THE INDUSTRIAL DATA SPACE:
PLATFORM FOR B2B DATA-SHARING

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Current Key Challenge:
Combination of Data in the »Ecosystem«

Pharma	Automobile	Trade	Production

Personalized Medicine

»Ecosystem«:
- Pharma industry
- Healthcare providers
- Doctors

Data:
- Health data
- Therapy data

Traffic routing 2.0

»Ecosystem«:
- Automobile manufacturers
- Traffic control center
- Municipalities

Data:
- Location, destination
- Vehicle data
- Traffic data

Supply Chain Transparency

»Ecosystem«:
- Retail
- Consumer goods industry
- Logistics providers

Data:
- EPCIS events
- Transport data
- Condition data

Digitized Factory

»Ecosystem«:
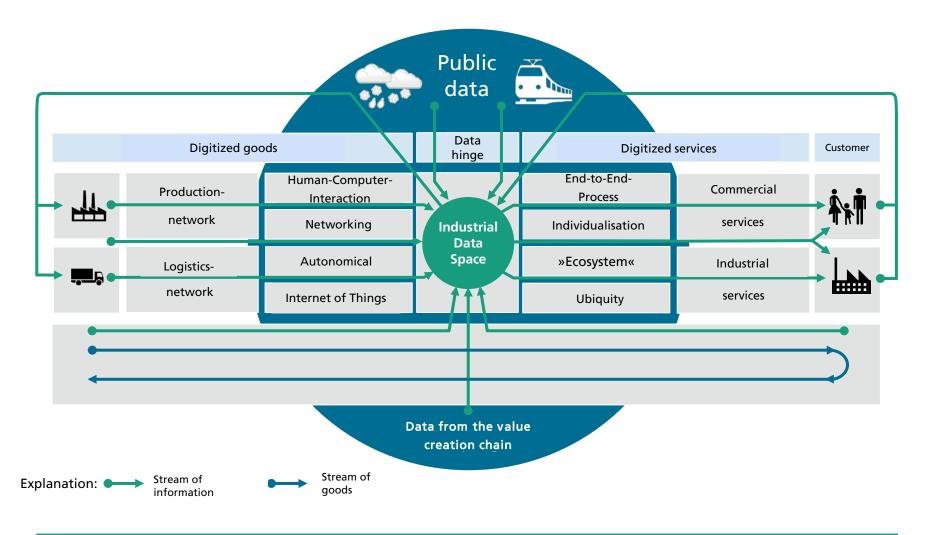- Automobile manufacturers
- Suppliers
- Logistics providers

Data:
- Product data
- Planning data
- Condition data

Sources: Microsoft, BMW, Databirds, SmartFace. Legende: EPCIS - Electronic Product Code Information Services.

The Industrial Data Space addresses this Challenge

Explanation: ●——► Stream of information   ●——► Stream of goods
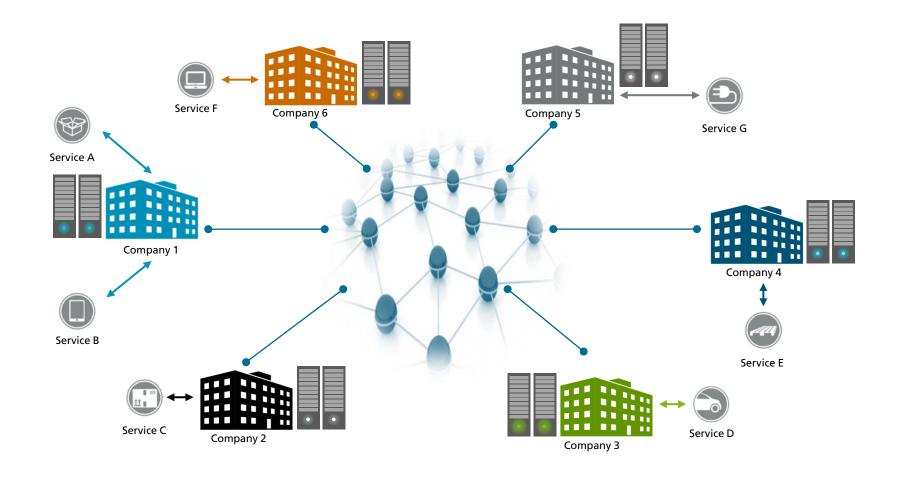
Industrial Data Space: Linking Data and Smart Services

Smart-Service-Scenarios					
Automobile Manufacturer	Electronics and IT	Services	Logistics	Machinery & Plant Engineering	Pharma & Medicine...

Architectural Level

Service and Product Innovations

»Smart Data Services« (anonymization, alerting, monitoring, quality of data etc.)

INDUSTRIAL DATA SPACE

»Basic Data Services« (information fusion, mapping, aggregation etc.)

Internet of Things · Broadband infrastructure · Device proxies, network protocols ···

Real-time domain · Sensors, actors, devices ···
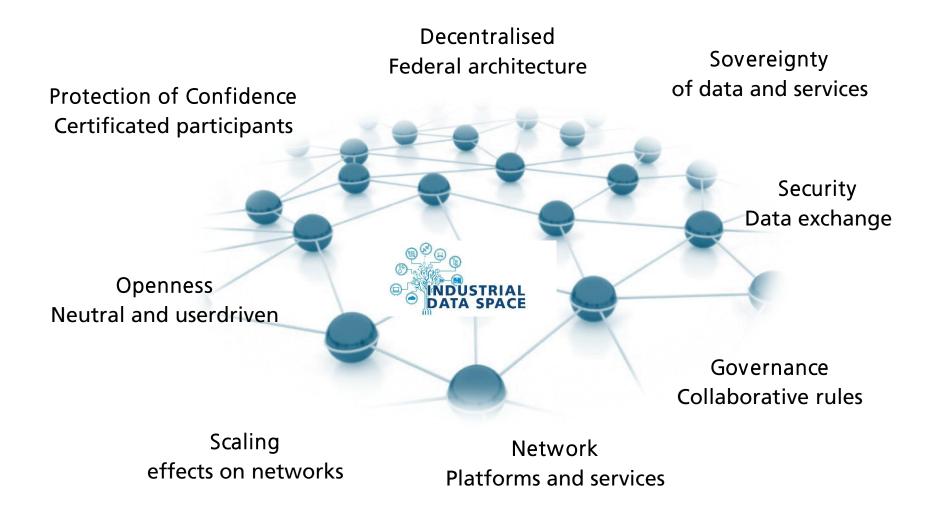
The Industrial Data Space Enables a "Network of Trusted Data"

Industrial Data Space: Core Principles

Decentralised
Federal architecture

Sovereignty
of data and services

Protection of Confidence
Certificated participants

Security
Data exchange

Openness
Neutral and userdriven

Governance
Collaborative rules

Scaling
effects on networks

Network
Platforms and services

Industrial Data Space: Four Basic Roles

Data Owner	Data User	Broker	Certification Authority
Provides data Operates endpoint in Industrial Data Space (or access via service provider). Defines terms of use and fees of data.	**Uses data** for providing **services** or for **internal purposes.** Satisfies terms for use of data.	**Brings** data owner and data user **together.** Operates »data directory«. Undertakes monitoring and clearing tasks.	**Certifies participants** to standards of Industrial Data Space (e.g. security, terms of use, use of standards)

Towards a European Data Space

Consortium of well-known European companies
supporting the initiative (incl. ATOS, PricewatershouseCoopers (PwC), Santander, Siemens, Telefonica, Banco Santander)

EARTO Working Group: "Towards a European Data Space"
to support the internationalization of the Industrial Data Space.

Cooperations with other international initiatives
(e.g. Pan-European I4MS, Smart Industry platform (NL), European Open Science Cloud, FIWARE, NESSI, BDVA, Industrie 4.0 (DE)).

Integration with the European Open Science Cloud
H2020-INFRADEV-2016-2 project "The European Open Science Cloud for Research Pilot Project (EOSCpilot)":
includes ramp-up activities to integrate with Industrial Data Space

First pilot applications of IDS at European level
E.g. basis for blockchain-based platform for b2b data exchange in the context of additive manufacturing (H2020 FOF-12-2017: AMable)

Conclusion:
The Industrial Data Space: Platform for B2B data-sharing

- Value of data is growing by integrating to **value-added services.**

- **Network effects** in market-place between data owner and data user.

- Necessary: **secure infrastructure** that protects sovereignty and trust.

- Next step: Realizing the **European Data Space**.

- **Currently preparing proposals for WP 2018-20**
  If interested, please get in touch !

Interested in getting involved ?

- **Please get in touch !**
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Contact

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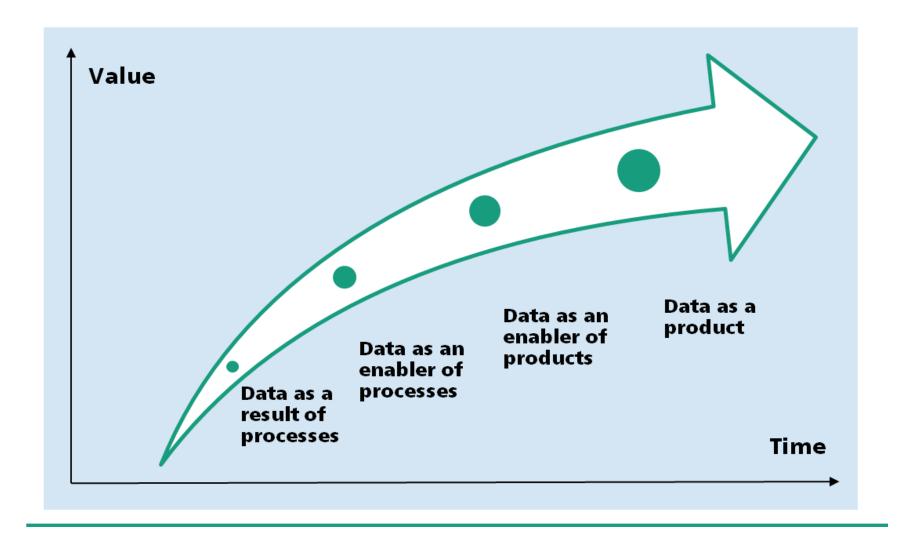
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Backup
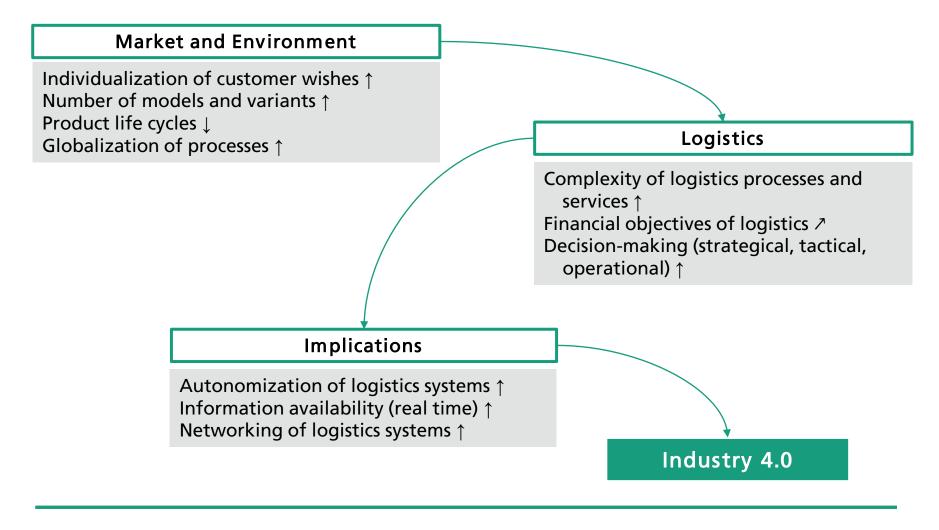
Central: Role of Data is Changing !

Example Audi: Industry 4.0 - A Means to an End -- Not an End to Itself

Market and Environment

Individualization of customer wishes ↑
Number of models and variants ↑
Product life cycles ↓
Globalization of processes ↑

Logistics

Complexity of logistics processes and services ↑
Financial objectives of logistics ↗
Decision-making (strategical, tactical, operational) ↑

Implications

Autonomization of logistics systems ↑
Information availability (real time) ↑
Networking of logistics systems ↑

Industry 4.0

Data as Economic Good

Company	Service offer	Country	Class of data	Amount stated	Value per dataset
Kroger	Super-market chain	US	Customer data incl. purchasing profile	Market value	1,6 EUR[1]
facebook	Social network	US	User data	Market value	225 USD[2,3]
FESTO	Automation engineering	DE	Production parts core data	Production cost	500 bis 5.000 EUR[4]
syngenta	Agricultural chemistry	CH	Materials core data	Value of use	184 CHF[5]

1) http://www.wsj.de/nachrichten/SB114461751613380539987045802122211843086060
2) http://en.wikipedia.org/wiki/Facebook; 890 million daily active users.
3) http://www.ft.com/cms/s/0/ecc0f050-37a3-11e4-bd0a-00144feabdc0.html#axzz3RH6OPOTH; Marktkapitalisierung von 200 Mrd. USD.
4) Vgl. Otto, Boris: Managing the business benefits of product data management: the case of Festo. In:Journal of Enterprise Information Management 25 (2012), Nr. 3, S. 272-297, DOI: 10.1108/17410391211224426; 5.000 EUR per new investment, 500 EUR annual care costs.
5) http://www.marketwatch.com/investing/stock/syt/financials (accessed on 9.2.15); Volume: 13,85 Mrd. CHF; Number materials core data: ca. 1.5 Mio; cost reduction potential because of high data quality according to expert interview: 2 percent of volume.

Data Management Needs New Skills

- **Ad-hoc query**
    - Ability to reply **any query at any time**
    - **Example**: Which raw materials did we obtain within a radius of 50 km around the nuclear power plant in Fukushima in the first three days after the accident?
- **Real time transparency**
    - Full transparency about **material and information flow**
    - **Example**: What is the value at risk of our global logistics network at a given moment?
- **Predictive analyses**
    - Use data for **proactive business management** – not for creating problems
    - **Example**: How to use weather and traffic data for controlling the distribution network?

Need for Action in Three Strategic Areas

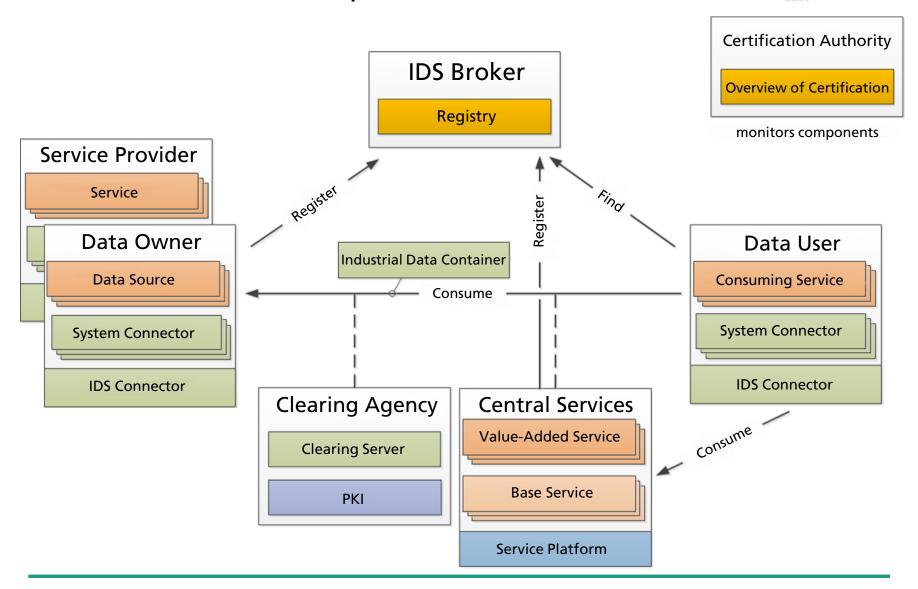|	
Interaction with Customers	Customer focus, focus on customer processes, end-to-end support, smart-service-design, ecosystem management etc.
Mastering Complexity of Services	Industry 4.0, Internet of Things, autonomization of fabrication, smart factory etc.
Compliance and Transparency	Sustainability, transparency of information, compliance at the push of a button etc.

Overview of the Components of the IDS
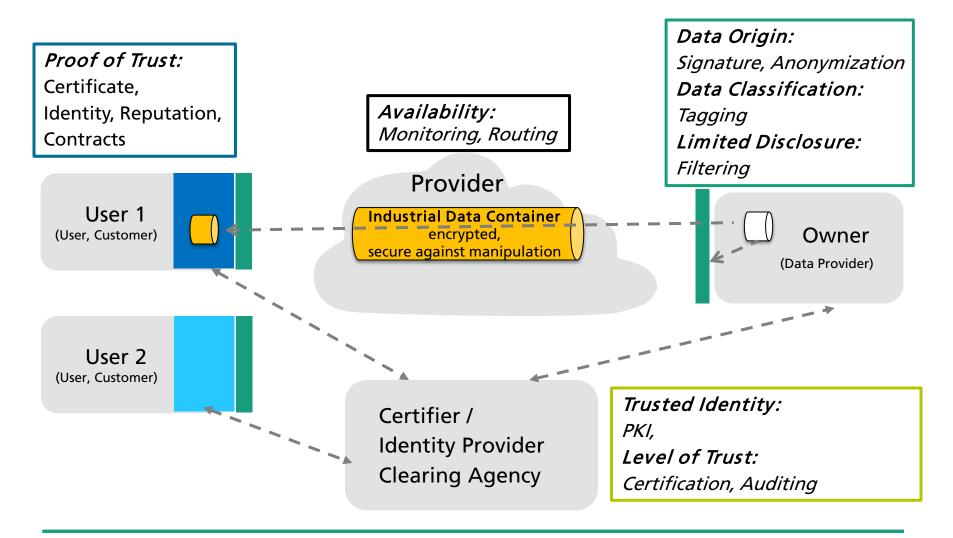
Industrial Data Container

Top Level Security Architecture

INDUSTRIAL DATA SPACE

Proof of Trust:
Certificate,
Identity, Reputation,
Contracts

Availability:
Monitoring, Routing

Data Origin:
Signature, Anonymization
Data Classification:
Tagging
Limited Disclosure:
Filtering

User 1
(User, Customer)

Provider

Industrial Data Container
encrypted,
secure against manipulation

Owner
(Data Provider)

User 2
(User, Customer)

Certifier /
Identity Provider
Clearing Agency

Trusted Identity:
PKI,
Level of Trust:
Certification, Auditing

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Use Cases of Industrial Data Space: Benefits and Strengths

- Linking data of **multiple data sources**

- Integration of **different data types**
  (e.g. product data and environment data of production)

- Involvement of at least **two companies**

- Integration of more than two **levels of the enterprise architecture**
  (e.g. »shop floor« and »office floor«)

- Foundation for **»Smart Services«**

Large Number of Use-Case-Candidates

TRANSPARENCY IN THE AUTOMOBILE LOGISTICS CHAIN

INTELLIGENT CONTAINER

SELF-CONTROLLING LOADING AIDS

TRACKING AND TRACING FOR PHARMACEUTIC PRODUCTS

»COMMUNITY LOGISITICS«

PREDICTIVE LOGISTICS FOR E-COMMERCE

COASTER: ASSISTANCE SYSTEM FOR WORKERS

VISUALIZATION OF SUPPLY NETWORKS

»REAL-LIFE EVIDENCE«

»COLLABORATIVE PREDICTIVE MAINTENANCE«

»SMART PRICING« IN LOGISTICS

INTELLIGENT TRUCK LOGISTICS

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Industrial Data Space Application Example: Some Use Cases in Logistics
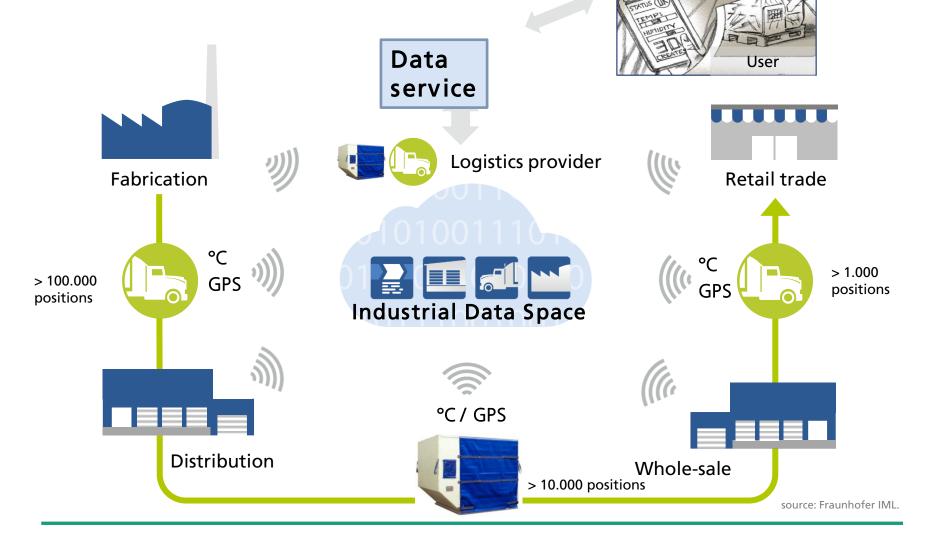
Application Partner	Use Case
AUDI AG	Transparency in supply network
DB Mobility Logistics AG / DB Schenker	Transparency in supply chain – reinforced structured / automatized exchange of information between all involved parties along the supply chain
KOMSA AG	From shipment to customer and consumer behaviour
REWE Systems	Autonomous transparency in the logistics chain
Robert Bosch GmbH	High performance supply chain – accumulation and exchange of relevant events along the supply chain
Robert Bosch GmbH	Luggage Control – support from traveling salesman
SICK AG	Coaster – Assistance system for workers
ThyssenKrupp AG	Transport logistics – Optimization of efficiency and observability of truck transport processes
ThyssenKrupp AG	Energy supply for flexible manufacturing plants
Wacker Chemie AG	Tracing of consignment of goods and alerting in case of deviation

Industrial Data Space Application Example:
Cool Chain in Pharmaceutics Supply

Data service

User

Fabrication

Logistics provider

Retail trade

°C GPS

°C GPS

> 100.000 positions

> 1.000 positions

Industrial Data Space

Distribution

°C / GPS

Whole-sale

> 10.000 positions

source: Fraunhofer IML.

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Industrial Data Space Application Example:
Enables Logistics Chain of the Future

INDUSTRIAL DATA SPACE

PEOPLE
Plan, control, connect…

TRUCKS
Transport goods autonomously.

CONTAINERS
Organize their own payload

LINKED DATA

SHELFS
Initiate refills by themselves.

CARRIERS
Specify items to remove.

VEHICLES and FORKLIFTER
Organize themselves in a cluster.

Image source: Fraunhofer IML, Jettainer, Daimler

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Industrial Data Space Application Example:
Enables new Services for Automobility

Position data

Driving dynamics

Maintenance data

Spare parts logistics

INDUSTRIAL DATA SPACE

New insurance models (e.g. „pay as you drive")

Linking of brand-independent specialist workshops

New rental models

Traffic flow control

Image source: Istockphoto