FDO for a **Global Integrated Data Space**

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Recap from yesterday

- “Get Data Accessible instead of copying”
- “Allow machines processing data”
- Persistence of information (digital product pass for buildings > 10 years)

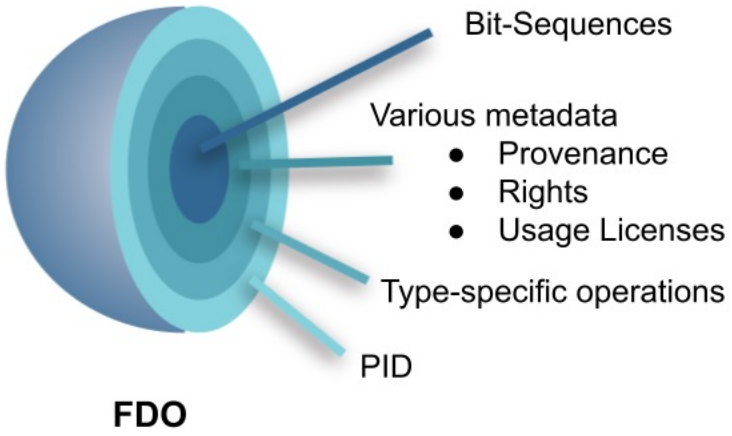
Support by the internet pioneers

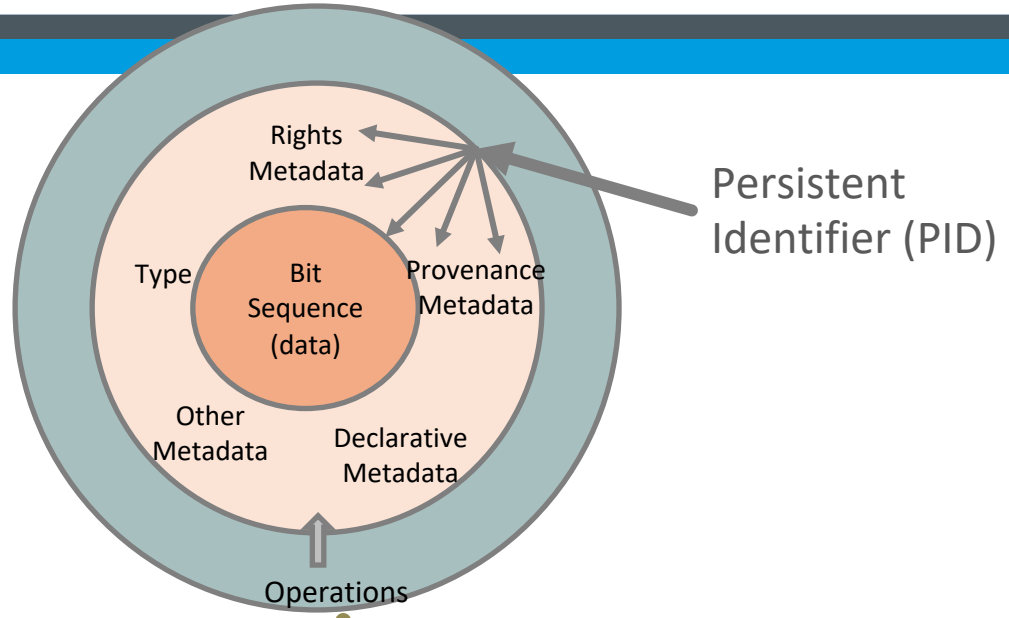
- Follow George Strawn‘s advice:
  - FAIR Digital Objects (FDO) combine dataspaces as the Internet combined computer networks
  - The Web was designed to enable humans to access media data, the GIDS with FDOs is designed to access all data by humans and machines

FDO Concept

- **Persistent Identification** of information
- Resolution of identifiers in **established trusted system**
- Machine **Readability** and Machine **Actionability**
- Resolution (Process) leads to **informed decision making**
- **link Data** with **Operations** with **Services**

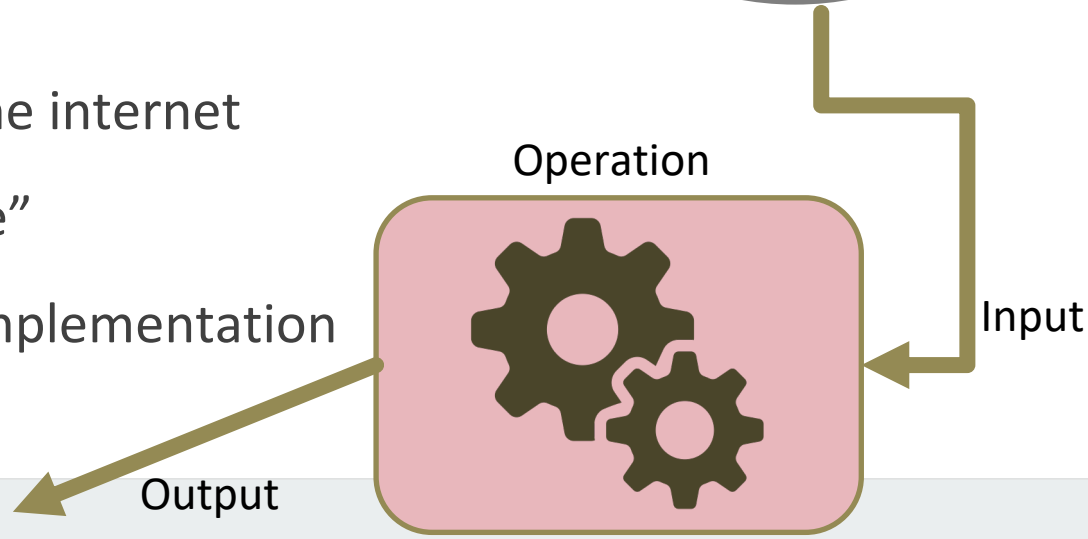
FAIR Digital Objects





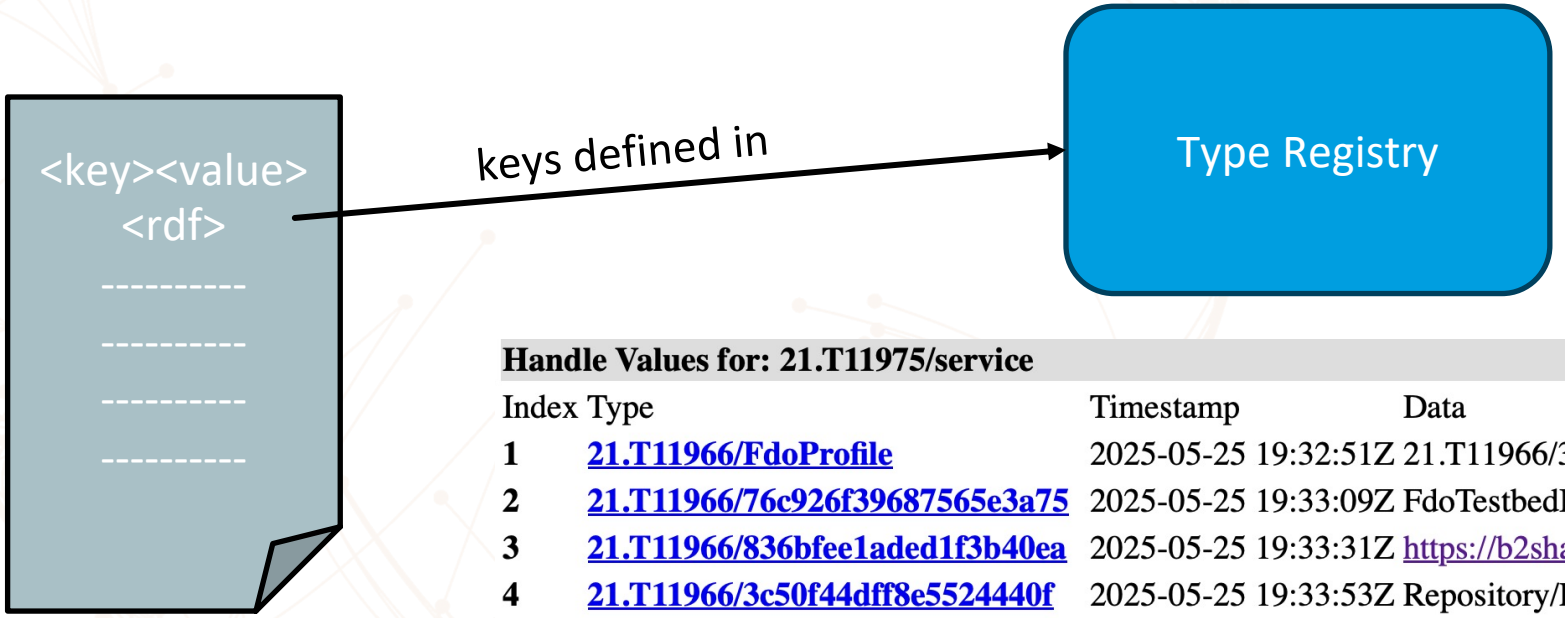
What is the FDO concept

- A data management solution for the internet
- The internet as a global “data space”
- Simple Requirements -> complex implementation



Typing is the key

- to achieve **machine actionability** (not only readability)
- to overcome semantic interoperability issues



- Community owned
- Decentralized
- Federated

Handle Values for: 21.T11975/service

Index	Type	Timestamp	Data
1	21.T11966/FdoProfile	2025-05-25 19:32:51Z	21.T11966/374a5ae719f21e98a74a
2	21.T11966/76c926f39687565e3a75	2025-05-25 19:33:09Z	FdoTestbedB2Share
3	21.T11966/836bfee1aded1f3b40ea	2025-05-25 19:33:31Z	https://b2share.testbed.pid.gwdg.de
4	21.T11966/3c50f44dff8e5524440f	2025-05-25 19:33:53Z	Repository/Data Service
5	21.T11966/e236fff11511968d8696	2025-05-26 08:50:28Z	[{"ip": "141.5.107.142", "port": 9999, "protocol": "DOIP on TCP"}]
6	21.T11966/053627be03244590c233	2025-05-25 19:35:23Z	["21.T11966/82045bd97a0acce88378"]
7	21.T11966/b5b58656b1fa5aff0505	2025-05-25 19:35:43Z	21.T11975/service
8	21.T11966/143d58e30d417a2cb75d	2025-05-25 19:35:58Z	updated

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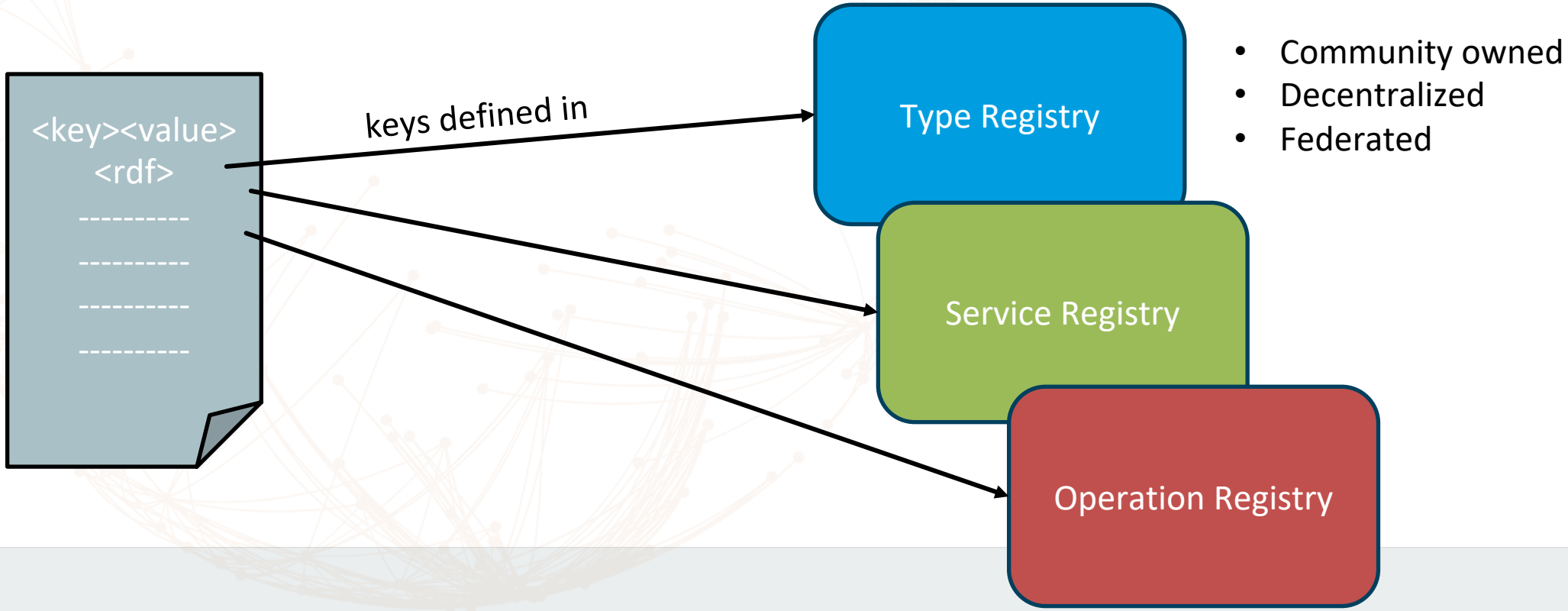
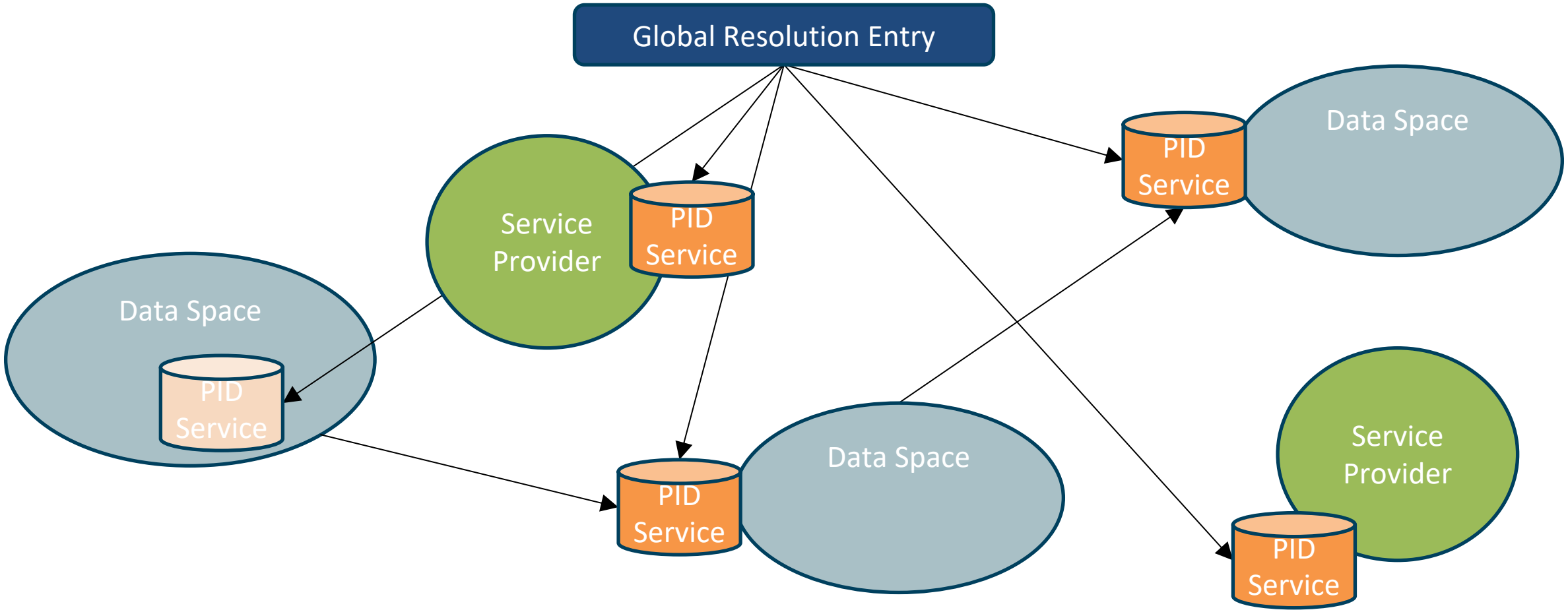


Persistent Identification

Decentralized globally resolvable PIDs



DONA

- Digital Object Naming Authority (DONA)
- **DONA is a Swiss foundation** hosting an international consortium that governs the Handle structure at the top level in **close collaboration with ITU-T**
  - was founded 2012 in Geneva
  - administers the system's Global Handle Registry and accredits MPAs
  - current Multi-Primary Administrators (MPA): 9
- The consortium will moderately grow in future

DONA

Digital Object Numbering Authority
DONA (www.dona.net)

Members of DONA (MPAs)

- Smart Africa Alliance
- Tunisian Internet Agency (Ati)
- Public Joint-stock Company Rostelecom
- Corporation for National Research Initiatives (CNRI)
- MISAVA Agency for Digital Identifiers (MISADI)
- Communications and Information Technology Commission (CITC)
- Chinese Handle Coalition (CHC)
- International DOI Foundation (IDF)
- Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen (GWDG)

Members of ePIC

- GWDG
- DKRZ
- GRnet
- SURF
- .....

Members of IDF

- DataCite
- Crossref
- Japan Link Center
- EIDR
- ....

ePIC API

HANDLE System

Dr. Robert E. Kahn, Director and Chair of the Board

Implementation

FDO CONNECT

- Advance Machine Intelligence (AMI)
- Deutsches Forschungszentrum für Künstliche Intelligenz Bremen (DFKI)
- Deutsches Institut für Normung (DIN)
- Leibniz-Institut für Informationsinfrastruktur (FIZ Karlsruhe)
- Fraunhofer-Institut für Angewandte Informationstechnik (FIT)
- Fraunhofer-Institut für Software- und Systemtechnik (ISST)
- Frankfurt School of Finance & Management (FSoFM)
- Gesellschaft für wissenschaftliche Datenverarbeitung Göttingen (GWDGG)
- Hochschule Hannover (HS)
- IndiScale
- Karlsruher Institut für Technologie (KIT)
- Knowledge Pixels
- Lehrstuhl für Informations- und Automatisierungssysteme (IAT) und IT-Center der Rheinisch-Westfälische Technische Hochschule Aachen (RWTHH)
- Oliver Rack (Nextlearning)
- Prof. Dr. Martini
- Spirit Legal
- Fachbereiche Physik und Elektrotechnik (FB1), Mathematik und Informatik (FB3) und Wirtschaftswissenschaften (FB7) der Universität Bremen
- YottaSen

FDO Connect wird im Rahmen der Initiative MISSION KI – Nationale Initiative für Künstliche Intelligenz und Datenökonomie entwickelt. MISSION KI wird vom ehemaligen Bundesministerium für Digitales und Verkehr bis Ende 2025 gefördert und von acatech – Deutsche Akademie der Technikwissenschaften umgesetzt.

MISSION KI
Nationale Initiative für Künstliche Intelligenz und Datenökonomie

acatech
DEUTSCHE AKADEMIE DER TECHNIKWISSENSCHAFTEN

GWDG
Gesellschaft für wissenschaftliche Datenverarbeitung mbH Göttingen

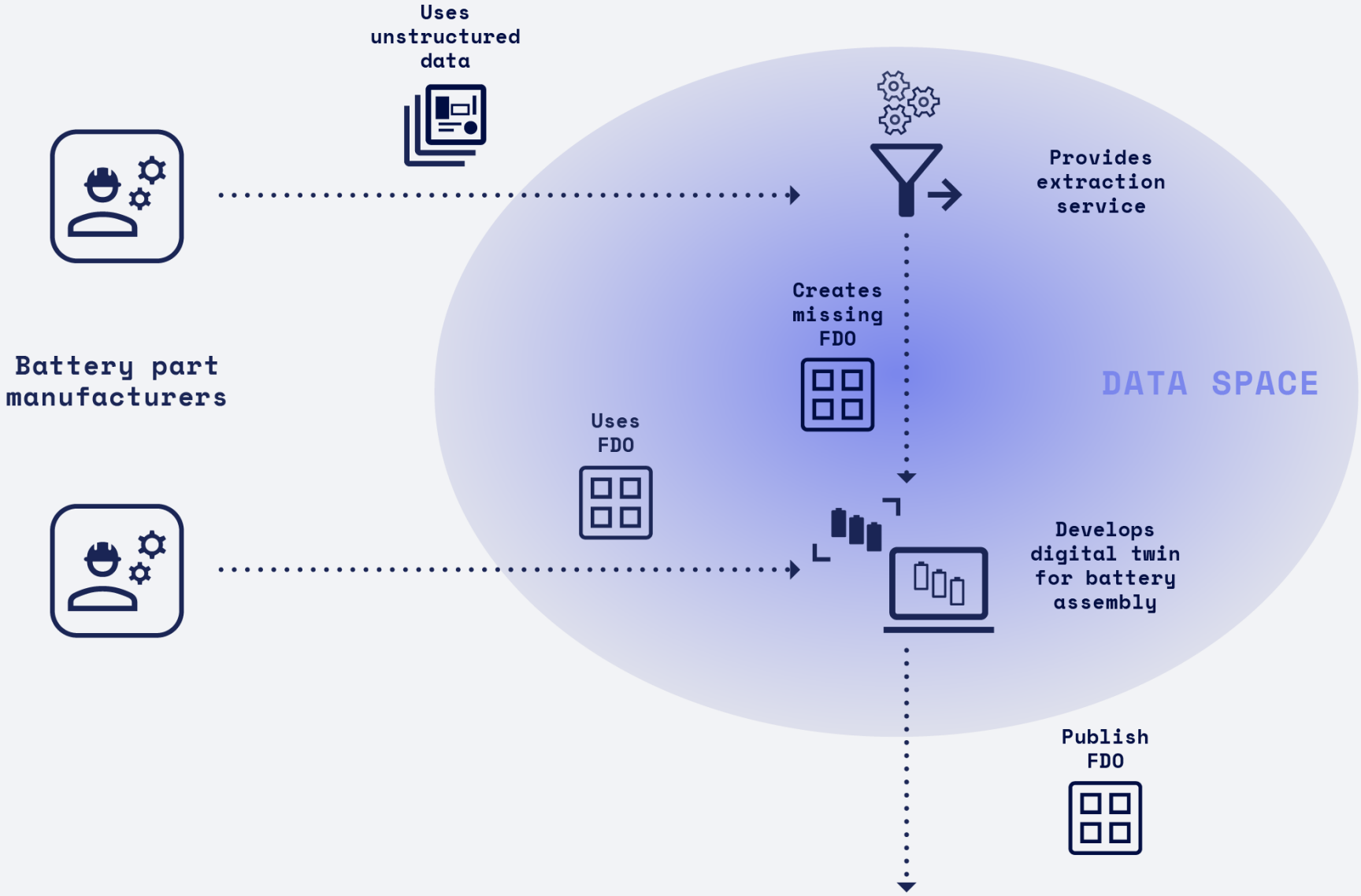
gefördert von

Bundesministerium für Digitales und Verkehr

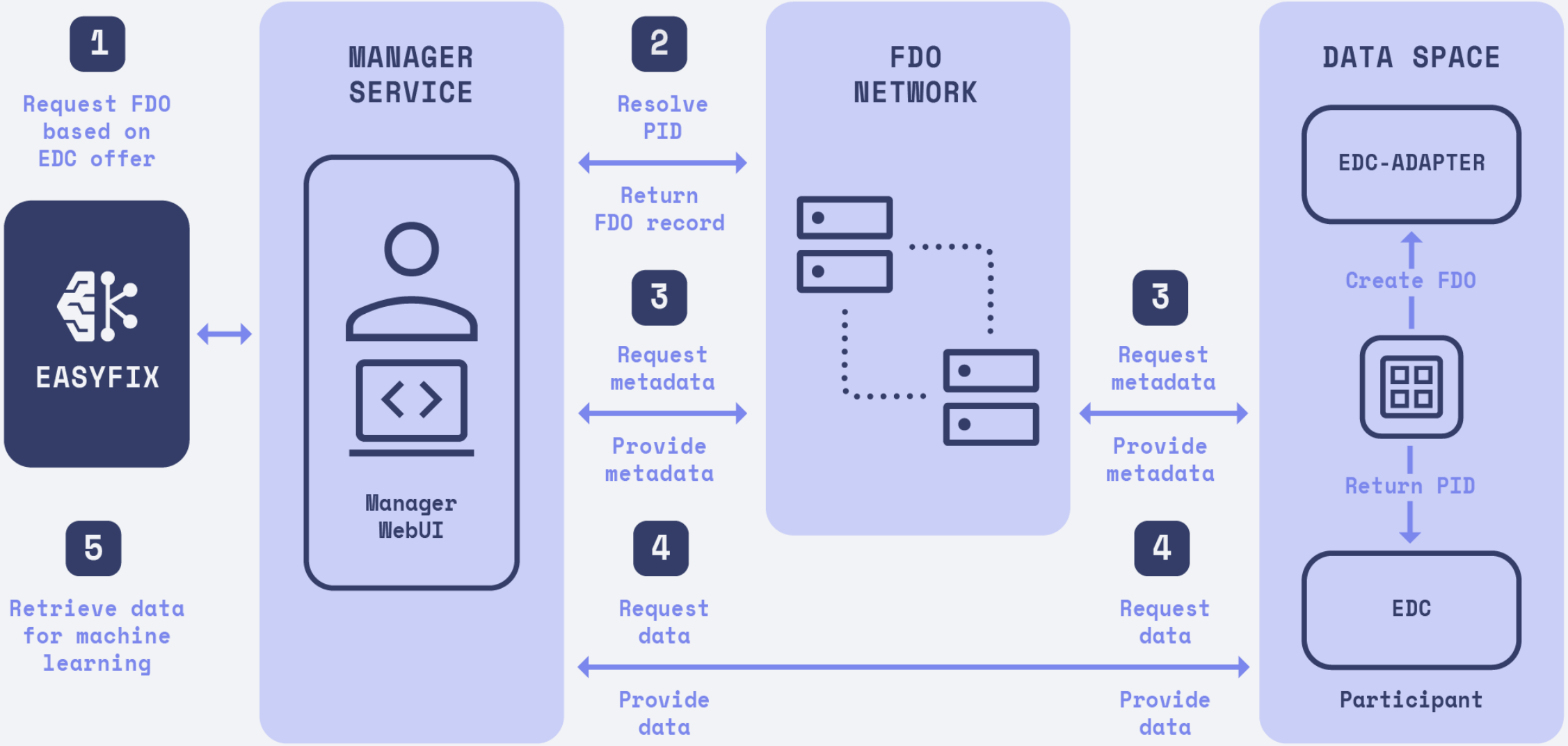
://fdo/connect

FDO Connect

Developing the FAIR Data Publisher

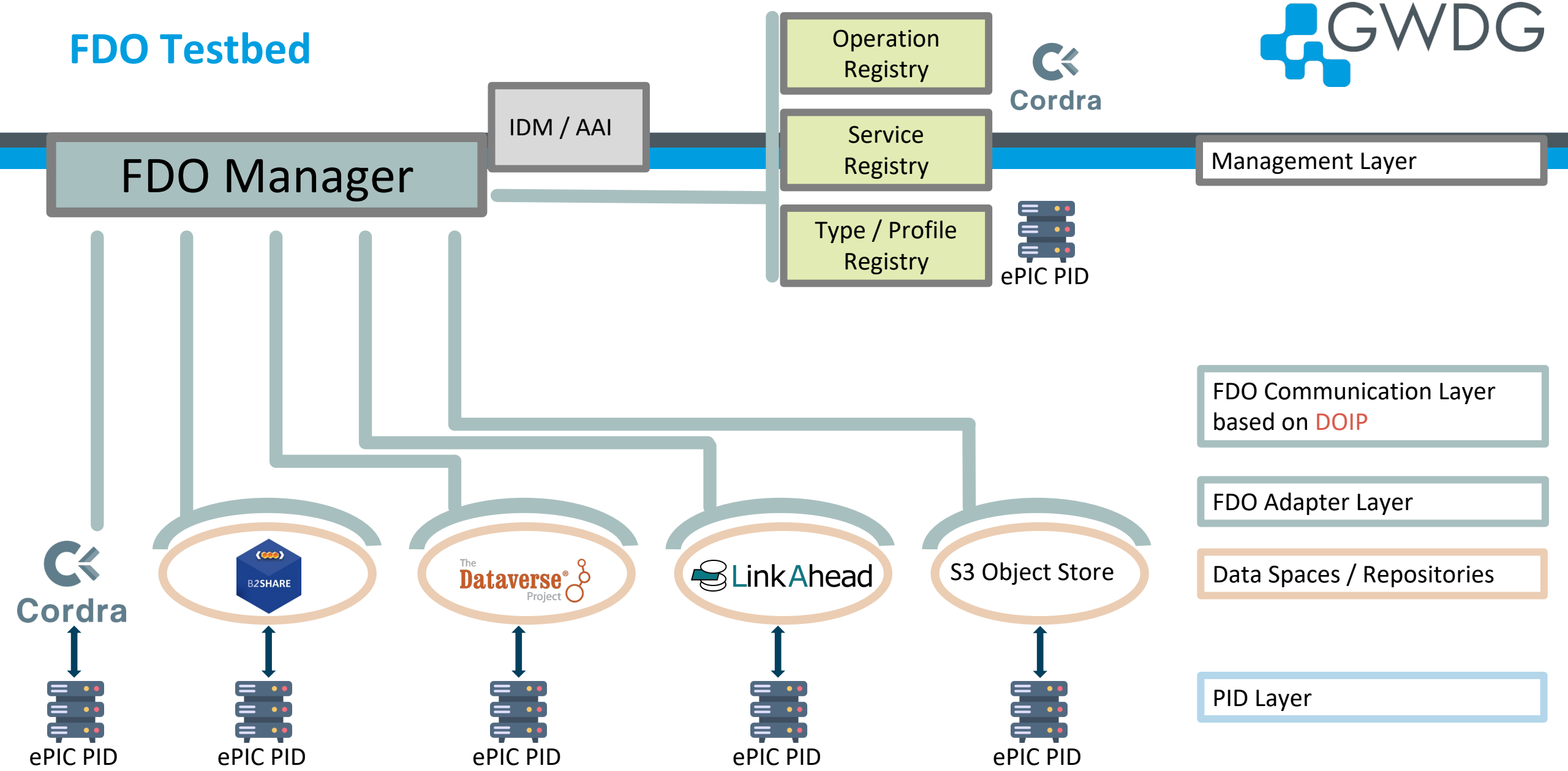


FDO Connect


1
Request FDO based on EDC offer
EASYFIX
5
Retrieve data for machine learning
MANAGER SERVICE
Manager WebUI
2
Resolve PID
Return FDO record
3
Request metadata
Provide metadata
4
Request data
Provide data
FDO NETWORK
3
Request metadata
Provide metadata
4
Request data
Provide data
DATA SPACE
EDC-ADAPTER
Create FDO
Return PID
EDC
Participant

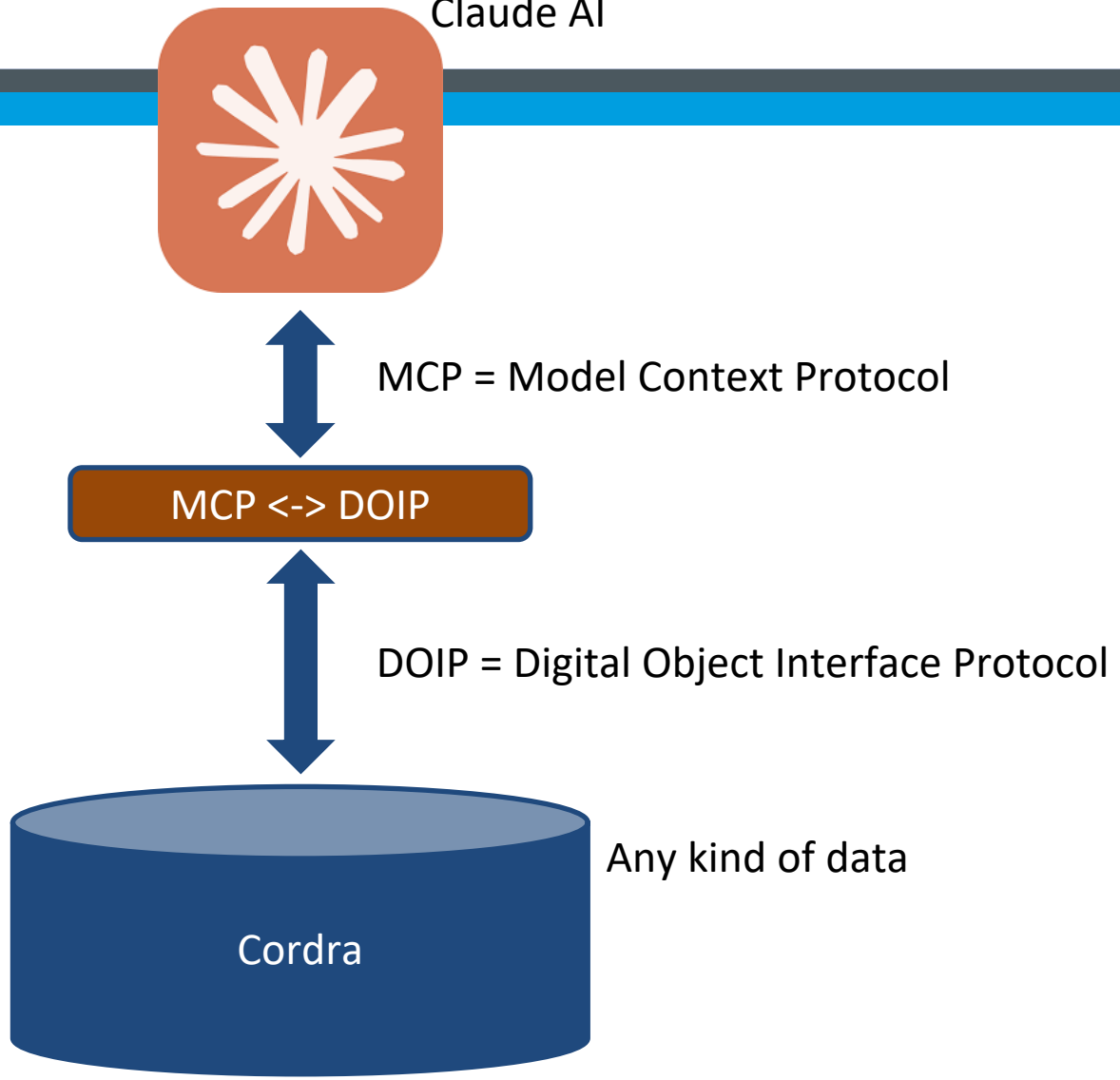
AI

FDO Testbed


FDO Manager
IDM / AAI
Operation Registry
Service Registry
Type / Profile Registry
Cordra
ePIC PID
Management Layer
Cordra
B2SHARE
The Dataverse Project
LinkAhead
S3 Object Store
ePIC PID
ePIC PID
ePIC PID
ePIC PID
ePIC PID
FDO Communication Layer based on DOIP
FDO Adapter Layer
Data Spaces / Repositories
PID Layer

AI

- Need to control the use of (digital) assets
- We do work with AI in various scenarios



Join the community!

3rd FAIR Digital Objects Conference

TU Wien
25. – 27. March 2026

TRUST
Persistence
Accountability
Transparency
Sovereignty
FAIR DIGITAL OBJECTS

FDO Applications and Specifications

FAIR Digital Objects underpin this Trust Framework.
Reporting on the increasing number of FDO applications and implementations.
Discussing FDO Interoperability challenges and ongoing specification work.

Thanks for your attention

Questions?