INTERNATIONAL DATA SPACES
A TRUSTWORTHY ARCHITECTURE FOR THE DATA ECONOMY

Antoine Garnier, Project Manager, International Data Spaces Association
300 people contributing

18 countries

95+
COMPANIES WANT TO LINK DATA WITHOUT REGRET

Interoperability
Data Exchange
»Sharing Economy«
Data Centric
Services

Data Ownership
Data Security
Data Value

DATA SOVEREIGNTY
is the ability of a natural or legal person to exclusively and sovereignly decide concerning the usage of data as an economic asset.
THE INTERNATIONAL DATA SPACES APPROACH CONNECTS ALL KINDS OF DATA ENDPOINTS

When broadening the perspective from an individual use case scenario to a platform landscape view, the INTERNATIONAL DATA SPACES positions itself as an architecture to link different cloud platforms through secure exchange and trusted sharing of data, short: through data sovereignty.

By proposing a specific software component, the INTERNATIONAL DATA SPACES Connector, industrial data clouds can be connected, as well as individual enterprise clouds and onpremise applications and individual connected devices.
IDS REFERENCE ARCHITECTURE MODEL

Roles and interactions in the Industrial Data Space
IDS REFERENCE ARCHITECTURE MODEL
Reference Architecture of Connector
IDS DIGITAL IDENTITIES
STRUCTURE AND COMPONENTS

Participant Certification
Core Component Certification

X.509 Certificates
DAPS Authentication
Dynamic Trust Management
Usage Control

Static
Dynamic
CONCERNS IN THE IDS INFORMATION LAYER

The IDS Information Layer separates the 6 concerns:

# Community of Trust
# Commodity
# Communication
# Context
# Content Concept
USAGE POLICIES
14 CLASSES OF USAGE RESTRICTIONS IDENTIFIED SO FAR

1. Allow access to data
2. Inhibit access to data
3. Restrict data access for specific system/group of users
4. Restrict data access for specific purposes
5. Restrict data access when specific event has occurred
6. Delete data after X days/months
7. Modify data (in transit)
8. Modify data (in rest)
9. Use data not more than N times
10. Use data in a specific time interval
11. Log data access information
12. Notify specific group of users
13. Share data only if it is encrypted
14. Control printing shared data
Activity details: Defining participants, processes and IDS components
Application of the Additive Manufacturing Platform

- Smart-Contract triggers the IDS Connector
- IDS Connector creates secure connections to others
- Each IDS Connector confirms when write is written
Application of the Additive Manufacturing Platform

- Smart-Contract triggers the IDS Connector of the Printhub
- Smart Contract controls the state-machine and sets other Printhubs to revoke

thyssenkrupp IDS

Quality File

CPS Data from manufacturing for Smart Products

PrintHub 1

PrintHub 2

PrintHub 3
## 4 SECURITY PROFILES
YOU DECIDE DEPENDING ON THE USE SCENARIO

<table>
<thead>
<tr>
<th>Reference Development</th>
<th>Base Free</th>
<th>Base</th>
<th>Trust</th>
<th>(Managed)Trust+</th>
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</thead>
<tbody>
<tr>
<td>Base Free</td>
<td>Open Source</td>
<td>IDS Community</td>
<td>IDS Community</td>
<td>Bound to strong SLAs</td>
</tr>
<tr>
<td>Base</td>
<td>Own infrastructure</td>
<td>All IDS Roles supported, Billing and Clearing optional</td>
<td>All IDS Roles supported</td>
<td>All IDS Roles supported</td>
</tr>
<tr>
<td>Trust</td>
<td>Full interoperable, reduced trust</td>
<td>Full interoperable, Free decision of communication</td>
<td>Full interoperable, Free decision of communication, Hardware anchor</td>
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<tr>
<td>(Managed)Trust+</td>
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<table>
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<tr>
<th>Communication Abilities</th>
<th>Base Free</th>
<th>Base</th>
<th>Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Free</td>
<td>Only private IDS with self signed certificates</td>
<td>Full interoperable, reduced trust</td>
<td>Full Security Level</td>
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<td>(Managed)Trust+</td>
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</tbody>
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IDS CONNECTOR IMPLEMENTATIONS
RUNNING ON DIFFERENT DEVICES

**Trusted Connector**
- Connector running on sensor device
- Implementation by Sick AG

**Base Connector**
- Connector running on Raspberry Pi
- Implementation by nicos AG

**Lightweight Sensor Connector**
- Connector running on 32 bit microprocessor
- Implementation by Fraunhofer

**Mobile Connector**
- Connector running on mobile device
- Implementation by thyssenkrupp AG, Fraunhofer and Logenios GmbH
MAKING IDS A GLOBAL STANDARD

Start of IDSA as global, user driven initiative

EVOlUtion of IDS OFFERING

IDS Reference Architecture Model
Working Group Architecture

MVP
Developer’s Community

Certification Criteria
Working Group Certification

Standard Contracts
Taskforce Legal Framework

Formal Standards
DIN/CEN/ISO/IEC/W3C/IEEE

ADOPTION AND PROLIFERATION

Certified Solutions by IDSA Members

// IDSA Hubs  // SME Alliance  // IDSA Communities  // Liaisons

New technologies

IDS as a fundamental approach in research projects

Spread the Word...and create awareness for IDS

Demonstrate Business Reference

IDS is a standard for the semantics of data exchange and for data sovereignty
Interweaving our architecture with other leading global initiatives
JOINTLY PAVING THE WAY FOR A DATA DRIVEN DIGITISATION OF EUROPEAN INDUSTRY
DATA + USAGE = VALUE

Data Economy

Internet of Everything

Today

DATA PROVISIONING
- Interoperability
- Asset Digitisation
- Networks
- Processing

DATA USAGE
- Free Flow of Data
- Data Sovereignty
- Usage Policies
- Trust

Building Frameworks
Frameworks of building blocks to assemble smart solutions

Commercial Solutions

Open Source Building Blocks

www.internationaldataspaces.org
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December 3rd to 5th, 2019

Venue:
ATOS Global Head Office
80 quai Voltaire
95877 Bezons, France

Hosted by: ATOS & ANRT
Co-hosted by: Institut Mines-Télécom

For registration:
idsa-winterdays.idento.one