Siemens MindSphere built on SAP Cloud Platform

Christian Frech
Key Account Manager

Restricted © Siemens AG 2017.
siemens.com/mindsphere
# Agenda

1. Why IoT and Industry 4.0
2. What is MindSphere
3. How can I use MindSphere
4. Customer References
<table>
<thead>
<tr>
<th></th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Why IoT and Industry 4.0</td>
</tr>
<tr>
<td>2</td>
<td>What is MindSphere</td>
</tr>
<tr>
<td>3</td>
<td>How can I use MindSphere</td>
</tr>
<tr>
<td>4</td>
<td>Customer References</td>
</tr>
</tbody>
</table>
Internet of things (IoT) causes a paradigm shift in 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

Why IoT and Industry 4.0
Simple consumer applications vs. complex industrial applications

~ 6 sensors

~ 2000 data points
Digitalization – now it is time for complex industries

1. Technical drivers
   Digitalization, sensors, connectivity, bandwidth, data processing and storage, clouds, analytics

2. Business drivers
   New business models, ecosystem concept, Paradigm shift: From product to customer focus...

Turning point!

Based on report „Smart Service World“/Accenture-Visualization

Restricted / © Siemens AG 2017
<table>
<thead>
<tr>
<th></th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Why IoT and Industry 4.0</td>
</tr>
<tr>
<td>2</td>
<td>What is MindSphere</td>
</tr>
<tr>
<td>3</td>
<td>How can I use MindSphere</td>
</tr>
<tr>
<td>4</td>
<td>Customer References</td>
</tr>
</tbody>
</table>
MindSphere
®
built on SAP Cloud Platform
What is MindSphere

MindSphere – The cloud-based, open IoT operating system from Siemens based on SAP Cloud Platform

MindApps
- Industrial App Store
- Apps from Siemens, partners or develop own apps
- Gain asset transparency & analytical insights

MindSphere
- Open interface for development of customer specific apps
- Various cloud infrastructures: offered as public, private or on-premise (planned)

MindConnect
- Open standards for connectivity, e.g., OPC UA
- Plug and play connection of Siemens and 3rd party products
- Secure and encrypted data communication
What is MindSphere

MindSphere offers key strengths as cloud-based, open IoT operating system

**Unique MindSphere strengths**

- Global Siemens **installed base of millions of devices**
  (30 million automation systems, 70 million contracted smart meters, 800 thousand connected products, e.g., trains)

- **Transfer of domain know-how into vertical-specific analytical apps**

- Integrated operational data with **Digital Twin to optimize simulation & engineering** (model-based analytics)

- **Plug & play connectivity** for quick connection of assets without coding

- Ecosystem with **broad domain expertise and horizontal IT capabilities**

Restricted / © Siemens AG 2017
What is MindSphere

MindSphere built on SAP Cloud Platform is the strongest Industrial Platform in the Market

Siemens Industry Partner Network / SAP Partner Network

We can implement customer requirements

Siemens Industry Application and Service Know-how

We analyze data and deliver service

More than 200 Beta Customers for Industrial Assets in a Production Environment

Siemens Instrumentation and Industry Domain Know-how

We know what and how to measure

Siemens Industry Sales Network / SAP Sales Network

We know the OT and IT contacts at our customers
What is MindSphere

Added Value throughout the possibilities of combining operational and business Data
What is MindSphere

MindSphere is based on ISB and SAP Cloud Platform on Cloud Foundry and Open Stack, ensuring IaaS Provider Independence

Siemens and SAP combine leading-edge technologies:

- Big Data platform supported by SAP
- SAP Cloud Platform: incl. Cloud Foundry, Redis, RabbitMQ, PostgreSQL, MongoDB, Platform and Multi-tenancy
- SAP IoT Application Enablement
- SAP SDKs (HCP/ UI5+)
- SAP API Business Hub
- SAP/ Siemens/ 3rd Party Applications on SAP Cloud Platform
- SAP/ Siemens Backbone Integration
- SAP service and support
MindSphere APIs – scalable application and connectivity development

MindApps API Characteristics:

- **Application Programming Interface (API)** of MindSphere for development of customer owned analytical apps (MindApps).
- Optimized for **industrial IoT App development** with additional reusable supporting modules (e.g. parsing, analytics and visualization modules).
- Upcoming MindSphere **App Store** will provide ready to use Applications.

**Key MindApp API Features**

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 **monetization and promotion channel** to industrial customers.

3. **Developer community** supported via Developer Portal, Developer Conference, dedicated consulting, free demo apps, and much more.
What is MindSphere

MindApps (Status at the Hannover Fair 2017)*
Currently being developed (application programming beta-phase)

To get more details about the MindApps under development, please refer to the attached document:

* Subject to changes
What is MindSphere

Applications from our Partners running on MindSphere*
Currently being developed (application programming beta-phase)
What is MindSphere

MindSphere and MindApps to increase business value for equipment suppliers and operators

Business Value

- Increase service efficiency / lower warranty expenses
  - Visualize and manage fleets worldwide
  - Automate failure and event alarming
- Offer additional services and new business models
  - Provide availability guarantees
- Enhance products via feedback loop to R&D
  - Use operational data to verify and optimize simulation & engineering

- Increase uptime / asset availability
  - Predict failures to run in-time maintenance and reduce / prevent unplanned downtime of machines
- Optimize assets
  - Identify optimal configuration for your equipment to reduce energy consumption, peak loads, etc.
- Increase maintenance efficiency
  - Prolong maintenance cycles over product lifetime
What is MindSphere

Strong open ecosystem emerging around MindSphere, opening new opportunities for our customers and partners

Predefined partner Roles:
Consulting / Strategy partner, Application Developer, Technology Provider, System Integrator, IaaS – Provider, Connectivity Developer

Restricted / © Siemens AG 2017
<table>
<thead>
<tr>
<th></th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Why IoT and Industry 4.0</td>
</tr>
<tr>
<td>2</td>
<td>What is MindSphere</td>
</tr>
<tr>
<td>3</td>
<td>How can I use MindSphere</td>
</tr>
<tr>
<td>4</td>
<td>Customer References</td>
</tr>
</tbody>
</table>
How can I use MindSphere

MindSphere enables a quick, easy and secure start into data-driven services

STEP 1
Connect
Get a MindSphere user-account, receive and integrate your MindConnect element into your machine/equipment

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

STEP 3
Run the Service
Monitor e.g. health status of all assets and drill into details using MindApp Fleet Manager
Agenda

1. Why IoT and Industry 4.0
2. What is MindSphere
3. How can I use MindSphere
4. Customer References
Customer References

Additional Success Stories

**Major soft drink producer**
- **Machine monitoring**
  - Affordable IoT solution for predictive maintenance of 150 motors
  - Increased asset uptime through accurate failure prediction
  - Global accessibility of data

**Multinational steel company**
- **Motor fleet management**
  - Low-cost solution for monitoring of motor fleet
  - Reduced downtime in all motor applications
  - Visualization of motor fleet

**Major international airport**
- **Failure prediction for baggage system**
  - Identification of all potential failures in baggage trail
  - On-time maintenance of defective baggage carts
  - Visualization of system failures
Siemens AG
Digital Factory
DF PL DS
Postfach 3240
91050 Erlangen
Deutschland
Email: mindsphere.industry@siemens.com

Christian Frech
Key Account Manager
Siemens AG
DF PL DS TS RA&TA
Mobil: +49 173 7415352
mailto:christian.frech@siemens.com

siemens.com/mindsphere