Industry 4.0 and the importance of norms and standards within collaborative, digitized process networks

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Content

1. Common language

2. Common processes

3. Common security

4. Take-aways
DIN e. V.

- service provider for standardization
- non-profit association supported by the private sector
- responsible German standards body - with a mandate to manage European and international standards work as well

1. Common language, common standardization

- 413 Employees
- 32.199 External experts
- 2.108 Members
- 70 Standards committees
International, European, National – DIN

ISO: International Organization for Standardization
IEC: International Electrotechnical Commission
ITU: International Telecommunication Union
CEN: European Committee for Standardization
CENELEC: European Committee for Electrotechnical Standardization
ETSI: European Telecommunications Standards Institute
DIN: German Institute for Standardization
DKE: German Commission for Electrical, Electronic & Information Technologies of DIN and VDE

DIN and DKE represent German interests in European and international standardization.
Unlike laws, standards are not legally binding. Their use only becomes binding when this is stipulated in legislation or in a contract.
Most DIN Standards originate at European level

Source of new DIN Standards (in %)
Standardization supports the single European Market by reducing trade restrictions.
Standardization @ DIN: two Products

**DIN Norm**
- the content is drawn up in workshops (project teams)
- time to publication: approx. 6 months
- direct financing of the DIN SPEC by the workshop consortium

**DIN SPEC**
- the content is drawn up in standards committees
- time to publication: approx. 18 months
- financing per expert in a standards committee
DIN SPEC 91349:
Taxonomy of Rules and Regulations in Smart Data

This DIN SPEC presents a classification framework for:

- technical rules,
- specifications and solutions,
- economic models and guidelines,
- laws and legal regulations, as well as
- other documents describing requirements or
- guidance in technical, economic or legal areas for products and services within the field of Smart Data.

Example ➔
Industrie 4.0 Roadmap is currently under review

- The team is working on Version 3
- Version 3 to be released by March 2018
- Contact: Filiz Elmas - filiz.elmas@din.de

Remark: Roadmap Industrie 4.0 – Version 2 was published in June 2016:
pls. follow: www.din.de

Roadmaps on other topics:
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Standards reduce complexity for cooperation

No standardization

- Number of interface = $n^2 - n$
- 5 systems = 20 interfaces
- i.e.: 10 systems = 90 interfaces

With neutral, standard interfaces

- Number of interfaces = 2n
- 5 systems = 10 interfaces
- i.e.: 10 systems = 20 interfaces

2. Common processes
Digitisation to support global processes

**Topical theme Blockchain**
- direct trustworthy transaction between any participants
- Standards to develop blockchain, i.e.: encryption, data bases, web services

**DIN SPEC 91345**
Reference Architecture Model Industrie 4.0 (RAMI4.0)

**DIN SPEC 43541**
OPC Unified Architecture - Automation ML
Plattform Industrie 4.0

Source: Standardization Council Industrie 4.0
Further examples of standards in support of Industrie 4.0

- **Additive Manufacturing** → DIN SC Technology of Materials (NWT): standardization in the field of powder metallurgy, heat treatment technology and laser technology. DIN EN ISO 529xx - series

- **Functional Safety** → Digitisation demands interaction between functional safety and IT Security. IEC 61508, IEC 62443


- **Security Gateway** → Reference architecture of a security gateway for the exchange of industry data and services. DIN SPEC 27070:2017-03

- **Shop Floor & Office Floor** → i.e. DIN SC Information Technology (NIA): Safety & Security Management on Shop-Floor and Office-Floor level. IEC 62443, ISO/IEC 270xx

- **Innovationmanagement** → DIN SC Services (NADL) guidance on establishing and maintaining an innovation management system (IMS). DIN CEN/TS 16555-1, DIN SPEC 77555-1
Industrie 4.0 - affected standardization groups at DIN

**National working groups:**

The DIN/DKE Steering Group of the SC I4.0 coordinates the work with several DIN working bodies, including:

- IT Security Coordination Office (KITS)
- Services Standards Committee (NADL)
- DIN Standards Committee Mechanical Engineering (NAM)
- DIN Standards Committee Technology of Materials (NWT)
- DIN Standards Committee Machine Tools (NWM)
- DIN Standards Committee Tools and Clamping Devices (FWS)
- DIN Standards Committee Safety Design Principles (NASG)
- DIN Standards Committee on Information Technology and Applications (NIA)
- DIN Standards Committee Ergonomics (NAErg)
- DIN Standards Committee Technical Fundamentals (NATG)
Industrie 4.0 - affected standardization groups

**International working groups:**
The activities of international working groups are incorporated into the work of DIN and DKE bodies. Of particular importance is the work of:

- ISO/TC 184 Automation systems and integration
- IEC/TC 65 Industrial-process, measurement, control and automation
- ISO/IEC JTC 1 Information technology
- IEC SG 8 Industry 4.0 - Smart Manufacturing
  - ISO SMCC Smart Manufacturing Coordination Group
DIN platforms to support information exchange and coordination of topics

DIN Coordination Office Logistics

DKE/DIN - Office SCI 4.0

DIN/DKE – Secure Digital Identities

DIN Connect – Innovation Platform

DIN Coordination Office for Service Standardization
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4. Take-aways
Vehicle data – Owner and access rights?

- navigation, traffic situation, weather conditions
- emergency function
- vehicle data (e.g. sensors on chassis) to describe road quality
- transfer of data for maintenance
- transfer of vehicle data for product improvement

Examples only

3. Common security

Information management and Data Security matter!

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Dimensions of Security Definitions

Corporate Security (including physical and perimeter security)

Information Security

Cyber Security
  Office Floor
    IT Security
      ISO 2700x
  Shop Floor
    Industrial Security
      IEC 62443-x

ISO/IEC JTC 1/SC 27
IT-Security Standardization on international level

• Domain-specific IT security standards – e. g., in areas such as IoT, smart cities, smart logistics, smart manufacturing – are needed to supplement existing standards on basic IT security technology:
  • Requires close cooperation among traditional SDOs and fora & consortia

• Appropriate protection of digital data is essential:
  • IT security standards need to effectively supplement legislative measures

⇒ all IT security and privacy aspects shall be realized within JTC1/SC27
Easy to use vs complex systems

Interoperability

Privacy
Security
Safety
Forensik

by Design

Quality Mgt.

Chain of Trust

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Sichere Digitale Identitäten
government-funded by BMWi

- Analysis of needs for action
- Recommendations
- Overview of current solutions
- Standardization roadmap
- Establish a Coordination Office
Blockchain - a systems perspective

http://frtechinfo.com/blockchain-mind-map/
The ISO/IEC TC 307 - Blockchain Matrix

Terminology

- Financial services
- Government
- Real estate

Technology

- IoT and related technologies
- Programming languages (e.g. smart contracts)
- Web services, systems integration & scalability
- Database and scalability
- Encryption, security and privacy

Contact @ DIN: Volker Jacumeit, volker.jacumeit@din.de
What do we need to implement Blockchain successfully across industries?

Technical Standards and Interoperability
- Reference Architecture
- Semantic, Ontology
- Secure Digital Identity
- IT-Security, Privacy

Willingness for change and networking beyond traditional sectorial barriers
- Trust and acceptance
- New business models for collaborative standardization work
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Industry is recognizing more and more the strategic relevance of standardization for digitization … and it needs your continuous involvement and cooperation.

DIN’s mission:
DIN is a platform to orchestrate and push digitization and innovation.
DIN is the representative body of industry and society for standardization.

The Era of digitization requires the cooperation of all standardization bodies, i.e. DIN, DKE, VDI including other fora and consortia to support the process networks of German industry.

Global cooperation →
Standardization is a key enabler for digitization and innovation to ensure success for our industry and society.

Conclusion