ProStep iViP Symposium 2017

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

DIN e. V. , Dr. Michael Stephan, Dr. Stefan Weisgerber

Essen, 2017-05-17, 14:25 – 15:05 p.m.

100 JAHRE **DIN**
1917–2017

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

Content

1. **Common language**

2. **Common processes**

3. **Common security**

4. **Take-aways**

Norms and Standards
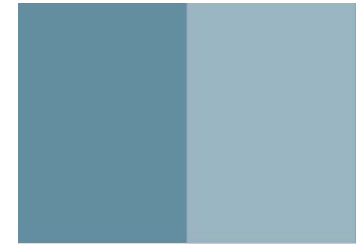
DIN e. V.

- 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

| 413 Employees | 32.199 External experts | 2.108 Members | 70 Standards committees |

# International, European, National – DIN
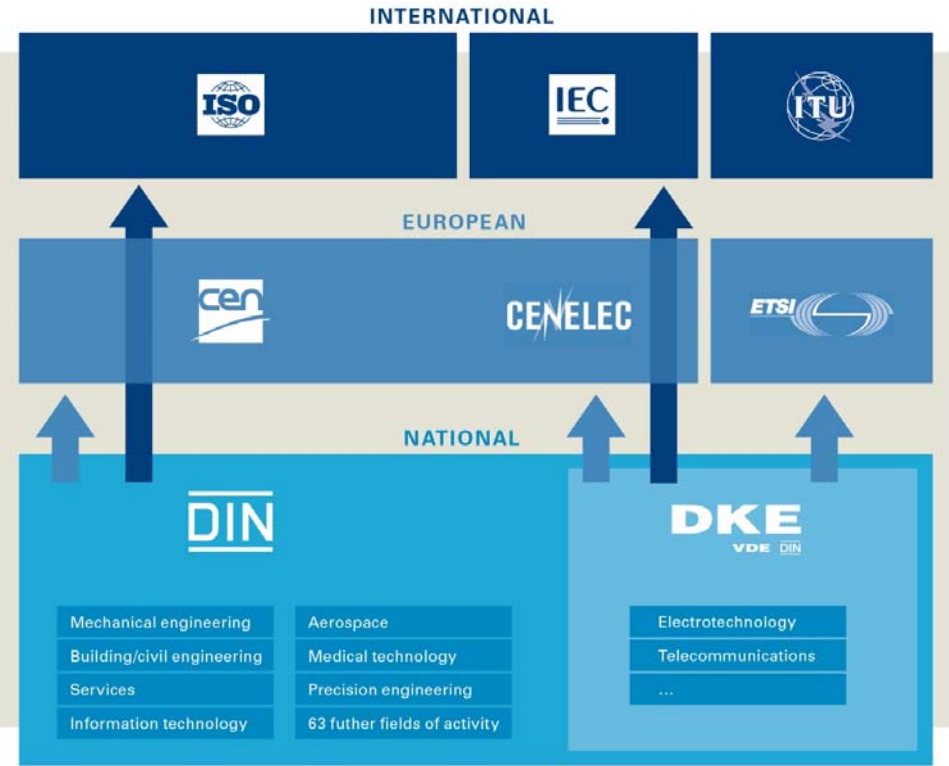
ISO: International Organization for Standardization

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.
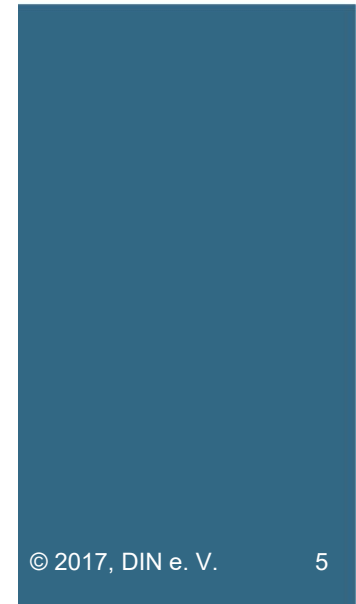
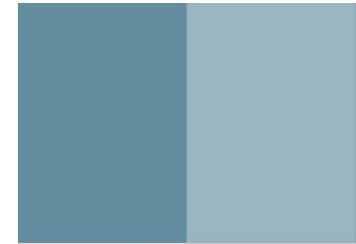© 2013 DIN German Institute for Standardization
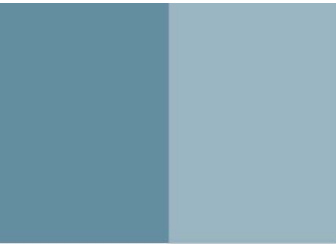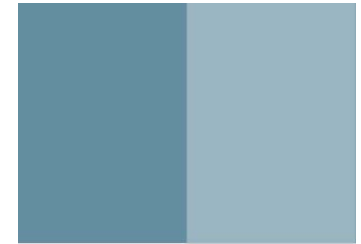
DIN - Principles

- voluntary
- public
- involvement of all stakeholders
- consensus-based
- state-of-the-art
- coherence

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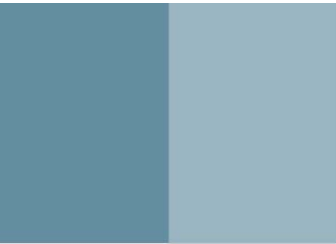
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Most DIN Standards originate at European level

Source of new DIN Standards (in %)

Legend:
- DIN (national)
- DIN EN (ISO) (european)
- DIN ISO and DIN IEC (international)
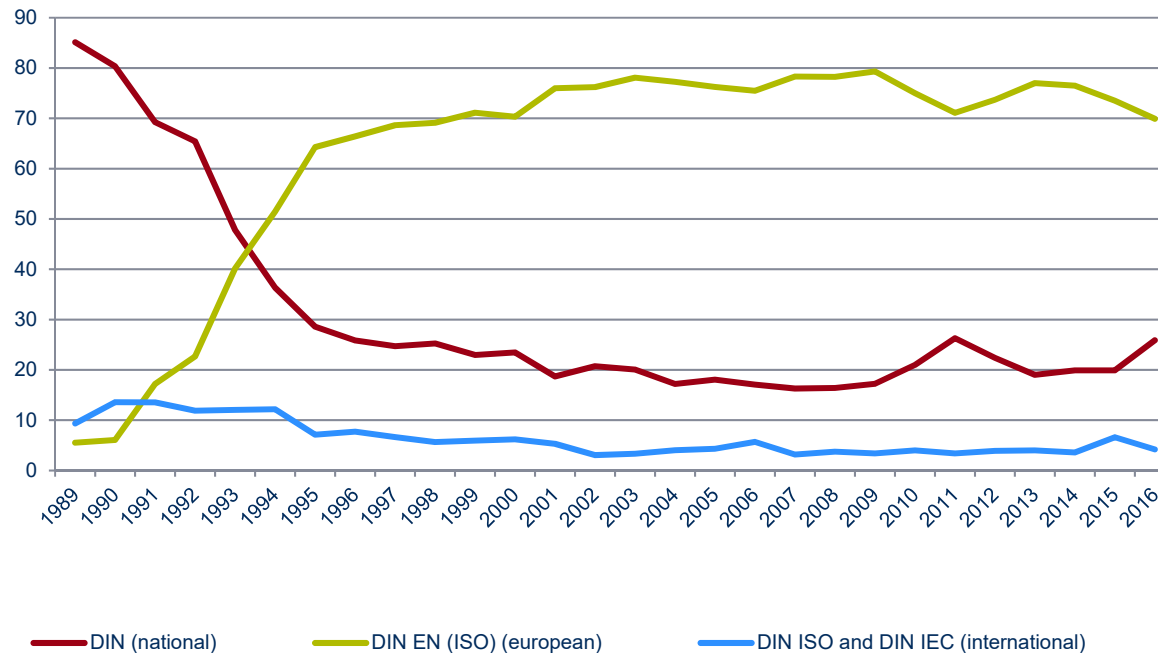
Standardization supports the single European Market by reducing trade restrictions

no. of all country spec. standards

European Standards

150.000

22.841

by 1985

2015
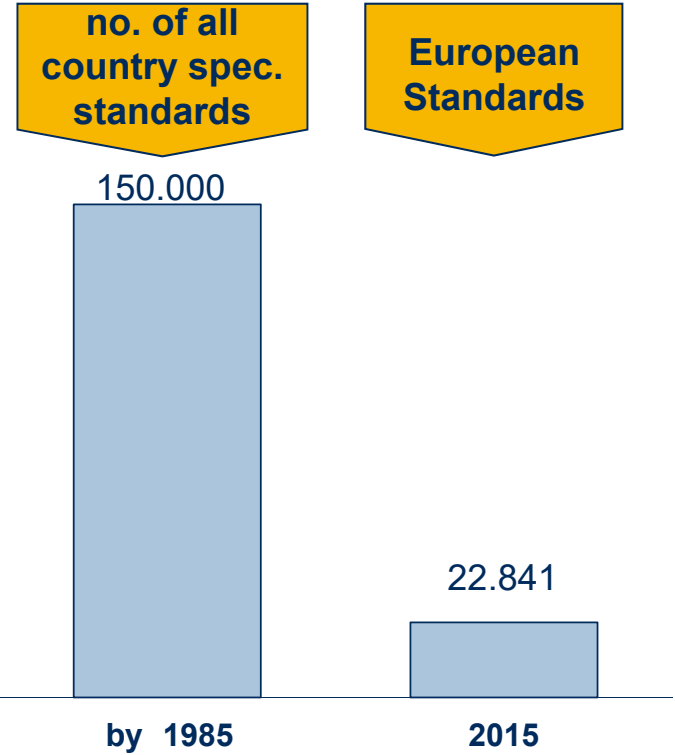
Standardization @ DIN: two Products
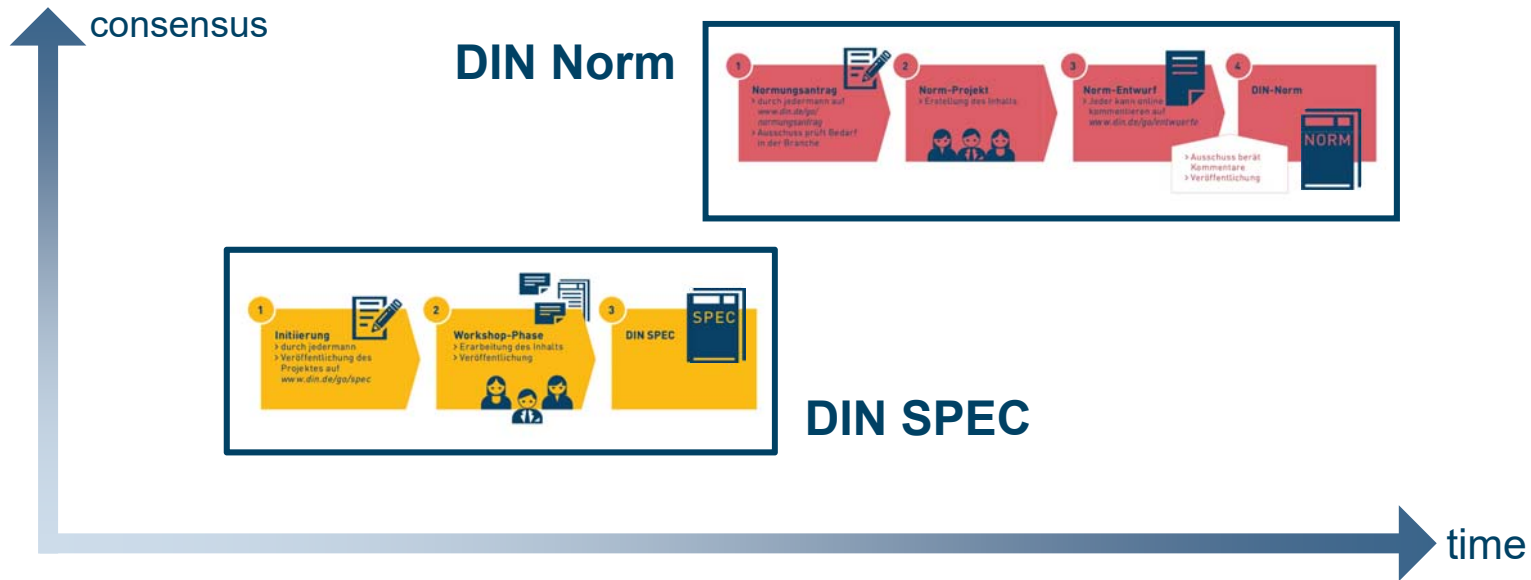
- the content is drawn up in workshops (project teams)
- time to publication: approx. 6 months
- direct financing of the DIN SPEC by the workshop consortium

- 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
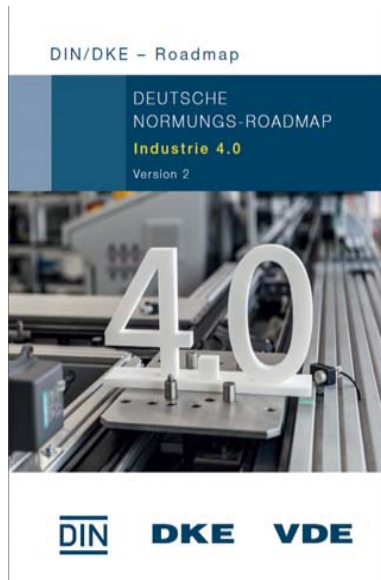
within the field of Smart Data.

Example ➜

Table G.1 — Classification of rules and regulations in the example application

		Data Value Chain					
		Data generation	Data acquisition	Data preparation	Data analysis	Presentation	Utilization
Technical	Data storage		SQL	SQL		SQL	
	Computing platforms	Linux	Linux	Linux	Linux		
	Access		FTP; Database management interface				
	Protection		Intranet; password authentication			SSL	
	Data formats	DWD KL; OBU driving data	ZIP			HTML; JSON; XML	HTML; JSON; XML
	Algorithms			Outlier detection	Descriptive, inductive and explorative statistics		
	Service interaction					Google Maps API; OSM API	Internal module API
Economic	Data governance and licensing	DWD licence; Internal guidelines for data protection					
	Business models and processes				DIN/EN 13816: 2002; DIN/EN 15140:2006		
	Contract design						Based on bonus/malus

(left axis label: Fields of Standardization)
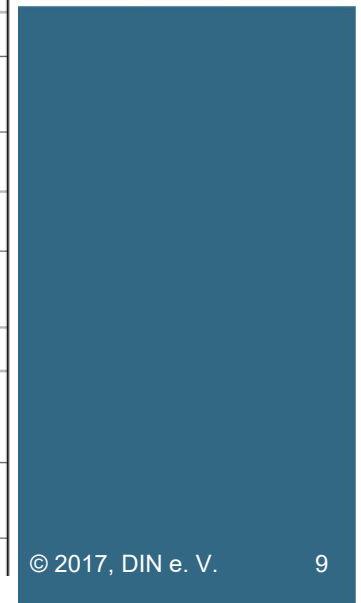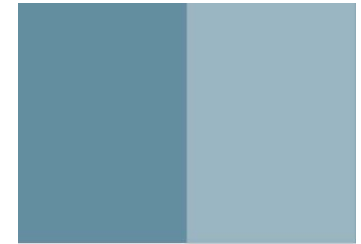
Industrie 4.0 Roadmap is currently under review
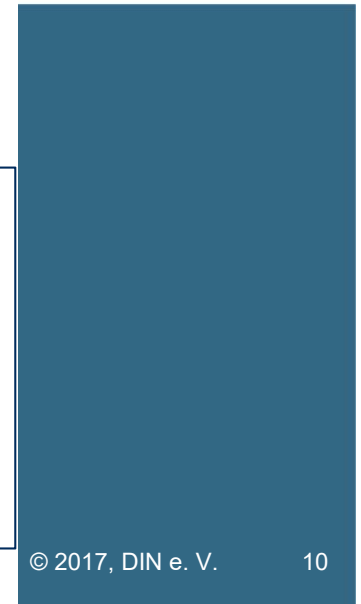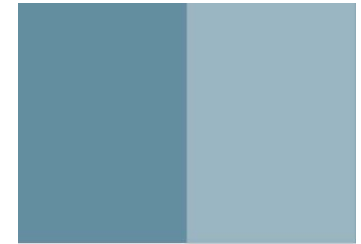

DIN/DKE – Roadmap

DEUTSCHE
NORMUNGS-ROADMAP

Industrie 4.0

Version 2

DIN DKE VDE

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

- The team is working on Version 3

- Version 3 to be released by March 2018

- Contact: Filiz Elmas - filiz.elmas@din.de

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Roadmaps on
other topics:

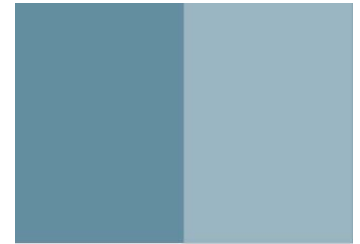# Industry 4.0 and the importance of norms and standards within collaborative, digitized process networks
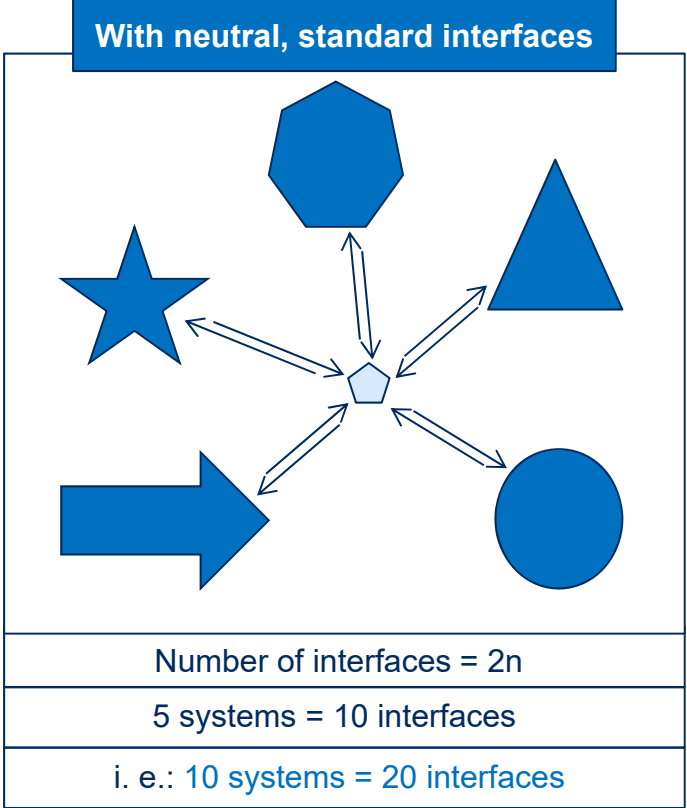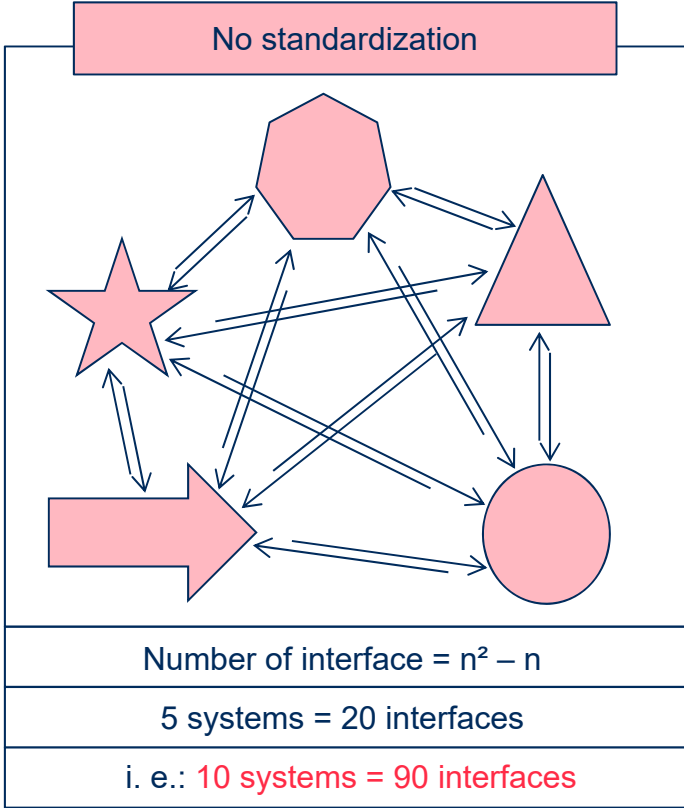
Content

1. **Common language**

2. **Common processes**

3. **Common security**

4. **Take-aways**

international Norms and Standards

Standards reduce complexity for cooperation

No standardization
Number of interface = $n^2 - n$
5 systems = 20 interfaces
i. e.: 10 systems = 90 interfaces

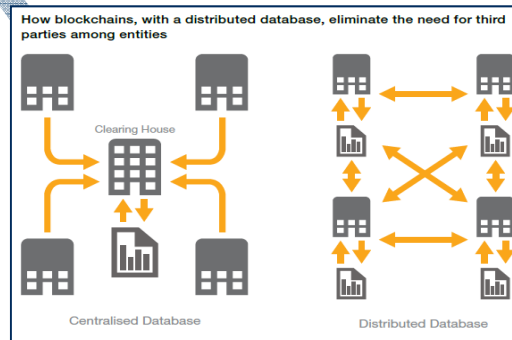| With neutral, standard interfaces |
| --- |
| Number of interfaces = $2n$ |
| 5 systems = 10 interfaces |
| i. e.: 10 systems = 20 interfaces |

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Digitisation to support global processes

DIN SPEC 43541
OPC Unified Architecture
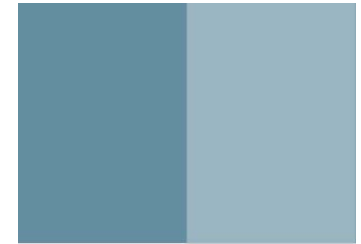- Automation ML
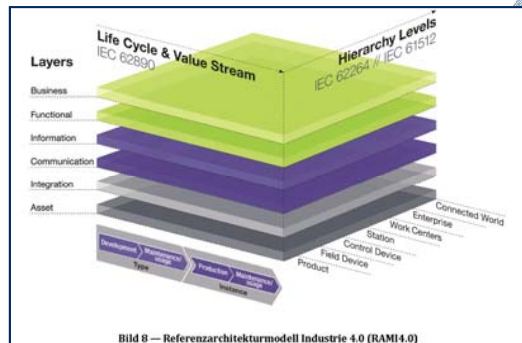
DIN SPEC 91345
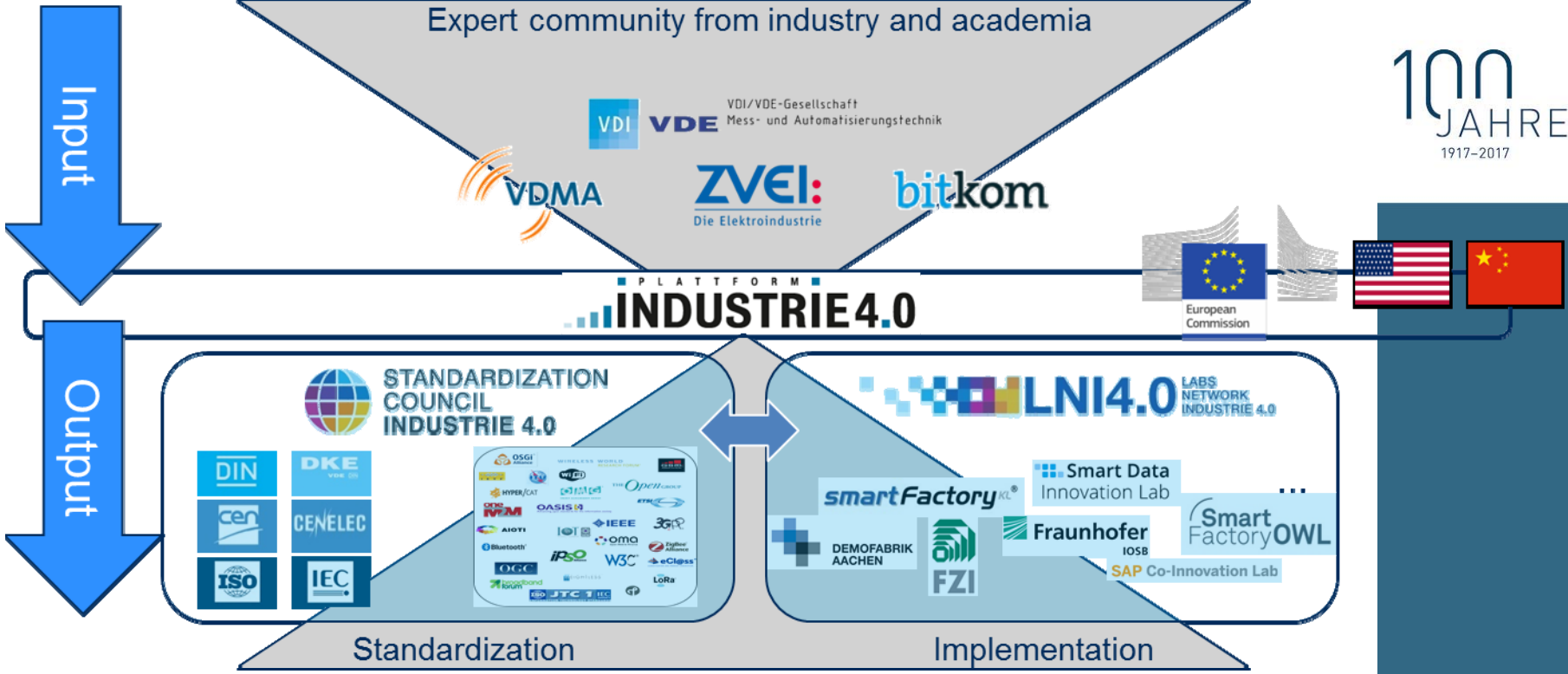Reference Architecture Model
Industrie 4.0 (RAMI4.0)

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

Plattform 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

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

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

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

Robots and robotic devices →
DIN-NAM, SC Mechanical Engineering:
Collaborative robots - guidelines where
robot systems and people share the
same workspace
DIN ISO/TS 15066; DIN SPEC 5306:2017-04

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)
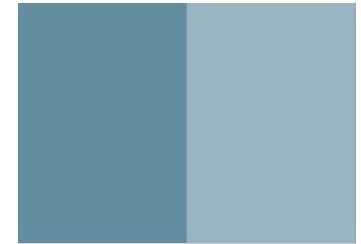- DIN Standards Committee Technical Fundamentals (NATG)
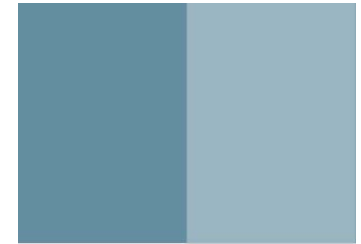
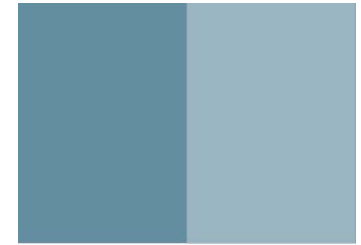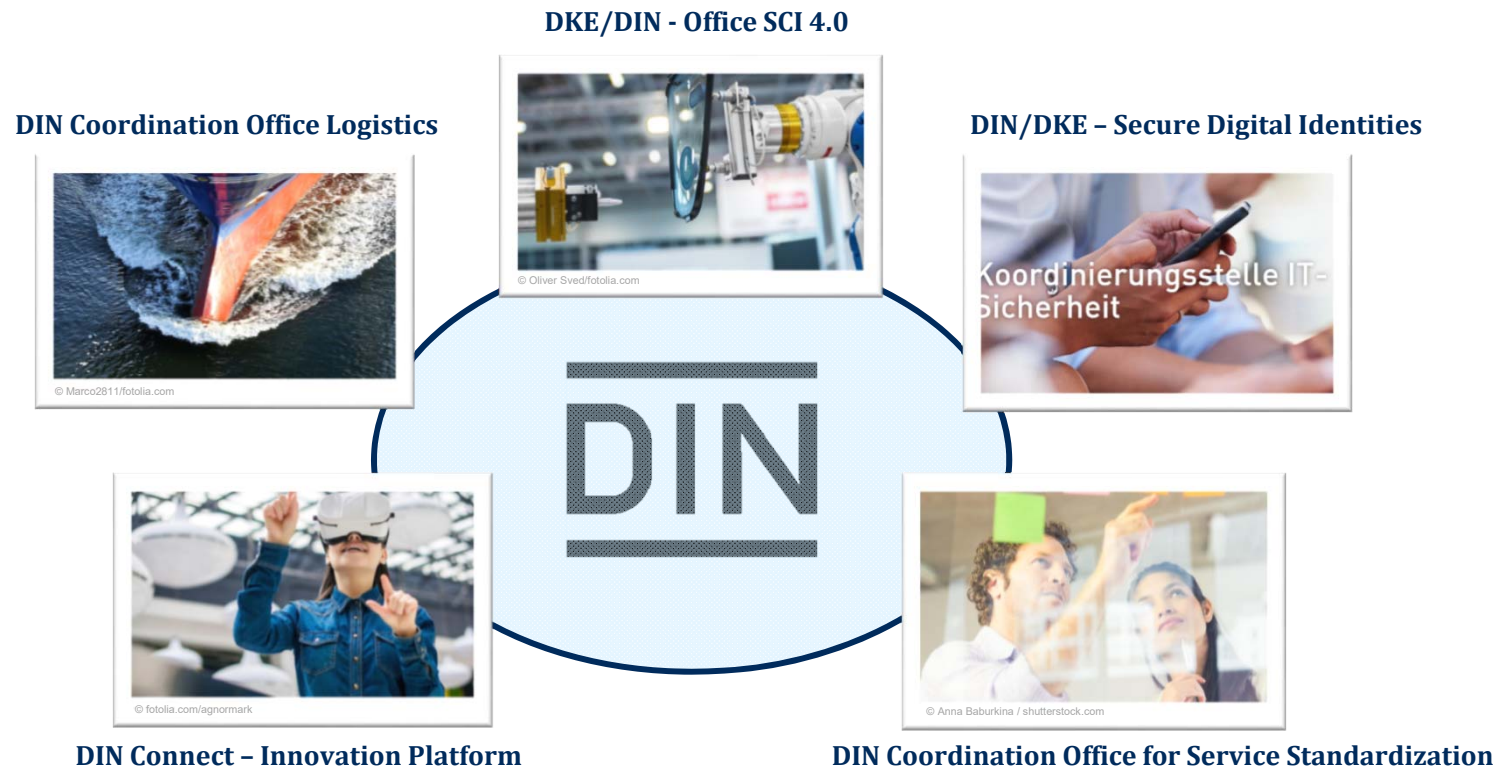# Industrie 4.0 - affected standardization groups

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

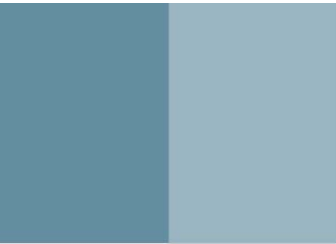# DIN platforms to support information exchange and coordination of topics

DKE/DIN - Office SCI 4.0

DIN Coordination Office Logistics

DIN/DKE – Secure Digital Identities

DIN

DIN Connect – Innovation Platform

DIN Coordination Office for Service Standardization

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

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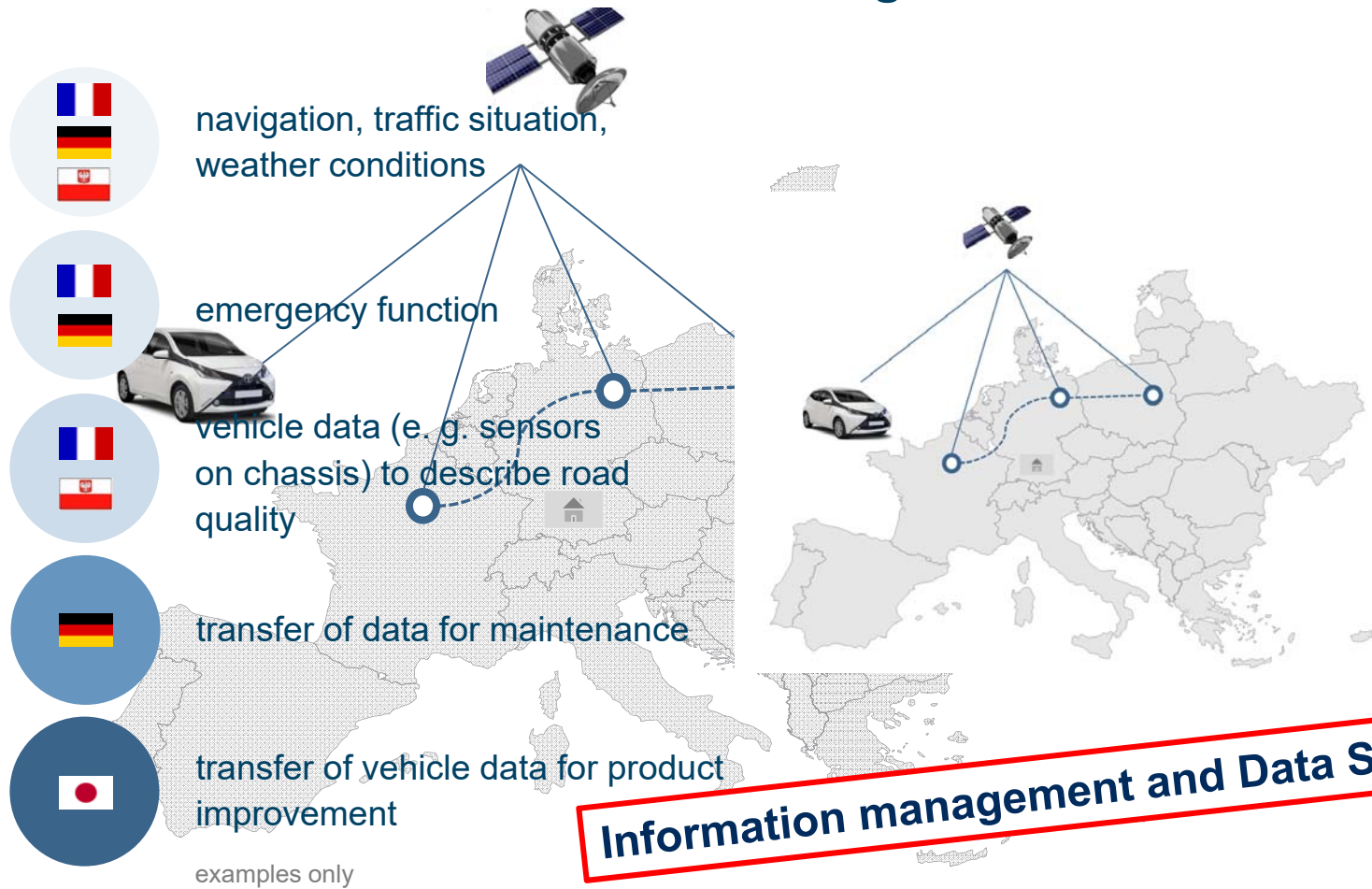1. **Common language**

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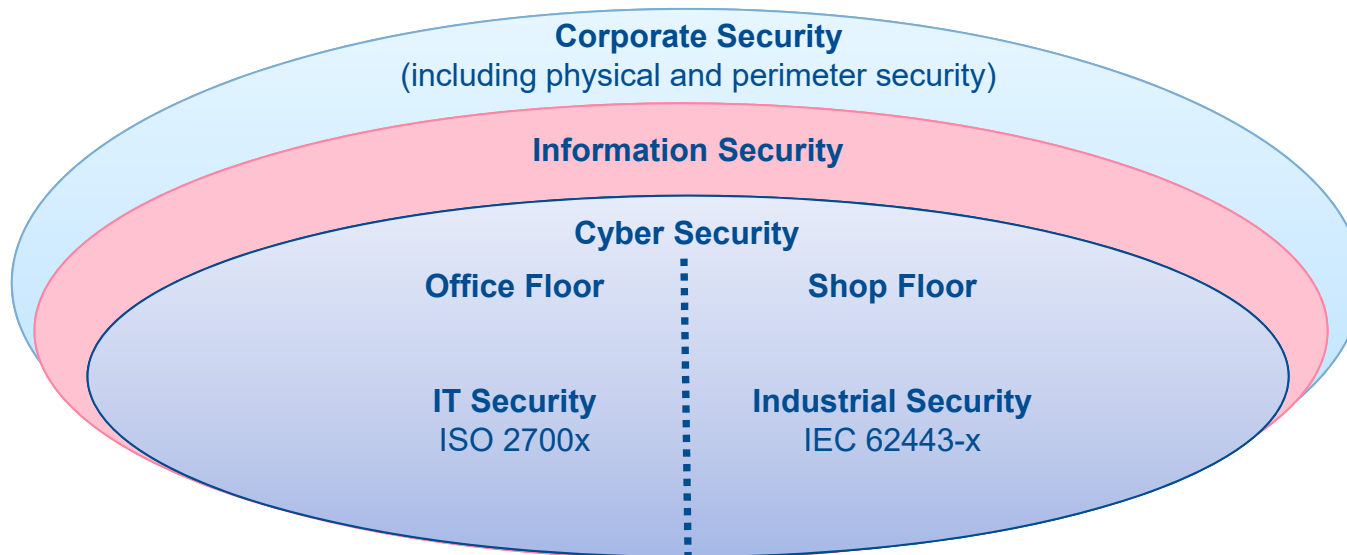3. **Common security**

4. **Take-aways**

international Norms and Standards
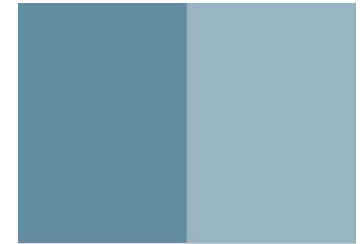
Vehicle data – Owner and access rights?

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

Information management and Data Security matter!

Dimensions of Security Definitions

Corporate Security
(including physical and perimeter security)

Information Security

Cyber Security

Office Floor

Shop Floor

IT Security
ISO 2700x

Industrial Security
IEC 62443-x

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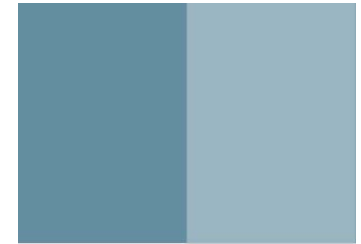
IT-Security Standardization on international level

- 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

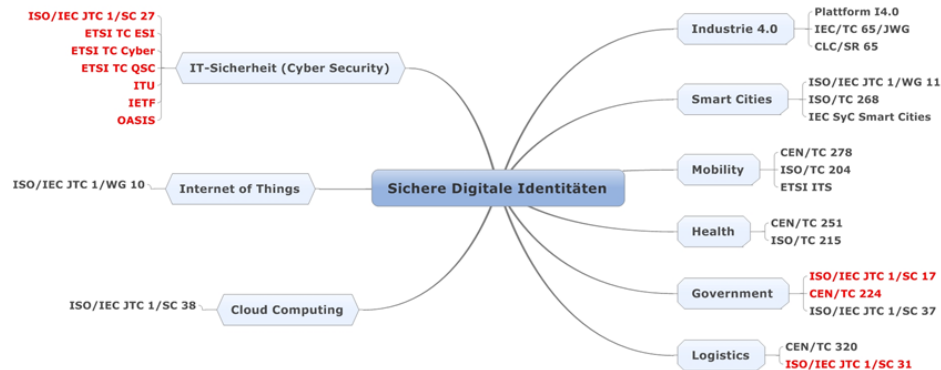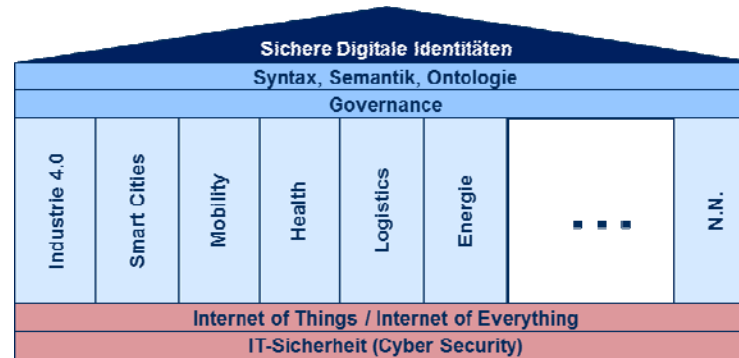➔ all IT security and privacy aspects shall be realized within JTC1/SC27

Easy to use vs complex systems

Interoperability

Privacy
Security
Safety
Forensik

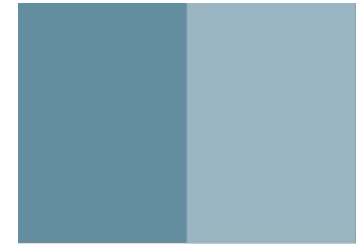by Design

Quality Mgt.

Chain of Trust
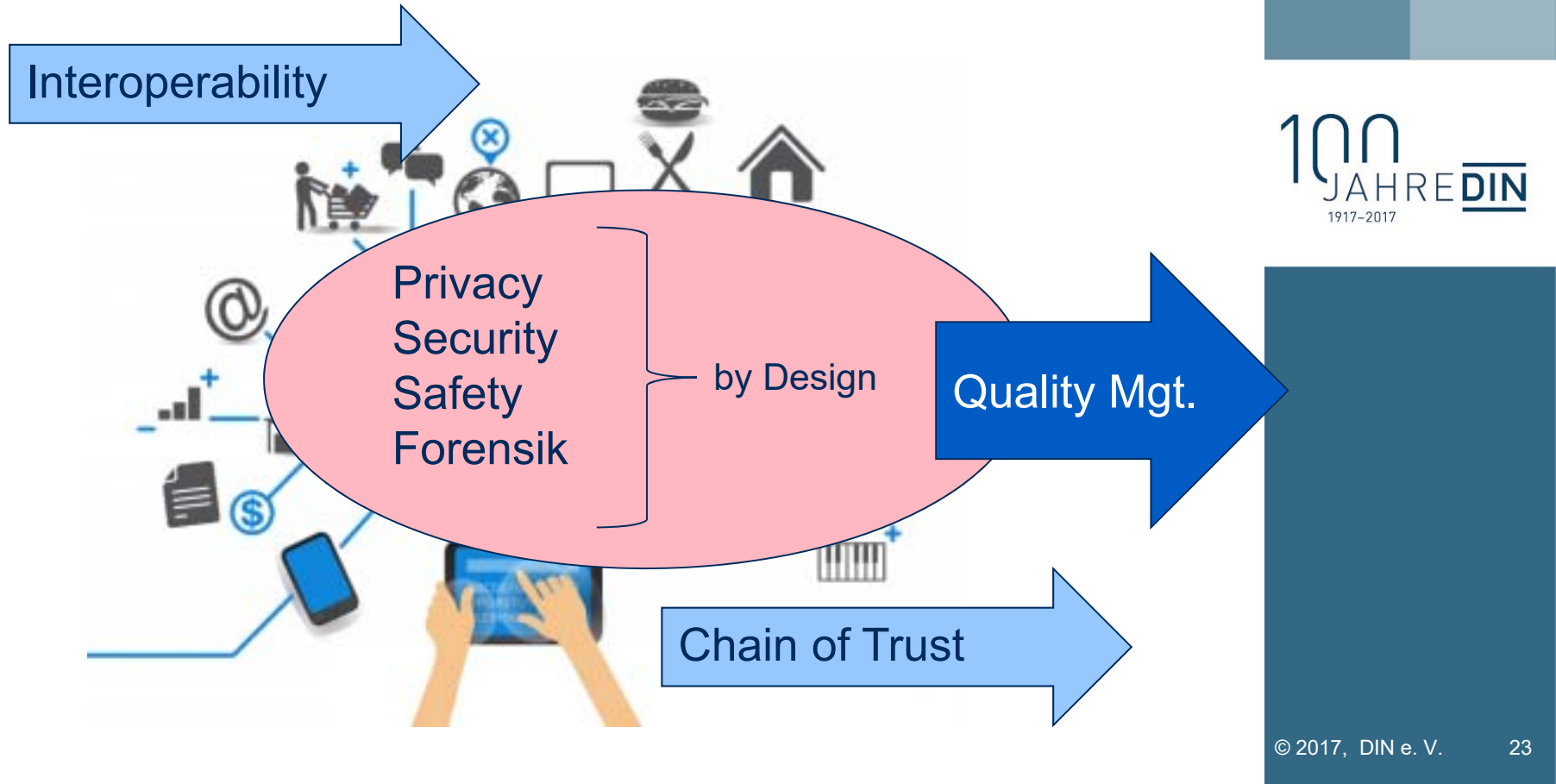
Sichere Digitale Identitäten
government-funded by BMWi

- Analysis of needs for action

- Recommendations

- Overview of current solutions

- Standardization roadmap
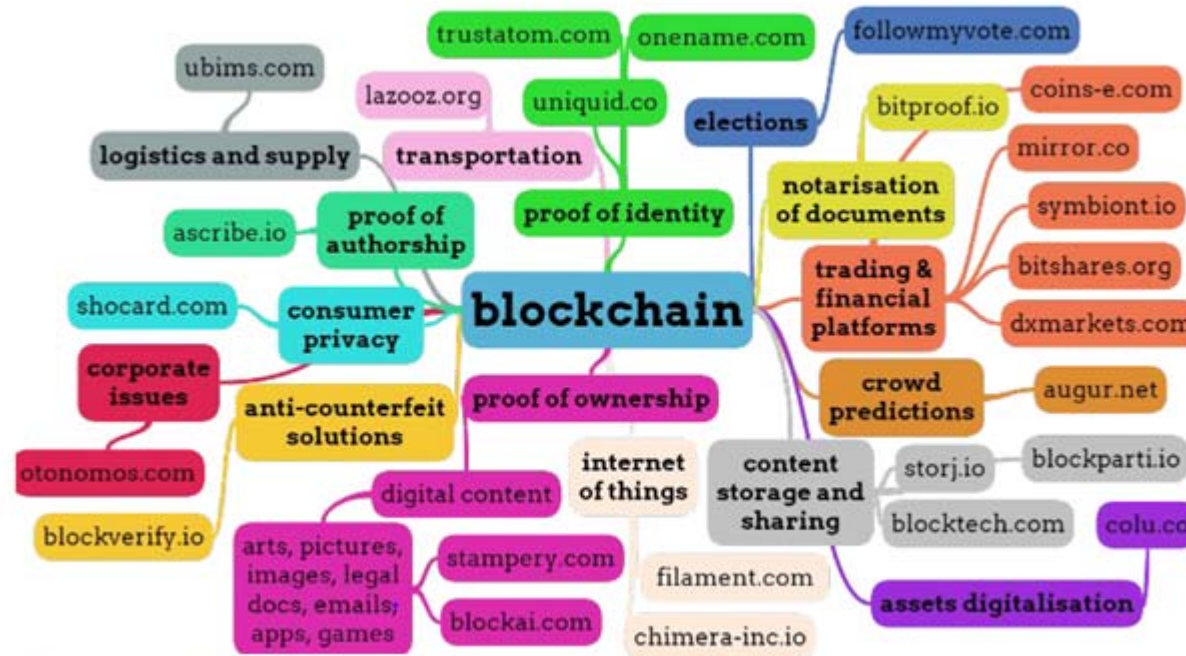
- Establish a Coordination Office

Blockchain - a systems perspective

http://fintechinfo.com/blockchain-mind-map/

The ISO/IEC TC 307 - Blockchain Matrix

Terminology

LegalTech

Financial services

Government

Real estate

IoT and related technologies

Programming languages (e. g. smart contracts)

Web services, systems integration & scalability

Database and scalability

Encryption, security and privacy

ISO/IEC JTC1

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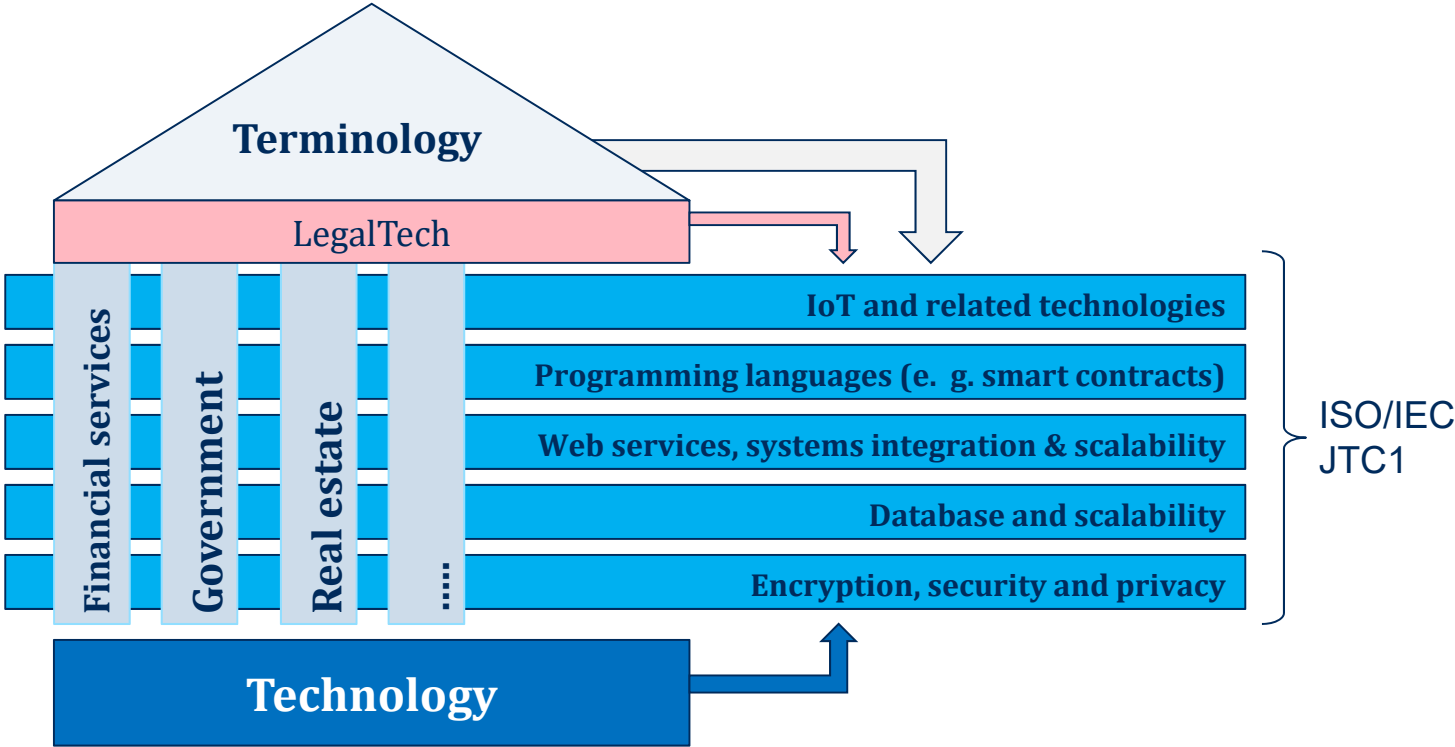
Contact @ DIN: Volker Jacumeit , volker.jacumeit@din.de
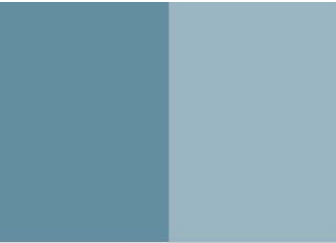
What do we need to implement Blockchain successfully across industries?

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
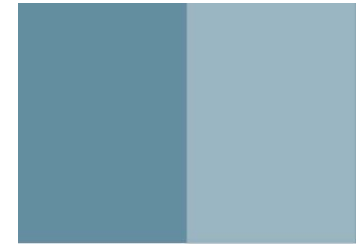
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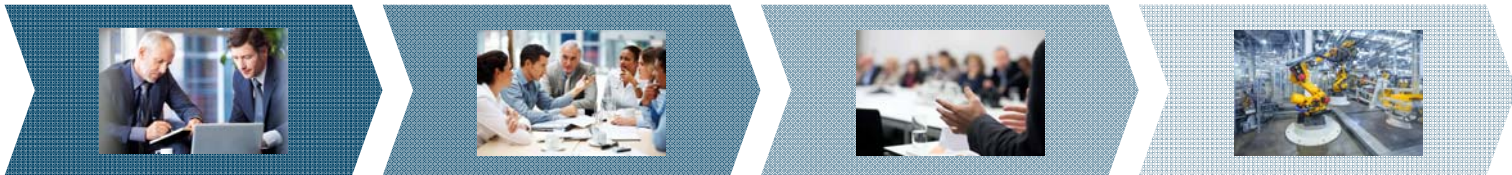
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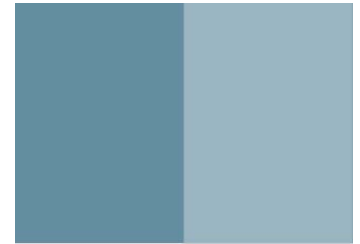
Conclusion

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

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www.din.de
www.din.de/go/spec
www.din.de/go/din-connect

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