INTERNATIONAL DATA SPACES
ENABLER OF DATA ECOSYSTEMS

PROF. DR. BORIS OTTO · PARIS · 3 DECEMBER 2019
INNOVATION BUSINESS ECOSYSTEMS
RAILWAY INDUSTRY EXAMPLE

Driver Advisory Systems
Predictive Maintenance
Obstacle Detection
Autonomous Train Operation
Smart Metering
...

OEM

Domain Knowledge

Component Suppliers

Operations Knowledge

Railway Operators

Leasing Companies

Energy Utility Companies

Railway Infrastructure Service Providers

Train Knowledge

Source: Knorr-Bremse (2019).
DATA-DRIVEN BUSINESS ECOSYSTEMS
COLLABORATIVE PREDICTIVE MAINTENANCE

Icon sources: flaticon.com (2019); Legend: PLM – Product Lifecycle Management; OEE – Overall Equipment Effectiveness; USP – Unique Selling Proposition.
INTEGRATING IDS AND ASSET ADMIN SHELL
USE-CASE CONDITION MONITORING

INTEGRATING IDS AND ASSET ADMIN SHELL
MAPPING TO REFERENCE ARCHITECTURE MODEL

AAS Type 3
IDS Connector active AAS

AAS Type 2
IDS Connector with API Access

AAS Type 1
AAS as IDS Data Asset
IDS-BASED DATA ECOSYSTEMS
DATA SOVEREIGNTY ON EDGE, FOG AND CLOUD LEVEL
IDS CONNECTOR
DEPLOYMENT OPTIONS
IDS CONNECTOR
INTERNAL SYSTEM ARCHITECTURE

Container Management

Operating System

Virtual Machine / Hardware

Custom Container
App Store Container
Execution Core Container
IDS CONNECTOR AS PART OF DIGITAL PLATFORMS
A PLATFORM COMPONENT ENSURING DATA SOVEREIGNTY

Industrial Use-Cases
- Preventive Maintenance
- Digital Farming
- Supply Chain Visibility

Commercial Use-Cases
- Smart Home
- Mobility
- HealthCare etc.

Internal Use-Cases
- Data as a Process Enabler

Context-free Use
- Data as a Product

Data Service Platform
- Data Analysis
- Data Mining
- Visualization
- Mapping/Transformation
- Integration/Aggregation
- Data Delivery
- IDS Connector

Cloud-based Data Storage
- Data Source Connectors
- Data Space Infrastructure
- Shared Information Model

Industrial Data Sources
- ERP
- MES
- SCADA
- Installed Base etc.

Commercial Data Sources
- CRM
- Loyalty Programs etc.

Social Data Sources
- Facebook
- Twitter etc.

Additional Data Sources
- Open Data
- Context etc.
CLOUD AND DATA SOVEREIGNTY ALONG THE DATA VALUE CHAIN

Data Storage
(Edge Cloud, Cloud, On-Premise etc.)

Data Use
(Maschinelles Lernen, Datenanalyse etc.)

Data Exchange
(data-centric, document-centric etc.)

GAIA-X and IDS complement each other to ensure cloud and data sovereignty for end-to-end data value chains in ecosystems
CLOUD AND DATA SOVEREIGNTY FOR EUROPE
ARCHITECTURE STACK

DATA SPACE
- Data Services
  - Connectivity
    - Cloud
    - Edge Cloud
    - Edge Devices
    - Sensors & Actuators
    - Hardware
- Data Analysis
- Data Storage
- Data Capture
- Cloud Sovereignty
- Component Sovereignty

Data Value Chain

Source: Deutsche Telekom, German Edge Cloud, Fraunhofer, IDS Association (2019).
BUSINESS ECOSYSTEM EVOLUTION
STAGE-WISE DEVELOPMENT

I

1:1

Bilateral Data Exchange

II

„Few to Few“

Closed Community Data Sharing

III

n:m

Open Dynamic Data Ecosystem

Legend: Circle-shaped Nodes – Ecosystem Member; C – Connector; B – Broker; I – Identity Provider; H – Clearing House; Edges between Nodes – Data Exchange.
IDS EVOLUTION ROADMAP
MAKING IT HAPPEN NOW

I. Research & Development
- Market analysis
- Architecture design
- "Proof of concepts", MVPs
- Research projects
- EU projects (Horizon 2020)
- Member state initiatives
- Knowing what to do

II. Community Building & Standardization
- Use-cases
- Standardization
- Reference modelling
- Internationalization
- IDS Association
- Regional Hubs
- EU projects (Horizon 2020)
- Knowing how to to it

III. Adoption / Use / Deployment
- Data infrastructure operations
- Ecosystem design
- Dissemination and exploitation
- Operations and support organization

Evolution / Convergence / Adoption

TODAY

www.industrialdataspace.org
VALUES & FRAMEWORK FOR INNOVATION (EU Law and Regulations)

ENTERPRISE/DIGITAL ECOSYSTEM (using EU standards)

SERVICE PLATFORMS

DATA SHARING INFRASTRUCTURE

CLOUD/EDGE INFRASTRUCTURE

NETWORK

SMART ECONOMY & SOCIETY

SMART SERVICES

SMART DATA

SMART PRODUCTS

SMART NETWORK

Essential Trust Services

Clearing House

Certification Body

Certification Authority

Dynamic Trust Management

Dynamic Attribute Provisioning

Basic Data Services

Broker

Transaction Log

Data Quality Scoring

Billing and Payment

Data Usage Control

Encryption

Interoperability

Data connector services

App Store

Data Governance

Antitrust Compliance

Design Principles

European values
Secure and trusted
Easy-to-use
Federated, neutral
Vendor-agnostic

1 July 2020
