Introduction to KMD & NEC's work with

Data Spaces

The new standard for data sharing in the EU

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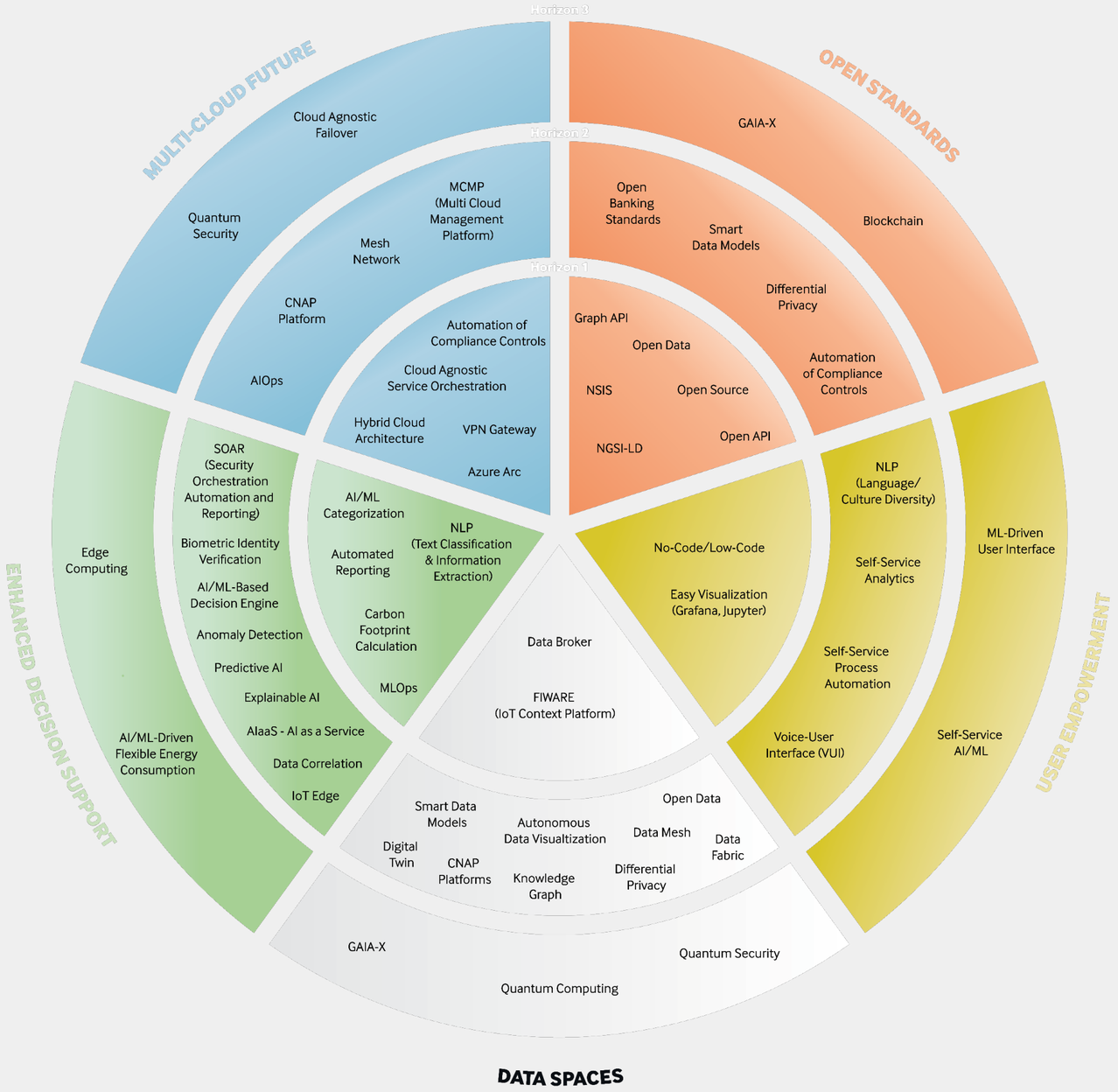
Context Management Data Space

KMD Tech & Innovation Strategy



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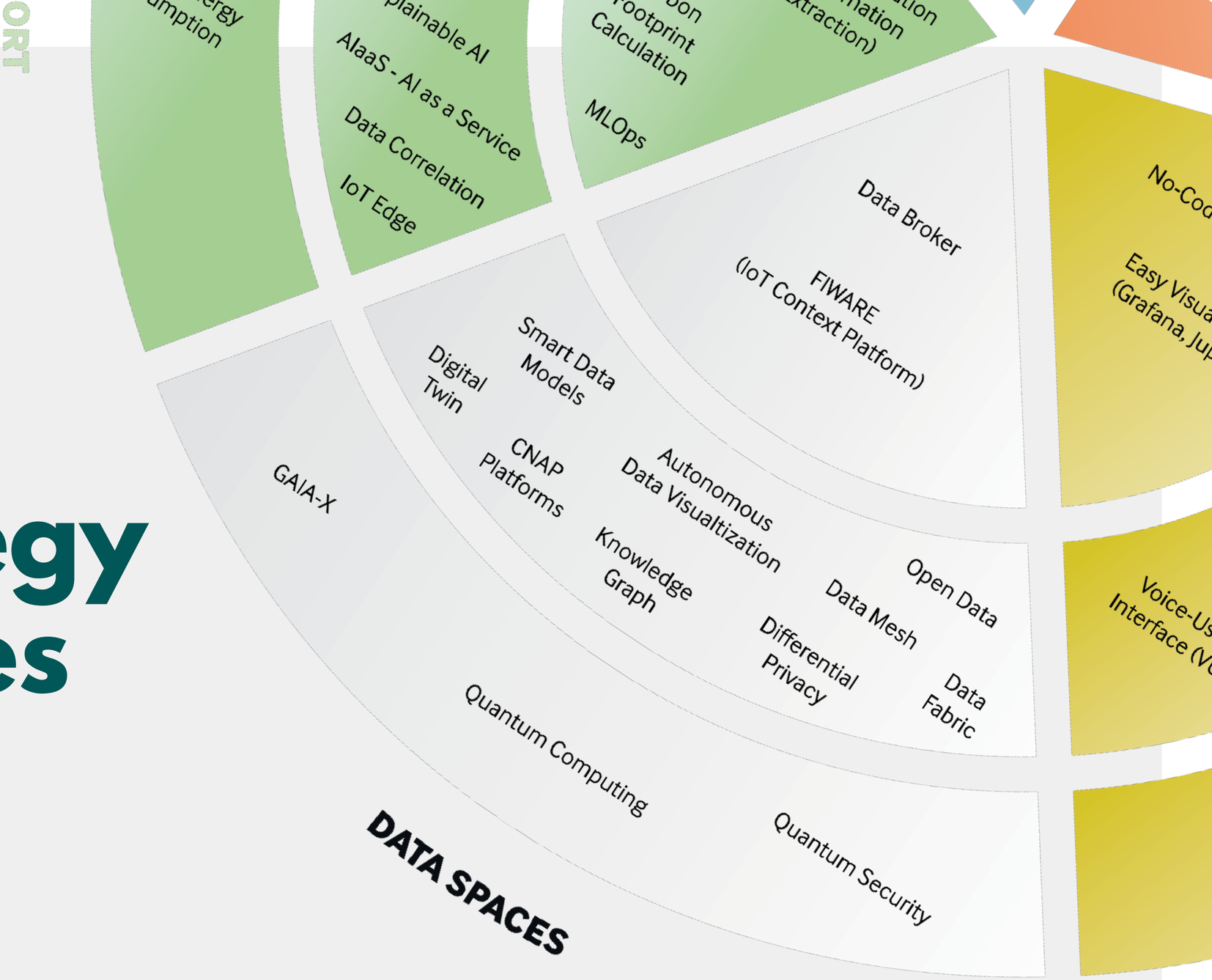
KMD strategy Data Spaces



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EU Digital Strategy 2020

Vision

A single market for European data

Problem

Availability of data

Desired outcomes

- Use of public sector information by business
- Sharing and use of privately-held data by other companies
- Use of privately-held data by government authorities
- Sharing of data between public authorities

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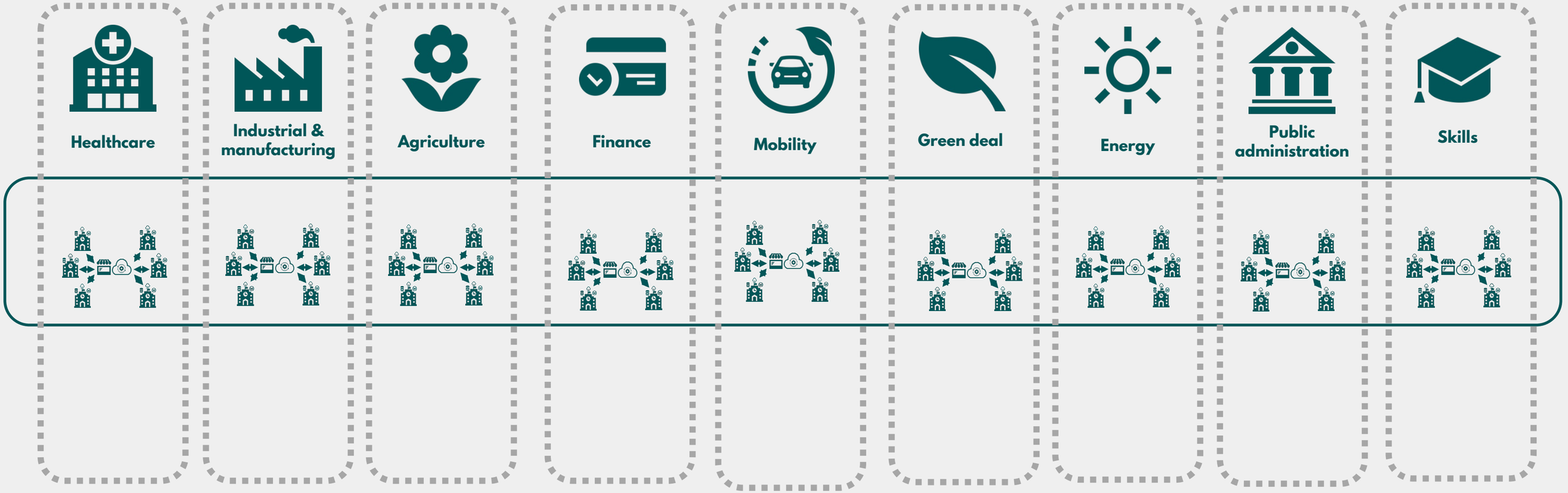
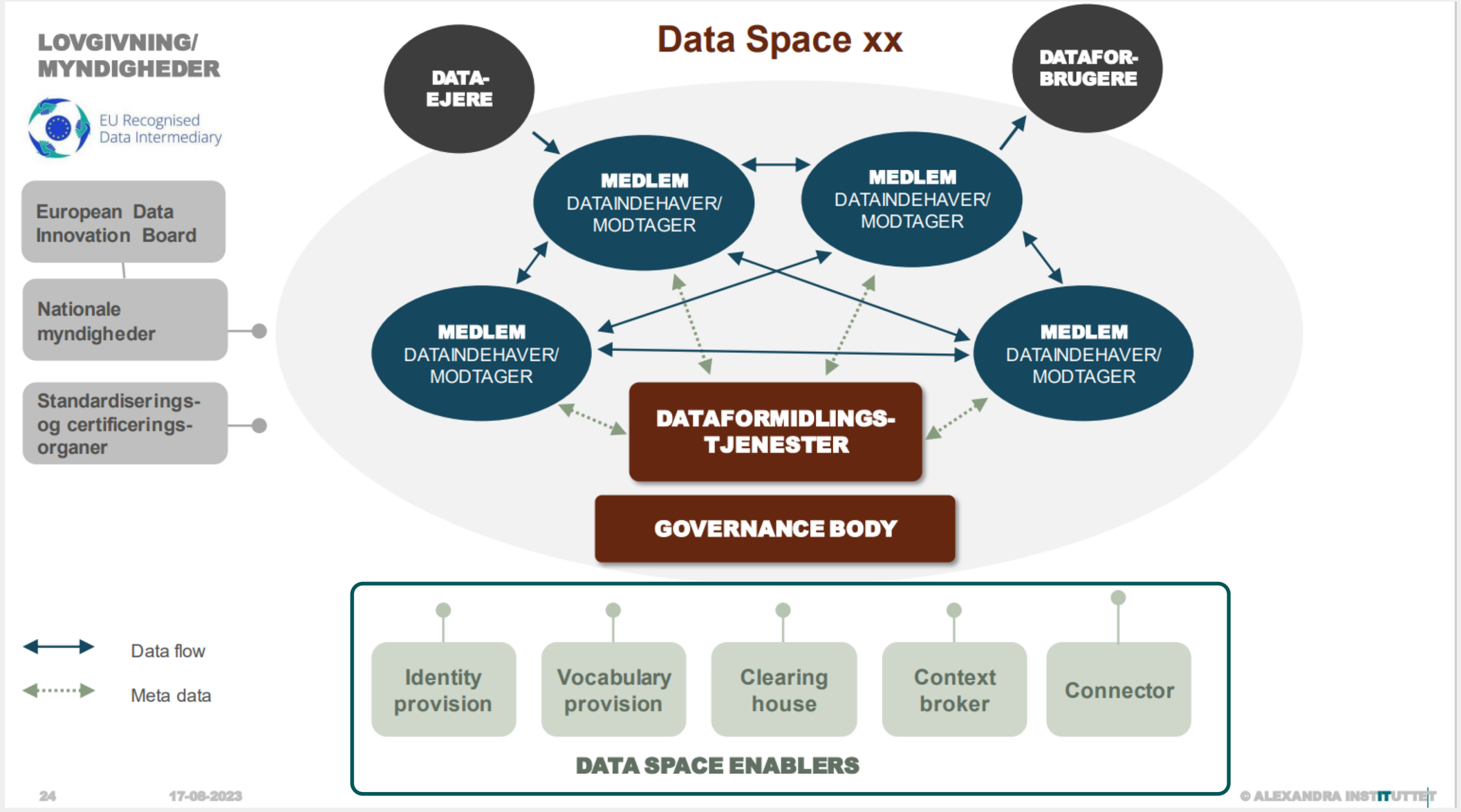
- A European strategy for data, 2020

Common European Data Spaces





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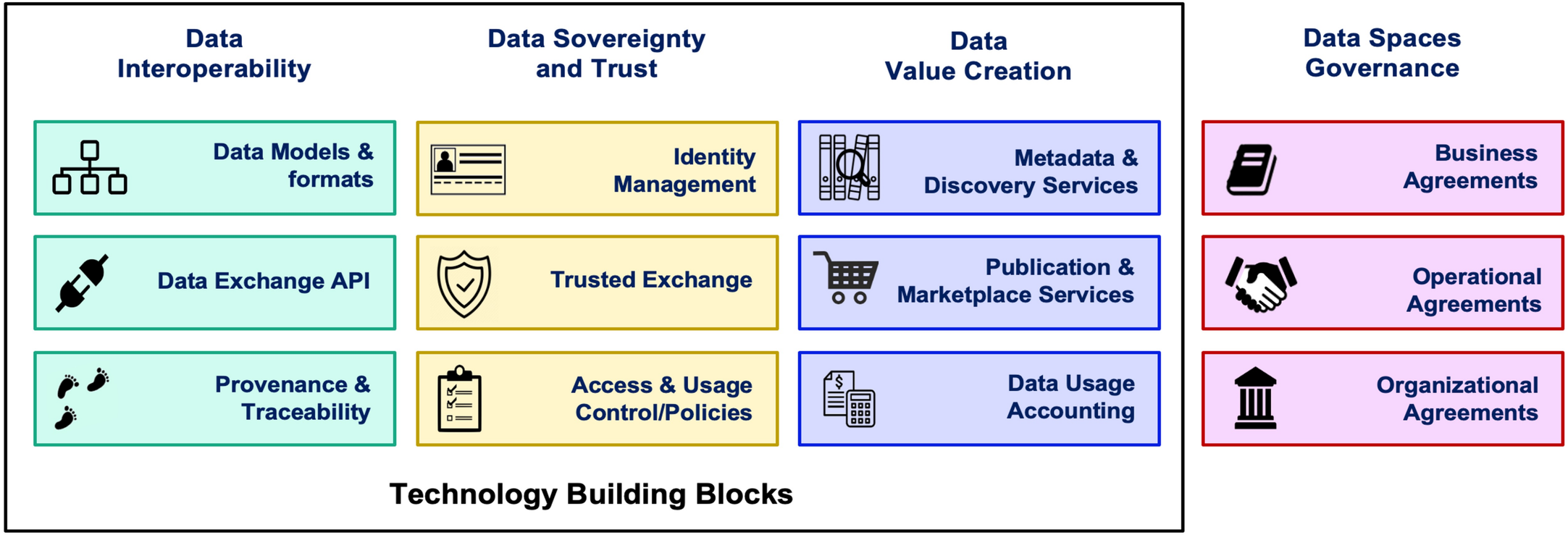
Data Space Elements

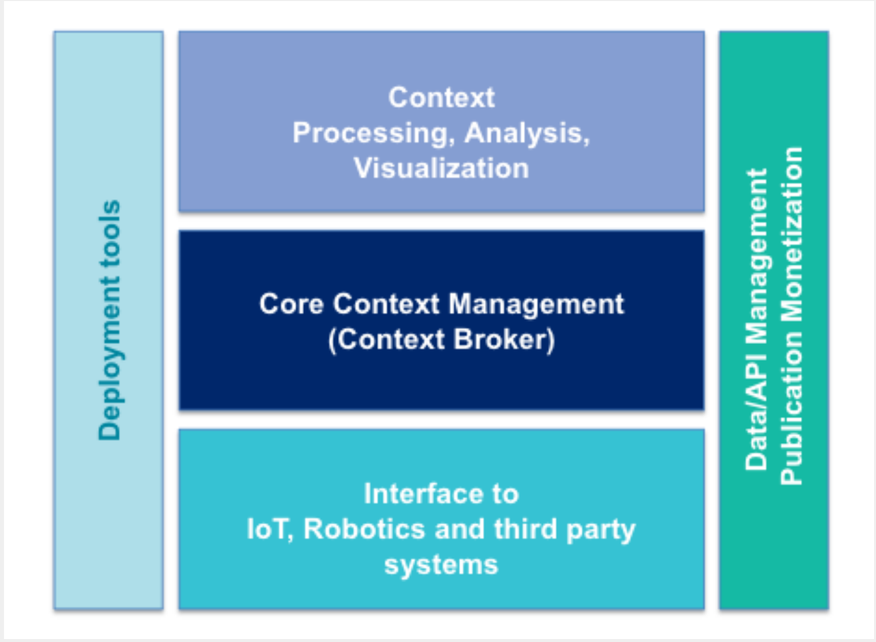


Missing Interoperability

01 Data is isolated or locked in vendor-specific systems and protocols

02 Utilizing data from multiple systems requires custom integration projects

03 Expanding and scaling integration projects is expensive, complex and time consuming



NEC NGSI-LD Scorpio Broker is an Open Source Data Context Platform that offers open standardized APIs, standardized Data Models.

It is part of the FIWARE ecosystem which is a community around Smart Cities, Clean Energy, IoT, Data Spaces, Digital Twins and much more.

Building around the NEC NGSI-LD Scorpio Broker, a rich suite of complementary open source FIWARE Generic Enablers are available, dealing with the following:

- Interfacing with the Internet of Things (IoT), Robots and third-party systems
- Context Data/API management, publication, and monetization
- Processing, analysis, and visualization of context information

Data Space future in 3 steps

#1 Context Management

- IoT data
- 3. Party data
- Smart Data Models
- Creating context
- Data visualization
- User management
- Open-source components

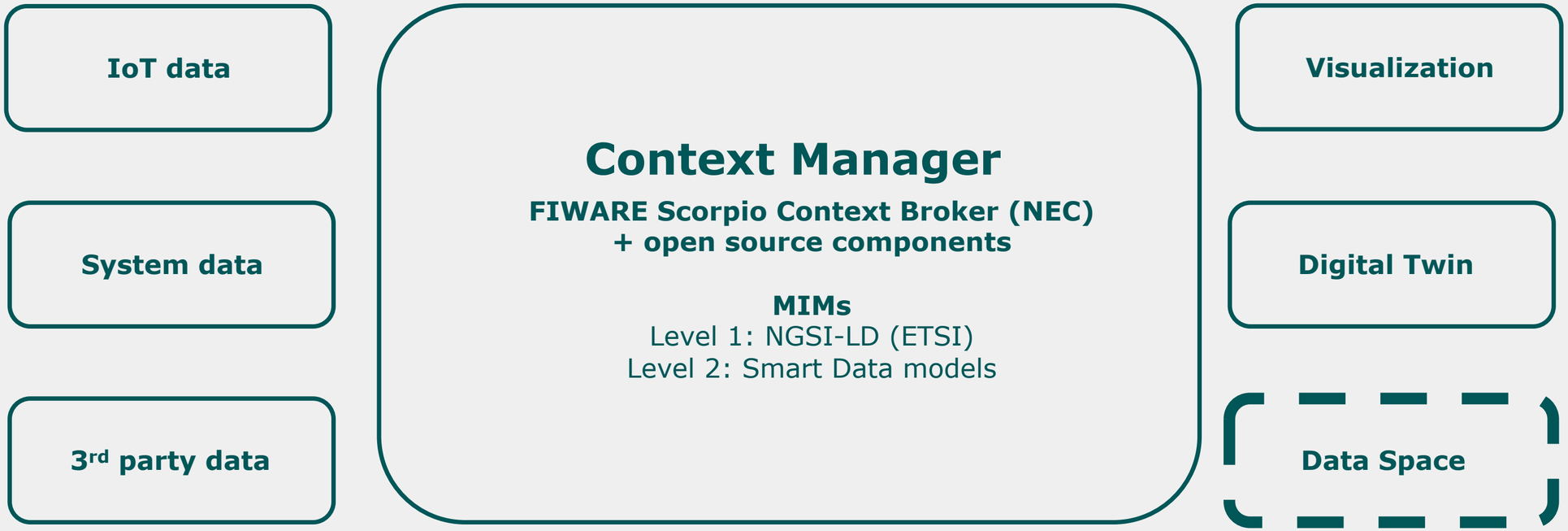
#2 Digital Twins

- Leveraging the value of context data
- Societally relevant use cases
- Buildings, Road networks, utilities, Energy etc.
- Predictions and simulations
- Basic Smart City component

#3 Data Spaces

- Next standard for data sharing in the EU Open standards
- Decentralized infrastructure
- Data ecosystems between companies and public entities

Entering Data Spaces from Context Management



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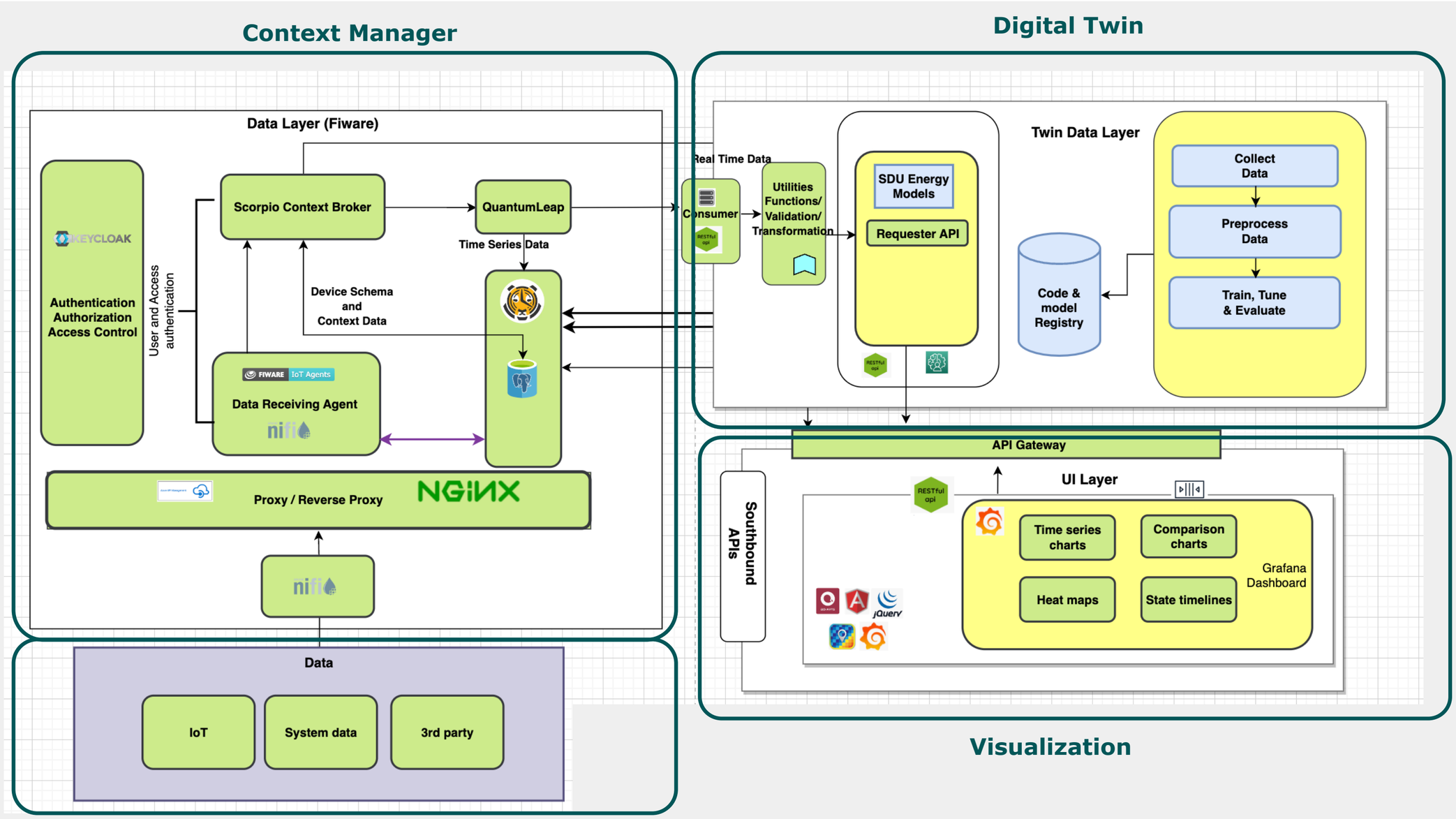

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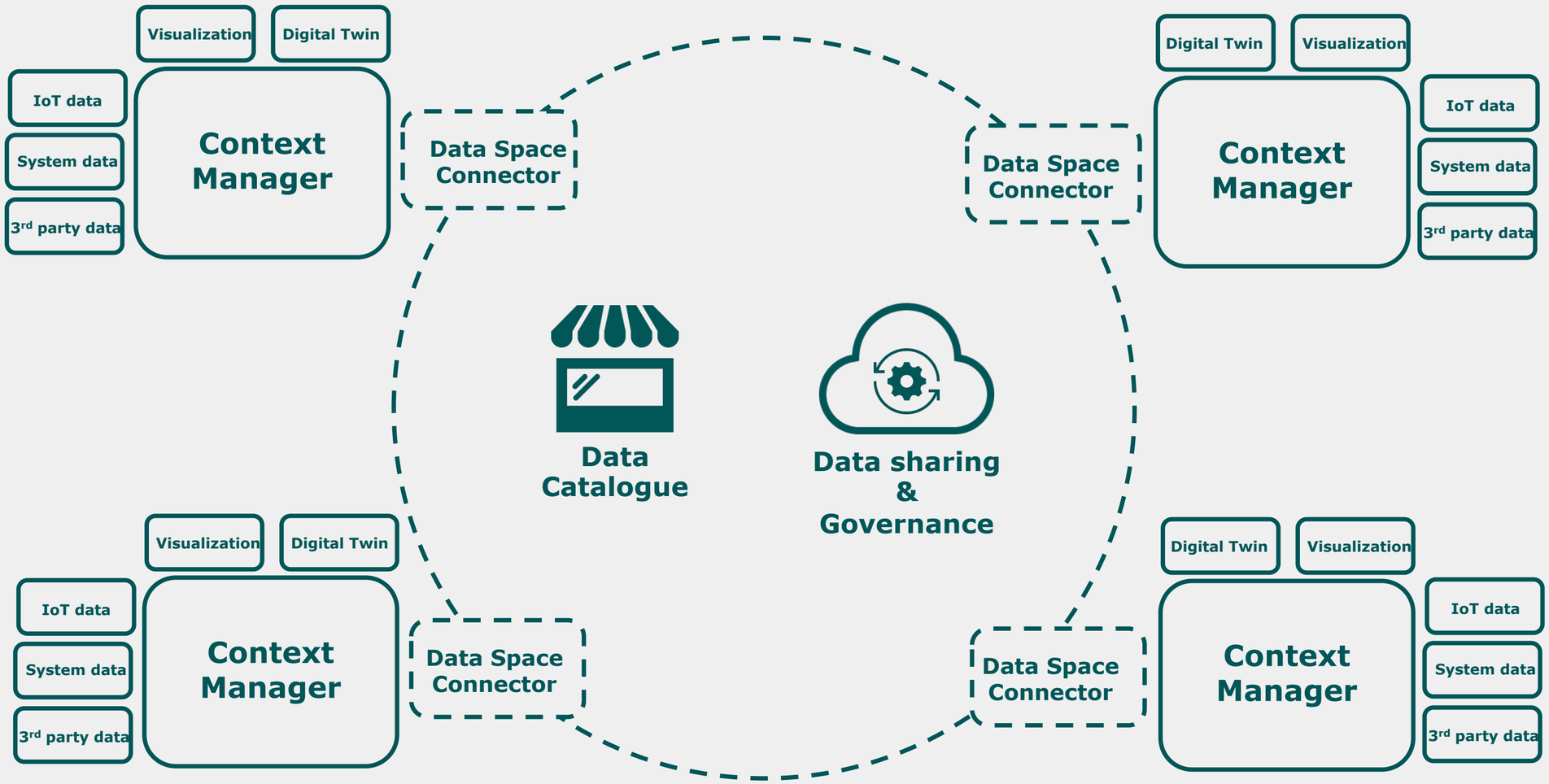
Data Space Connector



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\Orchestrating a brighter world NEC

Speaker: Dr. Ernö Kovacs, NEC Laboratories Europe GmbH
Contributor: Juan Ramón Santana, Luis Sánchez, Yuriko Nomura, Satsuki Hamaguchi, Martin Bauer, Benjamin Hebgen

International Data Space Collaboration – a first data space trial between Japan and EU

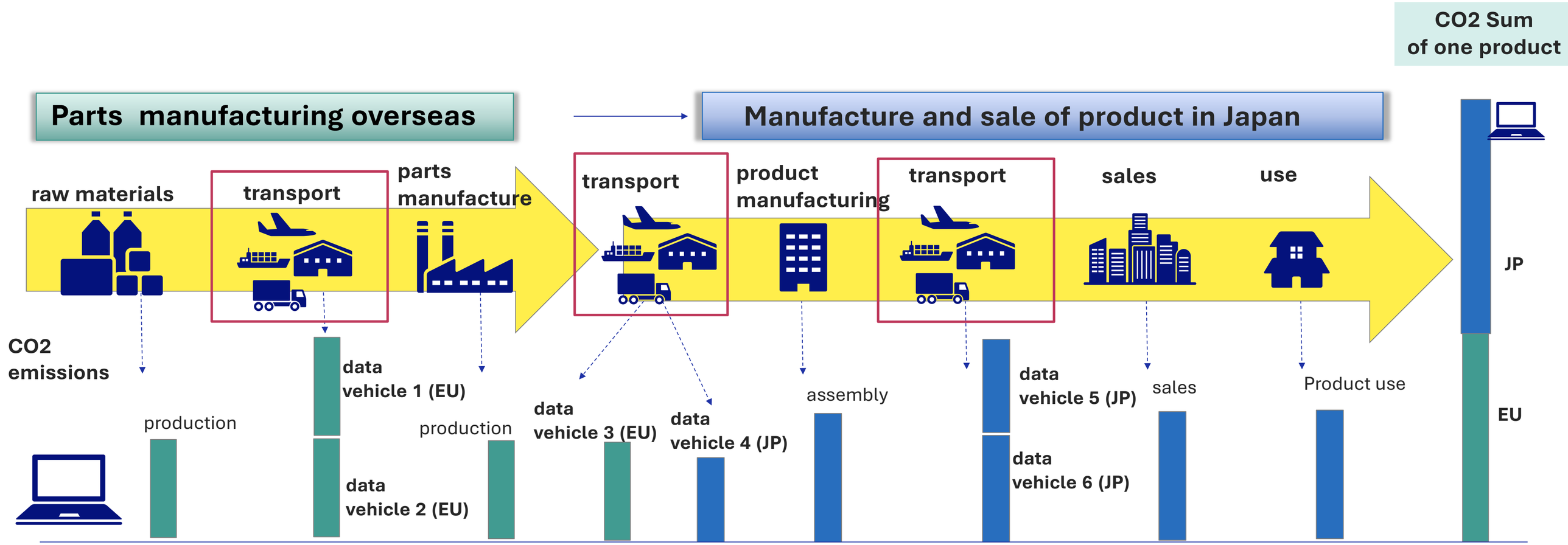
Decarbonisation / Green Products

Green Technology:

- Total carbon emission of a product is becoming an important sales argument
- Future products: need a “Digital Product Passport” capturing its environmental footprint
- International supply chains need to be incorporated into the CO2 calculations

→ Need to connect International Data Spaces across technology and legislative boundaries

Carbon Management in an International Supply Chain



Why different Data Spaces ?

Data Space

- are abstractions for a decentralized data management
- establish a common set of data governance mechanisms
- common source of Trust, established legal procedures, local standards
- follow a common protocol stack
- integration with the local legal systems, following local policies and recommendation

→ **Technology Sovereignty of countries and regions will be a reality**

Overview and Architecture

Overview

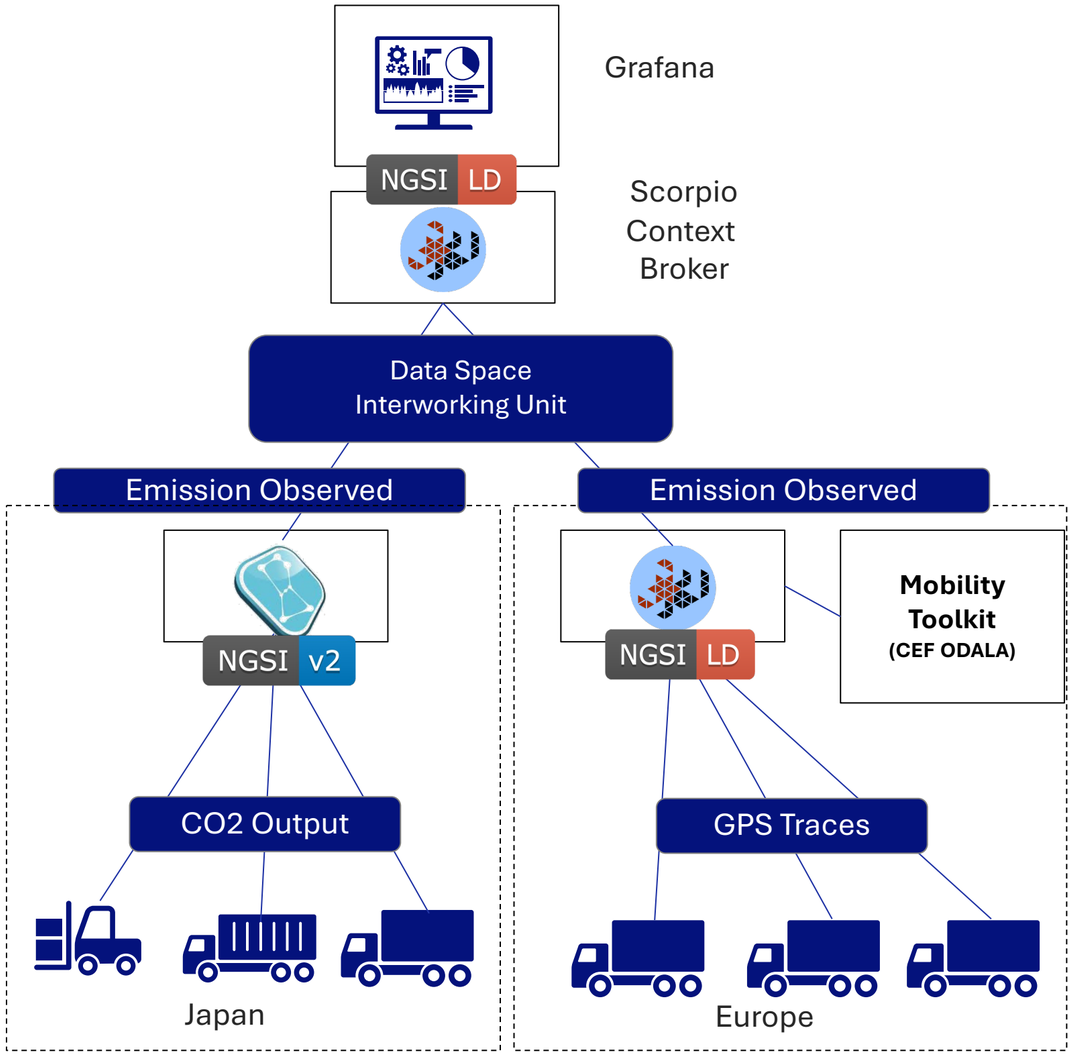
- Two independent Data Spaces
- One Aggregator for the Carbon Calculation

Europe

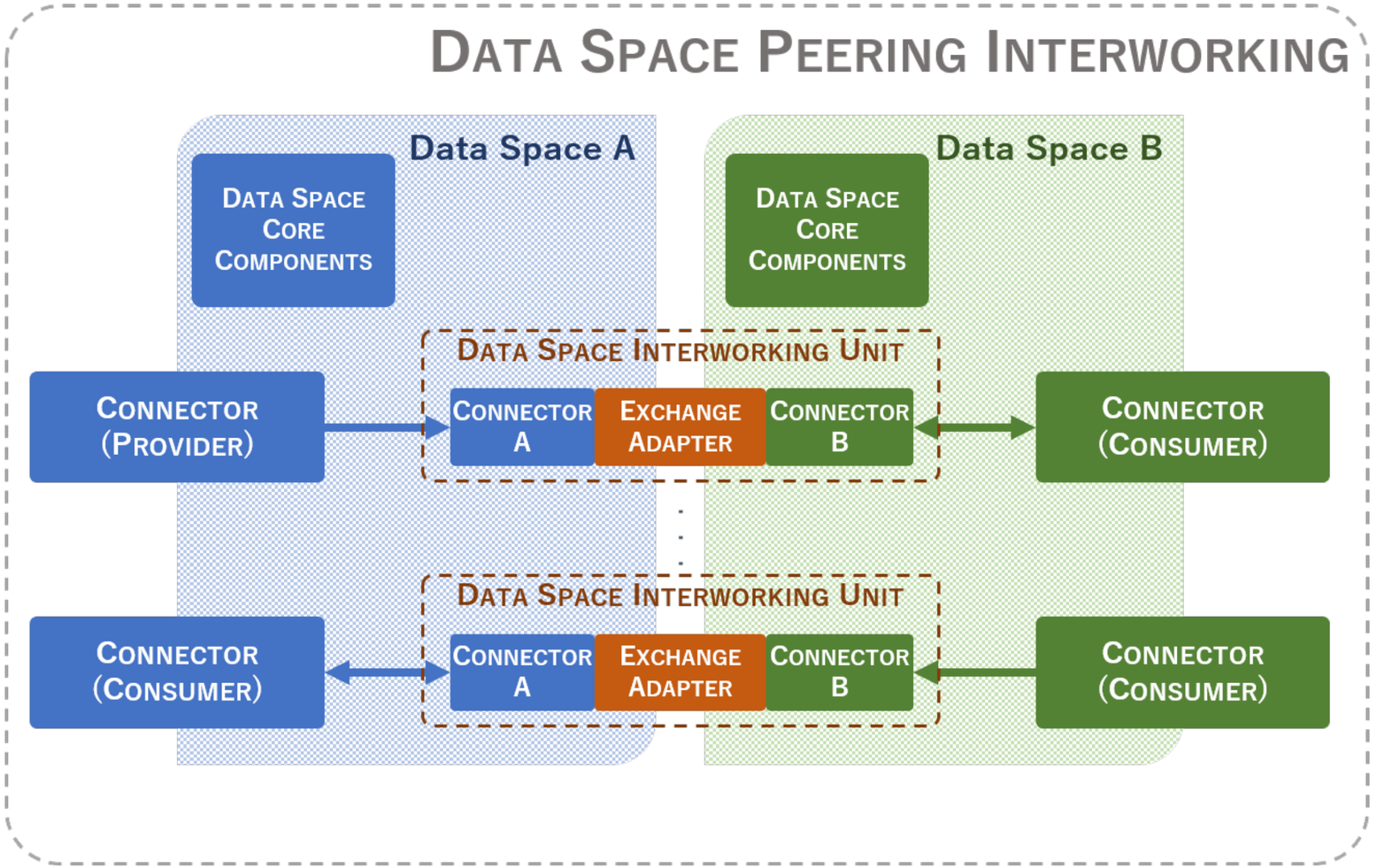
- Technology: FIWARE (NGSI-LD) + IDSA
- Trust Sources: European Trust Framework

Japan

- FIWARE (NGSIv2) + CADDE)
- Trust Sources: Japanese Trust Framework



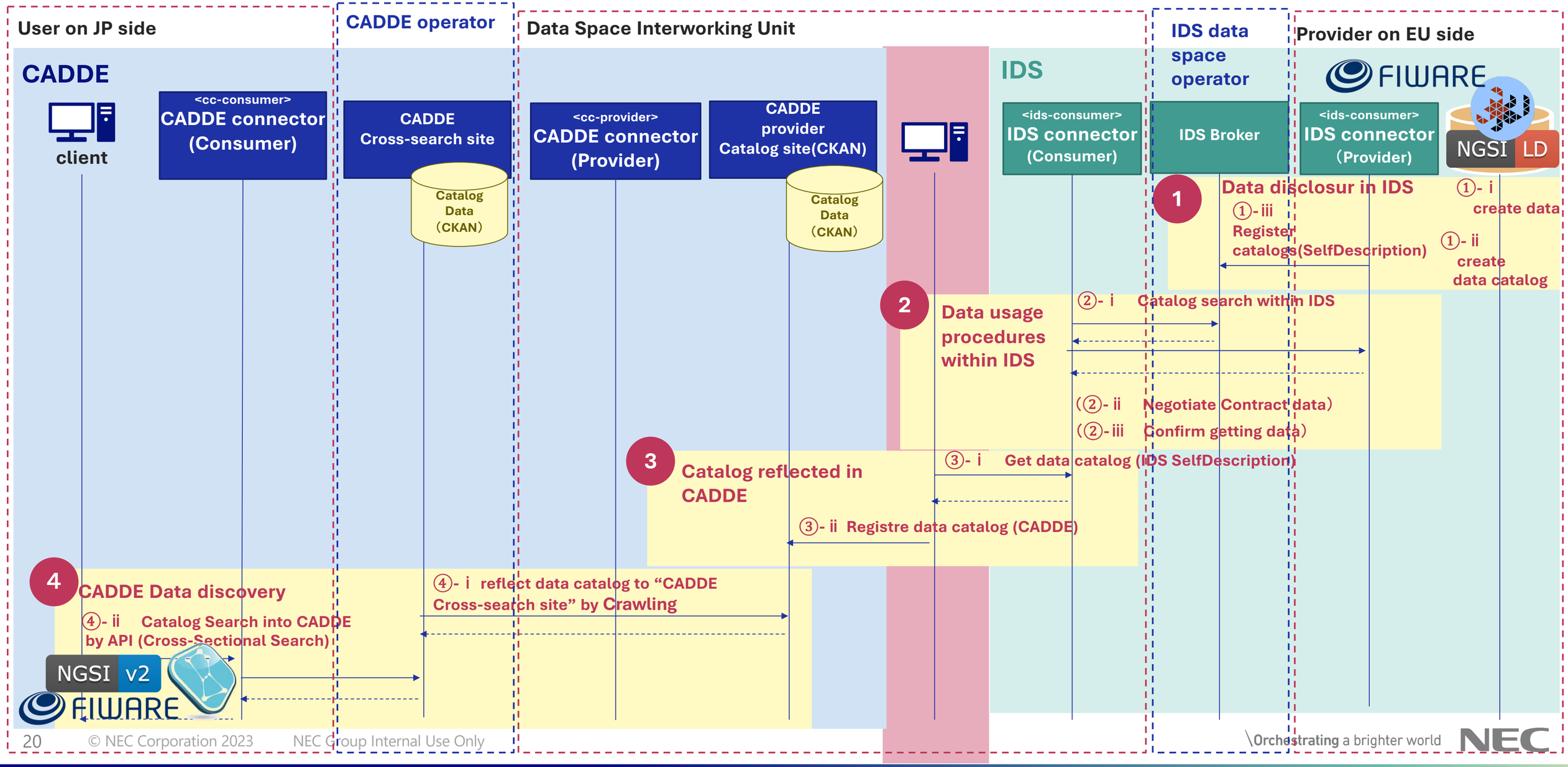
Data Space Peering



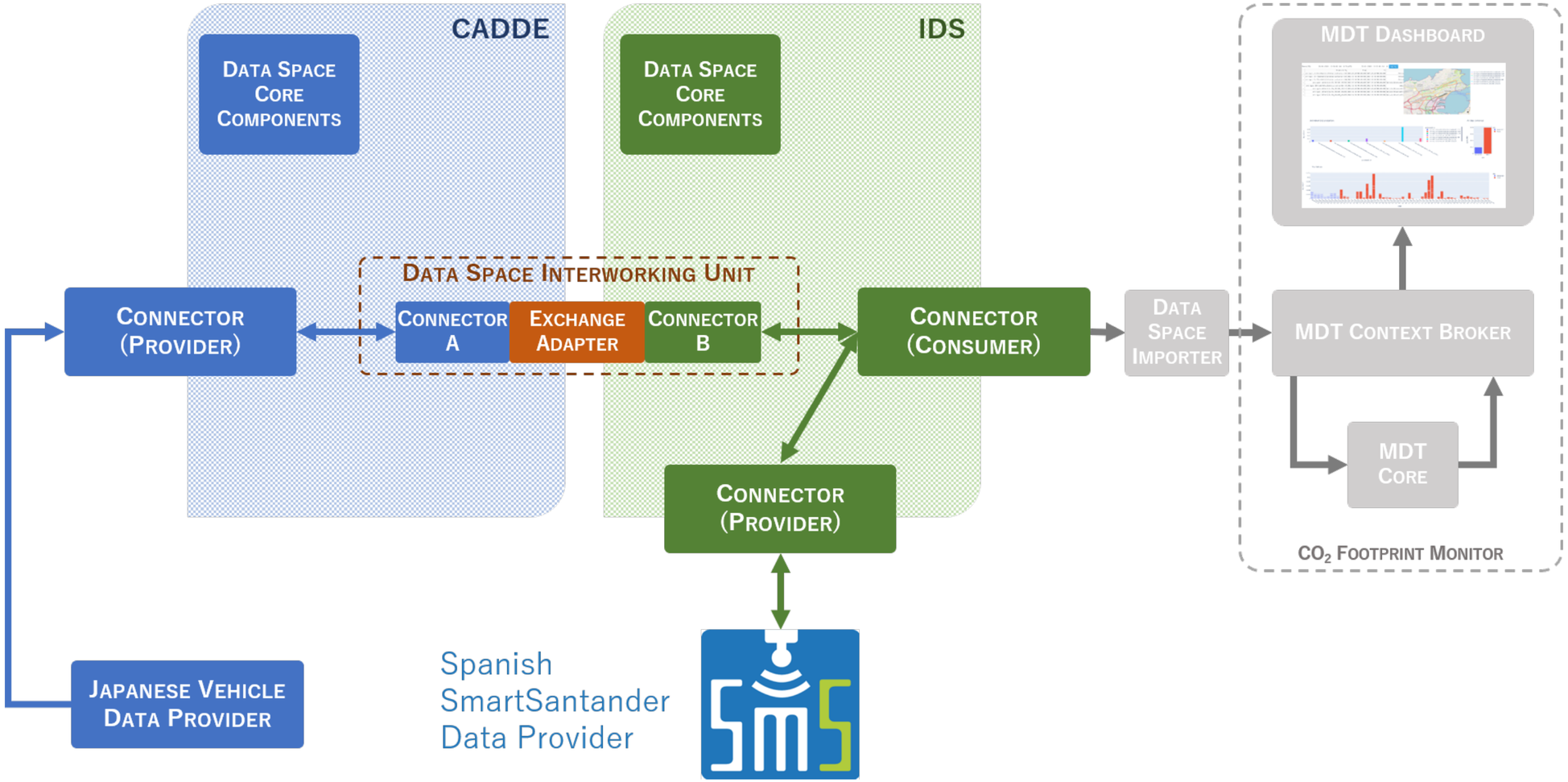
Data discovery Japan → Europe (search of IDS data by CADDE)

HTTP ver

JP→EU



Resulting System



Issues Solved during the Project

Trust

- Different Sources of Trust in both Data Spaces

Protocol Conversion

- Discovery, Data Exchange, Subscription utilize different protocols

Data Model Adaptation

- Each Data Space had a different data model

Legal Interoperability

- Usage Control Policies are defined based on consistent set of Trust Provider and System Mechanisms
- Current specifications are prohibiting data exchange outside of the own Trust Sphere

Lessons Learned and Outlook

Lessons Learned

- Technology issues like protocol conversion and data model matching can be solved on a technical level
- Trust Establishment needs further mechanisms for Federation
- **Legal Interoperability**
  - Extension to current standards and definitions are needs
  - We need modified usage control policies that cope with Data Space Interworking
  - Simplified:
    Single Data Space: (Data Space S1, Usage Control Policy A)
    Multiple Data Spaces: (Data Space [S1, S2], Usage Control Policy A' (A(S1), B(S2),)
  - Recommendation: modify data space standards to enable data space cooperation

Acknowledgement

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NextGenerationEU

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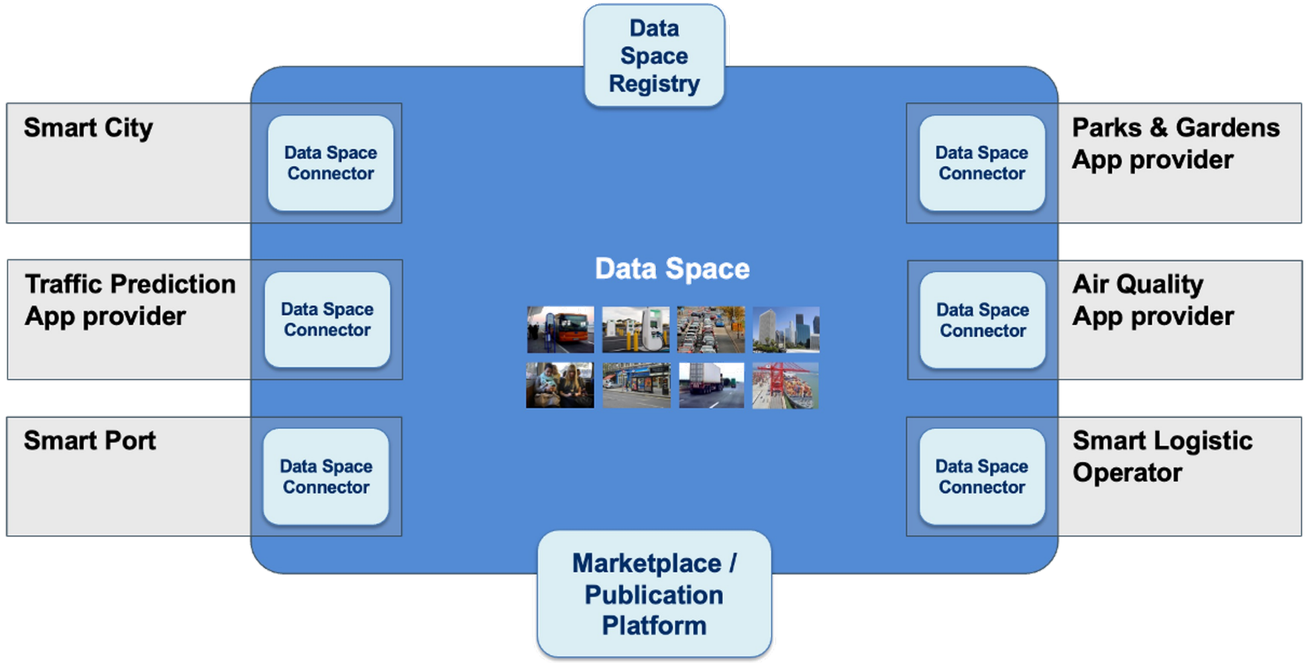
NLE: FIWARE Connector Exploration and vision for FIWARE in Data Spaces

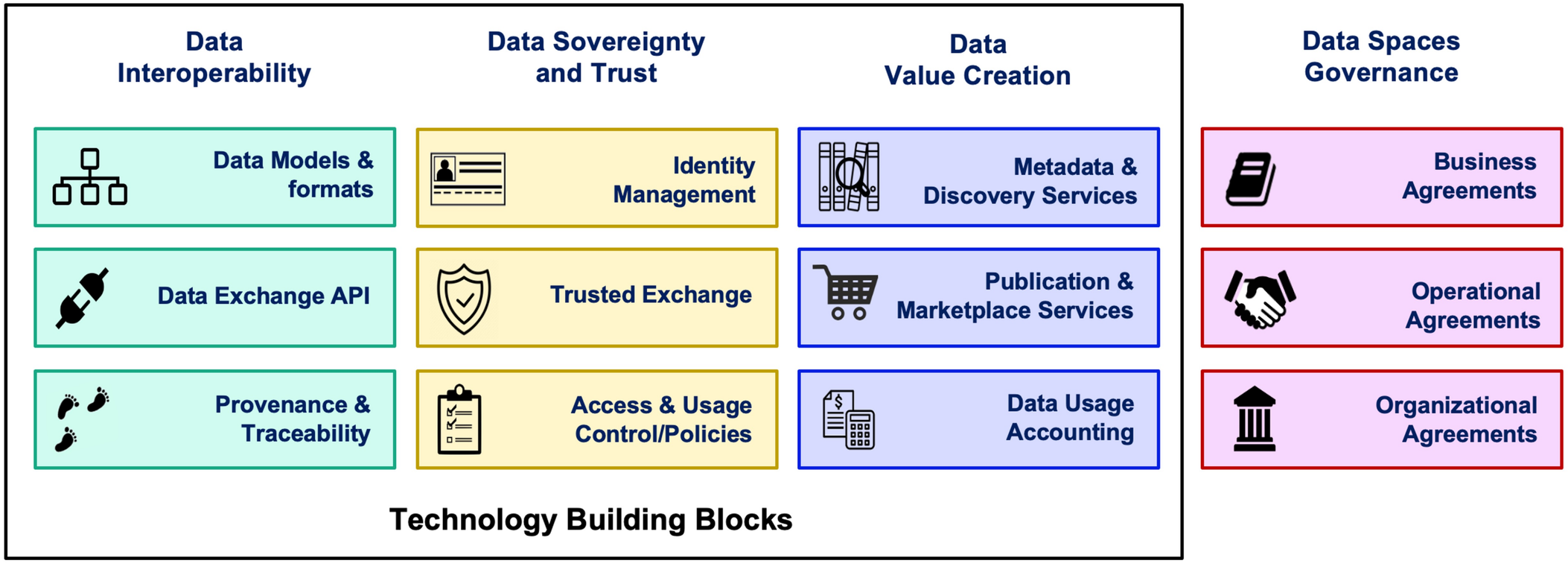
FIWARE Data Spaces Vision

- A **data space** can be defined as a **data ecosystem** built around **commonly agreed technology building blocks** for:
  - **Data Interoperability**: all participants exchange data using agreed APIs (protocols and data formats)
  - **Trust and Sovereignty on Data**: trust of parties accessing data services can be verified, digital identity can be managed in a decentralized manner (each organization managing its own users) and there is a common approach how authorization policies can be defined and enforced
  - **Data Value Creation**: Publication and Discovery of data services offerings as well as negotiation of contracts follow common standards



Source: FIWARE

Data Spaces Building Blocks



MATERIALIZING DATA SPACES REQUIRES SELECTING OPTIONS AND ADOPTING A MINIMUM BUT SUFFICIENT SET OF TECHNOLOGY STANDARDS

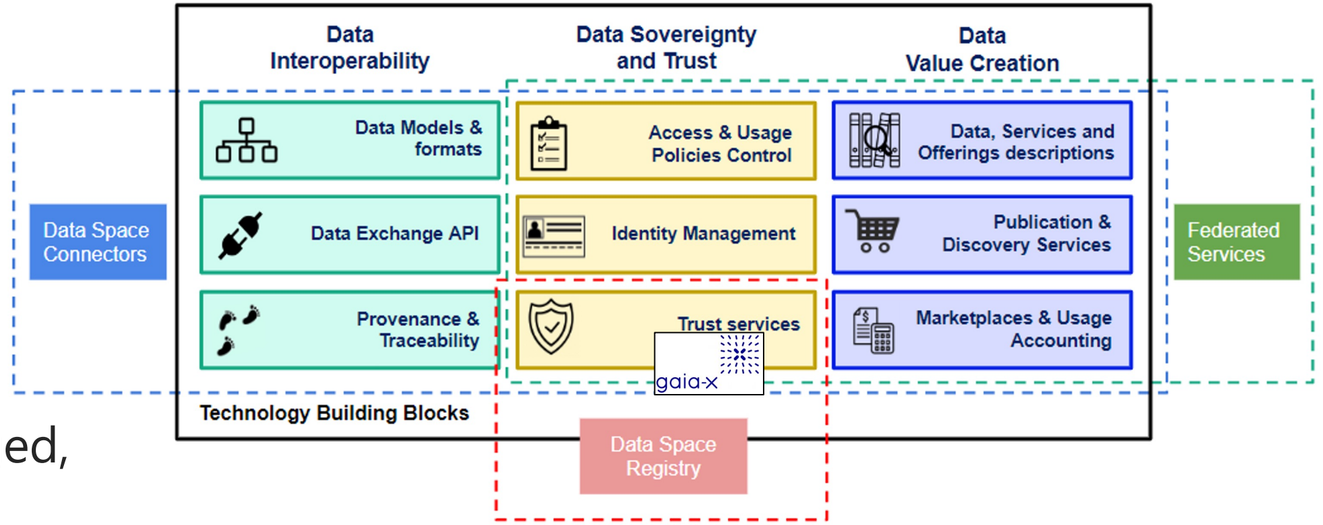
Source: FIWARE

Data Spaces Business Alliance (DSBA)

- BDVA, FIWARE, GAIA-X and IDSA created the **Data Spaces Business Alliance** (DSBA) to accelerate Business Transformation in the Data Economy
- The DSBA Technical Convergence (TC) delivers a Minimum Viable Framework (MVF) enabling the creation of data spaces
- A new edition of the DSBA TC (version 2.0) was released on April 21st, 2023 - Major highlights
  - Description of common vision and conceptual model
  - Identification of major standards per technology pillar and specifications of how they get integrated
- **FIWARE Data Space Connector – first to be DSBA-compliant**

Source: FIWARE

Technology Building Blocks



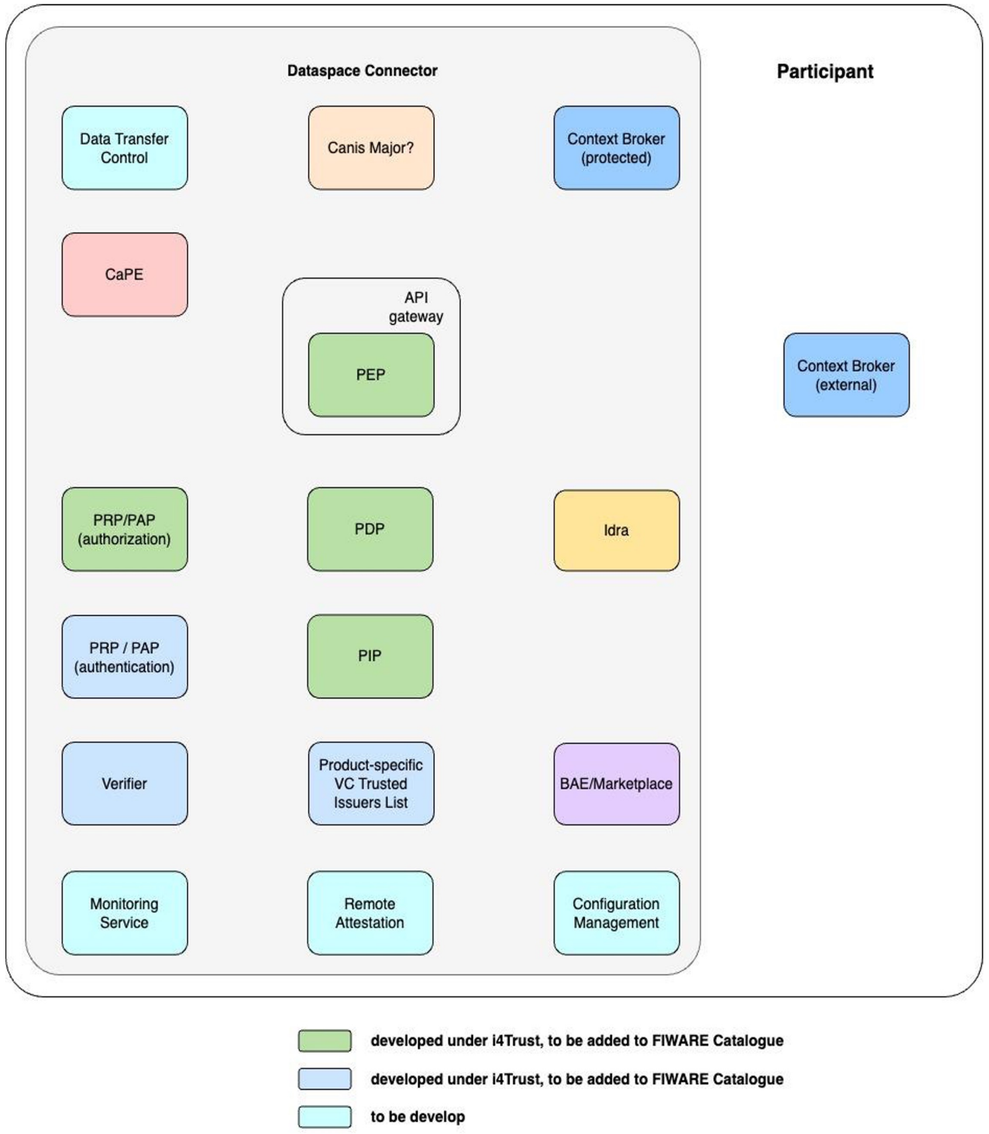
- Data Interoperability
  - NGSI-LD for **transfer of digital twin data** and Dataspace Connector Protocols for the Control of data transfer
  - Adoption of common data models is encouraged, e.g. Smart Data Models initiative
- Data Sovereignty and Trust
  - DSBA proposes a **decentralized Trust framework** *(Gaia-X),* compatible with the EU DID Wallet Architecture and EBSI
  - **Decentralized Identity Management** based on latest W3C and OIDC standards [W3C DID (Decentralized Identifiers), Verifiable Credentials (VC), Verifiable Credentials Issuance Protocols: OIDC4VCI, Self-Issued OpenID Provider: SIOPv2, Verifiable Credentials Exchange Protocols: OIDC4VP]
  - **Authorization framework following PEP-PDP-PIP and PRP/PAP architecture** for ABAC (attributes ⇔ claims in VCs), and adopting ODRL as Policy Definition Language
- Data Value Creation
  - Descriptions will be available through catalogs at connector level (supporting DCAT v3) or at data space level (Metadata Brokers or Marketplaces)
  - TM Forum APIs bring the basis for managing offerings and support contract negotiation via marketplaces

Source: FIWARE

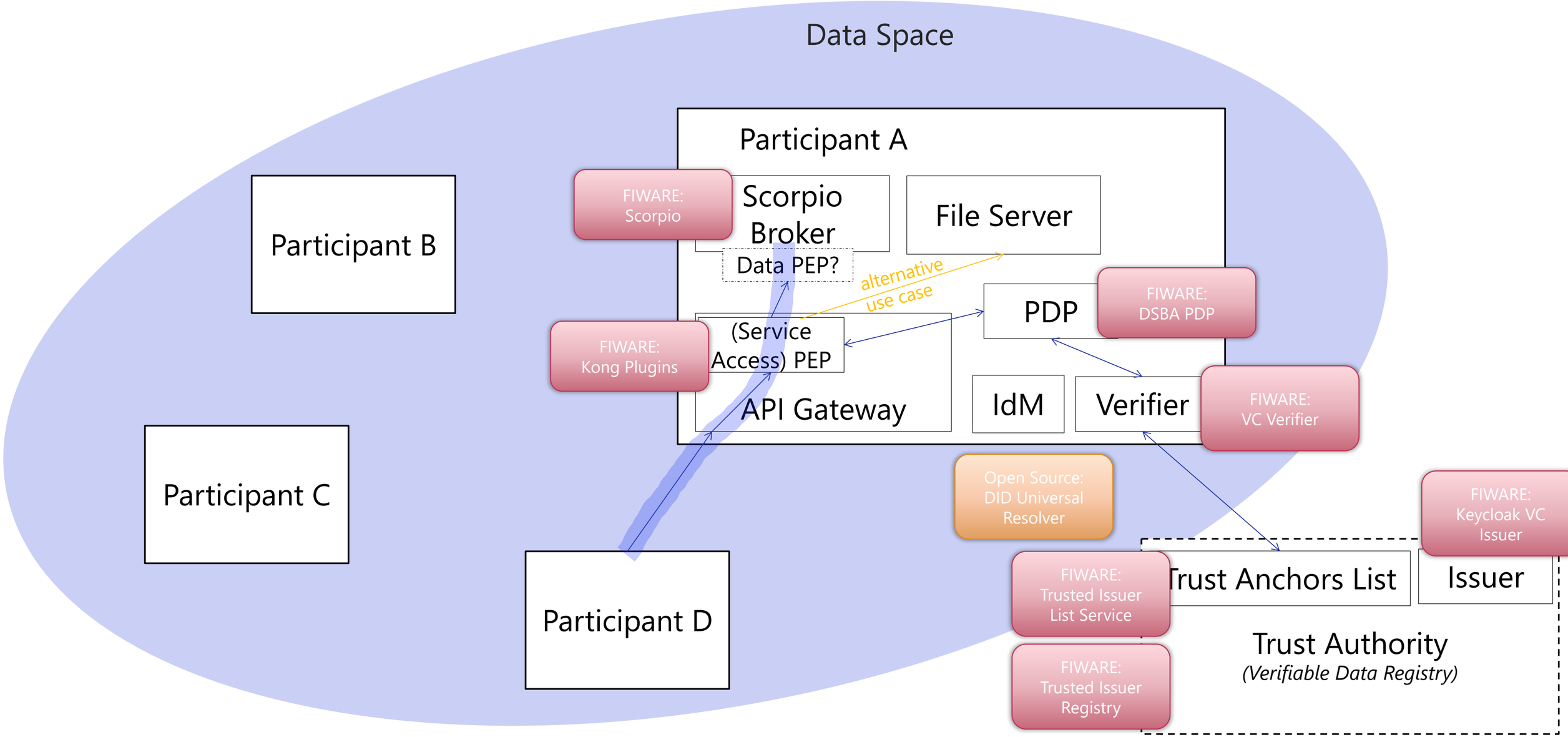
FIWARE Data Space Connector

https://github.com/FIWARE/data-space-connector

- A first release of FIWARE Data Space Connector components together with recipes for their deployment has been released on the basis of combining the following components which already align with DSBA TC recommendations:
  - Context Broker technology for Data Exchange/Transfer (NGSI-LD)
  - Trust and IAM components implementing W3C DID + VC/VP standards, SIOPv2/OIDC4VP protocols and interface to trust services based on extended EBSI APIs (DID-registry, Trusted Issuers Registry)
  - BAE modules implementing TM Forum APIs for contract negotiation
- For future releases: Personal Data Consent Management, Idra as DCAT-compliant data resources catalog, logging modules



NEC & KMD Explore FIWARE Data Space Connector



Summary

Europe’s Answer to the Dominance of Hyperscalers

- New Cloud Architecture based on Federated Data Processing

Data Spaces enable

- Trusted Data Sharing
- Providing Data to AI training

This Webinar showed how to realize

Data Spaces with current and future technology