# Digital Supply Chain for **Manufacturing** SAP Strategy and Roadmap

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September 11th , 2019
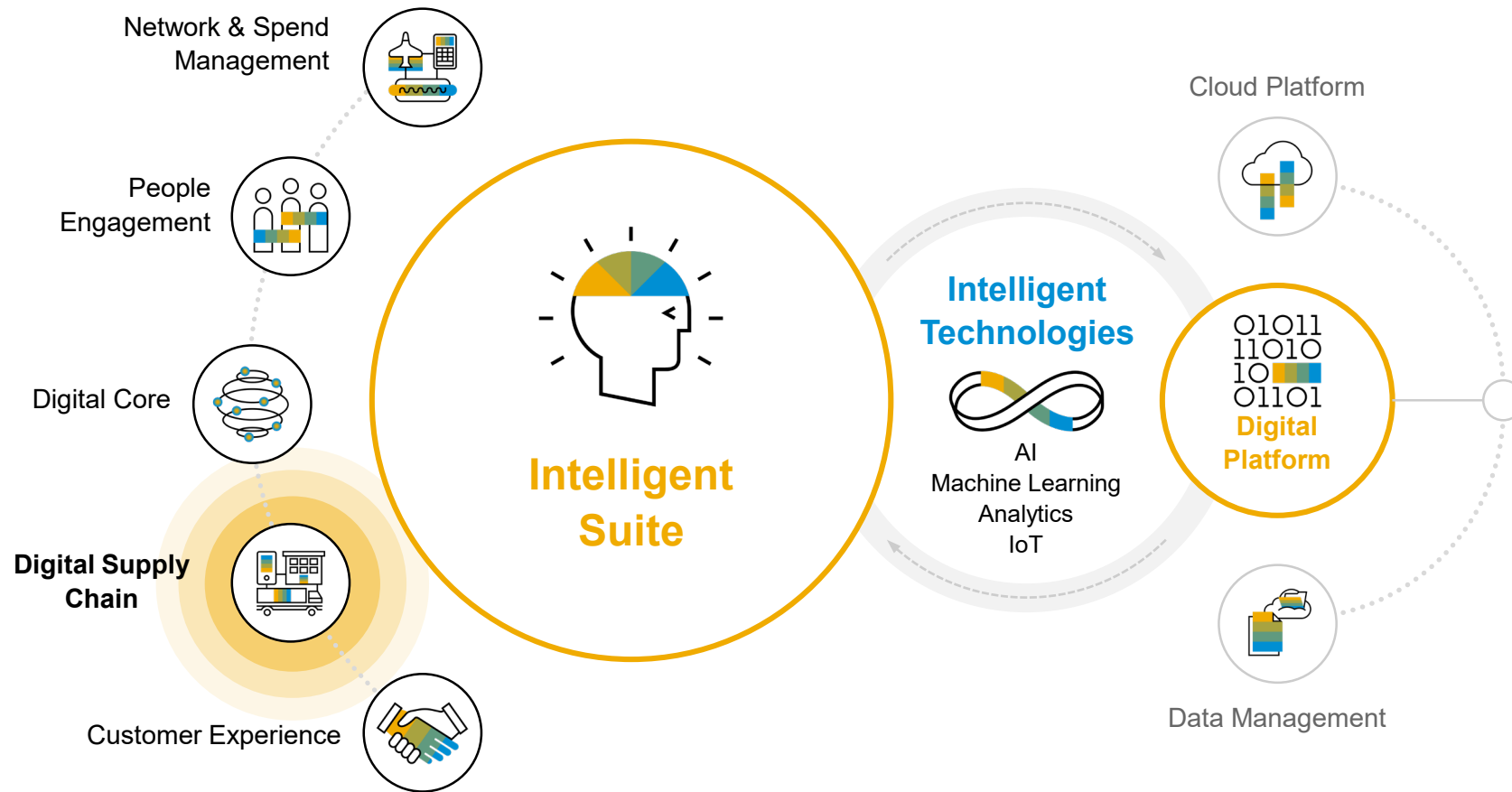
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# The Intelligent Enterprise
## The Foundation of a Digital Supply Chain



Network & Spend Management

People Engagement

Digital Core

**Digital Supply Chain**

Customer Experience

**Intelligent Suite**

**Intelligent Technologies**

AI
Machine Learning
Analytics
IoT

Cloud Platform

**Digital Platform**

Data Management

**The Intelligent Enterprise** features **3 key components:**

1  **Intelligent Suite**
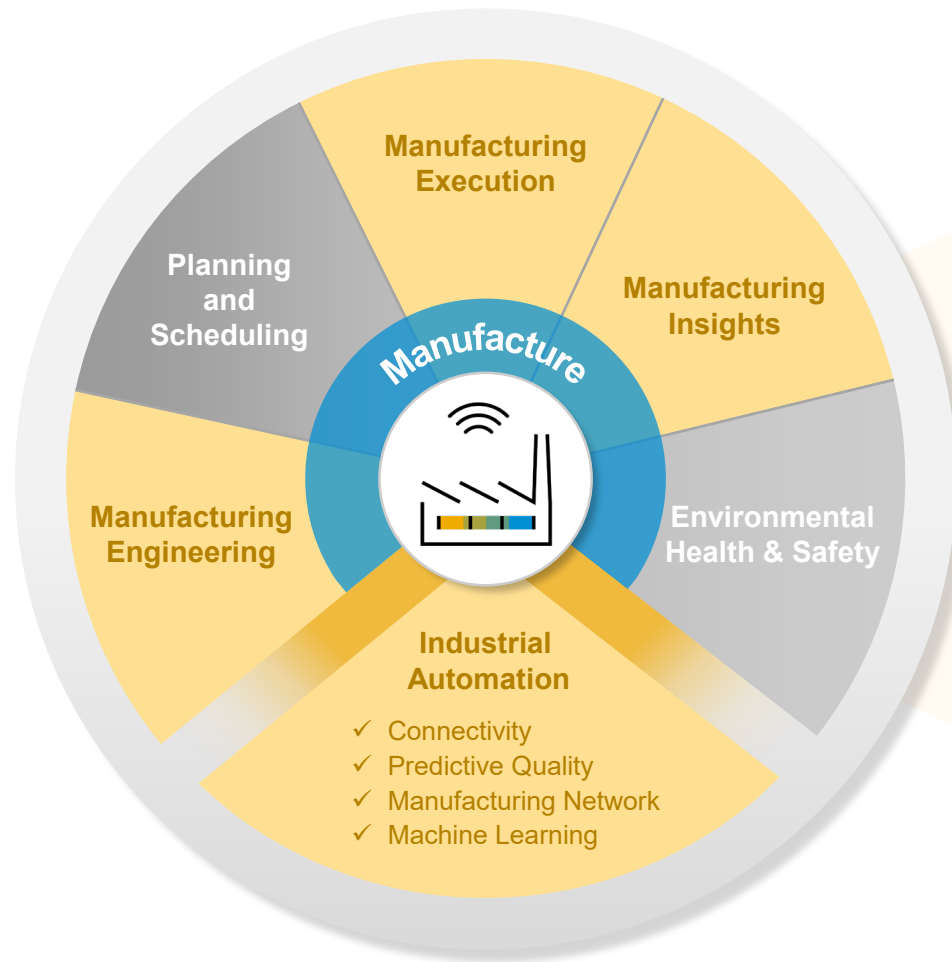
2  **Intelligent Technologies**

3  **Digital Platform**

# Digital Supply Chain Design to Operate

Connect Digitally to Perfect Reality
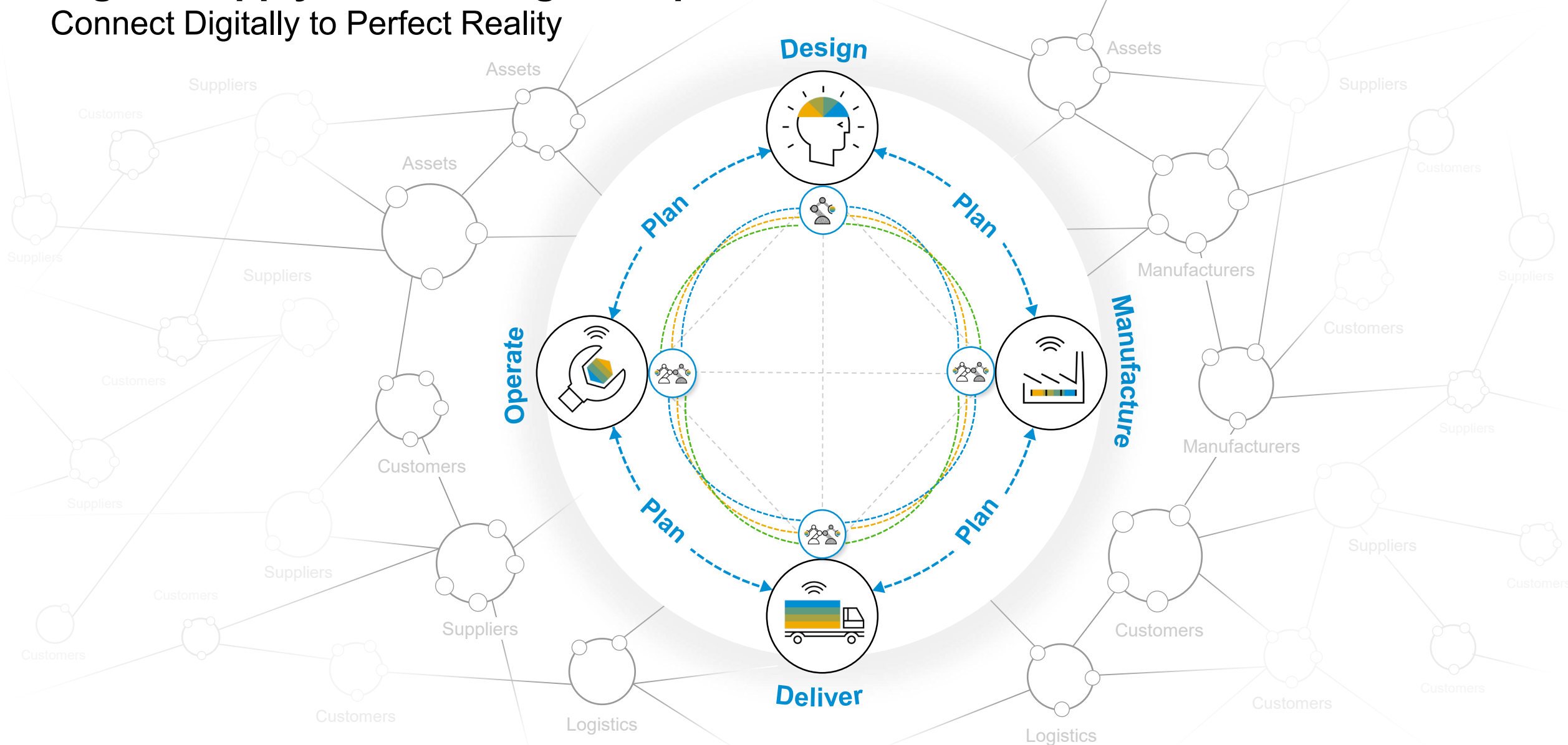
# SAP Digital Manufacturing Solutions

A complete portfolio of manufacturing solutions to support digitalization and Industry 4.0



Manufacturing Execution

Planning and Scheduling

Manufacturing Insights

Manufacture

Manufacturing Engineering

Environmental Health & Safety

Industrial Automation
- ✓ Connectivity
- ✓ Predictive Quality
- ✓ Manufacturing Network
- ✓ Machine Learning

## SAP Digital Manufacturing Cloud
- Manufacturing Insights
- Predictive Quality
- Manufacturing Execution

## 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
- Environmental, Health & Safety

# SAP Digital Manufacturing Cloud

Automate processes and resources to improve manufacturing efficiency, quality and productivity

Paperless production with intuitive user interfaces for production operators, automatic data collections and set machine parameters, thereby lowering cost, increasing productivity and quality.

Design, distribute and dynamically control manufacturing shop floor activities enabling a smart factory.

Shift and Labor planning to ensure business operations with right qualifications. Production Order scheduling and dispatching considering labor, resource and maintenance constraints to plan operations and adopt to short term changes.

Cross plant real-time analytics for manufacturing performance e.g. Perfect Order Fulfillment, Overall Equipment Effectiveness, loss analysis along with machine data to identify improvement opportunities.

Ability to collect and share product genealogy data between members of the network to trace accountability and provide transparency.
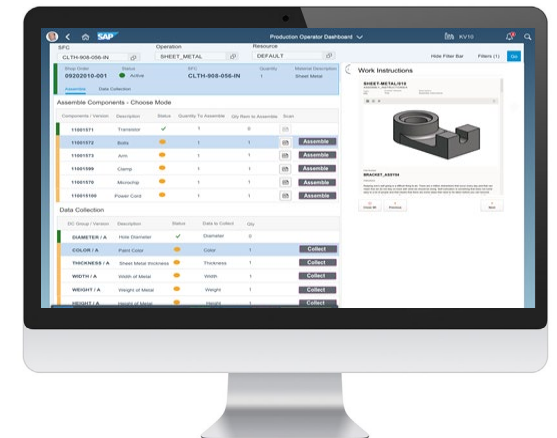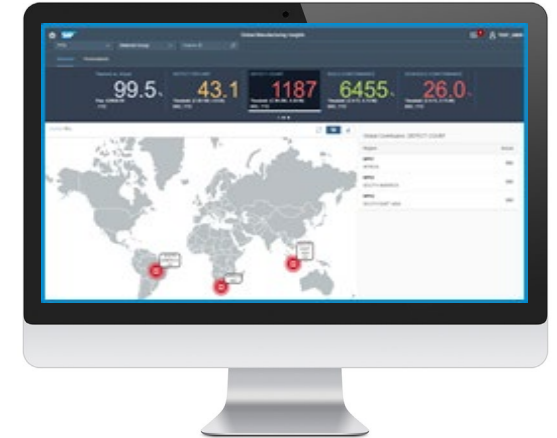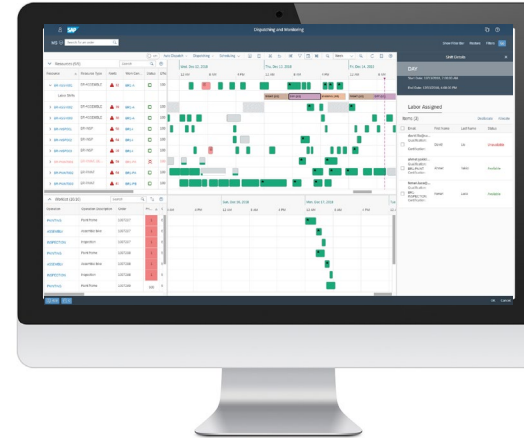
# SAP Manufacturing Suite (On-Premise)

Automate processes and resources to improve manufacturing efficiency, quality and productivity

Seamlessly connect top-floor to shop-floor operations to achieve rapid return on investment with out-of-the-box integration to SAP solutions. Provide your plants real time enterprise information to include latest supply chain changes into your agile operations.

Enables global manufacturers to efficiently produce products according specification, ensuring quality, full traceability, for manual and highly automated processes.

Paperless production with intuitive user interfaces for production operators, automatic data collections and set machine parameters, thereby lowering cost, increasing productivity and quality.

Monitor and document the entire manufacturing process to optimize resources and execution, reacting quickly to unexpected events utilizing the built-in intelligence

Connect your Operational technologies like logic controllers, devices, plant historian systems of your various manufacturing systems.
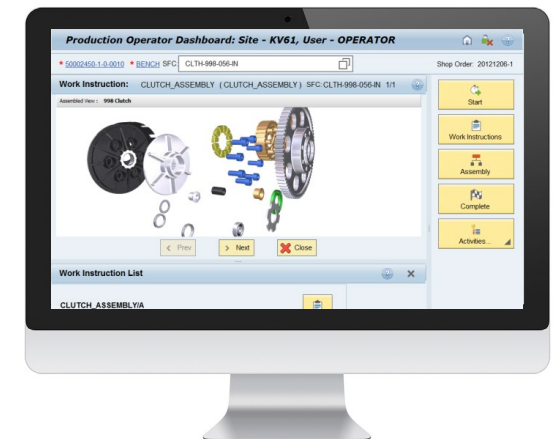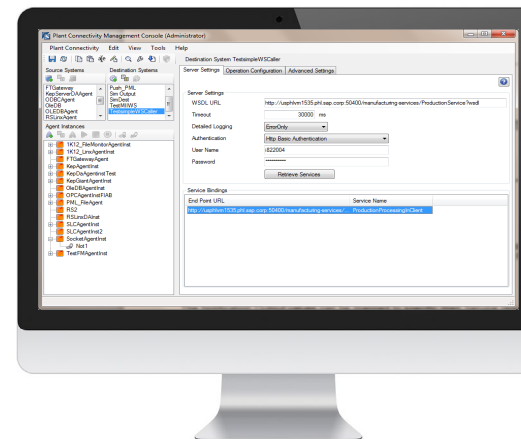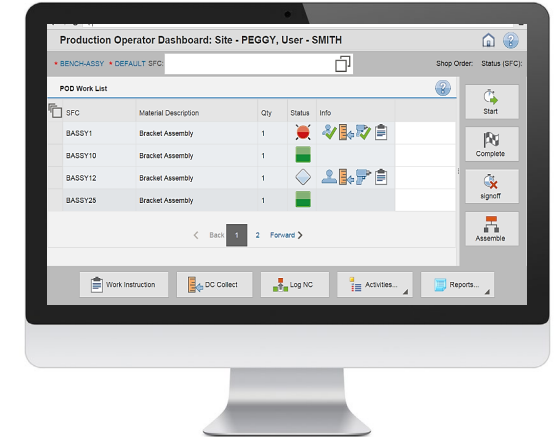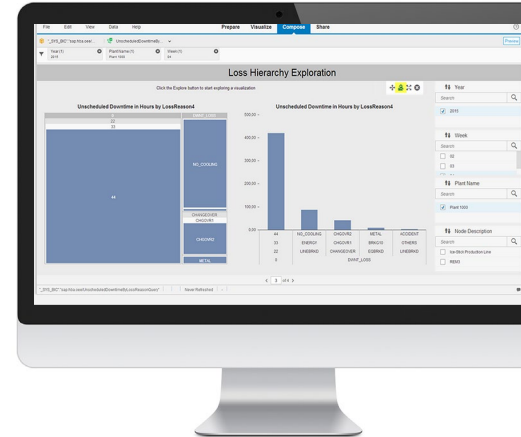
# Production Engineering and Operations (PEO) in S/4 HANA

Intelligent Handover from Engineering to Manufacturing

Convert product design into holistic production process design used for material and production planning, production order management and shop floor execution.

Orchestrate, control and document all changes done to manufacturing objects via Change Record Management

Perform comprehensive change impact analysis to identify objects which are affected by changes, and decide how and when to introduce the change
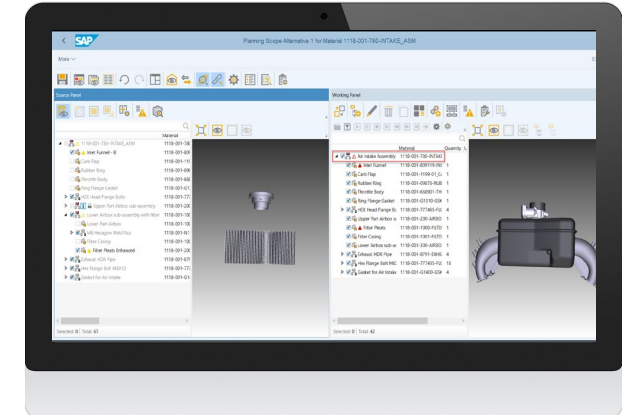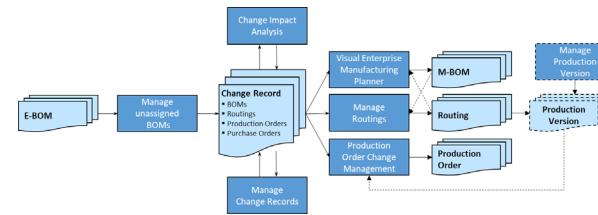
Define production process on different levels of granularity within one combined routing, addressing:
- costing and planning needs on operation level
- shop floor needs on activity level

3D visual support for BOM management, routing definition and interactive work instruction authoring.
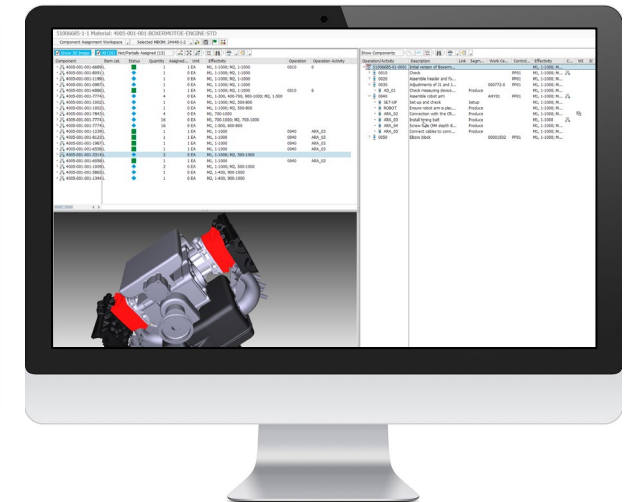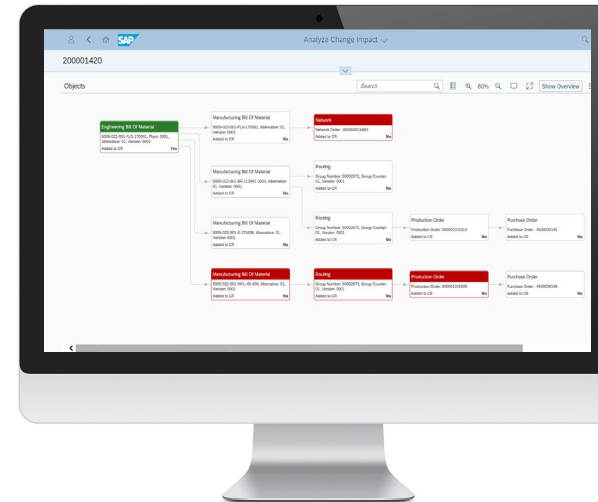
# SAP Manufacturing Suite

## Selected Highlights

# SAP Manufacturing Suite

## Highlights

| | |
|---|---|
| **Integration Excellence** | ERP Integration "out of the box" <br> Easy integration with shop-floor Automation layer <br> Lot Size 1 and Mass Customization |
| **Process Excellence** | Unit Level Tracking & Tracing <br> Comprehensive Nonconformance Management <br> Process Interlocking <br> High Performance with HANA |
| **Flexibility & Agility Excellence** | High Flexibility and Extensibility <br> Pure SOA based Architecture <br> Flexible Production Process Modeling without additional programming |
| **Usability Excellence** | Pure Browser Based Uis <br> Role specific access and Personalized Dashboards for operators |
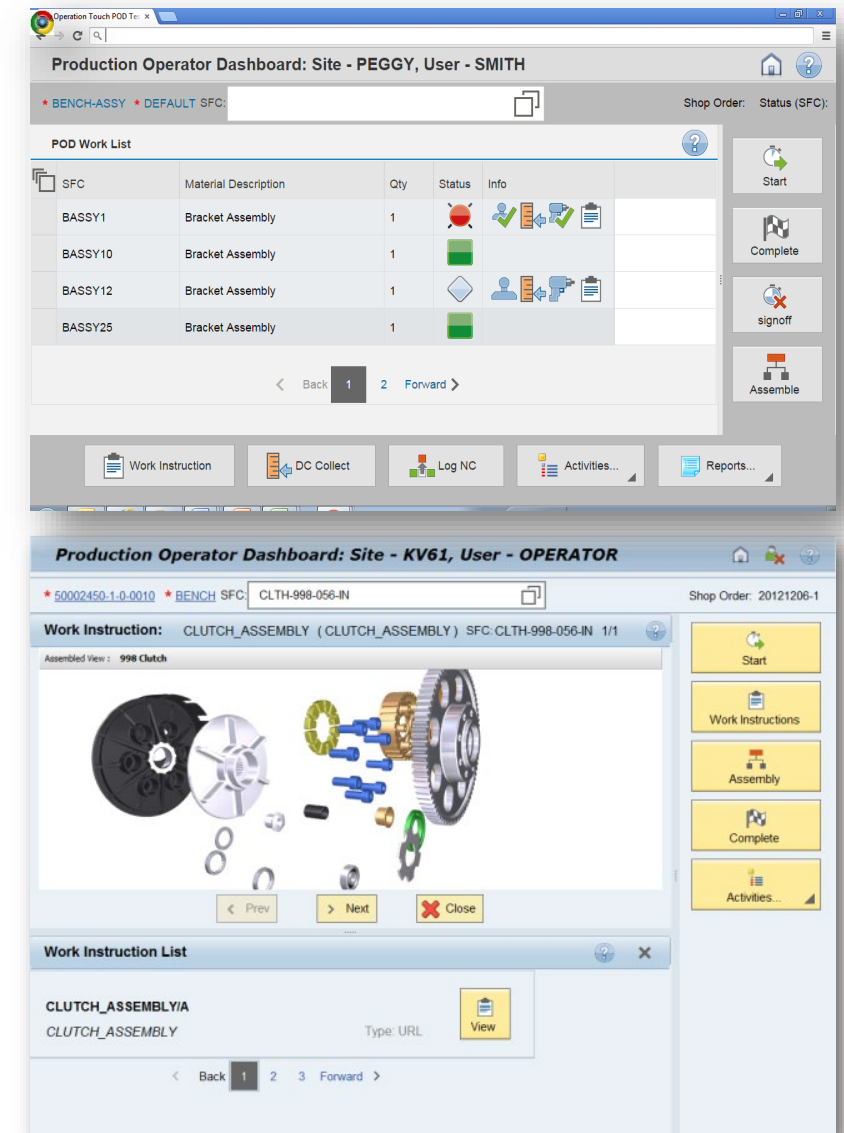
# SAP Manufacturing Suite
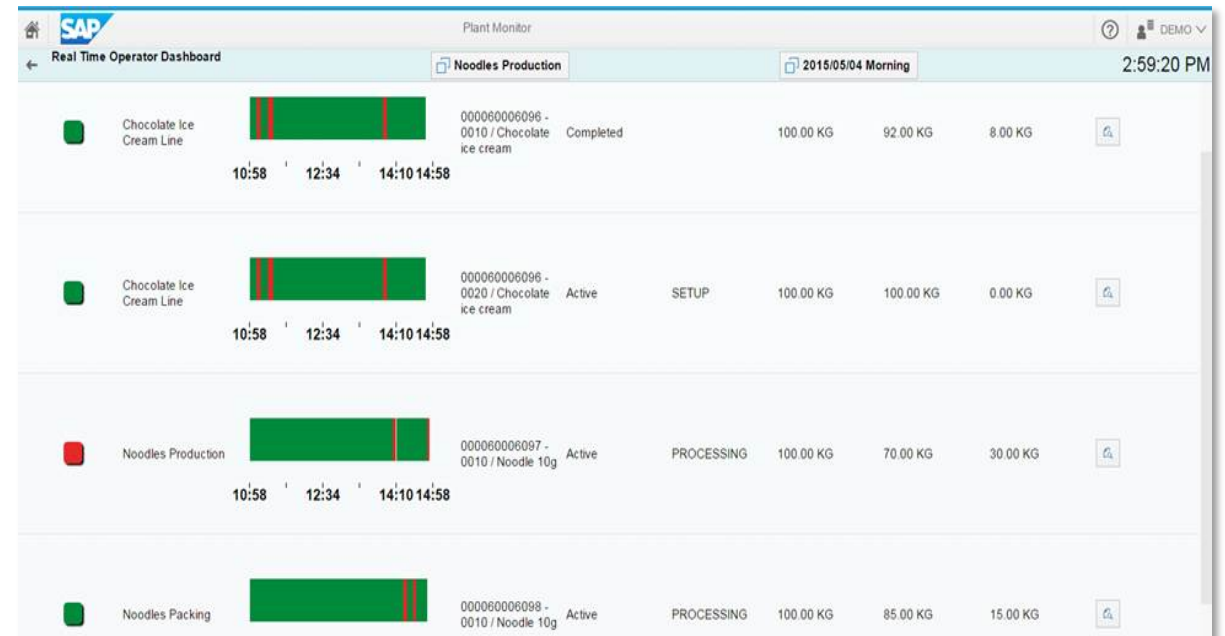## Overall Equipment Effectiveness

## Description

- Collect all OEE relevant information manually (Operator UI) or automatically (via PCo)
- OEE Analytics
- Single, common framework for all plants
- Cross plant performance comparison
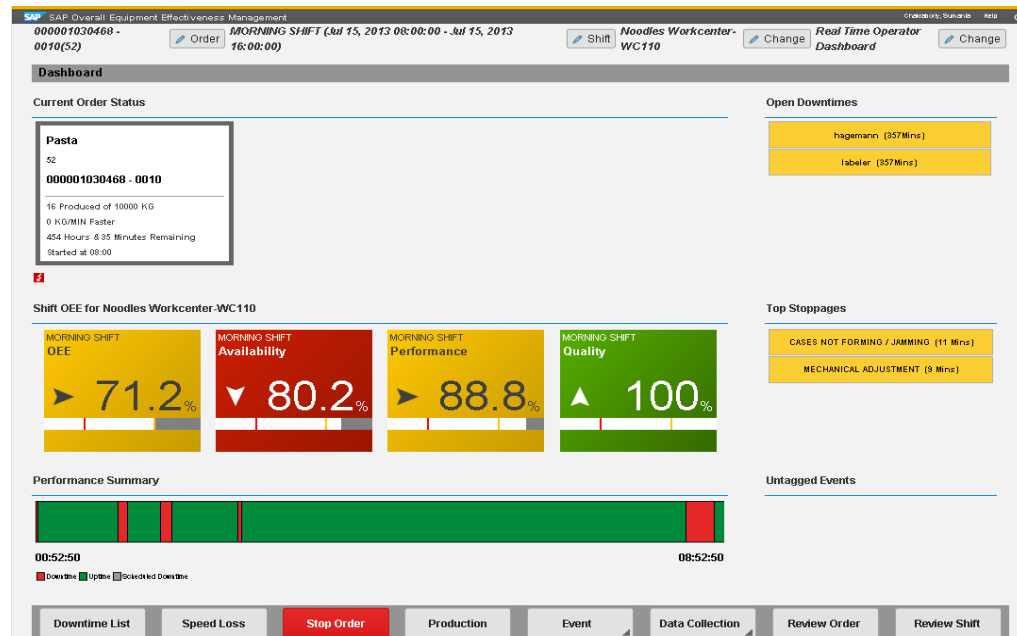
## Key Benefits

- Provide real time performance information
- Identify best practice
- Continuous Improvements

# SAP Manufacturing Suite
## Self Service Composition Environment

### Description

- Browser(HTML5) based design tool for dashboard creation by consuming different MII objects

- WYSIWYG based design

- Integrating tag value changes directly to browser using web socket interface or through catalogue query template

- Source code generation for high sophisticated UIs

- 3D file integration and simplified reporting for manufacturing application
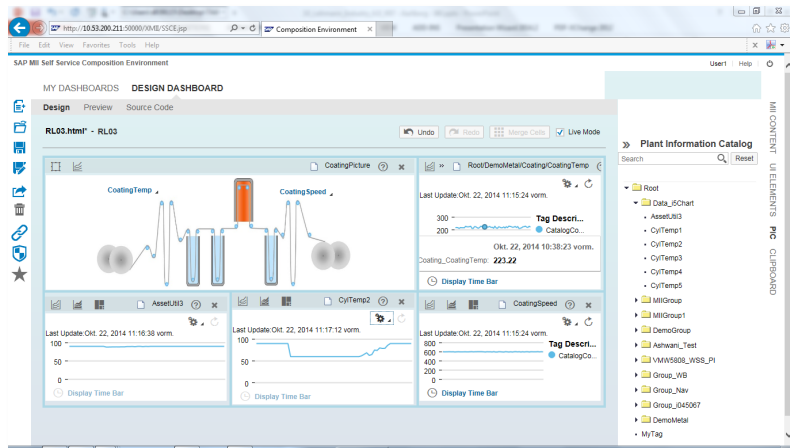
### Key Benefits

- Simplified interface for dashboard creation.

- Reduce the time required for dashboard creation

- Dashboard accessibility from mobile devices

- Remove the dependency on JRE required on each of the machine

- Build reporting application without any coding
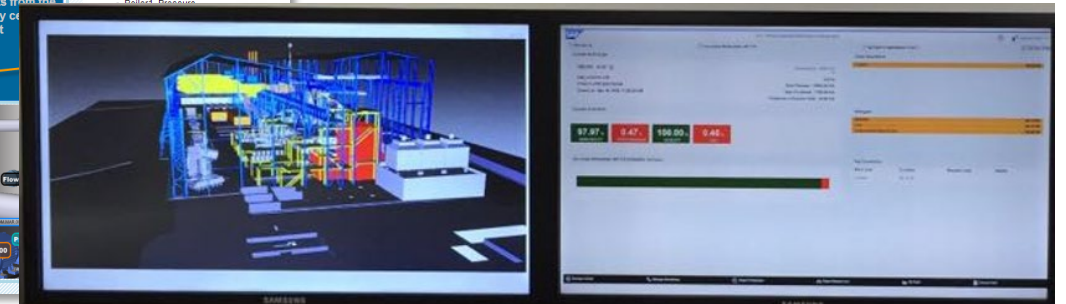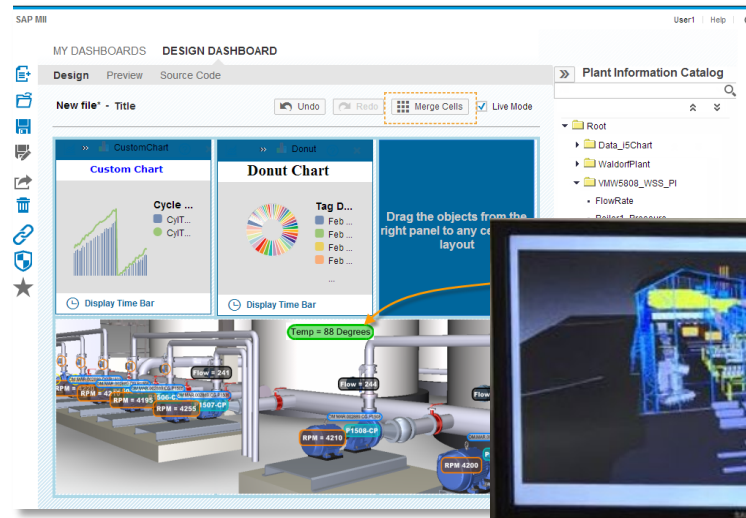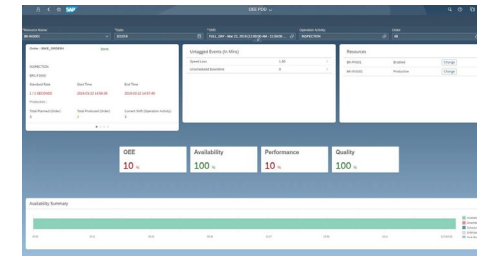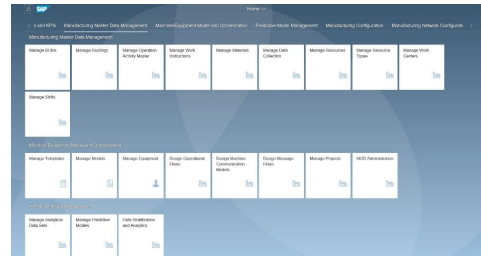
# SAP Digital Manufacturing Cloud
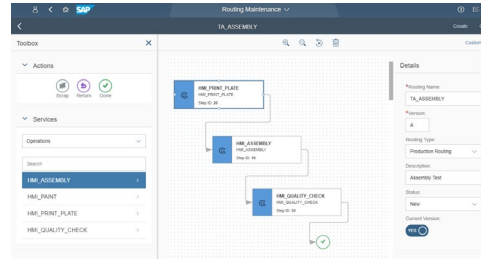## Selected Highlights

# SAP Digital Manufacturing Cloud for execution
## Orchestrate and control the shop floor

- Monitor the entire manufacturing process to optimize resources and execution

- Role-specific Fiori and operator dashboards

- Production Operator Dashboard (POD) is fully configurable, supports drag/drop and preview

- Operator OEE dashboards to monitor OEE and manage downtime events.

- Resource Orchestration to manage shop floor work flow and labor assignments

- Automation interfaces to provide for shop floor driven manufacturing events and data collection

# SAP Digital Manufacturing Cloud for Insights
## Key Performance Indicators

Manufacturing Insights can provide insight on real-time sensor data, transactional/operational data from the ERP/MES Systems and calculated KPI's which can help manufacturers to know what happened in manufacturing at the very first time

### Predefined and customized KPI

- Monitor performance using standardized key performance indicators (ca. 18 KPIs)
  - Order quantity fulfillment
  - Quality
  - On-time delivery & Schedule conformance
  - Overall Equipment Effectiveness (OEE)
- Custom key performance indicators (KPI) definitions using Analytical Modeler
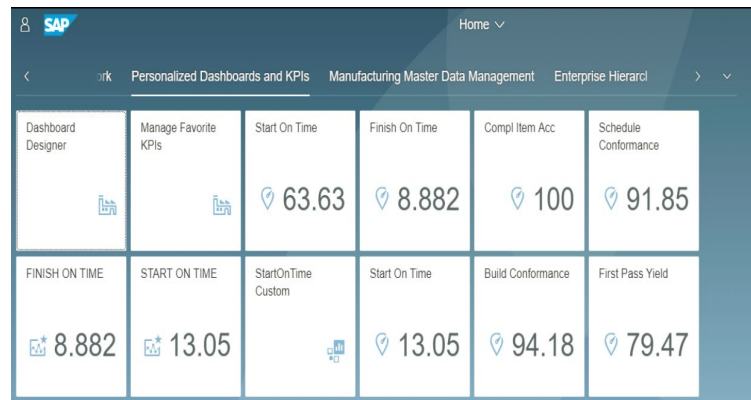
### Global Manufacturing Insights

- Generate and measure global performance across regions, countries and plants
- Cross plant comparison of KPIs
- Anywhere access to real-time data on mobile device
- Governance for entire enterprise
- Subscribe to alerts for ease of monitoring
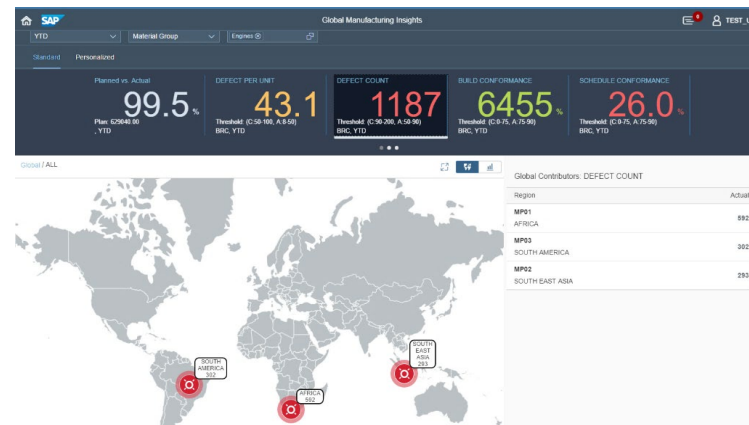
### Plant Manufacturing Insights

- KPI performance monitoring for a given plant
- Visibility of key areas impacting the performance of the KPI
- Drill down to find root cause of which material, work center, or order is causing the issue
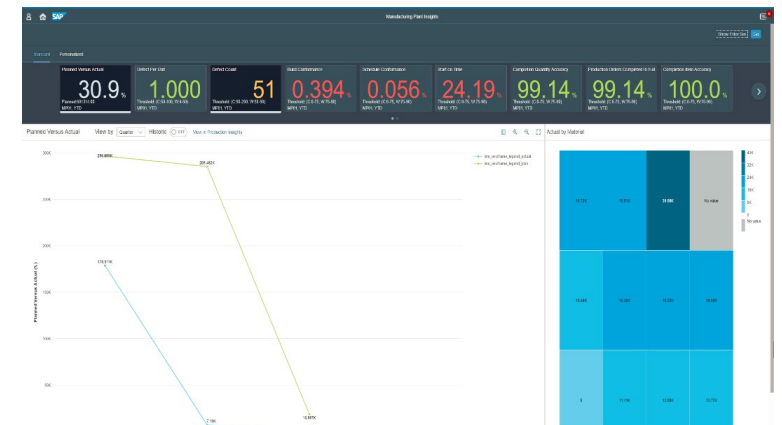
# SAP Digital Manufacturing Cloud for Execution
## Resource Orchestration & Dispatching

- Orchestrate labor and resources on the shop floor to achieve maximum availability

- React quickly to unexpected events utilizing built-in intelligence

- Dispatch and sequence operations to reflect the "real world" on the shop floor

- Monitor the entire manufacturing process to optimize resources and execution

- Reflect the reality on the shop floor by visualizing high priority orders, machine breakdowns, missing labor and production progress
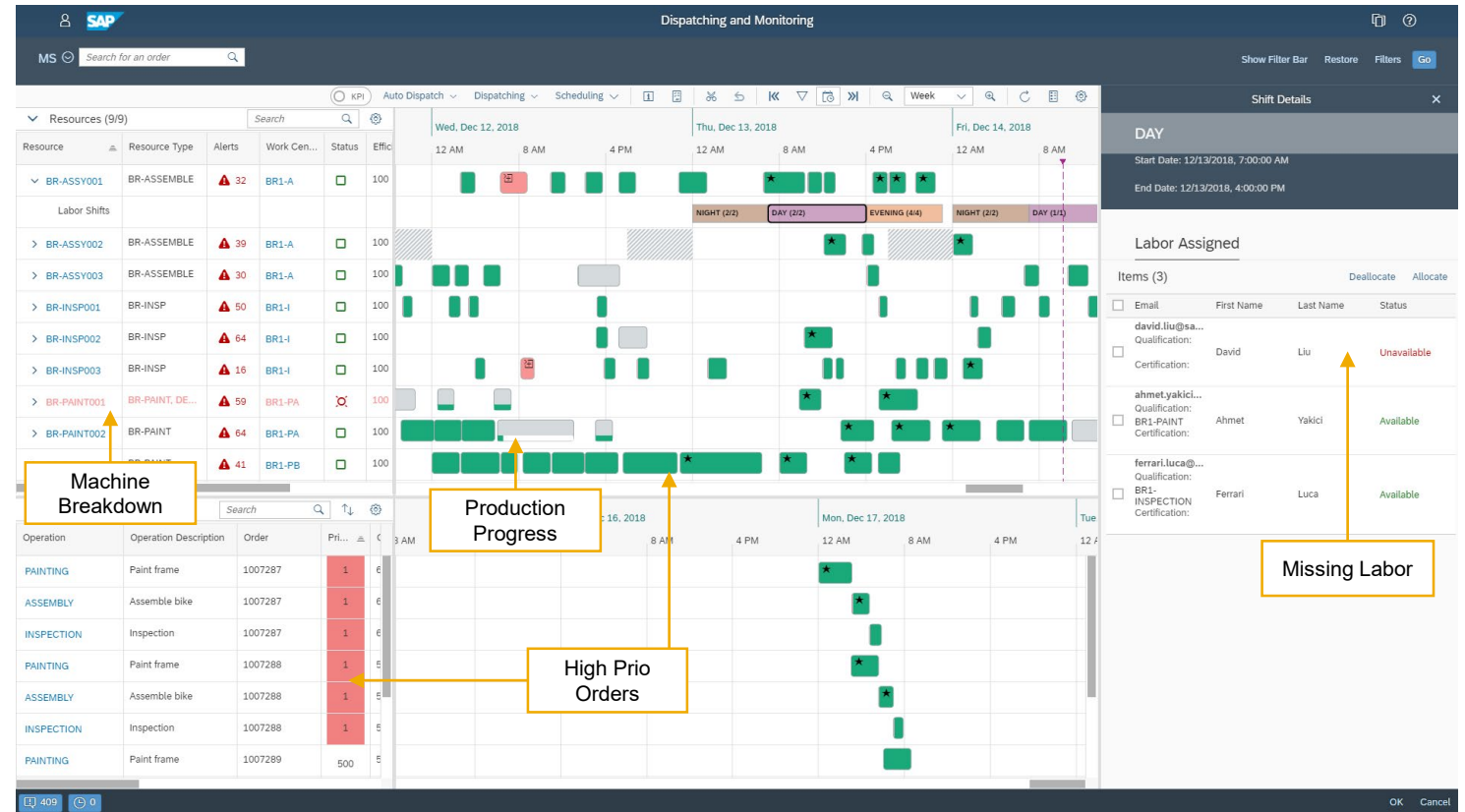
# Manufacturing Insights
Predictive Quality

## Key Capabilities

- 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

# SAP Digital Manufacturing

Hybrid Scenarios and Target Architecture

# Example for Hybrid Digital Manufacturing Landscape
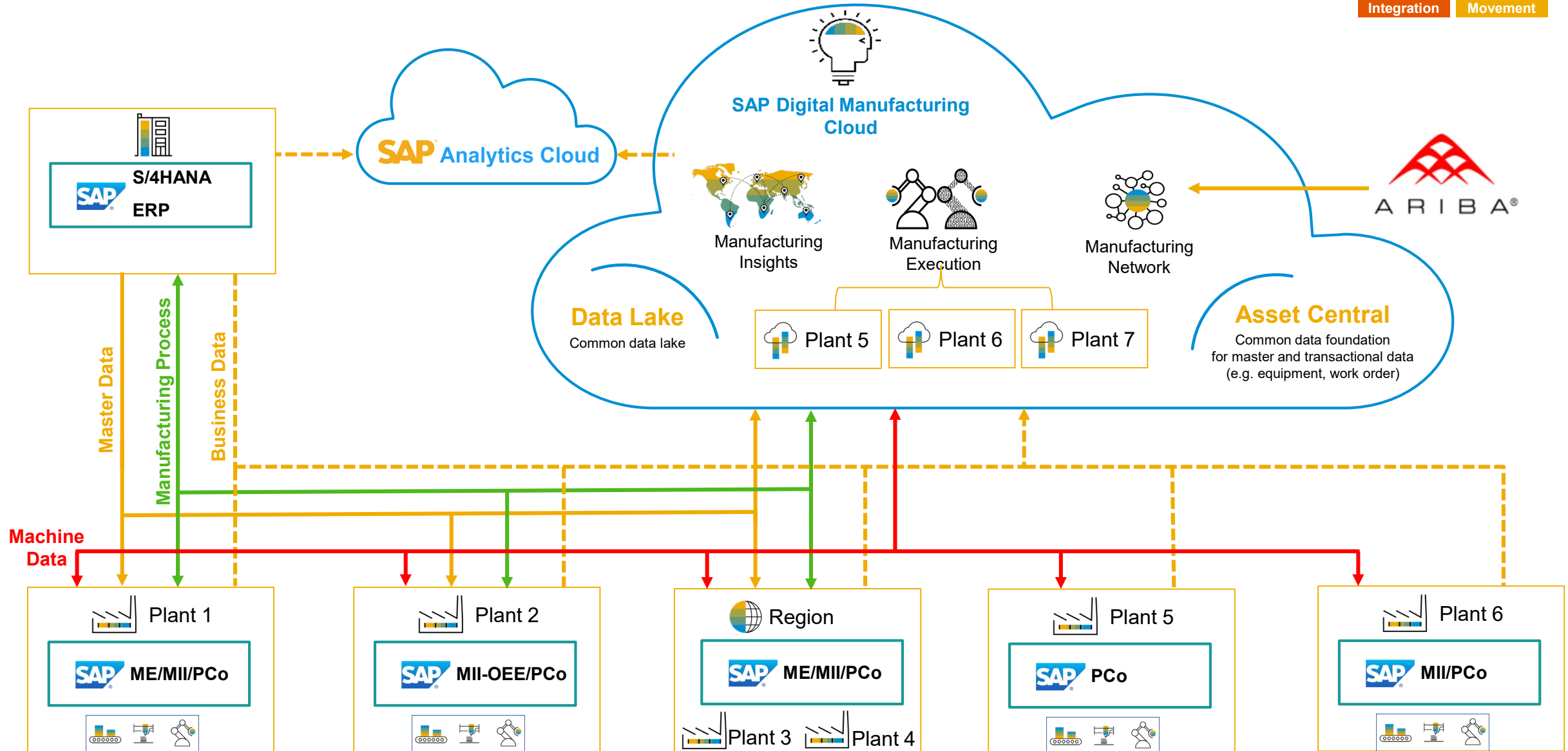
# SAP Digital Manufacturing Cloud
## Future Plans

# Digital Manufacturing Cloud for Execution
## Supporting multiple production scenarios for process industries

### Basic Scenario - Process Order Execution

- Execute batch-related order based on operations/phases with an intuitive user interface for the operator

- Trigger material movements

- Confirm production progress

- Provide capabilities to print documents and labels

### Extended Scenario - Process Order Execution

- Maintain enhanced work instructions to allow strong worker guidance

- Allow batch splits during order dispatching and order processing

- Batch classification

- Customer-specific batch numbering

- Support of Co-/By Products

- Manual and automatic data collections

- Mass data entry options for process order

- Quantity calculations

### Future Scenarios

- Weigh & Dispense

- Blending & Mixing

- Continuous Production

- Regulated Production

- (…)

# SAP Digital Manufacturing

Customer Examples

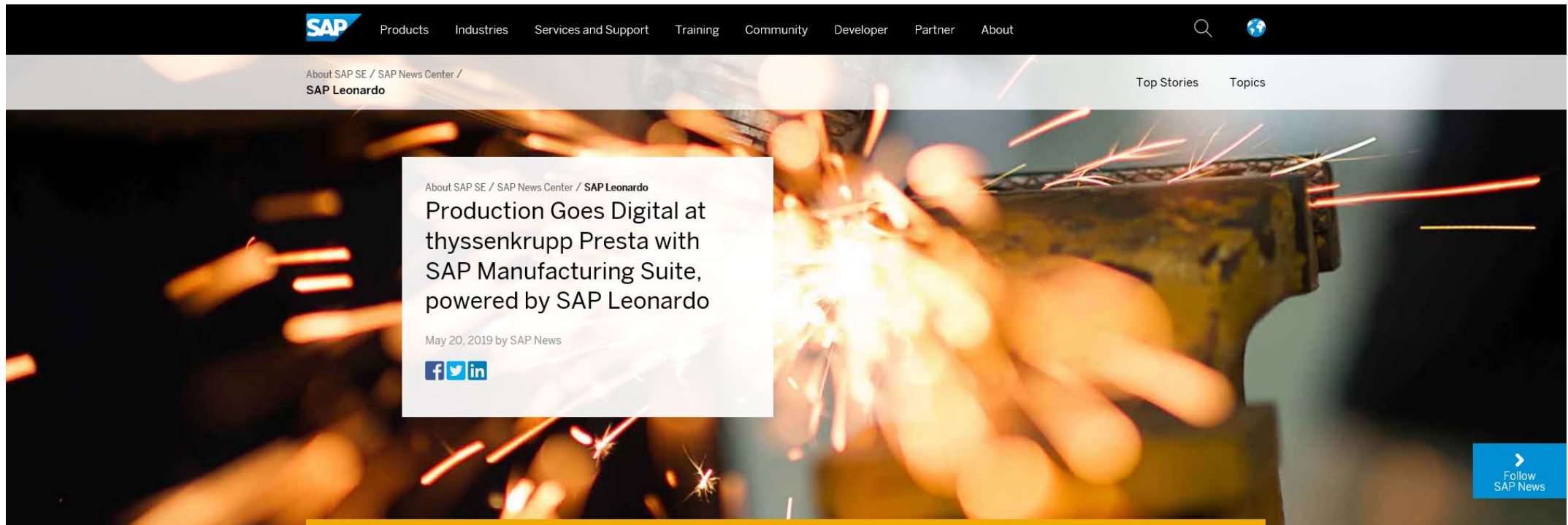# ThyssenKrupp Presta digitizes production with SAP Manufacturing Suite



- SAP supports the ThyssenKrupp Presta Steering Group in the further digitization and integration of production processes and systems;

- Greater efficiency and quality in global production;

- With the SAP Manufacturing Suite, ThyssenKrupp Presta Steering is implementing a modern, scalable cloud / on-premise hybrid solution with the goal of sustainably transforming and digitizing global production;

- The solution package implemented by ThyssenKrupp Presta consists of the components SAP Manufacturing Execution Suite (SAP MES), SAP Analytics Cloud and the SAP Cloud Platform
  - The first pilot plants are already in productive operation at the ThyssenKrupp Presta France plant

https://news.sap.com/2019/05/production-digital-thyssenkrupp-presta-sap-manufacturing-suite-sap-leonardo/

# Hindustan Zinc Ltd. increases transparency with SAP MII OEE

- **Customer: Hindustan Zinc Ltd.**

- Main objective of implementing SAP OEE was to capture downtime automatically and raise maintenance notification in SAP ERP system from the OEE Worker UI

- Automatic calculation of KPIs

- Single User Interface for operator

## Saving time and increasing visibility

**Company**
Hindustan Zinc Limited

**Headquarters**
Udaipur, India

**Industries**
Mining and mill products – primary metals

**Products and Services**
Zinc, lead, silver, and cadmium

**Employees**
6,742

**Revenue**
Rs 14,788 crore
(US$2.32 billion) (2014–2015)

**Web Site**
www.hzlindia.com

**Partner**
Sarla Technologies
www.sarlatech.com

**Objectives**
- Achieve better visibility, clarity, and transparency into operations for improved strategic decision making
- Improve compliance and reduce errors with processes based on enterprise resource planning
- Automate the collection and reporting of operational data for greater efficiency

**Why SAP**
- Long-time user of SAP® software
- Proven success of the SAP Manufacturing Integration and Intelligence (SAP MII) application among industry peers
- Immediate technical help through SAP Service and Support offerings like the SAP Ramp-Up program

**Resolution**
- Worked with SAP Consulting to support the SAP MII implementation
- Integrated shop-floor systems with the SAP ERP application for real-time information flow
- Migrated data captured in spreadsheets to SAP MII
- Automated overall equipment effectiveness (OEE) calculations

**Benefits**
- Simple, user-friendly interface
- Time savings by automating weigh scales, equipment failure notifications, and OEE dashboard reporting
- Greater visibility with centralized data and integrated processes

**20%–30%**
Faster reactions to process parameters

**50%–60%**
Automation of notification for process parameter deviations

**80%**
Of relevant process parameters controlled through SAP MII

"SAP MII automatically captures shop-floor data, therefore reducing the time required to capture and report on this information. It also provides greater visibility into our manufacturing process. And SAP Service and Support offerings helped ensure a smooth deployment and continued support."

Mr. Pradeep Vijay, Head – SAP, Hindustan Zinc Limited

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# SAP supports your Digital Transformation in Manufacturing

"The digital transformation in manufacturing is going to be enormously impactful for companies like Jabil. We see it as a tremendous opportunity for us to respond to customers more quickly, to build products in regions that are closer to where the end customers are, and to open up entirely new business models."

John Dulchinos, Vice President of Digital Manufacturing for Jabil

# Thank you.

**Veronika Schmid-Lutz**

Chief Product Owner SAP Digital Manufacturing

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Product road maps for digital manufacturing available on sap.com/roadmaps include:

- SAP S/4HANA Manufacturing for production engineering and operations

- SAP Manufacturing Suite

- SAP Digital Manufacturing Cloud