Interconnection and Interoperability – why Standards matter

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Terminology

- **Interconnection** is the physical linking of a carrier with equipment or facilities not belonging to that network (including the associated commercial arrangements). The term may refer to both inter-carrier and carrier-customer connections.

- **Interoperability** is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, in either implementation or access, without any restrictions.

Source: Wikipedia (modified)

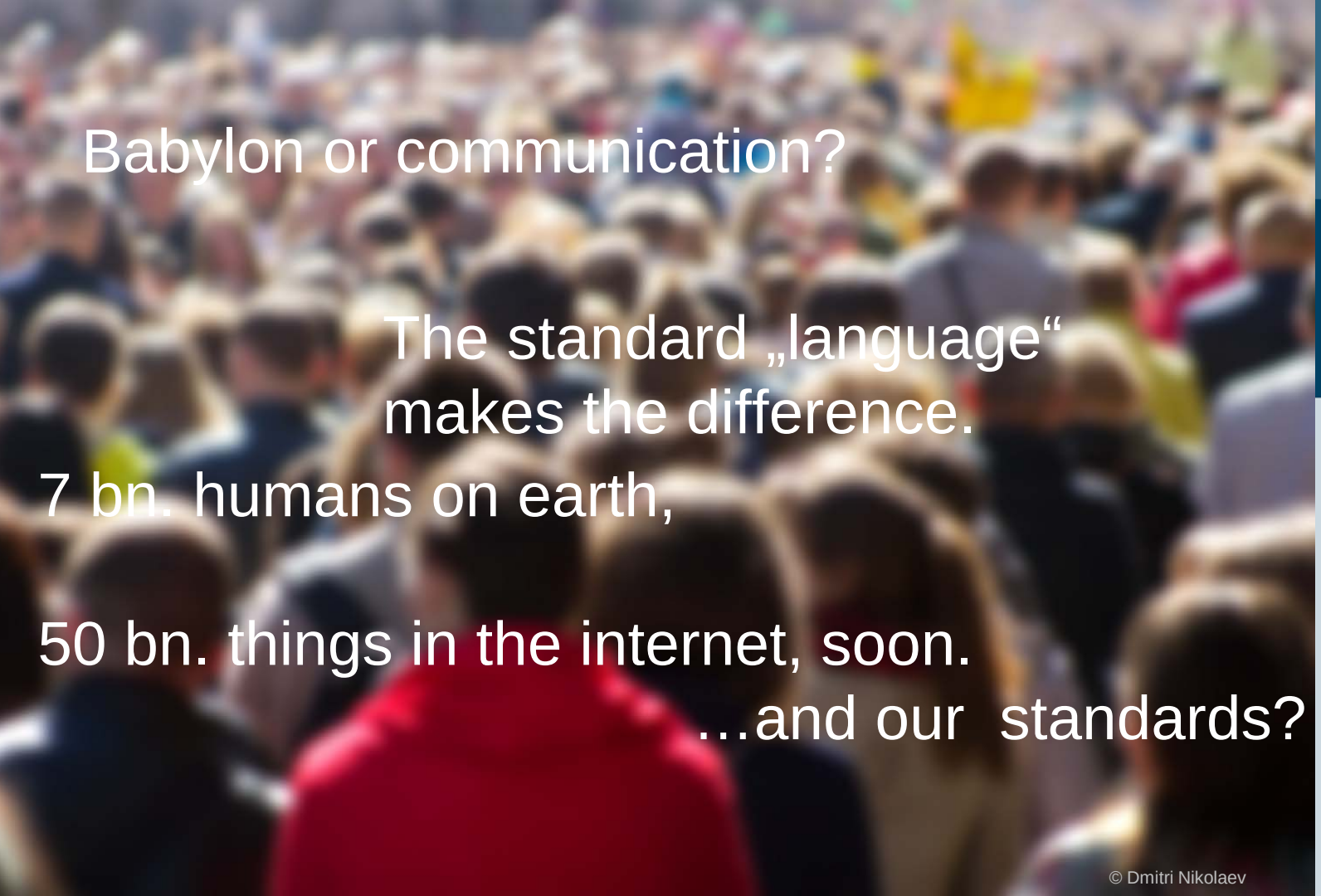
Babylon or communication?

The standard „language“
makes the difference.

7 bn. humans on earth,

50 bn. things in the internet, soon.

…and our standards?



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The ingredients?

Technology
Understanding
Quality
Trust
Interoperability

Reference Architecture
Semantics
Ontologies
Secure Identities
IT security
Data protection
...

The two DIN ways to Standardisation

Overview

DIN Norm

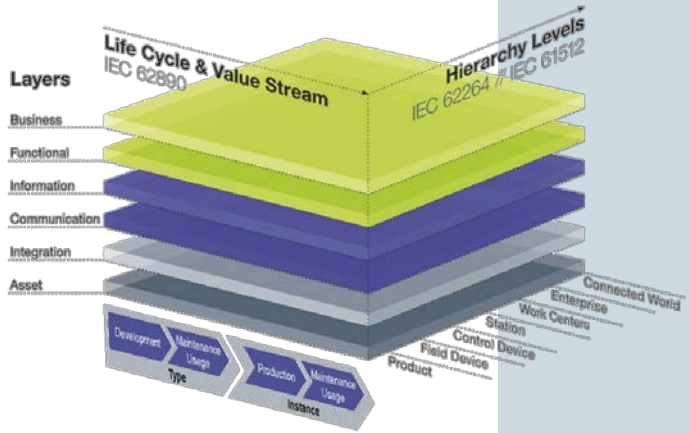
- Defined in DIN standards committees (Gremienarbeit)
- Time to publish: target of max. 18 months
- Financed by yearly fee per participant

DIN SPEC

- Defined by a project team (Workshop approach)
- Time to publish: about 6 months
- Financed by the project team

Case Study: Understanding DIN SPEC 91345 – RAMI 4.0

- RAMI4.0 is a reference architecture model for semantic technologies and their benefits for automation and its associated technologies.
- One of the fundamental ideas on RAMI4.0 is the grouping and description of highly diverse aspects in a common model.
- RAMI4.0 permits step by step migration from the world of today to that of I4.0, and the definition of application domains with special stipulations and requirements.
- **DIN SPEC 91345** on RAMI4.0 published in April 2016



Case Study: Transaction Cost
DIN SPEC 91310 – Transparent Offers

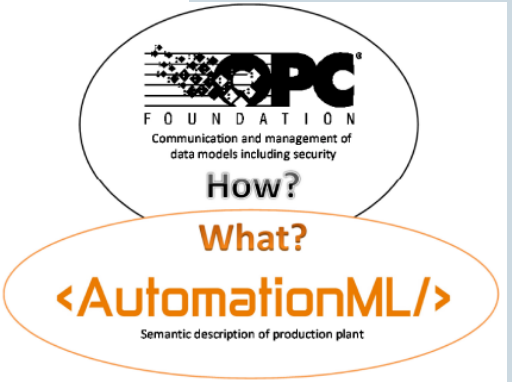
- The increasing dissemination of renewable energy plants has also created a market for operation & maintenance services
- Diversity in service description, both related to scope and terminology used, creates increased efforts and uncertainties while negotiating service agreements and may lead to delays
- DIN SPEC 91310 provides a harmonized description for such services
- Thus it allows to conclude service contracts - significanty faster and with less ambiguities.

Case Study: Trust
DIN SPEC 4885 – Composite Testing

- The mechanical properties, such as shear modulus, of fibre-reinforced plastics are different to conventional materials
- A German engineering start-up has developed an innovative testing system able to determine those characteristics in a precise and reproducable, though fast and efficient way.
- The underlying testing method has proven to be the most suitable one for the conditions of fibre-reinforced plastics
- Publication as DIN SPEC 4885 has given the method the credibility to find wide acceptance and recognition

Case Study: Interoperability
DIN SPEC 16592 Combining OPC UA and Automation ML

- Describes the combination of AML engineering data with OPC UA online information such as process data and diagnostic information, and supports the bi-directional exchange of information between production and planning/engineering.
- The goal is to communicate, exchange, and operationalize AML by means of OPC UA. The purpose is to simplify the creation of OPC UA information models based on existing AML data.
- It reduces the need for manual configuration for discovery and browsing mechanisms.
- **DIN SPEC 16592** will be published in December 2016



Case Study: IT-Security, data protection, trust

DIN SPEC 27099: Network-architecture to protect highly sensitive data

- DIN SPEC 27099 was developed to enrich ISO 27000 framework.
- It specifies a relatively simple, but effective network-architecture, against non-authorized access and manipulation.
- It is a system composed of a three server architecture:
  one connected to the internet, one for access management and one for the application data.
  The access management level allows for controlled communication between the internet server and the application server.
- This approach, proposed by an innovative start-up, is a good example to gain market visibility.

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Standards in Support of Innovation

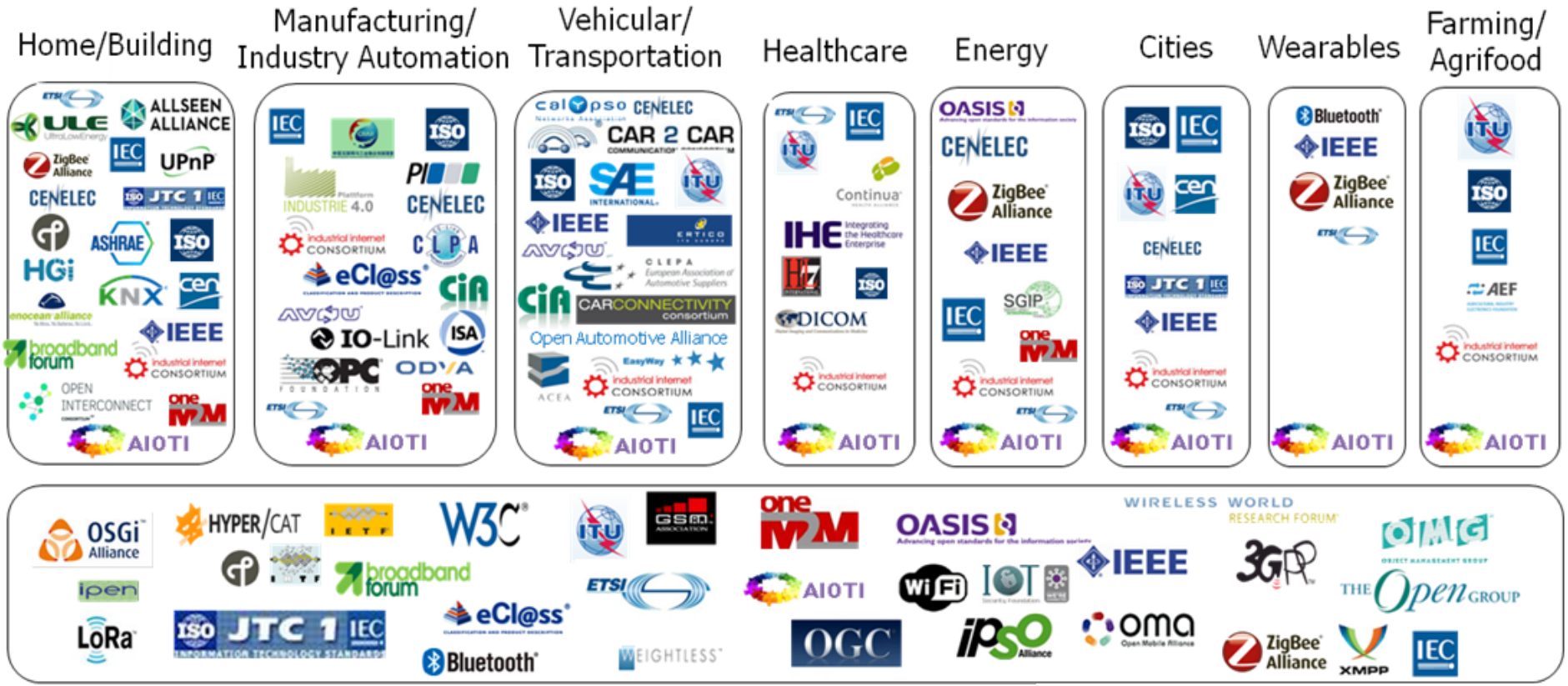
► Basic research	► Applied research	► Experimental development	► Market introduction
Terminology Measuring Testing	Interfaces	Compatibilty Interoperability	Quality Products Services
Smoother communication Uniform and independent testing methods Reduced information and transaction cost	Interconnection/ interoperability between components Reduced adaption cost	Integration into existing systems Prerequisite for future technology generations	Improved acceptance Reduced risik Faster market penetration

Following: K. Blind, EBN-Broschüre, May 2014

IoT SDOs and Alliances Landscape

(Vertical and Horizontal Domains)

SDO =
Standards Development Organisation



Source: AIOTI WG3 (IoT Standardization, Release 2.0

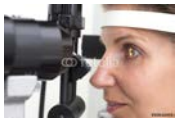
The user perspective:
the same IoT to ensure interoperability for all sectors

Home/ Building

Automa- tion

Mobility/ Transport

Health



Energy

Smart Cities

Wearables

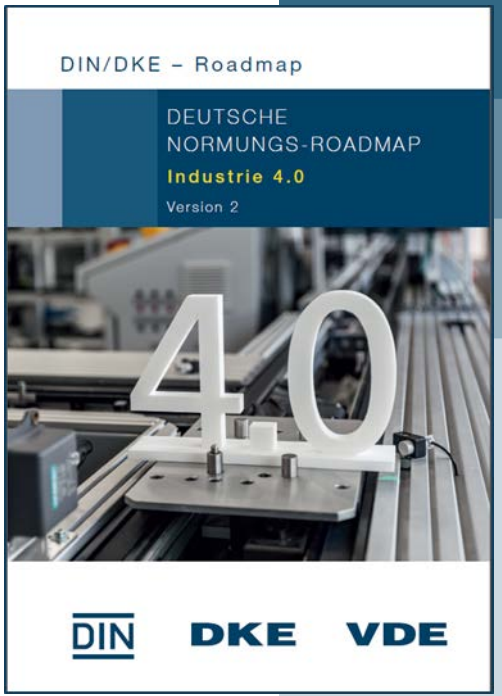
Farming

...

Internet of Things

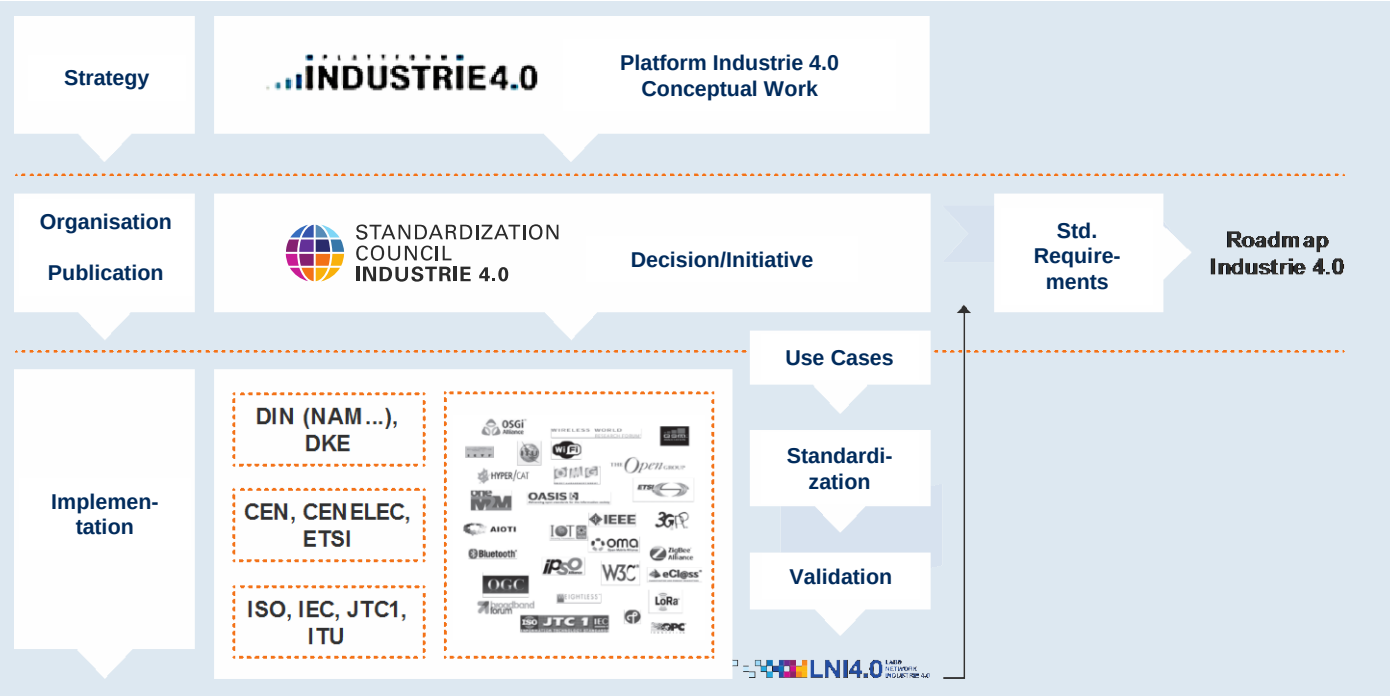
Standardization Roadmap Industrie 4.0

- Summarizes ongoing activities and the work results of these activities
- Gives an overview of all relevant stakeholders
- Gives a comprehensive overview of the current status of standardization
- Lists existing standards and specifications
- Outlines the need for further standardization and gives recommendations for action
- Work on Version 3 now starting with broad stakeholder involvement



Available for download: www.din.de/go/industry-4-0

Industrie 4.0 – A Multi-Level Effort



LNI4.0 = Labs Network Industrie 4.0

Take Aways: standards are a key enabler for interconnection and interoperability

- Without standards, the IoT and its applications – such as Industrie 4.0 – will remain a bunch of singular solutions
- Standards need to be based on proven practical experience
- Standards create the level playing field, e.g. for the SME
- The key challenging tasks are
  - to bridge between the enabler IoT and the vertical sectors
  - to ensure convergence between the vertical sectors, e.g. regarding IT security
- The standards landscape today is highly complex,
  … should not get worse, but should get sorted.

SME = small & medium-sized enterprises (Mittelstand)

Thank you for your attention!

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Case Study: Quality
DIN SPEC 8100 – Drapability Testing

- Fibre-reinforced plastics play an increasing role for the production of high-performance mechanical structures e.g. in vehicle or aircraft construction
- Defects in the fibre structure will substantially impair the mechanical properties of such components
- DIN SPEC 8100 describes a method to determine characteristics of the fabric, when being draped.
- Thus it supports selection of the best-suited fabric for construction of fibre-reinforced plastics components.