SAP Asset Intelligence Network
backbone for SAP Internet of Things

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Market Shifts in Product and Service Innovation by 2020
Focus moves from producing & installation to efficiently operate over entire lifetime

By 2017 IDC predicts

60%

of Global Manufacturers will use analytics to sense and analyze data from Connected Products and Manufacturing and optimize increasingly complex portfolios of products

By 2018 Gartner predicts

6 billion

Connected “Things” will be requesting support

By 2017 IDC predicts

30%

of Top 100 Global Manufacturers will arm field service workforces with Augmented Reality capabilities to bridge the gap between traditional products and connected services

By 2018

40%

of Global Manufacturers will achieve superior "Perfect Service Levels" by investing in analytics to support unified Customer Life-Cycle orientation from sales through service

By 2020

50%+

of major new business processes and systems will incorporate some element, large or small, of the IoT

2 Gartner ‘Gartner reveals top predictions for IT organizations and users for 2016 and beyond’, 2015
3 Gartner ‘Analysts reveal five unexpected implications from the Internet of Things’, 2016
The SAP Internet of Things DNA

Intelligently connecting People, Things and Businesses

- Business Process Integration
- Social & Collaboration
- Big Data
- Business Models

- Artificial Intelligence and Machine Learning
- APIs & Microservices
- Natural Language
- Assets & Machines
- Business Applications
### Solution & Innovation Portfolio

#### SAP Leonardo Bridge

<table>
<thead>
<tr>
<th>Connected Product</th>
<th>Connected Assets</th>
<th>Connected Fleet</th>
<th>Connected Infrastructure</th>
<th>Connected Markets</th>
<th>Connected People</th>
<th>Partner Applications</th>
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</thead>
<tbody>
<tr>
<td><img src="image1" alt="Product Insights" /></td>
<td><img src="image2" alt="Fixed Assets Insights" /></td>
<td><img src="image3" alt="Fleet Management" /></td>
<td><img src="image4" alt="Building Insights" /></td>
<td><img src="image5" alt="Market Insights" /></td>
<td><img src="image6" alt="People and Work" /></td>
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<td><img src="image7" alt="Goods and Equipment" /></td>
<td><img src="image8" alt="Manufacturing Execution" /></td>
<td><img src="image9" alt="Logistics Safety" /></td>
<td><img src="image10" alt="Construction" /></td>
<td><img src="image11" alt="Rural Areas" /></td>
<td><img src="image12" alt="People and Health" /></td>
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<td><img src="image13" alt="Supply Networks" /></td>
<td><img src="image14" alt="Manufacturing Networks" /></td>
<td><img src="image15" alt="Logistics Networks" /></td>
<td><img src="image16" alt="Energy Grids" /></td>
<td><img src="image17" alt="Urban Areas" /></td>
<td><img src="image18" alt="People and Homes" /></td>
<td></td>
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</tbody>
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#### SAP Leonardo for Edge Computing

- SAP Cloud Platform
- SAP Leonardo IoT Bridge

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SAP Leonardo **Connected Assets** – 3 Complementary Digital Twins

- **SAP Asset Intelligence Network**
- **SAP Predictive Maintenance**
- **SAP Digital Twin for Structural Dynamics**
Asset Management is undergoing a massive change due

- Digital Manufacturing Information (VDI 2770)
- Demographic change
- Collaboration Models enabled by Industrie 4.0

SAP Asset Intelligence Network

Provides a digital representation of all industrial equipment used in the field with secure, controllable sharing rights across business partners to enable customer insights, performance analytics & new digital services.
Production planners aim for the following...

- **Maximize asset productivity**
- **Drive safe operations**
- **Reduce costs**

<table>
<thead>
<tr>
<th>$</th>
<th>Overall equipment <strong>effectiveness</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>↑</td>
<td><strong>Return on assets</strong></td>
</tr>
<tr>
<td>+</td>
<td><strong>Unplanned outages</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Annual OSHA related incidents</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Recordable accident frequency rate</strong></td>
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<tr>
<td></td>
<td><strong>Annual service and maintenance cost</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Planned maintenance budget vs. actual cost</strong></td>
</tr>
</tbody>
</table>
... but face different challenges in Asset Management

Average Asset Lifecycle Costs (example Industrial Pump)

- Initial Costs: 10%
- Installation Costs: 9%
- Operating Costs: 9%
- Maintenance Costs: 20%
- Disposal Costs: 4%
- Downtime Costs: 9%
- Inconsistency Costs: 7%
- Environmental Costs: 7%
- Incompleteness Costs: 7%
- Vastness Costs: 7%
- Incorrectness Costs: 7%
- Uncertainty Costs: 7%

Too much administration
Incompleteness
Old documentation
Inconsistency
Vastness
Incorrectness
Uncertainty

*www.pumpsandsystems.com
Asset specific documentation during the lifecycle

Digital manufacturing information for all stakeholders

- Engineering
- Procurement
- Construction
- Commissioning
- Operation
- Inspection, Statutory checks
- Overhauling
- Upgrading
- Decommissioning

- Specifications Sheet
- Bill of Capital Spare Parts
- Bill of Materials
- Mechanical Drawing
- ATEX Certificate
- Assembly Data Sheet
- Declaration of CE Conformity
- Wiring Diagram
- Operations Manual
- Repair Manual
- Inspection Schedule
- Maintenance Schedule
- Statutory Check Schedule
- tbc...

- Modell specific
- Equipment specific
SAP Asset Intelligence Network
Execution of the digital manufacturer information

Digital Manufacturer Information about:
- Technical Characteristics
- Parameters, Protocols & Interfaces
- Activities carried out by humans (assembly, installation, operation, maintenance, disposal)

Is the foundation

for Industrie 4.0 and the Internet of Things
SAP AIN customer numbers are growing and we are accelerating network growth with the biggest Chemical Operator BASF.
SAP solution for collaborative asset management

SAP Asset Intelligence Network

Apps
- Apps for collaborative processing of service bulletins, performance improvement, and spare parts change management

Content
- A cloud portal of standardized content that defines and documents equipment and models, shared and stored, for a consistent definition between business partners

Network
- A secure network to connect multiple business partners for inter and intra company collaboration

Combined together to deliver

SAP Asset Intelligence Network
Business Value for Asset Operators
Benefit from a single source of truth

**MANUFACTURER**

- Manufacturer #A
- Manufacturer #B
- Manufacturer #C

**OPERATOR**

- Asset operator
- Service Provider

Understand the complete context – one channel to many manufacturers

- Pump XYZ
  - Manufacturer A
- Flow Meter
  - Manufacturer B
- Engine
  - Manufacturer C

**BUSINESS VALUE**

- Establish one channel to many manufacturer’s, EPCs and Service providers
- Reduce manual asset search effort
- Lower asset life cycle costs
- Decreased downtime, planned and unplanned
- Lower spare parts inventory
- Receive notifications, service work summaries and service bulletins
- Push communication and alerts to manufacturers / service providers
- Reduce master data maintenance effort
- Higher process safety by transparent and bundled product – service offerings from manufacturer

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Performance Analytics
Improve product performance allowing customers to benefit from asset insights

Manage assets as a service or redesign them based on performance

- Institute collaborative network services for managing equipment, collecting asset performance analysis and feedback and fostering usage-based design enhancement
- Improved recall capabilities based on equipment status and lifecycle information
- Inform customers about major updates using announcements and 3D instructions
- Embedded analytics for models and equipment
... and finally **rethink** Business Processes

- **Equipment register**
- **Business partner network services**
- **Private area**
- **Machine records**

- **Visual audit & name plate recognition**
- **Specifications & visual work instructions**
- **Service bulletins, recalls & warranty**
- **Quality, inspection & calibration results sharing**
- **Model database**

- **Commissioning & handover**
- **Spare parts management**
- **Business context for predictive maintenance**
- **Performance Improvement (product & process)**
- **Analyse equipment performance**

- **Asset performance & strategy mgmt.**
- **Manage 'Equipment as a Service'**
SAP Asset Intelligence Network
What it looks like – how it works

Ease of use
SAP Asset Intelligence Network is a cloud-based business network with consumer-grade user experience, seamlessly integrated with Fiori and SAP Fiori Launchpad

Simple and secure onboarding
For manufacturers, operators, EPCs and service providers

Powerful business content and analytics
- Introduce a digital twin to represent each physical machine or product along its asset lifecycle
- Standardize equipment management through asset master data and spare-parts information available for update from the network
- Streamline maintenance through access to the latest documents and service bulletins on maintenance strategies
- Achieve collaborative design and execution for complex installation or maintenance procedures
Leverage manufacturer information along the Lifecycle
3D Data, Service Instructions & Announcements

Digital Twin for Business
New digital services like Firmware updates, recalls, spare parts updates etc. require a completely different approach to asset management:

- Every equipment has one unique identifier and one master record accessible by all relevant parties throughout its lifecycle
- The Digital Twin brings together the
  - Sensor information (asset health)
  - Installation and service information
  - Sales and contextual information

![Digital Twin Diagram]

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Performance Analytics
New approach to asset management

**SAP AIN as single source of Asset Information**

+ SAP IoT Application Enablement
+ SAP Cloud Platform Manufacturer Apps

- SAP AIN open architecture UI Extension Concept enables operators to integrate different Applications using the API Interfaces (native SCP, Siemens Mindsphere etc.)
- 1 source of asset information enriched by OEM data
- Integrated into SAP Plant Maintenance System
Industrial IOT in a “box”

In Construction

At SPS Drives

Tour of IoT Wall https://youtu.be/OjuzyXKotaM
End to end scenario

As designed
Connected Products
- Engineering BoM
- Material master
- Drawings and Specifications

As built
Manufacturing Execution
- Serialized Structure
- Configuration
- Equipment Onboarding

As maintained
Fixed Assets Insights
- Functional Locations
- Ticket Federation
- Spare Parts Ordering

Cont. Improvement
Digital Services
- Product Observation
- Firmware Update
- Equipment as a Service

Manufacturer
Product Design Network
SAP Asset Intelligence Network + SAP Hybris Cloud for Customer
Operator
New Business Models
End-to-end scenario
Integration Scenarios
Customer Portal & HCP extension capabilities

**Customer Portal & HCP extension capabilities**

- SAP provides a standard role-based personal dashboard acting like an equipment portal providing insights into the frequently viewed equipment, favorites and suggested tasks.
- Customers can easily enhance and adjust this personal dashboard using the extension capabilities of HANA Cloud Portal and SAP Fiori Launchpad.
Integration Scenarios
Integration with Enterprise Asset Management

The integration options are available via notes:

- Display of model information in custom EAM side panel
- Creation of model attachments in EAM for linked EAM objects

Pre-requisites for both of the above capabilities is the implementation of the following notes:

- Linking of EAM objects to AIN Models (Note 2327152)
- AIN Authentication (Note 2382489)
Connect with Sensor data using SAP IoT AE

**Digital Twin connected to IoT Thing Model**
SAP Asset Intelligence Network can be connected with SAP IoT Application Enablement Services for Time Series Data.

- Digital Twin leverages the defined Thing Model defined by SAP IoT AE
- SAP IoT AE providing business semantics to model physical devices and processes
- Time Series Data is not stored in SAP AIN
- SAP IoT AE stores Data using Dynamic Tearing

→ 1 Single Source of Asset Information Data bringing together static static Master Data (OEM and Operator) with dynamic sensor information (asset health)

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Integration Scenarios
Support for the RAMI 4.0 Administration Shell

SAP Asset Intelligence Network supports the RAMI 4.0 Administration Shell

- One single source of truth for the asset / equipment
- Information about the utilization of the asset
- Accessible via APIs, based on a service-oriented architecture
- Contains information about different application aspects (installation, business partners, condition monitoring, tickets, spare parts, etc.)
- Supports unique Identifiers, types and instances
- Manufacturer and operator specific attributes

Integration with Cloud for Customers

SAP Cloud for Customers is just one integration possibility

Manufacturers can easily access all available tickets for an equipment and control the access for Operators and service providers

Operators can create service requests directly on the equipment level

If the collaboration is in place, manufacturers can apply this on their customer equipment to fulfill service agreements and increase uptime & customer satisfaction
Integration Scenarios
API Integration

Powerful REST APIs and API tutorial for SAP Asset Intelligence Network

- Model APIs: [Here](http://help.sap.com/ain-current)
- Equipment APIs: [Here](http://help.sap.com/ain-current)
- Template APIs: [Here](http://help.sap.com/ain-current)
- Location APIs: [Here](http://help.sap.com/ain-current)
- Document APIs: [Here](http://help.sap.com/ain-current)
- Spare Part APIs: [Here](http://help.sap.com/ain-current)
- And many more
SAP Asset Intelligence Network

Architecture

SAP Cloud Platform (SCP) (PaaS)

SCP / Fiori (HTML5) Applications

AIN Subscriptions

AIN User Interfaces

SCP / Java Applications

AIN Integration

SAP Asset Intelligence Network Application

SCP Identity Service

SCP Document Service

SCP Persistence Service

Redis

Elastic Search

SAP Clea

On-Premise / Managed Cloud / SaaS

SAP Hybris

Ariba

SAP Predictive Maintenance & Service

SAP S/4 HANA

SAP CRM

ABAP HTTP Calls (on-Premise)

SAP Cloud Integration Services (Cloud)

AIN Mappings
SAP Asset Intelligence Network – Chemical Customer A
Use Case 1 - Equipment Installation – Next Level Plant Maintenance

Manufacturer

- Optional Invitation by Premium Account
- Greenfield: Automatic creation of equipment data
- Brownfield: Updating & enhancing data

SAP Asset Intelligence Network

- Sensor Data
- Service Tickets
- SLA
- Upsell Revenue
- Customer Satisfaction
- Service Bulletins / Compliance

Asset operator

- Brownfield: Publishing of functional location data
- Greenfield: Leveraging Manufacturer data & syncing with SAP PM

Value

- Efficiency
- Maintenance rework costs
- Up to date data of the digital twin on site
- Training effort
- Master data effort
- Maintenance Inventory
- OEE
SAP Asset Intelligence Network – Discrete Customer 2
Use Case 2 – Supplier Track and Trace

- Automatic creation of equipment data
- Connecting digital twin with digital components
- Leveraging Equipment data including components
- Optional Invitation by Premium Account
- Value
- Manufacturer
- Supplier
- Up to date data of the digital twin on site
- Service Bulletins / Compliance
- SLA
- Upsell Revenue
- Customer Satisfaction
- Efficiency
- Maintenance rework costs
- Sensor Data
- Service Tickets
# SAP Asset Intelligence Network

## Product roadmap overview - key themes and capabilities

### Recent innovations

- **Process Improvements:**
  - Historical Work Order / Logbook
  - Multi-level equipment creation based on hierarchical model templates
  - Clustering of equipment with Groups
  - Manufacturer refined failure modes
  - Enhanced Template Navigation
  - Improved Spare Parts handling with Documents, Templates, and Equipment Level Quantities
  - Extending Group Analytics by Group Population

- **Integration:**
  - Enhanced EAM integration to sync

### Planned Q1/2018

- **Process Improvements:**
  - Historical Notifications / Logbook
  - Extended organizational Authorization
  - Modelling of Key Figures for condition based and predictive maintenance (Design Time)
  - Dashboard for condition based and predictive maintenance (Run Time)
  - System Modelling
  - Automatic Registration and Topology Detection
  - Obsolescence Management for Spare Parts
  - Model Structure Cardinality Ranges
  - Unified Equipment Status with PdMS and Device Connectivity
  - Introducing Reliability Availability and Maintainability Figures to Failure Modes
  - Extending Group Analytics by Group Age
  - New Authorization Group to share Headers only

- **Integration:**
  - Shopping Cart
  - 3D Printing with SAP Distributed Manufacturing
  - SAP PdMS and IoT Application Enablement Integration

### Planned Q2/2018

- **Process Improvements:**
  - Creation and editing of Work Orders / Notifications
  - Introduction of Collaborative Work Order
  - Subscribe to Data Changes
  - System Functions
  - Operating Context
  - Cross Timeline Event Reporting

- **Integration:**
  - Integration with SAP PLM

### Planned Q4/2017

- **Process Improvements:**
  - Creation and editing of Work Orders / Notifications
  - Introduction of Collaborative Work Order
  - Subscribe to Data Changes
  - System Functions
  - Operating Context
  - Cross Timeline Event Reporting

- **Integration:**
  - Shopping Cart
  - 3D Printing with SAP Distributed Manufacturing
  - SAP PdMS and IoT Application Enablement Integration

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Press coverage
From design thinking project to a vibrant business network

The Automated Asset Exchange
SAP’s Asset Intelligence Network will be a cloud-based global registry of industrial equipment that will facilitate data exchange between suppliers and manufacturers.

By Stephanie Neo, Senior Editor, on March 17, 2016

SAP Asset Intelligence Network – Die Plattform für Anlagendaten
SAP asset Intelligence Network (AIN) soll Hersteller und Betreiber von industriellen Anlagen zusammenbringen, um Daten zu teilen und physikalisches Equipment virtuell zu repräsentieren.
Foundation for a successful, global, single network of assets

All business partners need to talk a common language
Typical journey to get there?

1. An internal Installed Base / Asset Portal across multiple in-house systems
2. An external Installed Base / Asset Portal where you invite key Service Providers and Manufacturers
3. Progressively benefit from an expanding network of contributors

Propose an Industrial IoT Pilot with your customers
SAP Asset Intelligence Network

Service Offerings

Business Assessment Service

Approach
SAP AIN introduction & use cases
Report from customer backend system to find SAP Asset Intelligence Network support assets
Business case calculation & validation

Deliverables
Business case
Dedicated business transformation roadmap in asset management
Final presentation

Value and benefits
Dedicated use cases with business value for further procedures
Clear road map with integration possibilities
Adoption of an ideal model for asset management processes and solutions

Jump Start Service

Customer specific system instance
Enables you and a collaboration partner to leverage network capabilities in asset management
5 models & 100 equipment
8 weeks

Optional add-ons
API automation
Integration (CS/CRM or PM)
Synching PM/CS/CRM task lists

Value and benefits
Very affordable prototype with your own equipment data in SAP HCP
Basis for a project decision, reusability for an implementation project
Summary

SAP Asset Intelligence Network

Provides a digital representation of all physical equipment in the field with secure, controllable sharing rights across business partners to enable:

- **Customer insights**: Leverage the installed base in the business network to grow aftermarket business

- **Performance analytics**: Improve product performance allowing customers to benefit from asset insights

- **Digital services**: Win in the new digital market space by driving advanced business models into the customer base
Thank you.

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Admin Guide – SAP AIN 1705 Release
Operations Guide – SAP AIN 1705 Release
Security Information – SAP AIN 1705 Release