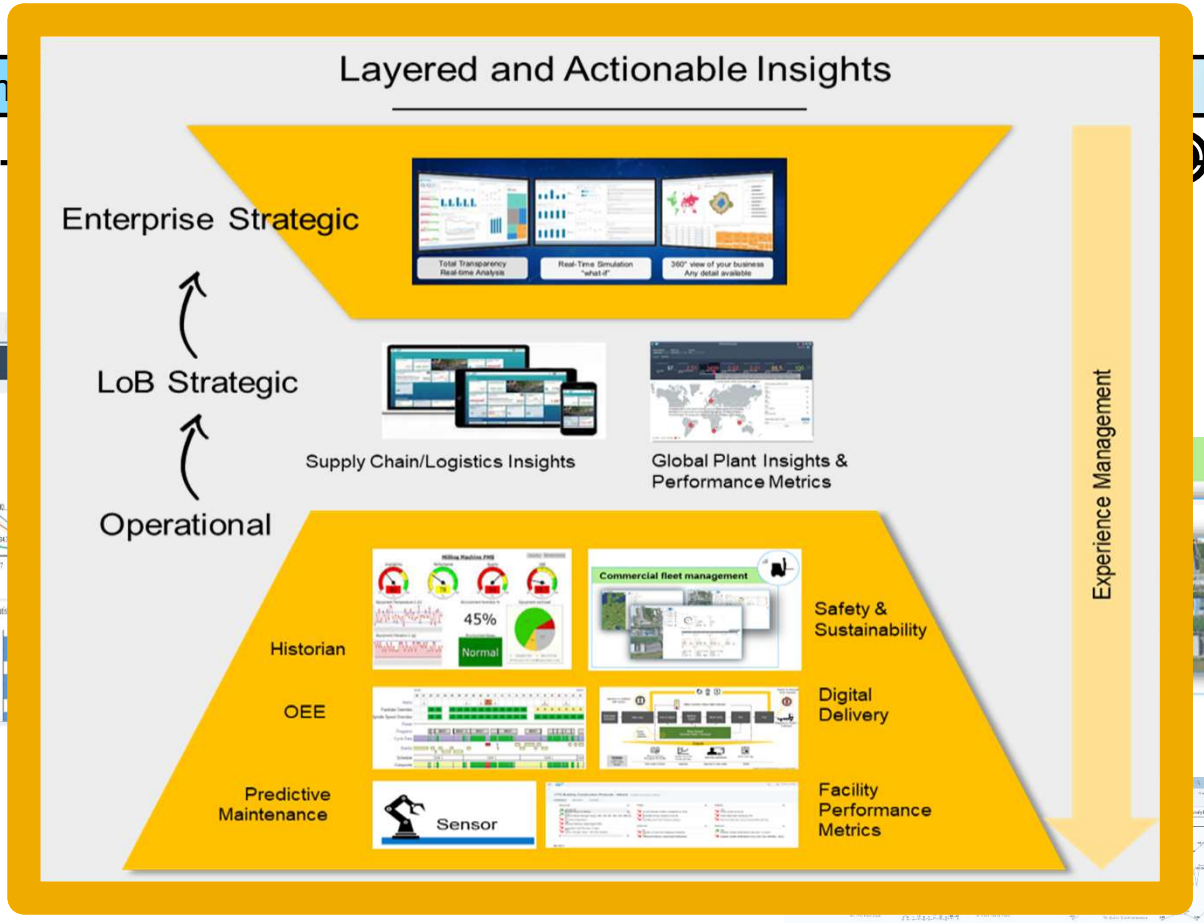
Live Enterprise: Digital Board Room to Digital Operations Center

Digital Board Room

Financials



Logistics Control Tower

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Showcase - Industrial Partnerships

SAP

BECKHOFF
Automation technology

EVOGUARD
Double-seated valve

gebhardt
Warehouse

APPLIED Industrial Technologies
MIR AGV

KRONES
Bottling bock

TRIACOS KRONES Group

KUKA
Robotics

KOLVER USA
Industry 4.0 Torque driver

METTLER TOLEDO
Weighing scales discrete

FUJITSU

Atlas Copco
Torque driver and tightening technology

SCHUNK
Grippers

SICK
Sensor Intelligence.

3DSignals
Brown field connectivity to cloud

KINEMIC HANDSFREE INTERACTION
Gesture control

CAPTRON
Sensor button technology

Endress+Hauser
Sensors

OPC UA

sartorius
Weighing scales process

INTRANAV
Inhouse Geotracking

NEOCEPTION Pepperl+Fuchs
Kanban

ROCKETFARM
OPC UA empowerment

UNIVERSAL ROBOTS
Robotics

NavVis
Digital 3D environments

ZEBRA

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D2O from Discrete Industries to Process Industries

The life cycle of a valve for batch production

DISCRETE ASSEMBLY

Design and operate a discrete unit to produce and mix syrups

double seated valve

Design product and assemble it

BATCH PRODUCTION

Develop a recipe for a concentrate, produce, mix and pack the product.

Liquid concentrate

Develop recipe and produce batch

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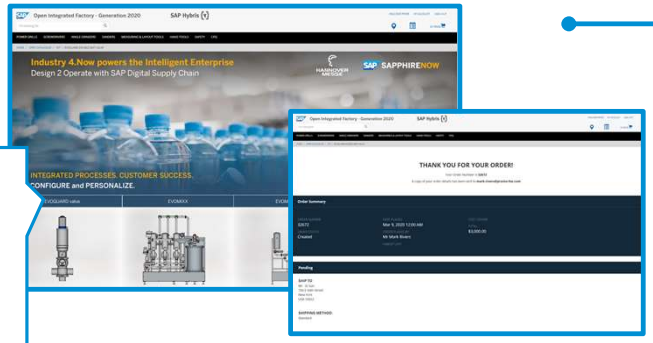
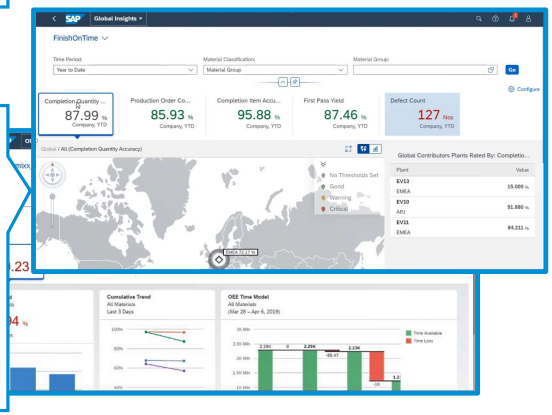
Use Cases covered in SAP Industry 4.Now Showcase

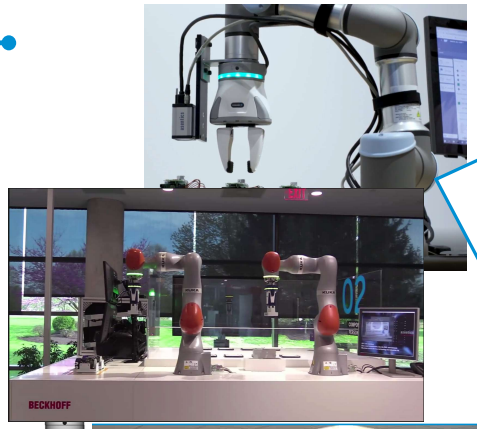
Intelligent Factory for Discrete Industries

- Personalization
- Lot-Size-of-One
- “As-built” Genealogy



- Real-time shop floor to top floor analytics
- Digital Operations Center
- Digital Thread/one pane of glass: Manufacturing & Maintenance





- Production order scheduling (drilling down to planning horizon of one-day)
- Inbuilt quality management w/ Visual inspection
- Component personalization
- IoT-enabled Kanban
- Industrial machine connectivity
- Machine-to-machine orchestration

- Automation of Production Material Flow
  - Automated Warehouse
  - Dynamic routing
- Digital twin of final manufactured equipment
- Digital product history
- Outbound delivery with transportation management
- Gesture-based interfaces
- Modular manufacturing (Matrix Production)

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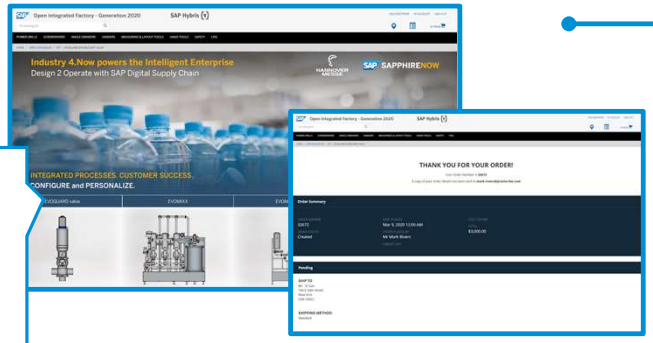
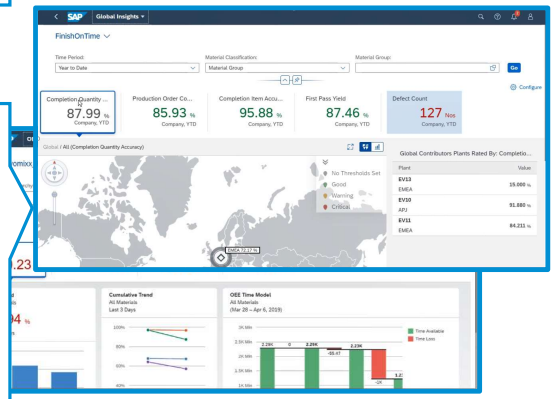
Use Cases covered in SAP Industry 4.Now Showcase

Intelligent Factory for Discrete Industries

- Lot size of One
- Heijunka



- Muda, Mura, Muri
- Kaizen



- Poke-yoke
- Standardized Work
- Kanban

- Jidoka & Automatic Line Stop
- Packout quantity & Pitch

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Over to the Live Showcase!

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Moving beyond the factory with the

INDUSTRY4.NOW

EXPERIENCE

Industry 4.Now Program
Thomas Saueressig, Member of the SAP Executive Board

Our strategy for Industry 4.0, which we call Industry 4.Now, goes well beyond smart manufacturing in factories and plants. It connects production with end-to-end process execution across the supply chain – so you can reach a new level of connectivity and adapt to change on the fly. Industry 4.Now unlocks the full value of Industry 4.0.

↓ EXPLORE NOW

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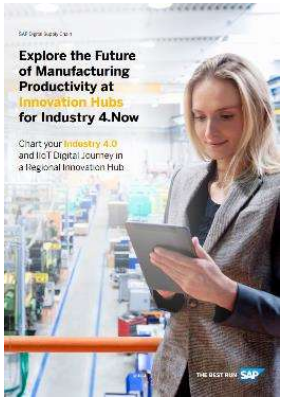

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Q&A

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Thank you.

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