Design to Operate
In the Intelligent Enterprise

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The Digital Era is evolving into The Intelligence Era

**ENABLING TECHNOLOGIES**

- **Mainframe & PCs**
  - 1960s - 1980s
  - Transistors & silicon revolution
  - Large scale Mainframe Computing adoption
  - Emergence of PC’s
  - Plant floor automation

- **Client Server & Internet**
  - 1990s - 2000s
  - Widespread PC adoption
  - Broadband Internet
  - ERP and business process technologies

- **Cloud, Mobile & Big Data**
  - 2000s - 2010s
  - Mobile & Smartphone ubiquity
  - Cloud Computing
  - Social Networks
  - Big Data

- **Intelligent Technologies**
  - 2010s - 2020s
  - Machine learning (ML) and artificial intelligence (AI)
  - Internet of things (IoT) and distributed computing
  - Blockchain

**CUSTOMER VALUE CREATION**

- **Industrial Automation**
- **Business Process Automation**
- **Digital Transformation**
- **Intelligent Enterprise**
The Intelligent Enterprise
The foundation of a Digital Supply Chain

Intelligent Suite

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

Intelligent Technologies
AI
Machine Learning
Analytics
IoT

Cloud Platform
Data Management

The Intelligent Enterprise features 3 key components:

1. Intelligent Suite
2. Intelligent Technologies
3. Digital Platform
The Intelligent Enterprise
Key End-to-End Processes

Source to Pay

Total Workforce Management

Design to Operate

Lead to Cash

Network & Spend Management

People Engagement

Digital Core

Manufacturing & Supply Chain

Customer Experience

Intelligent Suite

Intelligent Technologies

Cloud Platform

Data Management

AI
Machine Learning
Analytics
IoT

Digital Platform

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Design to Operate in the Intelligent Enterprise
Key Differentiators:

1. Intelligence built into business processes
2. Seamless Integration
3. Digital Twin along value chain
4. Asset Central for all of IES
5. End to End Visibility
Top floor wants the Connected Supply Chain but... continues to organize in departmental silos
Digital Supply Chain
Connect Digitally to Perfect Reality
Digital Supply Chain
Connect Digitally to Perfect Reality
2019 Design to Operate Showcases!

**HANNOVER MESSE** April 1–5, 2019

**SAPPHIRE NOW** May 7–9, 2019 Orlando, Florida
2019 Design to Operate Showcase Videos!

https://www.youtube.com/watch?v=v2hp01G7_hw

https://www.youtube.com/watch?v=gnpQ-k24XYM

https://www.youtube.com/watch?v=gnpQ-k24XYM

https://www.youtube.com/watch?v=oeUqq4vUAM
# Design to operate (overview)

<table>
<thead>
<tr>
<th>Design</th>
<th>Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create <strong>product design</strong>, early cost estimates and master data for new/changed product</td>
<td>Plan demand for new/changed components.</td>
</tr>
<tr>
<td>Hand over to manufacturing and service to manage BOM and routing.</td>
<td>Plan supply for new/changed components.</td>
</tr>
<tr>
<td></td>
<td>Create master production schedule.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procure</th>
<th>Manufacture (subassemblies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procure components to build subassemblies.</td>
<td>Receive subassemblies into warehouse.</td>
</tr>
<tr>
<td>Manage and track inbound delivery.</td>
<td>Schedule subassembly production.</td>
</tr>
<tr>
<td>Receive procured components into warehouse.</td>
<td>Produce subassemblies and track progress.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sell</th>
<th>Manufacture (finished product)</th>
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</thead>
<tbody>
<tr>
<td>Receive customer sales order. (assemble to order)</td>
<td>Schedule finished product production.</td>
</tr>
<tr>
<td></td>
<td>Produce finished product and track progress.</td>
</tr>
<tr>
<td></td>
<td>Register serialized finished product.</td>
</tr>
<tr>
<td></td>
<td>Receive finished product into warehouse.</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Sell</th>
<th>Deliver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive customer sales order. (assemble to order)</td>
<td>Plan transport, pick, pack, and load product, for delivery.</td>
</tr>
<tr>
<td></td>
<td>Perform and track outbound transportation and receive proof of delivery.</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Operate</th>
<th></th>
</tr>
</thead>
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<tr>
<td>Receive asset master data and onboard asset.</td>
<td>Perform inspection, maintenance, and repair.</td>
</tr>
<tr>
<td>Monitor assets with IoT data, perform analysis, predict asset failure.</td>
<td>Request product improvement.</td>
</tr>
<tr>
<td>Plan asset maintenance.</td>
<td>Decommission asset.</td>
</tr>
</tbody>
</table>

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### Design to operate (overview)

#### Design
- **Receive customer feedback**
  - Requirements and system concept for new/changed product.
  - SAP S/4HANA Cloud for intelligent product design
- **Create product design, early cost estimates and master data for new/changed product.**
  - SAP S/4HANA
  - SAP SD Visual Enterprise
  - SAP Engineering Control Center
  - SAP Product Lifecycle Costing
- **Hand over**
  - Manufacturing and service to manage BOM and routing.
  - SAP S/4HANA
  - SAP Asset Intelligence Network

#### Procure
- **Procure components to build subassemblies.**
  - SAP S/4HANA
  - SAP Logistics Business Network
- **Manage and track inbound delivery.**
  - SAP S/4HANA
  - SAP Logistics Business Network
- **Receive procured components into warehouse.**
  - SAP S/4HANA
  - SAP S/4HANA (EWM)

#### Manufacture (subassemblies)
- **Schedule subassembly production.**
  - SAP S/4HANA
  - SAP Digital Manufacturing Cloud
- **Produce subassemblies and track progress.**
  - SAP S/4HANA
  - SAP Digital Manufacturing Cloud
- **Receive subassemblies into warehouse.**
  - SAP S/4HANA
  - SAP Digital Manufacturing Cloud

#### Manufacture (finished product)
- **Receive customer sales order.**
  - (Assemble to Order)
- **Schedule finished product production.**
  - SAP S/4HANA
  - SAP Logistics Business Network
- **Produce finished product and track progress.**
  - SAP S/4HANA
  - SAP Digital Manufacturing Cloud
- **Register serialized finished product.**
  - SAP S/4HANA
  - SAP Digital Manufacturing Cloud
- **Receive finished product into warehouse.**
  - SAP S/4HANA
  - SAP S/4HANA (EWM)

#### Deliver
- **Plan transport, pick, pack, and load product for delivery.**
  - SAP S/4HANA
  - SAP Logistics Business Network
- **Perform and track outbound transportation and receive proof of delivery.**
  - SAP S/4HANA
  - SAP Logistics Business Network

#### Operate
- **Receive asset master data and onboard asset.**
  - SAP S/4HANA
  - SAP Asset Intelligence Network
- **Monitor assets with IoT data, perform analysis, predict asset failure.**
  - SAP Pred. Maintenance and Service
  - SAP Predictive Engineering Insights
- **Plan asset maintenance.**
  - SAP S/4HANA
  - SAP Asset Strategy and Performance Management
  - SAP Pred. Maintenance and Service
- **Perform inspection, maintenance and repair.**
  - SAP Asset Intelligence Network
  - SAP Asset Manager
  - SAP Predictive Engineering Insights
- **Request product improvement.**
  - SAP Asset Intelligence Network
  - SAP S/4HANA Cloud for intelligent product design

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* Represent product families, see subsequent slide for detailed material list

** SAP S/4HANA Supply Chain for extended warehouse management

*** SAP S/4HANA Supply Chain for transportation management
Digital Supply Chain
From Design to Operate

**Design**
- Reduce time to market
- Continuously and sustainably innovate
- Deliver on customer demand

**Plan**
- Holistic view of demand
- Balance inventory and service levels
- Improve forecast accuracy

**Manufacture**
- Optimize manufacturing processes and minimize waste
- Improve collaboration with contractors
- Increase agility and responsiveness

**Deliver**
- Improve speed, efficiency and sustainability
- Deliver perfect orders consistently and profitably
- Increase utilization of warehouse and transportation

**Operate**
- Manage lifecycle of physical assets efficiently and sustainably
- Predict and simulate asset behavior
- Avoid unplanned downtime
Connect Digitally to Perfect Reality – Design
Business value for R&D/Engineering

Innovate digital products and services faster
Enable new business practices by managing product and asset intelligence across networks

Institute design excellence
Drive product development based on requirements with an integrated systems engineering approach

Compliant product lifecycle management
Improve collaboration and integrate product development to be first to market with innovative, sustainable and compliant products

Increase profitability and visibility
Loop back failure and operational analysis from service to engineering for design improvement and lower product cost

8% increase in meeting revenue goals with clearly documented and validated new product requirements.
SAP Performance Benchmarking

17% decrease in time to market where product development projects are managed from concept to launch.
SAP Performance Benchmarking
Connect Digitally to Perfect Reality – Plan
Business value for Supply Chain

State-of-the-art business processes
Enable new end-to-end business processes, models and revenue streams

Synchronized planning processes
Eliminate planning silos through connected and integrated planning processes

End-to-end visibility
Provide visibility on strategic, tactical and operational levels across internal and external data

Faster planning cycles
React faster to changes in the business through complete integration across the supply chain

40%
shorter lead times with flexible rules-driven supply-demand matching.
SAP Performance Benchmarking

12%
fewer days in inventory with dynamic, frequently updated forecasts.
SAP Performance Benchmarking
Connect Digitally to Perfect Reality – **Manufacture**
Business value for Manufacturing

**State-of-the-art business processes**
Leverage new technologies to identify and enable business processes with highly flexible UI’s

**Connected manufacturing**
Eliminate manufacturing silos through a single data model with connected, integrated processes

**Top floor to shop floor visibility**
Complete end-to-end visibility on strategic, tactical and operational levels

**Faster more efficient execution**
Improve throughput, increase quality, and reduce waste

**Advanced analytics**
Leverage configurable KPI’s to identify process bottlenecks and improve performance efficiency

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**8%**
increase in plan adherence where delivery dates are integrated with material availability and real-time manufacturing conditions.

SAP Performance Benchmarking

**28%**

decrease days in inventory where manufacturing processes are controlled through pull-based production schedule.

SAP Performance Benchmarking
Connect Digitally to Perfect Reality – **Deliver**

Business value for Logistics

**Balance customer service and delivery costs**
Enable efficient logistics and order fulfillment processes to increase speed and reduce cost and emissions

**Warehouse Management**
Optimize labor, storage, and fulfillment costs

**Transportation Management**
Reduce costs and carbon footprint and improve service, efficiency, and sustainability

**Logistics Networks**
Collaborate with logistics partners and improve fulfillment through visibility and IoT connectivity

93%
Increase of domestic on-time delivery.
SAP Performance Benchmarking
State-of-the-art business processes
Leverage new technologies to enable new asset management business processes with highly flexible UI's

Real-time insights
Provide end-to-end visibility on strategic, tactical and operational levels

Connected assets
Bring together information from operational and business systems using IoT for scalable transparency

Prediction and simulation
Drive smarter decisions, improve reliability, and reduce outages and emissions

Collaboration throughout the asset lifecycle
Share asset information and collaborate on a cloud-based business network with integrated processes

17% increase in return on assets where asset management systems are fully integrated.
SAP Performance Benchmarking

79% decrease in accident frequency with monitoring of strong safety measures for people and assets.
SAP Performance Benchmarking
The Intelligent Digital Supply Chain
Connect Digitally to Perfect Reality

Operator

Asset intelligence
Asset Management, predictive maintenance and service

Operator

Product intelligence
Collaborative R&D, engineering and manufacturing

Design
Plan
Plan
Manufacture
Plan
Operate
Deliver
Evolution of the Digital Twin | From Data Repository to Intelligent Orchestrator
Delivering the Customer Experience with SAP Digital Supply Chain

- Design
- Plan
- Manufacture
- Deliver
- Operate

Reusable Business Services
- IoT Application Enablement
- Business Partner Services
- Asset
- Domain Specific Services
- …Partner apps.

Technical Platform Services
- Security
- Fiori & Mobile
- Cloud
- Multi-device
- …Partner services

Connecting Things
- IoT Services
- Leonardo Edge

Processing Data
- Pipeline Engine
- SAP Data Hub

Store Data
- HANA
- SAP Vora
- Cloud Storage

Analyzing Data
- Analytics
- Machine Learning

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Asset Central
A Digital Twin enabler for next generation product and asset modeling and management

Asset Central provides a common master and transactional data layer, a set of out-of-the-box integrations to SAP back-end business and Internet of Things solutions and standard basic functionalities enabling common next generation product and asset modeling and management.
Why SAP
Connect Digitally to Perfect Reality

SAP’s supply chain solutions digitally connect your entire supply chain, so you can deliver at your best today, while you adapt and continuously improve to reshape how you deliver tomorrow.

With SAP, you can create a digital mirror of your complete supply chain—from design, planning and manufacturing to logistics and ongoing maintenance—embedding intelligence from beginning to end and ensuring your customers are central to each and every phase of your business.

You get total visibility as products are designed, delivered and deployed by connecting your business processes with real-time data from assets, equipment, customers and suppliers.

Only SAP can deliver all the processes and data with embedded innovations like 3D printing, IoT, machine learning, and blockchain into your everyday operations. With SAP’s supply chain solutions, you get the operational visibility and customer intelligence to manage your entire supply chain digitally and execute flawlessly today, while transforming your business for the future.
Thank you.

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