Internet of Things and Industry 4.0 facilitating the future of Manufacturing

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LoB Manufacturing & Sustainability
IoT is connecting information, people, and things
Unprecedented change fueled by hyperconnectivity

The Internet of Things

2.5 billion
Connected people on social networks by 2020

75 billion
Connected devices by 2020

US$65 trillion
Global business trade by 2020
The Internet of Things is not about ‘things’

IoT is about...

- Reimagining business processes
- Reimagining customer experience
- Reimagining human behavior
SAP enables IoT from core to edge

Connect with intelligence on the edge

- Monitor assets and send alerts
- Connect to people and things
- Data acquisition
- Transform business operations
- Cloud Platform
- Optimize corporate planning and reporting
- Real-time insights and automated decision-making

Transform business operations

- Reimagine business models
  - Reimagine product design
  - Reimagine customer experience
  - Reimagine business with value-added services
  - Build real-time supply chains
  - Enable responsive manufacturing
  - Tap into the world’s largest business network
  - Reimagine employee experience

Reimagine product design

Reimagine customer experience

Reimagine business with value-added services

Build real-time supply chains

Enable responsive manufacturing

Tap into the world’s largest business network

Reimagine employee experience
Intelligenz in Edelstahl

inoxFOAM  inoxTOWEL  inoxTISSUEPAPER
Industry 4.0 - The world of manufacturing continues to change
The fourth industrial revolution

Key Enablers

- **Mobile Computing**
  Affordable access to information

- **Social Media**
  Knowledge sharing in communities

- **Internet of Things**
  Connected via one protocol

- **Machine 2 Machine**
  Self regulation

- **Big Data & Predictive Analytics**
  Understanding and extrapolation

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1st Industrial Revolution
adoption of mechanical production facilities by using water and steam power

2nd Industrial Revolution
adoption of work-sharing mass production by using electrical power

3rd Industrial Revolution
use of electronics and IT to automate the production

4th Industrial Revolution
based on cyber-physical systems

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*Source: DFKI (2011)
Accelerate the Enterprise Success
Higher Productivity due to Simplification

How to accelerate and grow productivity and profitability in complex business environment? How to run business and production seamlessly integrated?

Need for **SMART SIMPLIFICATION**

(1) Top Floor to Shop Floor
Accelerate the Enterprise Success
Grow Productivity due to Simplification

How to accelerate and grow productivity and profitability in complex business environment? How to run business and production seamlessly integrated?

Need for **SMART SIMPLIFICATION**

1. Top Floor to Shop Floor
2. Customer to Operations
   - Simplify
   - Harmonize
   - Reduce

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Internet of Things and Industrie 4.0
SAP Connected Manufacturing runs Industrial IoT with Industrie 4.0 scenarios
Product Networks
Personalized Solutions – Product Networks – Design/Produce/Operate

Real-time Network Insights
- Demand
- Logistics
- Scheduling
- Order Fulfillment

SAP Business Suite 4 HANA
- Production Planning
- Materials Management
- Quality Management
- Plant Maintenance
- Human Resources

Connected Manufacturing
- SAP ME
- SAP MII
- 3D Visual Enterprise
- SAP QIM
- SAP PCo
- Shop Floor Dispatcher

Automation
- DCS
- MES
- Plant Data Collection
- Plant Historian
- Wireless Integration
- LIMS
- SCADA/HMI
- Environmental Building Management
- Sensors

Shop Floor
- public cloud
- private cloud
- on-premise

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SAP Connected Manufacturing
The Connected Plant in the Extended Supply Chain

**MONITOR**
- DESIGN
- PLAN
- RESPOND
- PRODUCE
- DELIVER
- OPERATE

**ERP**
- Production plan
- Bill of materials (BoM)
- variant management
- production steps

**MES (ME & MII)**
- Production details management
- Detailed and flexible
- production step routing
- Shop floor controls for each step

**PCo**
- Mapping of ME production details to PLC control parameters (recipe)

**PLC (Machine)**
- Sensor detects material carrier
- Requests control parameters from ME

**Log parametric data**
- tolerance checks
- Return „conformance“ or „non-conformance“ decisions

**Serial Numbers**
- Quality results per lot
- Order confirmation
- Inventory update, Equipment usage

**Mapping of ME production details to PLC control parameters (recipe)**

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SAP Responsive Manufacturing
Innovation to Help You Run Better

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Powered by HANA
SAP Integrated Manufacturing Solution

Production Planning and Scheduling

Performance Visibility and Monitoring

Manufacturing Execution

Quality Planning and Control

ERP PP
APO PP/DS
Shop Floor Dispatcher

ERP
MII
ME
Dashboards
BOBJ
HANA Analytics

ERP QM
MII
ME
QIM
3D VE
CAMS
Context of Industry 4.0 along Systems & Business Partners
Integration Scenarios

Integration Scenarios

1. Shop Floor to Top Floor
3. e-commerce Integration
4. Machine Cloud
5. Direct Replenishment
6. …
SAP Connected Manufacturing Strategy
Cloud / On-Premise / Shop Floor

- Public cloud
- Private cloud
- On-premise

SAP Manufacturing Execution Suite
(SAP ME, SAP MII, SAP PCo)

Manual Data Entry

Automatic Data Entry (Machine Connectivity)

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Thank You

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