MindSphere
Paradigms shift of the digitalization
Veränderungen in der Kommunikation

Source: The Washington Post Online
Unrestricted

Plant Data Services

Veränderungen in der Kommunikation

Source: The Washington Post Online
The internet of things (IoT) is bringing paradigm shifting trends to the industry

**Shift from hardware to software**

**Users become designers**

**New business models become possible**

From the taxi to ride sharing
From the record store to streaming
Creating value through new business models

Today: Revenue through machine sales

The future: New scope for value creation through the sale of machine output
From data ... 

Data collection

Visualization and recommendations

Increasing the availability of components

Secure data storage and transmission

Maximizing process efficiency

Optimizing energy consumption

Improving cyber security

Data analysis and simulation

MindSphere
MindSphere will develop into an open ecosystem of connected assets applications

- SIMATIC
- SINUMERIK
- SINAMICS
- SCALANCE
- PCS 7
- Third-party products

MindSphere – Siemens Cloud for Industry

- MindSphere Apps
- Own Apps
- OEM Apps
- Endcustomer Apps
- Developer Apps
- App Store
MindSphere – an open cloud platform for Industry Customers based on SAP HANA Cloud Platform

Optimization of plants and machines as well as energy and resources

- **Open standards** for connectivity of Siemens and third-party products
- **Plug and play connection** of Siemens products (engineering in the TIA Portal)
- **Cloud for industry** with open application interface for individual customer applications
- Transparent **pay-per-use pricing model**
- Opportunities for completely new **service models**
MindConnect APIs - easy and integrated connectivity as additional differentiator

MindConnect APIs Development Characteristics:

- **Close Siemens internal collaboration** regarding embedded Agents in SIMATIC, Sinumerik, Scalance, Simotics, PCS 7, TIA portal, etc.

- **Java based** multi platform Agent (installable on Windows / Linux) as well as small footprint **Agent Code Library** for integration in 3rd party assets.

### Key MindConnect Features

1. Dedicated IoT Gateways focused on brownfield installations with **MindConnect Nano** and **SIMATIC IoT 2000**

2. MindConnect **embedded Agents** in standard Siemens industrial products focused on greenfield as unique differentiator, with e.g. SIMATIC, Sinumerik

3. **TIA portal integrated** MindSphere engineering to lower effort significantly coming with v14
MindApp APIs – scalable application development for digital business models

MindApps API Development Characteristics:

- **APIs** of MindSphere for development of customer owned analytical apps (MindApps)
- Optimized for **industrial IoT App development**
- Ensure app **scalability** leveraging MindSphere
- Taking advantage of **future innovation** of platform and connectivity

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1. **Development tools** for standard Integrated Development Environments (IDEs) Eclipse. Additional **modules supporting** IoT use cases (e.g. parsing, analytics and visualization modules)

2. **MindSphere App Store** provides numerous ready to use Applications (MindApps). For App developers the App Store offers a **monetarization and promotion channel** to industrial customers.

3. **Developer community** supported via Developer Portal, Developer Conference, dedicated consulting, free demo apps, and much more
MindSphere offers an easy way into digital services for OEMs and end-customers

- Customer finds new service ideas
- Customer receives a secure connection of assets and processes
- Customer implements new services efficiently
- Customer sells services
- Customer operates services efficiently

- with …
- with …
- with …
- with …
- with …

- … our best practices and our expertise
- … MindConnect Nano from Siemens
- … our solutions, Fleet Manager and Visual Analyzer
- … MindSphere ecosystem
- … our platform: MindSphere – Siemens Cloud for Industry
MindSphere is seen as a leading platform for industrial IoT

MindSphere makes your company ready for Digitalization
Digital Engineering Cover 04/16

MindSphere looks like the starter drug to Industry 4.0
EngineeringSpot 03/16

MindSphere wins Gold Award for "Lead Generation"
Hannover Fair 04/16

GE and Siemens take the lead – watch out for Predix and MindSphere …
Société Générale 03/16
MindSphere enables customers to create new data-driven services in only two easy steps

**STEP 1 Connect**
Get MindSphere user-account, receive and integrate Connector Box into machine / equipment

**STEP 2 Configure**
Configure data acquisition, connectivity and Visual Analyzer via MindSphere

**Run the Service**
Monitor e.g. health status of all assets in MindSphere with Fleet Manager and drill into details using Visual Analyzer
### Asset Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset name</td>
<td>DTDC-Model-3Travel</td>
</tr>
<tr>
<td>Asset Type</td>
<td>Drive Trains Democase 3.0 Travel</td>
</tr>
<tr>
<td>Asset ID</td>
<td>06998724</td>
</tr>
<tr>
<td>Description</td>
<td>It is a demo equipment for fairs and customer events</td>
</tr>
</tbody>
</table>

### Details:

- **89% completed**
- **Location**
  - **Customer**: [Details]
- **Data Sources**
  - **DATA POLICY**: 4 configured
- **Asset Aspects**
  - **Variations**: 4 configured
- **MiniConnect Information**
  - **Status**: Not onboarded
- **Network Connection**
  - **Status**: Offline
Efficiently create your service, for instance to reduce downtimes of assets

Run the Service Fleet Manager & Visual Analyzer

Monitor the health status of all assets in the Fleet Manager and analyze problems in detail in the Visual Analyzer
Requests system facilitates recommending actions

1. Variable
   - Select a variable to monitor
   - contamination.Asset91

2. Condition
   - Define rule condition
   - greater than

Run the Service
Set rules & send requests
Send recommended or requested actions and address specific users or user groups
## Fleet Manager

### Assets

<table>
<thead>
<tr>
<th>Name</th>
<th>ID</th>
<th>Customer</th>
<th>Location</th>
<th>Open Requests</th>
<th>Show...</th>
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<tr>
<td>Rule</td>
<td>Pre</td>
<td>Description</td>
<td>Action</td>
<td></td>
<td></td>
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<td>---------------------------</td>
<td>-----</td>
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<tr>
<td>Critical Break Temp Important</td>
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<td>Critical Break Temp Important</td>
<td>E-mail to owner of Demo Case</td>
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<td>Critical Break Temp Urgent</td>
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<td>Critical Break Temp Urgent</td>
<td>Call Demo Case owner</td>
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<td></td>
</tr>
</tbody>
</table>
Add new rule

1. Variable
   - Select a variable to monitor
   - XTOOLS.BreakTemperature - float

2. Condition
   - Define rule condition
   - If XTOOLS.BreakTemperature is greater than 45

Step 3
4. Prio, description and action

- **Define pri and description for request to be triggered and recommended action**

  - **Prio:** Information
  - **Description:** enter description here
  - **Action:** enter action here

  ![Request created](image)
4. Prio, description and action

- **Prio:** Information
- **Description:** Urgent
- **Action:** Important

Request created
4. Prio, description and action

Define prio and description for request to be triggered and recommended action

- **Prio:** Urgent

- **Description:** Critical temperature on Break

- **Action:** Enter action here
4. Prio, description and action

- Define prio and description for request to be triggered and recommended action

- **Prio:** Urgent

- **Description:** Critical temperature on Break

- **Action:** Fill Demo Case Owner
4. Prio, description and action

- **Prio:** Urgent
- **Description:** critical temperature on Break
- **Action:** Call Demo Case Owner

5. Rule name

- **Rule name:** critical temp on Break
What the customer orders and gets

MindAccess Users

- Receive Email with Login Data (User Name and Password)
- Own URL: OEM.mindsphere.io
- MindApps are activated inside of MindSphere (Fleet Manager and Visual Analyzer are automatically activated with MindAccess order)

MindConnect Nano

- Hardware delivery
- Preinstalled IPC (based on SIMATIC Nano Box)
MindSphere can already enable a broad variety of use cases and business models

<table>
<thead>
<tr>
<th>CRM, Marketing &amp; Sales</th>
<th>Research &amp; Development</th>
<th>Operations, Production &amp; IT</th>
<th>Service &amp; Support</th>
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<tbody>
<tr>
<td>Performance and Usage Dashboard</td>
<td>Product Usage Analysis</td>
<td>Asset and Material Tracing</td>
<td>Asset/ Fleet Management</td>
</tr>
<tr>
<td>Customer Self-Service Portal</td>
<td>Product Quality Analysis</td>
<td>Asset Condition Monitoring</td>
<td>Availability Management</td>
</tr>
<tr>
<td>Customer Intelligence and Cross-/ Up-selling</td>
<td>Firmware and Application Management</td>
<td>Automated Production and Supply Chain Management</td>
<td>Warranty Management</td>
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<tr>
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<td>Automated Analytics and Reporting</td>
<td>Performance Management</td>
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<tr>
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<td>Resource and Energy Management</td>
<td>Condition Management</td>
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<tr>
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<td>Connected Operations Intelligence</td>
<td>(Condition-based) Diagnostics and Monitoring</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(Condition-based) Predictive Maintenance</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Product Tracing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Service Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Automated Service Execution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Remote Service and Remote Maintenance</td>
</tr>
</tbody>
</table>

**Availability Management**
- Automatic evaluation of critical condition values
- Proactive alarming, inspection and problem fixing
  - Increased machine up-time

**Warranty Management**
- OEM analysis of machinery data and maintenance activities
- Expanded warranty given proper, compliant maintenance
  - Greater warranty reliability

**Performance Management**
- Continuous evaluation of components power consumption
- Specific recommendation to optimize configuration
  - Optimized energy consumption
Use Case Example – Condition Management

Increased machinery uptimes (e.g. Honing Machine)

CUSTOMER GROUP/ INDUSTRY

- OEMs
- System and Machine Manufacturer
- Machine Tool Manufacturer
- Discrete Parts Manufacturing Industry

CHALLENGES TODAY

- As machining time increases, honing stones become worn.
  
  To guarantee quality, the honing stones must be replaced before either critical threshold values or the end of tool life has been reached.

  This can result in:
  - Honing stone wear that’s not directly detectable
  - Loss of quality and productivity
  - Possibility of having to re-machine parts

MINDSPHERE ENABLED SOLUTION

1. Scalable alerts related to honing stone wear
   - Detailed monitoring of feed force, machining time, and tool life
   - Forecast of remaining tool life
   - Optimal coordination of tool availability and conditioning

BENEFIT FOR OEM

- New options for service business
- Offering of sophisticated, distinguishable machinery
- Implementation of newly enabled service models

…FOR END-CUSTOMER

- Increased output
- Sturdier processes
- Strategically scheduled maintenance and optimized service processes
- Planning safety and cost efficiency
## Planned release schedule for MindSphere
### Out of the box analytics

<table>
<thead>
<tr>
<th>Q2</th>
<th>CY 2016</th>
<th>Q3</th>
<th>CY 2017</th>
<th>Q1</th>
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</thead>
<tbody>
<tr>
<td><strong>Connect and visualize</strong></td>
<td><strong>Define rules</strong></td>
<td><strong>Requests</strong></td>
<td><strong>Extend data acquisition</strong></td>
<td><strong>Define KPIs</strong></td>
</tr>
<tr>
<td>Connection of assets</td>
<td>Define rules to monitor incoming data based on thresholds</td>
<td>Based on automatically created events, specialists analyze the data and find potential problems</td>
<td>Event-triggered acquisition</td>
<td>Combine variables into KPIs</td>
</tr>
<tr>
<td>Transfer of time series data</td>
<td>Automatic generation of events and requests</td>
<td>Notify customers manually</td>
<td>Acquisition of controller events and events from log files</td>
<td>Define rules for KPI monitoring</td>
</tr>
<tr>
<td>Overview of all assets with Fleet Manager</td>
<td>Analyze data with Visual Analyzer</td>
<td>Acquisition of high frequency data (e.g. vibration data)</td>
<td>MindConnect Nano</td>
<td>MindConnect Lib</td>
</tr>
</tbody>
</table>

### MindConnect
- **MindConnect Nano**: Out of the box analytics
- **MindConnect Lib**: MindConnect for SINUMERIK
- **MindConnect Software**: MindConnect for S7-1200
- **MindConnect Pico**: MindConnect for S7-1500
- **OPC Cloud Connect**: MindConnect for S7-1000

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*Page 45 July 15th, 2016*
### Printing International

**Machine Performance Assistant, powered by Siemens Plant Data Services**

![Image of printing machinery]

**Printing International** is building pad printing machinery to print on all kinds of plastics, glass, ceramics, porcelain, on caps and closures, medical devices and pharmaceuticals.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transparency on machine performance</td>
<td>• Cloud based Fleet management application</td>
</tr>
<tr>
<td>• Worldwide service network</td>
<td>• Easy connectivity with Data service box</td>
</tr>
<tr>
<td>• Remote support, contractual availability</td>
<td>• Remote Access</td>
</tr>
<tr>
<td>• IT security</td>
<td>• Machine cycle data collector</td>
</tr>
<tr>
<td></td>
<td>• Production data collector</td>
</tr>
<tr>
<td></td>
<td>• Cockpit</td>
</tr>
<tr>
<td></td>
<td>• Production Reporting</td>
</tr>
<tr>
<td></td>
<td>• Service Desk</td>
</tr>
<tr>
<td></td>
<td>• Siemens Remote Services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customer benefit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Faster and more efficient services</td>
<td>• Designed to perform</td>
</tr>
<tr>
<td></td>
<td>• Improved knowledge of the machines in the field</td>
</tr>
<tr>
<td></td>
<td>• Technology service Differentiator</td>
</tr>
<tr>
<td></td>
<td>→ Early adaptor (Be the first)</td>
</tr>
</tbody>
</table>
Are you aware of the full **potential** of your installed basis?

Would you like to **monitor** and continuously improve your fleet **around the world**?

Do you want to reduce your **warranty costs**?

Do you intend to **profit** from the “software-ization” of the machine building industry?

Would you like to offer **added value**, e.g. with extended warranties?
Refine your machine building expertise.

Get ahead of the competition with new services and business models.

Secure customer relations, market share and growth.

The time is … … now.
Digital Enterprise Software Suite – 
The Siemens answer to Industrie 4.0 requirements

MES
SIMATIC IT

Lifecycle and Data Analytics
MindSphere / OMNEO

PLM
Teamcenter / NX

TIA
SIMATIC / SINUMERIK

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Thank you for your attention!