REFERENZARCHITEKTUREN FÜR DAS INDUSTRIAL INTERNET

Dirk Slama, Vice President
Bosch Software Innovations
The Bosch Group – Business Sectors

- Mobility Solutions
- Industrial Technology
- Energy and Building Technology
- Consumer Goods

Bosch Software Innovations
[Industrial] Internet of (Things|Everything)
Examples

Indego Connect
Automatic Lawn Mover

sFDE
structured Field Data Exploration

Inventory Management
for Professionals
Opportunities of the IIoT Value Chain Transformation

Source: Enterprise IoT

1. Targeted Sales
2. Remote Services
3. Remote Management
4. Improved Support
5. Digital Services

Product Performance and Usage Data

Product Improvements

Production Improvements
Challenges of the IIoT Value Chain Transformation

Source: www.enterprise-iot.org
Clash of two worlds
We need ways to build bridges – in both directions

„Machine Guys“
- „Brownfield“
- Strong company heritage, risk adversity
- Corporate career is the norm
- Domain: Physics, Engineering
- „Think Big“
- Long QA & release cycles

„Internet Guys“
- „Greenfield“
- High-risk, VC-driven culture
- Entrepreneurial management and employees
- Domain: IT, Services
- Focus on point solutions
- Perpetual beta

Source: enterprise-iot.org
Key: Building Bridges

Plan ➤ Build ➤ Run

IIC BSSL (IIoT Solution Lifecycle)

Asset Preparation

Link between IIoT Solution and I4.0 Manufacturing

Type ➤ Instance

RAMI4.0, Lifecycle Dimension #2

IIoT Solution

Asset Operations Cloud

Manufacturing Cloud

I4.0 Manufacturing
Collaboration between IIC and Industry 4.0

Zurich, 11/2015: Exploratory Workshop on IIC/I4.0 Collab.

Bosch ConnectedWorld, Berlin 03/2016: Presentation of IIC/I4.0 collaboration, first joint Testbed proposal

Chicago, 05/2016: Joint Workshop on architecture, testbeds and standardization

IIC & I4.0 WorldTour Walldorf, Germany, Turin, Singapore, etc.

1. Complementary Domain Focus
2. Cross-Domain Interoperability
3. Testbed Collaboration
1. Domain focus areas are complimentary.

2. A clear mapping between both architectures will enable cross-domain interoperability.

3. Collaboration on testbeds / test facilities and infrastructure will ensure interoperability on the technical level.
1. **DOMAIN FOCUS AREAS ARE COMPLIMENTARY**

<table>
<thead>
<tr>
<th>ENERGY</th>
<th>IIC</th>
<th>HEALTHCARE</th>
<th>MANUFACTURING</th>
<th>PUBLIC DOMAIN</th>
<th>TRANSPORTATION</th>
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<tbody>
<tr>
<td><strong>Cross-domain &amp; Interoperability in IIoT</strong></td>
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<td><strong>Detailed model for next-gen Manufacturing value chain</strong></td>
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A CLEAR MAPPING BETWEEN BOTH ARCHITECTURES WILL ENABLE CROSS-DOMAIN INTEROPERABILITY

RAMI4.0

Interoperability

IIRA

PLATFORM INDUSTRIE 4.0
COLLABORATION ON TESTBEDS / TEST FACILITIES AND INFRASTRUCTURE WILL ENSURE INTEROPERABILITY ON THE TECHNICAL LEVEL
Example: IIC Testbeds
Spec or Code first?

Nothing can be mandatory in an OCF spec unless an open source reference implementation is available

IP policy: RANDZ
(Reasonable and non-discriminatory w/ zero royalty)

OCF owns certification (mark, tools, program)

Sponsored by OCF and hosted by Linux Foundation
IP policy: Apache 2.0
(Provides patent protection from code contributor.)
OCF membership not required to be part of the open source project

Source: https://www.slideshare.net/brecky558/happily-married-or-warring-factions-open-source-and-standards
Open Source (and|vs) Standards

**STANDARDS / SPECS**

Focuses on the What

- Specs enable certification tests which drive interoperability
- A standard typically has many implementations
- Assertion of IP by getting it into the spec
- Industrial efficiency – volume economics, commoditization, etc.

**OPEN SOURCE**

Focus on the How (this is work!)

- API compliance ensures things work together
- Some open source projects have a single implementation, others more
- Assertion of an implementation by making the code available for others to distribute
- Accelerated development of commercial solutions and a community of maintainers

Source: https://www.slideshare.net/brecky558/happily-married-or-warring-factions-open-source-and-standards
Mit „Unschärfe“ umgehen lernen
ZVEI Positionspapier „Agile Standardisierung“

FRAMEWORK
RAMI 4.0/IIRA

THEMENPRIORISIERUNG
business-driven
value-driven
user-story

AGILER PROZESS

NORMUNG

Optimierung

Fokus
Keynote Chancellor Merkel at #FoGip16

“I am very pleased that the Platform Industrie 4.0 is now working together with the American [System] IIC on standardization issues. This will help moving things forward. And we all know: If you are defining the standards, you are in a pole position.”

https://www.youtube.com/watch?v=DU_QFDYJ9M4
https://www.bundesregierung.de/Content/DE/Rede/2016/04/2016-04-12-rede-merkel-forschungsgipfel.html