S/4HANA Essentials Workshop
What every IT and Business Professional Must know About SAP S/4HANA - Manufacturing and Supply Chain

Mike Luk, Senior Solution Manager, SAP Hong Kong
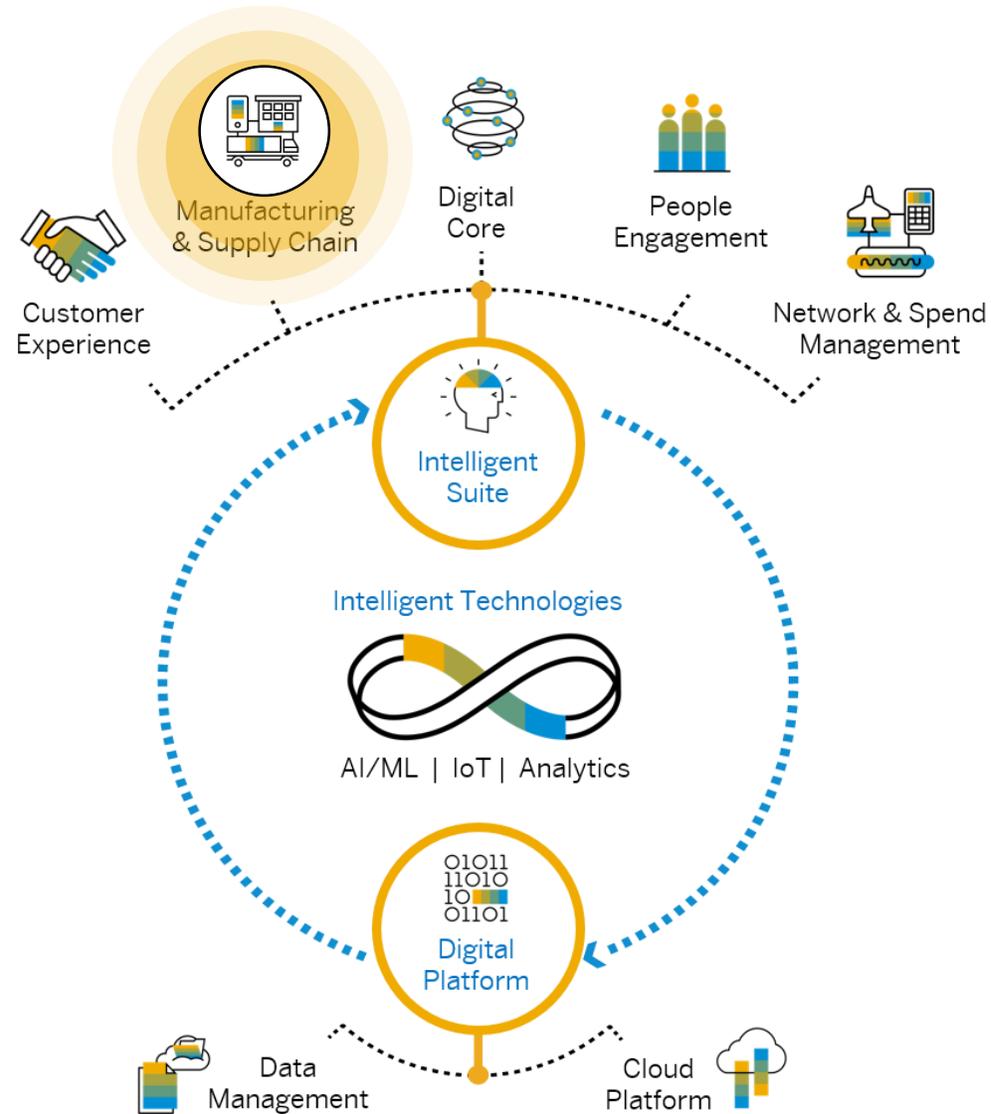
Hong Kong
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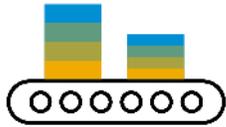
The Intelligent Enterprise framework

THE INTELLIGENT ENTERPRISE features 3 KEY COMPONENTS:

Manufacturing & Supply Chain
Digital Core
People Engagement
Network & Spend Management
Customer Experience

Intelligent Suite

Intelligent Technologies

AI/ML | IoT | Analytics

Digital Platform

Data Management
Cloud Platform

1 Intelligent Suite

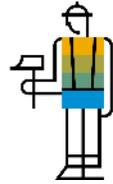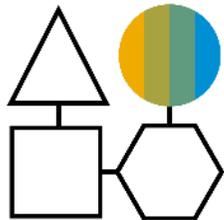2 Digital Platform

3 Intelligent Technologies

New Market Trends Require New Manufacturing Business Models
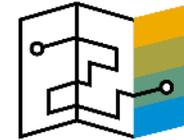

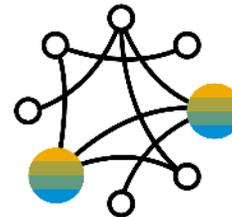Mass Production → **Individualized Products**

Manual Labor → **Automation**
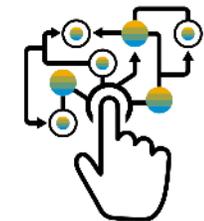
Disconnected Processes → **Integrated Shop Floor**

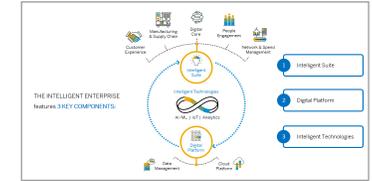Goods on Stock → **Predicted Demand**

Our solutions in manufacturing help you become an intelligent enterprise

Digital Products and Projects

Portfolio and Project Management
Product Compliance
Product Development and Configuration
Product Formulation and Recipe Development

Digital Business Planning

Demand Management and Insights
Sales, Inventory and Operations Planning
Response and Supply Planning

Digital Manufacturing

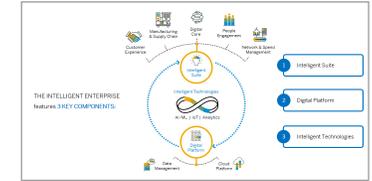| |
|---|
| Manufacturing Execution (Industry 4.0) |
| Manufacturing Operations (Industry 4.0) |
| Environmental Health & Safety |
| Manufacturing Networks |
| Industrial Insights |

Digital Logistics

Warehouse Management
Transportation Management
Track & Trace and Logistics Networks
Order Promising
Yard Logistics

Digital Asset Management

Asset Operations and Maintenance
Intelligent Asset Management
Mobile Asset Management
Predictive Maintenance Service Management

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Holistic Portfolio & Project Management
From Ideas to Project Success with Enterprise Portfolio & Project Mgmt.

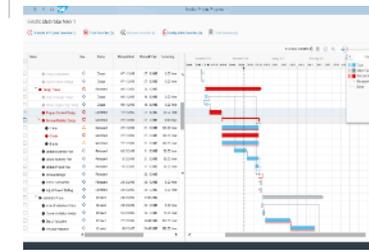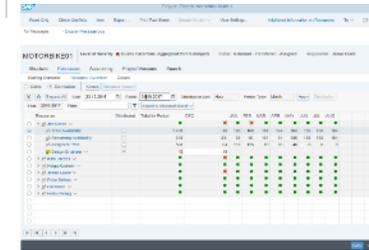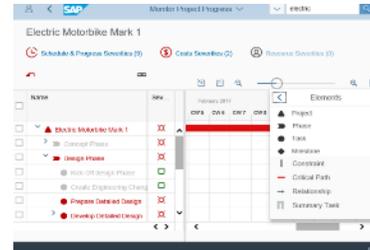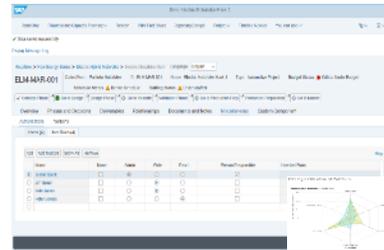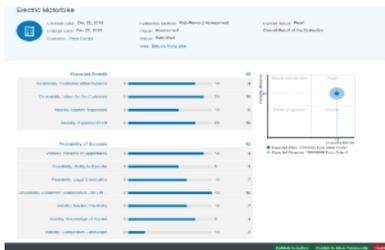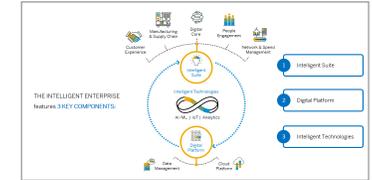| Idea Management **	Portfolio Management	Project Planning(*)	Project Resource Management *	Project Execution (*)	Monitoring (*)
• Collect & Evaluate Ideas • Collaborate, Discuss & Vote • Identify Experts • Rank Ideas • Execute on Ideas • Track Performance from Idea to Product • Document Idea & Innovation Process	• Draft Project Timeline • Financial & Capacity Planning • Risk Assessment • Technical Feasibility • Evaluate Commercial Success, Draft KPIs • Project Total Score & Ranking • Project What-If / Simulation • Decision Support • Strategic Direction	• Use Templates • Structure Project • Schedule Tasks & Activities • Planning of Project Efforts & Costs • Manage Milestones • Manage Authorization (ACL) • Archiving • Import/Export…	• Plan Resource Demand • Role Demand in Project • Identify Available Resources via Candidates, Resource Pools & Teams • Resource Assignment • Workflow & Notification • Resource Overview • Resource Allocation • Availability Control	• Phase Approvals • Project Accounting • Time Recording • Multi Project Management • Project Versions / Snap Shots • Document Management • Engineering Change Management	• Progress Tracking • Budget Control • Availability checks • Plan vs. Actual • Embedded Analytics Dashboards

*Additional license - **Additional installation and license – C(Partially) Compatibility scope

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Manufacturing Networks
Industrial Insights

Digital Logistics

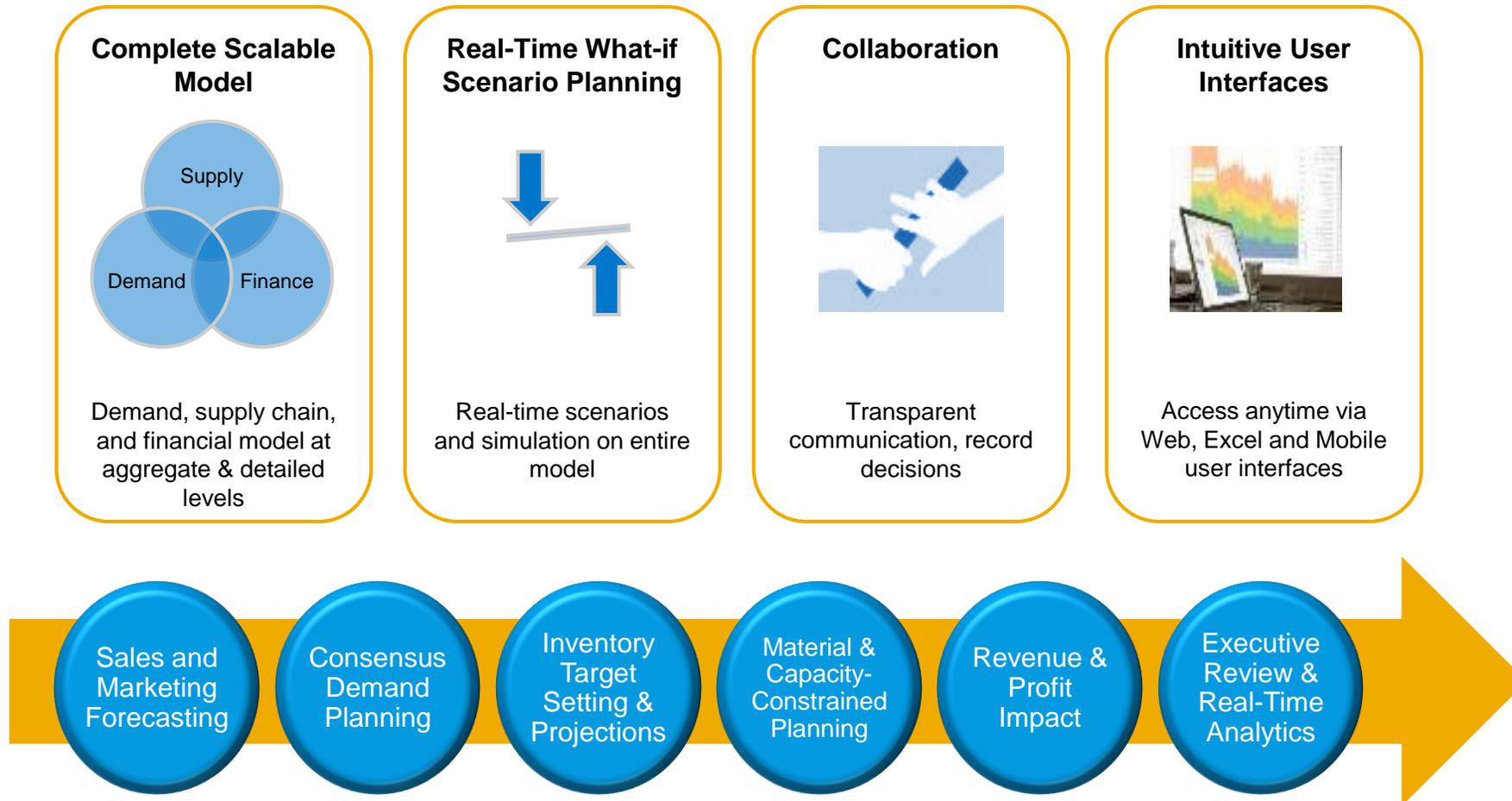| |
|---|
| Warehouse Management |
| Transportation Management |
| Track & Trace and Logistics Networks |
| Order Promising |
| Yard Logistics |

Digital Asset Management

Asset Operations and Maintenance
Intelligent Asset Management
Mobile Asset Management
Predictive Maintenance Service Management

What are the key differentiators for SAP Integrated Business Planning for sales and operations?

Complete Scalable Model

Demand, supply chain, and financial model at aggregate & detailed levels

Real-Time What-if Scenario Planning

Real-time scenarios and simulation on entire model

Collaboration

Transparent communication, record decisions

Intuitive User Interfaces

Access anytime via Web, Excel and Mobile user interfaces

- Sales and Marketing Forecasting
- Consensus Demand Planning
- Inventory Target Setting & Projections
- Material & Capacity-Constrained Planning
- Revenue & Profit Impact
- Executive Review & Real-Time Analytics

What's the difference between MRP and IBP?

Collaboration
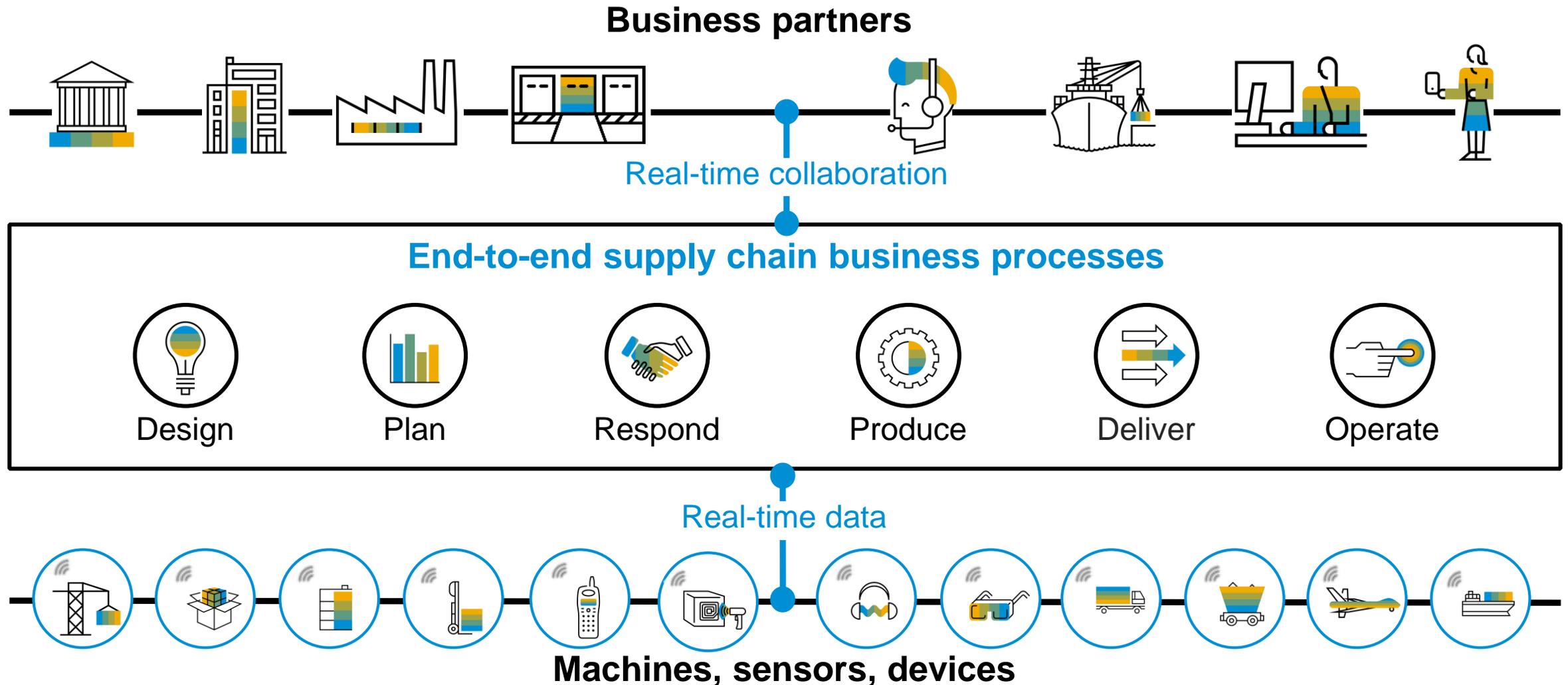
Periodic Forecast Result

SAP Integrated Business Planning

In the digital supply chain product portfolio from SAP

Business partners

Real-time collaboration

End-to-end supply chain business processes

Design   Plan   Respond   Produce   Deliver   Operate

Real-time data

Machines, sensors, devices
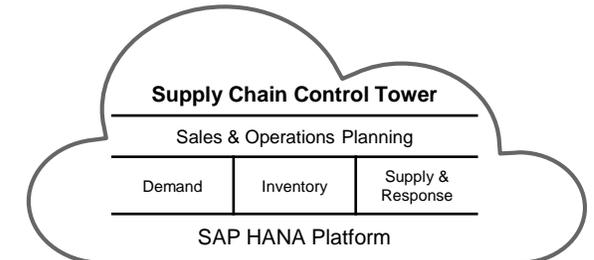
SAP S/4HANA Supply Chain Planning
Extendable LoB scope for Strategic Planning in the Cloud

SAP S/4HANA®

Sales, MRP, Inventory, Procurement & Manufacturing ← Digital Handshakes → **Strategic Planning**

Supply Chain Control Tower
Sales & Operations Planning
| Demand | Inventory | Supply & Response |

SAP HANA Platform

Integrated Business Planning**

S/4HANA Process	Handshake	IBP Process
Sales Analysis / Business Partner / Products / Prices	Sales Analysis	Demand Sensing
	Products / Business Partner / Sales Channels	Consensus Demand / Sales & Operations Planning
Inventory Turnover / Supplier Performance / Contracts, Quotes	Inventory Turnover / Supplier Analysis	Inventory Forecasts / Supplier Optimization
MRP & PPDS* Dependent Requirements, Demand Driven MRP & Constraint based Planning / Advanced ATP*	Planned Independent Requirements / Prioritization Input for Capacity Bottlenecks, e.g. Prioritization Input for Sequencing (aATP or PPDS)	Production Plan / Tactical: What if Constraints / Operational: Order Creation, Rules & Priorities
Manufacturing & Supply Chain Execution	Analysis & Optimization	Continued Analysis & Demand Match

- Demand
- S&OP
- Inventory Planning
- SAP Ariba
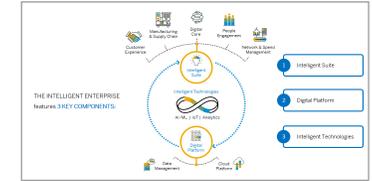- Response Network Planning
- Control Tower

Leverage SAP Best Practices to run planning processes in IBP for sales and operations, IBP for response and supply (time-series based optimizer), IBP for demand, IBP for inventory and Supply Chain Control Tower.

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SAP Sales and Operations Planning, Powered by SAP HANA

https://www.youtube.com/watch?v=EZTMH3q5rxc

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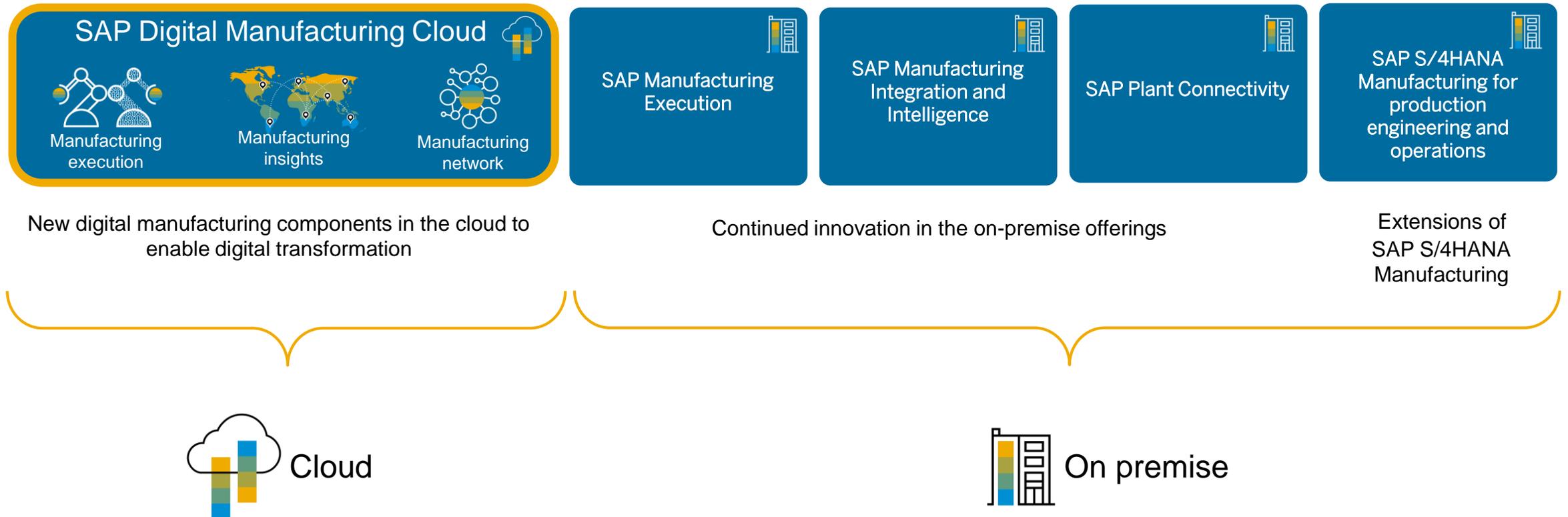| Warehouse Management |
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SAP Industry 4.0
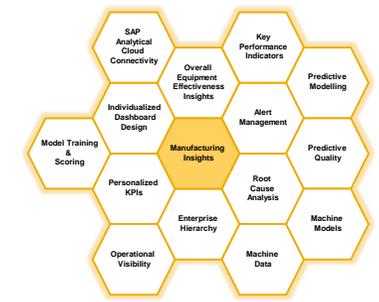# Integrated Operational Platform
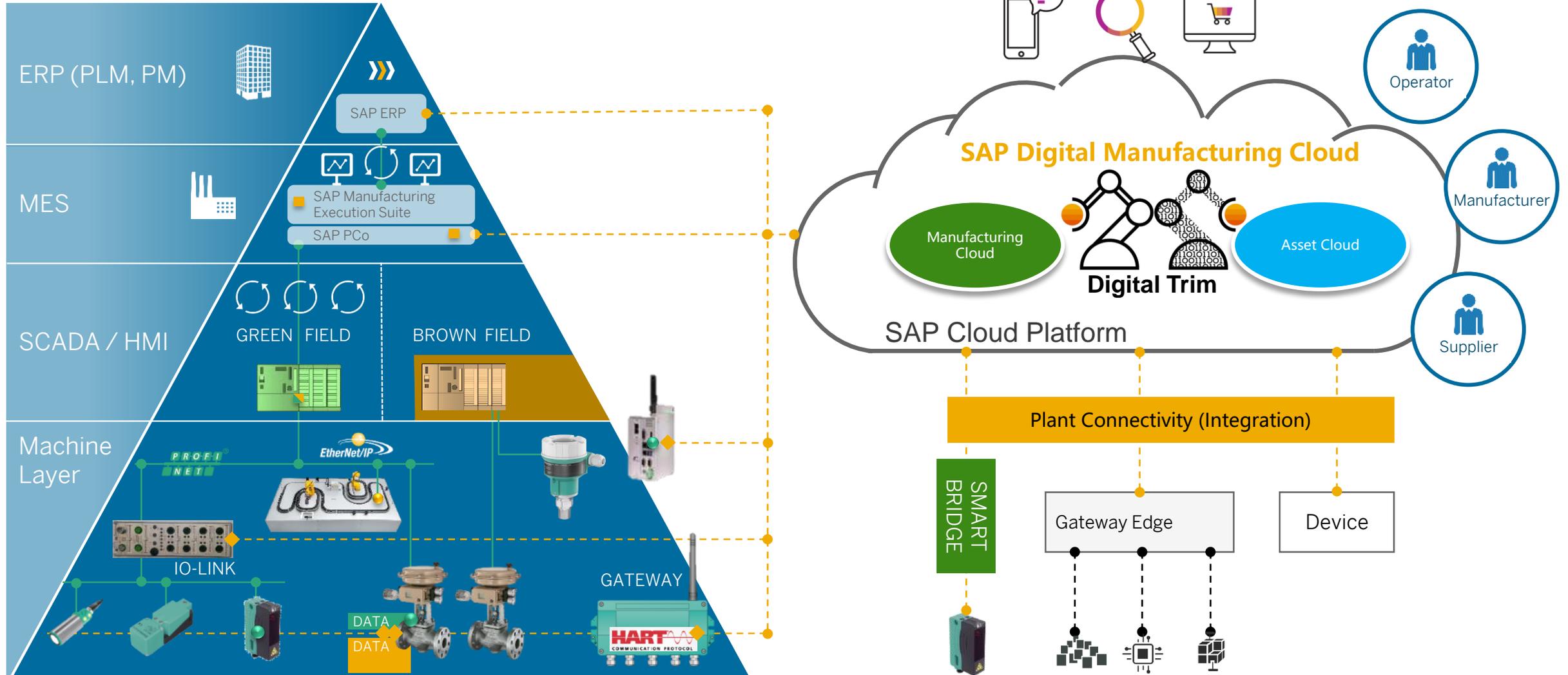
SAP Digital Manufacturing Cloud
In the digital manufacturing product portfolio

SAP Digital Manufacturing Cloud

Manufacturing execution   **Manufacturing insights**   **Manufacturing network**

SAP Manufacturing Execution

SAP Manufacturing Integration and Intelligence

SAP Plant Connectivity

SAP S/4HANA Manufacturing for production engineering and operations

New digital manufacturing components in the cloud to enable digital transformation

Continued innovation in the on-premise offerings

Extensions of SAP S/4HANA Manufacturing

Cloud

On premise

SAP Digital Manufacturing Cloud for insights

Achieve operational excellence by utilizing dashboards filled with standard/customized KPIs and real time data of sensor data, transactional/ operational data from the ERP/MES system for strategic decisions in the board room, tactical decisions at unit or plant level and for daily operations on the shop floor

✦ Analyze performance using dashboards filled with pre-defined, standardized key performance indicators (KPI)

✦ Retrieve data from your shop floor and production systems and combine it with contextual information from your business sources like SAP ERP, SAP ME, SAP MII

✦ Leverage built-in machine learning algorithms in the analysis of quality defects

✦ Perform root cause analysis and drill-down at any level; global, plant or individual work center

✦ Customize your reporting and generate individual dashboards or create formulas for customized KPI calculations

✦ Incorporate data from non-SAP sources using Analytical Model
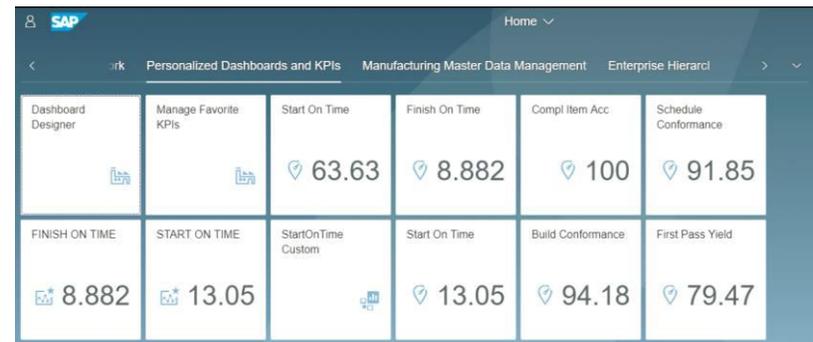
# SAP Digital manufacturing cloud- Predictive Quality

is a solution dedicated to help manufacturers gain valuable insights into the quality aspects of their manufacturing processes, streamline quality management and apply predictive algorithms to reduce losses incurred due to quality issues and recommend corrective actions

Key Capabilities

Predictive → Quality Improvements ← Deep Dive

- Expose manufacturing big data (IT/OT data) in the pre-defined manufacturing semantics

- Intuitive workbench to Analyze & Correlate multi-tier data related to 3Ms of manufacturing

  - 3Ms = Machine, Material, and Method

- Simplify predictive model building and model life cycle management to keep pace with the operations

- Near real-time evaluation/scoring of predictive models and trigger corrective actions to the right people
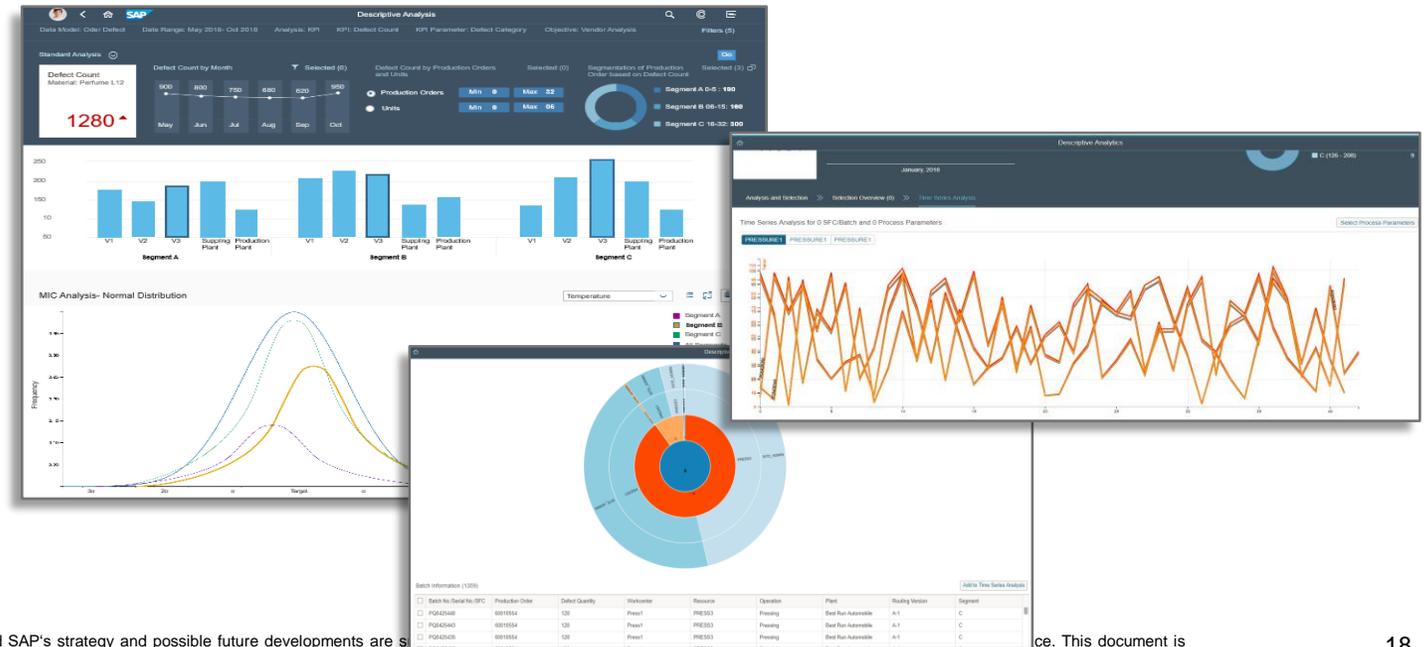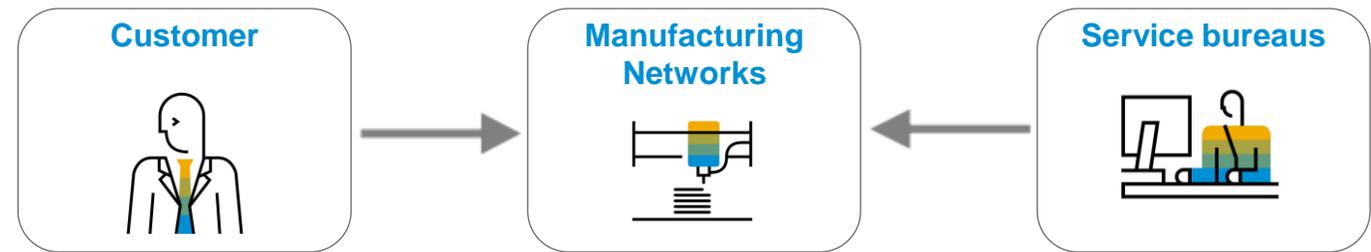
Digital Manufacturing Cloud – Manufacturing Network
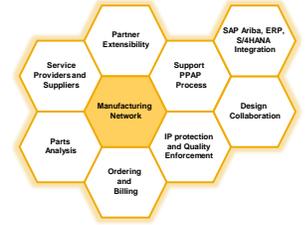
Provides a cloud-based collaborative platform that connects customers with (additive) manufacturing service providers, e.g. suppliers of 3D printing services, material providers, original equipment manufacturers (OEM), and technical certification companies

- **Collaboration** between customers and service providers on design optimization, quality and pricing

- Technical and economical **part assessment** by customers

- **Integration with SAP S/4HANA** for sourcing and procurement

- **Service offering advertisement** by service providers

- **Extensibility** to enable scenarios specific to domains, customers or service providers

IIoT Demo

IIoT Demo

21

Overall Equipement Efficiency Demo

ERP (Planning)

MII (Executio n)

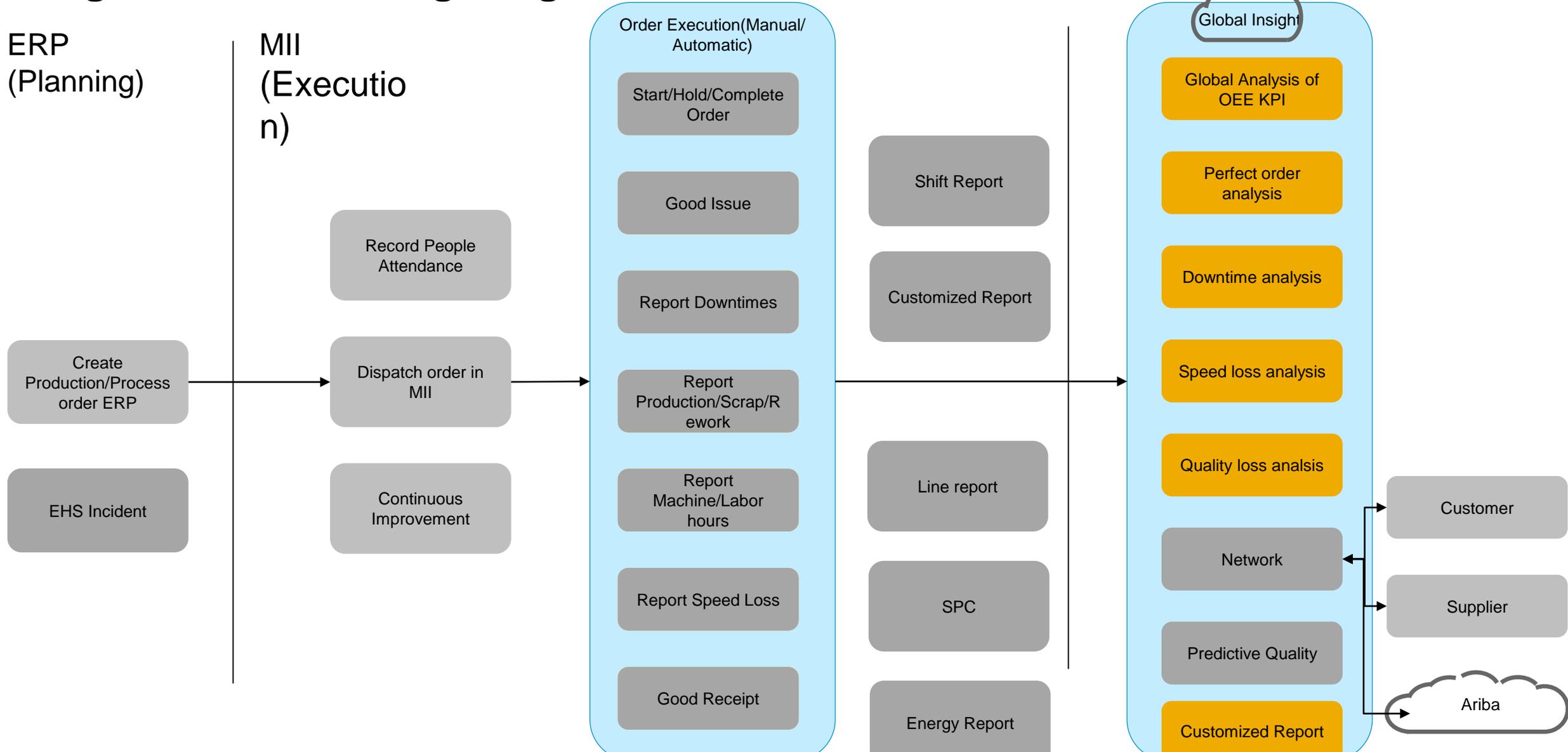**Order Execution(Manual/ Automatic)**

Global Insight

ERP (Planning)	MII (Execution)	Order Execution		Global Insight
Create Production/Process order ERP	Record People Attendance	Start/Hold/Complete Order	Shift Report	Global Analysis of OEE KPI
EHS Incident	Dispatch order in MII	Good Issue	Customized Report	Perfect order analysis
	Continuous Improvement	Report Downtimes	Line report	Downtime analysis
		Report Production/Scrap/Rework	SPC	Speed loss analysis
		Report Machine/Labor hours	Energy Report	Quality loss analsis
		Report Speed Loss		Network
		Good Receipt		Predictive Quality
				Customized Report

Customer

Supplier

Ariba

OEE Demo

OEE Demo

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Digital Manufacturing Insight - Demo

ERP (Planning)

MII (Execution)

Order Execution(Manual/Automatic)

Global Insight

ERP (Planning)	MII (Execution)	Order Execution		Global Insight
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		Report Speed Loss	SPC	Network
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				Customized Report

Customer

Supplier

Ariba

Digital Manufacturing Insight Demo

Digital Manufacturing Insight Demo – Global View
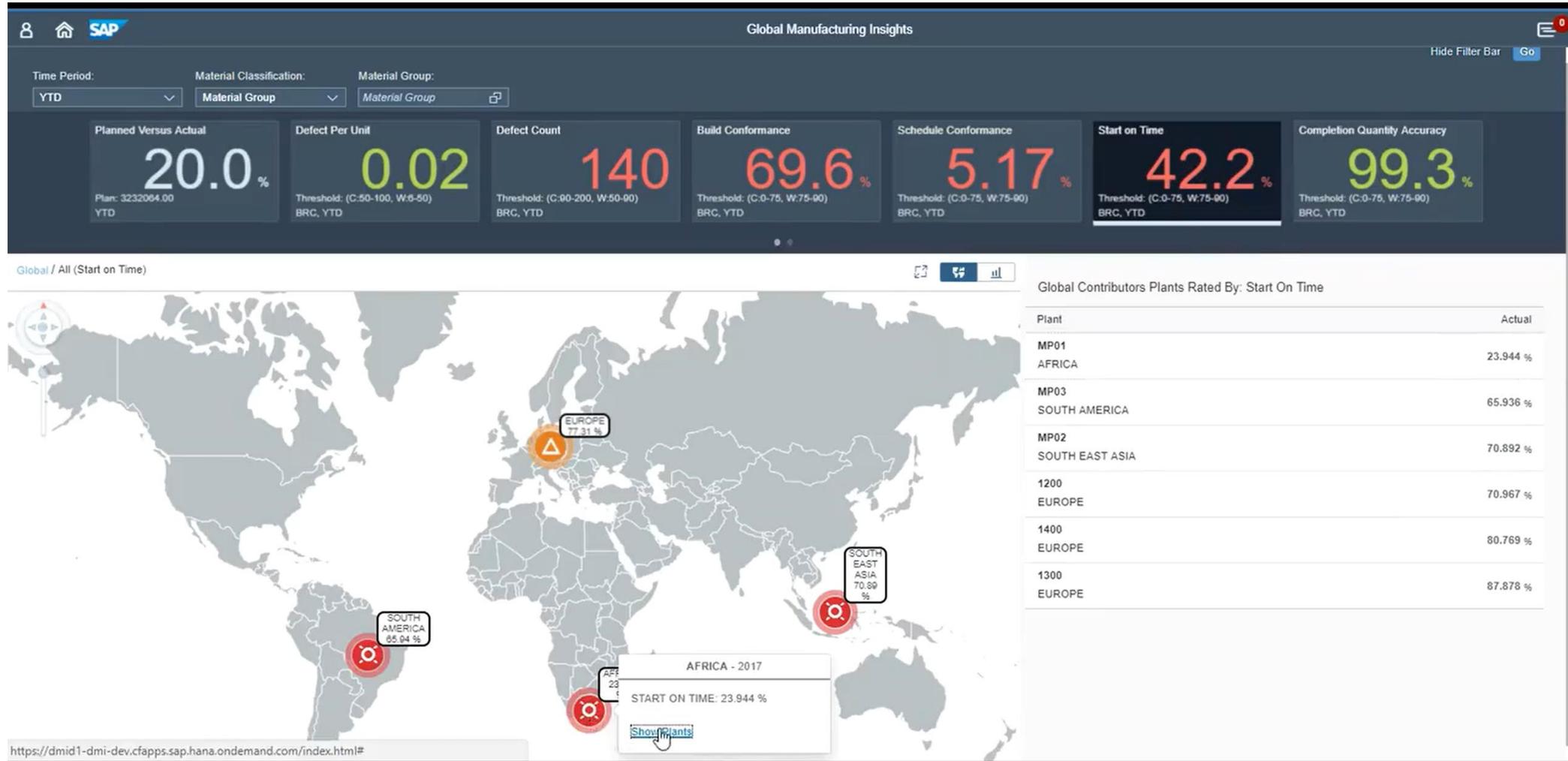
Streamlined Material Requirements Planning with SAP S/4HANA

More frequent MRP runs & improved, streamlined UI for fast resolution

External Requirements
(Sales Orders, Forecast)

Internal Requirements
(Independent & Dep. Requirements, Subcontracting)

NEW MRP RUN:
~10X faster, ~5 x reduced storage compared w. SAP ERP

MRP RUN ⧖

Creates and schedules orders for requirement date

Leveraging **HANA capabilities for parallelization**

Purchase Order / Requisition

Stock Transfer Reservations

Production Order

Planned Order Schedule Lines

MRP Analysis for External & Internal Requirements
Detect **disruptions** in material availability & flow
Exception & KPI
driven process
Shorter **time-to-action**
Customize own **worklists**
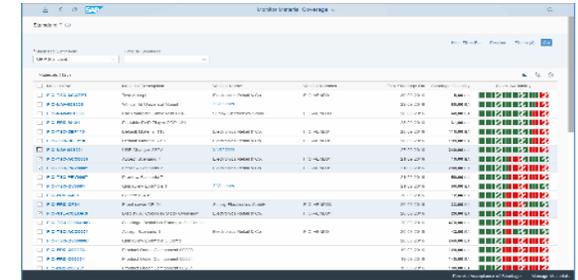
Manage Internal or External Requirements
Find **issues**
Simulate their impact
in real-time
Use **Change Requests**
to track resolution flow
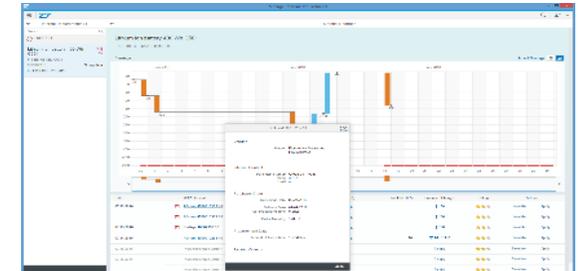
Monitor Capacity
or
Constraint based planning (PPDS)*
Analyze resource impact of schedules
Provide **solution alternatives**
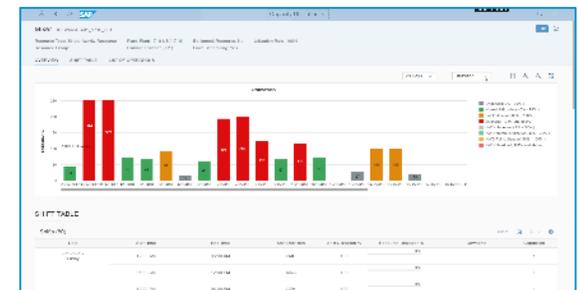
Use PPDS **Planning Board** for Reschedules & Pegging Optimization and Create **Collective Orders** for Suppliers*

Manufacturing Planning and Operations with SAP S/4HANA

PRODUCTION PLANNING

PRODUCTION OPERATIONS

Manage Material Shortages

MRP Live results in much faster creation of Supply

Use MRP Cockpits to identify any short term Material issues as bottleneck materials, and simulate their impact in real-time

Provide Insight to Action & resolution alternatives Use Change Requests to track resolution flow

New App: Display MRP Master Data Issues (F1425A Successor of F1425) to display issues of master data occurring during an MRP Live run to track status of acceptance and with links to related apps
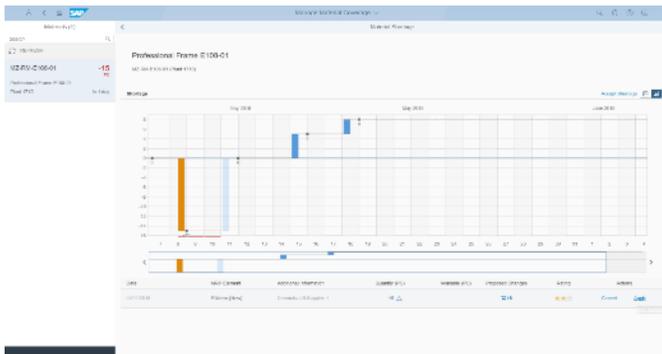
Monitor Capacity

View the capacity requirement and available capacity for work centers and evaluate critical and overload situations based on priority, using KPIs

View the backlog of overdue orders and operations for work centers and capacity required to fulfill all the open orders in evaluation horizon

Visualize work center capacity utilization based on set bucket types, such as shifts, days or weeks to understand load distribution

See operations relevant to a work center, with operation specific capacity information and navigate to apps that let you manage orders and operations.

Manage shifts for a work center to enable a better utilization spread across an evaluation horizon
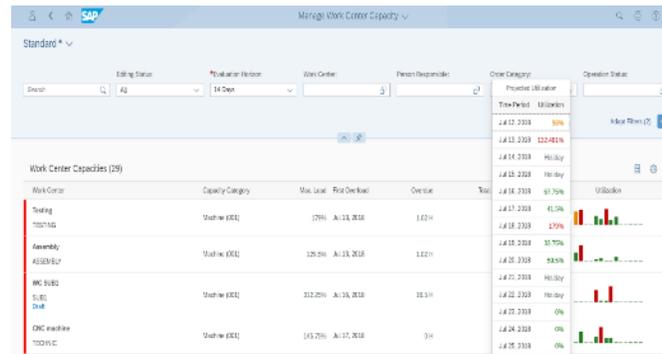
Monitor Production Orders / Operations and Confirm Progress

Monitors production process either on order or on operation level
Automatically detects exceptions / issues, like Holds, Delays, Missing Components, Quantity Deviations & Quality Issues
Provides contextual information for root cause analysis and decision support
 Order Schedule and History
 Work Center Schedule and History
 Material availability in plant and supply area
Provides immediate actions
 Setting / Releasing Holds
 Manual order adjustments
 Order update with latest master data
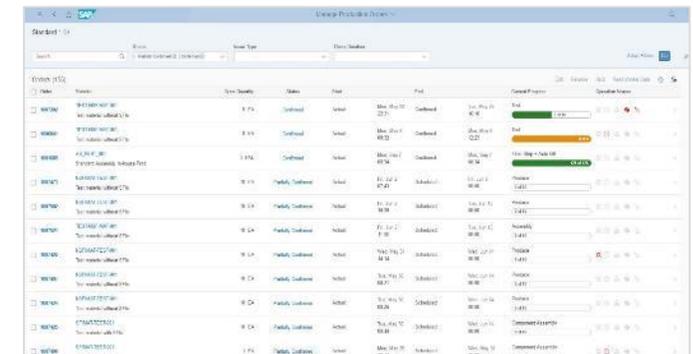
SAP S/4HANA Manufacturing

S/4HANA LoB Solution in Manufacturing*


EXTENDED PRODUCTION PLANNING & SCHEDULING*

PPDS

Constraint Based Production Planning (PP/DS) gets co-deployed with SAP S/4HANA on the same system utilizing one HANA database production or external procurement to cover product requirements. You can execute a **visualized Production Scheduling** to plan critical products, such as products with long replenishment lead times or products that are produced with bottleneck resources. In addition you can use the app "**Create Optimal Orders for Shipment**" app to order several materials in one purchase order and optimize the order quantities to best utilize the capacity of the means of transport.

DDMRP

Demand Driven MRP is targeting a **dynamic demand driven Replenishment and Inventory Optimization.** Goal is to manage buffers of components and semi-finished products across the complete BoM dynamically – to lower overall stock levels and still ensure high customer service levels at lowest possible inventory levels across the complete BoM / value chain.

COMPLEX MANUFACTURING*

SAP S/4HANA Complex Manufacturing is a solution to manage **Production Engineering & Operations** will extend the S/4HANA digital core to bridge the gap between engineering and manufacturing via facilitating digital collaboration of manufacturing master data, design structures handovers, process planning and intelligent change management.
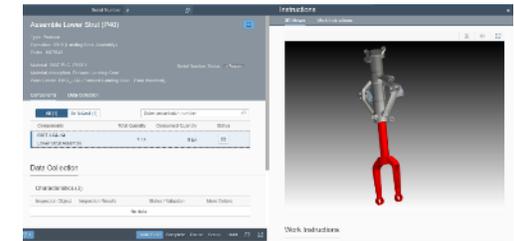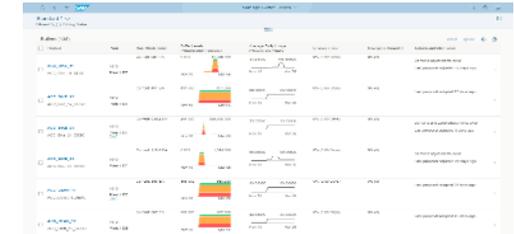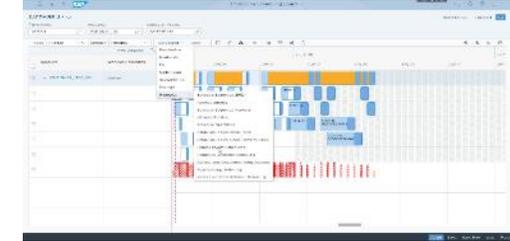
Additional Suite Solutions in Manufacturing **

For flexible and detailed Shop Floor Control S/4HANA should be integrated with:
- **Responsive Manufacturing** (e.g. ME, MII, QIM, VE for Discrete Industries)
- **Production Operations** (e.g. MII, QIM for Process Industries)
- **Digital Operations for Manufacturing** (e.g. MII)
- **SAP Global Track & Trace**

*Additional license - **Additional installation and license – C(Partially) Compatibility scope

S/4HANA Constraint based Production Planning & Scheduling*

Finite capacity planning - PP/DS in S/4HANA:
Increased production throughput and reduced production costs leveraging finite capacity planning embedded in S/4HANA. **One MRP** plans everything: create finite production plan according to the available capacity situation and schedule available resources and generate production plan to the precision of seconds.

- Access SAP Fiori App for Production Scheduling Board as web based graphical scheduling tool
- Customize the web-based graphical scheduling tool for production planning and detailed scheduling according to various industry needs, major improvements in **Production Scheduling Board**
- **Combined order support** for planning/scheduling in to improve scheduling efficiency for order combinations to optimize manufacturing operations (former IS-Mill)

Monitor Capacity Utilization:
Capacity utilization of resources can be monitored using this app. Production Planners can add the area of responsibility to plants in which they want to monitor the capacity.

- Optimize and plan resource schedule and order dates and times in detail by taking the resource and component availability into account
- Plan critical products, such as products with long replenishment lead times or products that are produced with bottleneck resources
- Customizable evaluation profile and horizon available with Utilization Chart based on daily buckets.
- **Monitor Capacity Utilization** with new object page to analyze **capacity details by resource and manage shifts and operations**.

Create Optimal Orders for Suppliers:
Optimize the results of your Material Requirements Planning (MRP) by creating collective purchase orders for material shortages.

- Use calculation logic of S/4HANA to optimize a **collective Purchase Order** for your schedule in seconds!
- Considers **supplier capacities** to harmonize own requirements against supplier constraints
- Use native HANA capabilities for **simulating** order combinations supported by **graphical visualizations.**
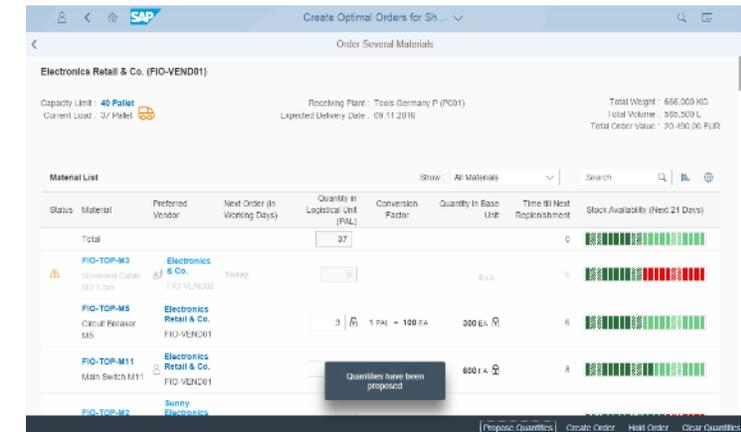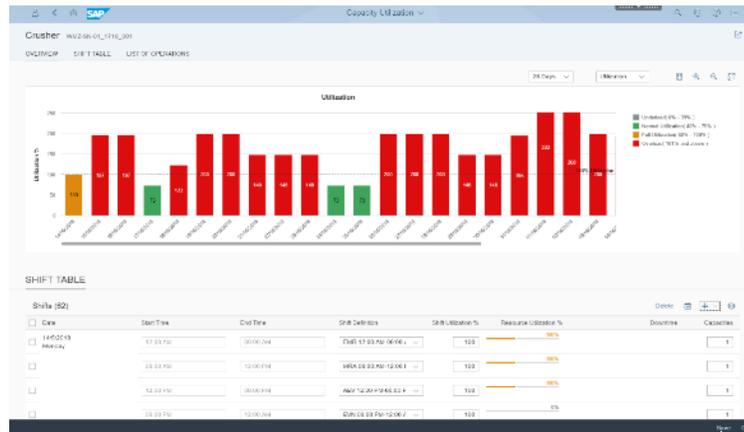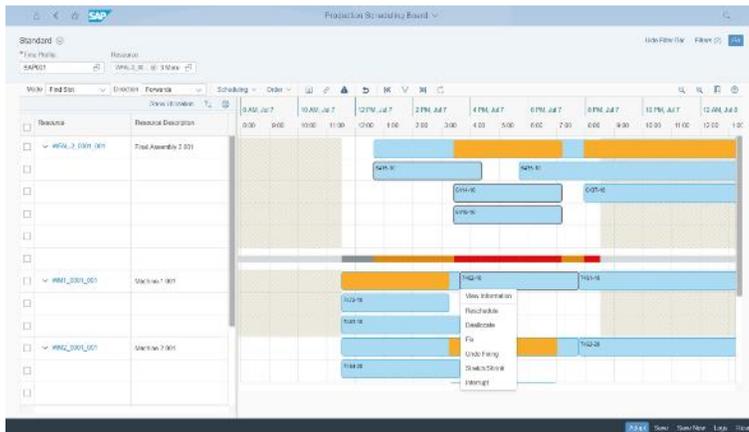
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Constrained-based combined orders scheduling

Business Background

- **Different products** may go through **common process** steps. It is desirable to group and execute them together. This optimizes resource usage and reduces order handling for the user.
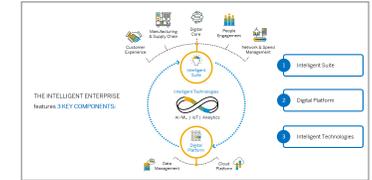
Solution

- Common operation sequences in different orders can be combined in one production order. Combination can be for selected operations (except process orders) or entire orders. Operations to be combined must have same base unit of measure and no gaps in between. The combination steps are selection, combination, and scheduling.

- With SAP S/4HANA 1709, constrained-based combined orders scheduling with PP/DS for SAP S/4HANA is activated by default. With activation on, for advanced planning materials, original orders combined via transaction MILL_OC and the resultant combined orders are transferred to PP/DS for SAP S/4HANA. Combined orders integration with side-by-side SCM APO PP/DS remains not supported.
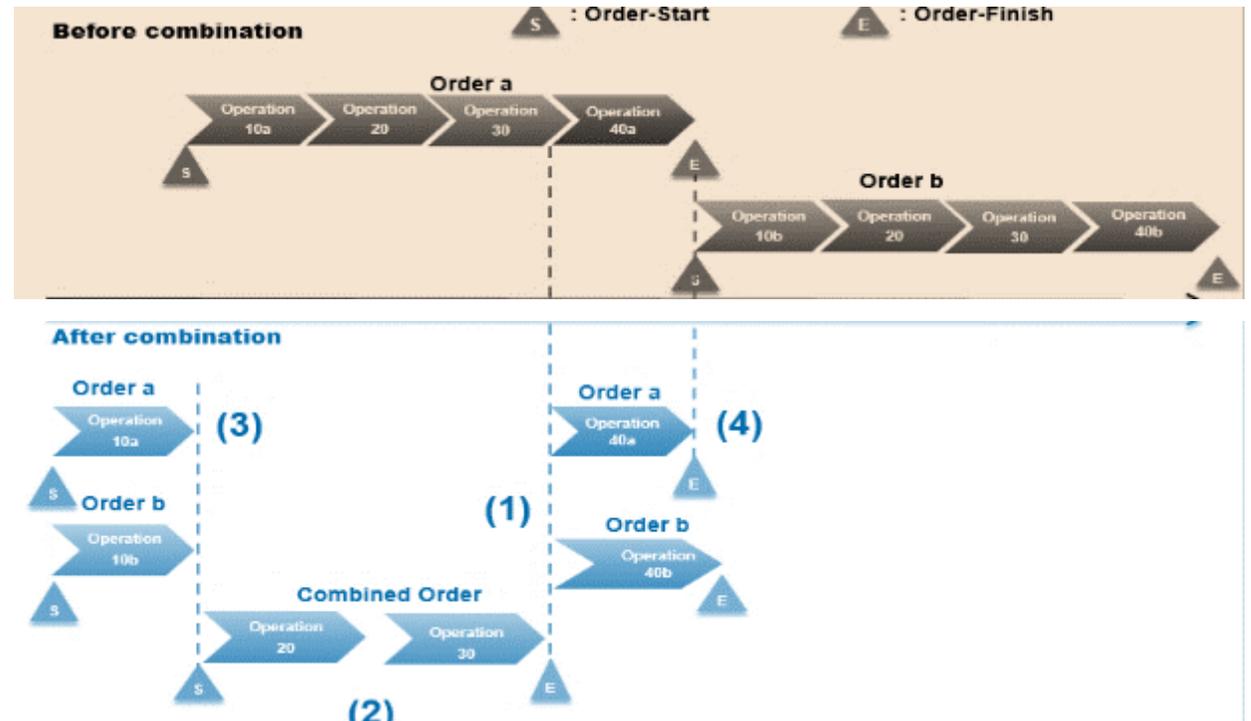
Process View

- Search for earliest end date of the last operation to be combined, used as the finish date of the combined order

- Use Backwards scheduling of all objects to be combined

- Backwards scheduling of all operations of the original orders to be finished before combination

- Schedule all operations of the original orders to be executed after the combination

Our solutions in manufacturing help you become an intelligent enterprise

Digital Products and Projects

Portfolio and Project Management
Product Compliance
Product Development and Configuration
Product Formulation and Recipe Development

Digital Business Planning

Demand Management and Insights
Sales, Inventory and Operations Planning
Response and Supply Planning

Digital Manufacturing

Manufacturing Execution (Industry 4.0)
Manufacturing Operations (Industry 4.0)
Environmental Health & Safety
Manufacturing Networks
Industrial Insights

Digital Logistics

Warehouse Management
Transportation Management
Track & Trace and Logistics Networks
Order Promising
Yard Logistics

Digital Asset Management

Asset Operations and Maintenance
Intelligent Asset Management
Mobile Asset Management
Predictive Maintenance Service Management

Extended Warehouse Management with SAP S/4HANA

Supporting all levels of warehouse complexity

SAP S/4HANA SUPPLY CHAIN

Suite**

ADVANCED WAREHOUSING*

WAREHOUSING

Enterprise Management

SAP S/4HANA®

Leverage Decentral SAP EWM for

- High volume warehouses
- Independent operations, versioning, upgrades
- Material Flow System (MFS)

- Inventory Management Optimization (e.g. Slotting)
- Inbound Process Optimization (e.g. Deconsolidation)
- Outbound Process Optimization (e.g. Waves)
- Material Flow Control
- Yard Management (e.g. TU handling, DAS)
- Labor Management (incl. Processors, Shifts, Time & Attendance, Travel Distance, Standards, Tracking and Monitoring)
- Value Added Services
- Kitting
- Cross Docking
- Warehouse Billing
- Integrated Load Planning
- Improved Package Builder & Stock Consolidation

- Inventory Management
- Inbound Processing
- Outbound Processing (incl. change of deliveries)
- Internal Warehouse Movements
- Physical Inventory
- Reporting
- Enhanced QM Integration in S/4HANA with EWM
- New Pick-by-Cart FIORI App
  (Pick small quantities, multiple customers in one run, or into same parcel)

Optimize & Synchronize through Warehouse Hub

Optimize warehouse operations
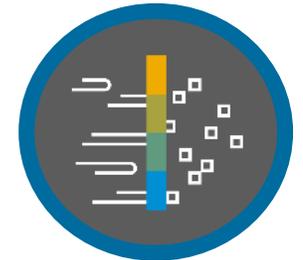
Stock transparency and control

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Transportation Management with SAP S/4HANA

SAP S/4HANA®

SAP S/4HANA SUPPLY CHAIN

Suite**

Leverage Decentral SAP TM for

- Transportation hub approach
- Independent operations, versioning, upgrades

INTEGRATED TRANSPORTATION MANAGEMENT*

- Strategic Freight Management
- Service Order Management
- Combined Inbound / Stock Transfer / Outbound Transportation Process
- Driver Management
- Advanced Charge Calculation
- Carrier / Service Billing
- Planning:
- Order and Delivery Based Planning Process
- Transportation Cockpit
- Vehicle Scheduling Routing Optimization
- Gantt Chart

- Planning on 2 monitors
- Transportation Proposal
- Automated Carrier Selection / Carrier Ranking List
- Load Consolidation / Load Planning (3D Visualization)
- Package Building
- Professional Tendering Management
- EWM Integration (via services)
- Integration with
  - Event Management
  - Global Trade Service
  - Descartes

TRANSPORTATION

- Main Parts of the Transportation Network
- Freight Agreements
- Charge Management
- Separated Inbound / Outbound Freight Order / Booking Management (Delivery based)
- Basic Transportation Planning (POWLs / manual Freight Unit Selection)

- Transportation Execution without Event Management
- Freight Settlement Management
- Basic Agency Billing
- Direct Tendering for Service Agents (Subcontracting)
- Dangerous Goods Management
- TM Output Management
- TM Analytics

Enterprise Management

Enhanced Transportation Model through Hub approach
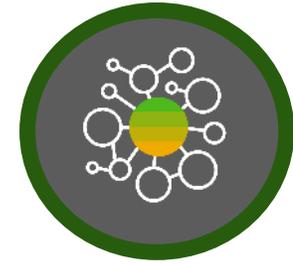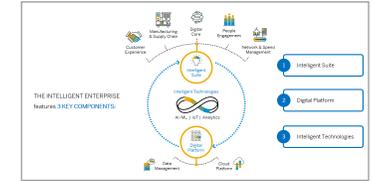
Optimize Transportation Processes

Shipping transparency and control

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Digital Asset Management

Asset Operations and Maintenance

Intelligent Asset Management

Mobile Asset Management

Predictive Maintenance Service Management

E2E Architecture for Intelligent Asset Management and Digital Twin

IoT Services
Sensor Integration

Sensors

Sensors

OSIsoft.

Data Historian

SAP Analytics Cloud

OEM & Component Manufacturers
PLM & Manufacturing Systems

| OEM 1 |
| .. |
| … |
| … |

Obsolescence Details
Installation guides
O & M Manuals
Specifications

CFIHOS/ @eClass / ISO 14224

Streaming Rules

Datahub & Vora

hadoop
Data Lake

3D Envelope
3D Parts

PdMS & PEI
Predictive Maintenance, Engineering & Services

Bulk Rules

Big Data Stack

Visual Conversion Services

AIN
Asset Intelligence Network

ASPM
Asset Strategy and Performance Management

DMC
Digital Manufacturing Cloud

Engineering Authoring Systems

| System 1 |
| .. |
| … |
| … |

ETO
Plant Design

Asset Central
Common data foundation for master and transactional data (e.g. equipment, work order)

Plant Maintenance

| Customer 1 |
| .. |
| … |
| … |

Approved Equipment Lists

ERP Systems

ECC 6 EhP6+

S/4HANA OP & S/4HANA Cloud

Non SAP ERP

Asset Manager
Online / Offline Native Mobile App

EPC & Contractors
P&IDs, Construction Drawings, Progress Reports

End Customers
P&IDs, Construction Drawings, Digital Services

*Represents the roadmap for the E2E Architecture for Intelligent Asset Management and Digital Twin

Asset Intelligence Network Demo

Why S/4HANA?
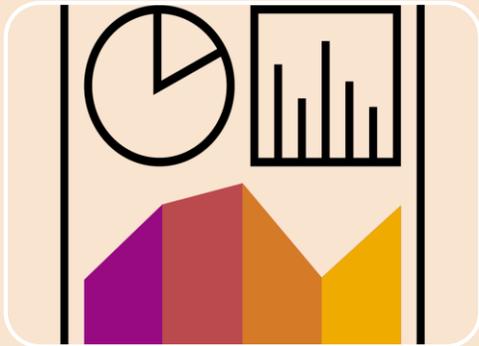
Improve supply chain & production efficiency with real-time insight from **granular manufacturing data** and ERP information, to take **immediate and corrective actions**
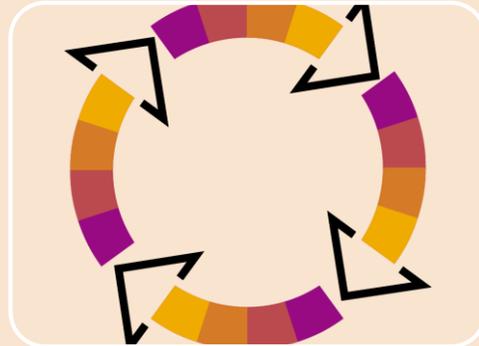
Improve Material and Quality through **real-time business network collaboration** with customers and suppliers

Reduce speed lose caused by quality and asset issues related to 3Ms (Machine, Material, and Method) through **predictive quality/ asset** management
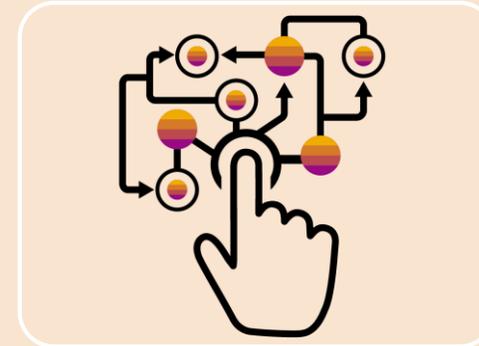
Reduce Total Cost of Ownership through natively integrated solutions from top floor down to shop floor and **without Extract - Transform – Load (ETL) process**

Thank you.

Follow us

THE BEST RUN **SAP**