



Symposium on Interoperability and Data Spaces

Welcome

Agenda morning session



Welcome

- Keynote to the vision of digitalisation, Alexander Markowetz
- Activities on the European SET-Plan, Stavros Stamatoukos, DG Energy
- Introduction of activities in the energy sector: CEtPartnership, HE project int:net

Data Space development and interoperability in the different sectors

- **Healthcare:** myHealth@EU
- **Agriculture:** standardisation activities
- **Energy:** Project EDDIE, Project ENERSHARE, Project OMEGA-X
- **Transportation:** Project DeployEMDS
- **Public Services:** X-Road® 8 "Spaceship"

Lunch break

Behind the scenes tour (IHE) Connectathon test floor

Interactive Session on practical views to interoperability testing



Energy

Project EDDIE

Georg Hartner



EDDIE

EUROPEAN DISTRIBUTED
DATA INFRASTRUCTURE
FOR ENERGY

PROJECT OVERVIEW

SET Plan Implementation
Working Group 4


2nd Symposium

Interoperability + Data Spaces
TCC Trieste Convention Center

June 6th 2024

AGENDA

- Data Space for a participative energy system
- EDDIE Vision
- How to engage



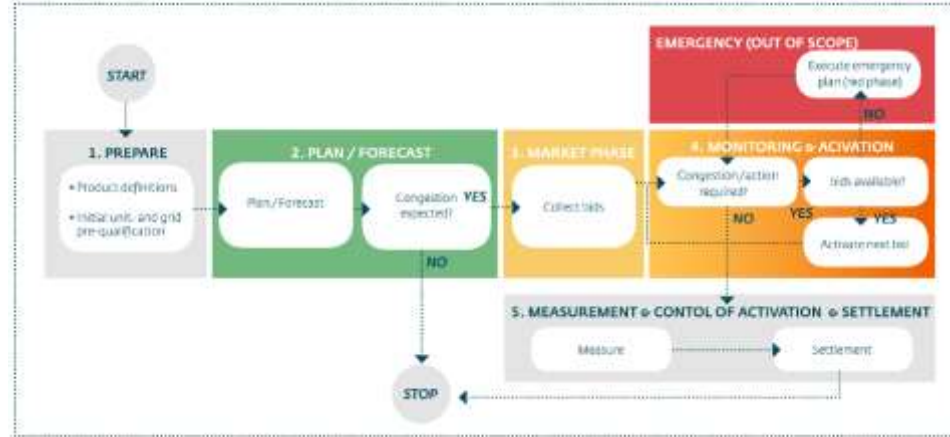
A DATA SPACE FOR A PARTICIPATIVE ENERGY SYSTEM

with a uniform and common European API for energy
data – driven solutions

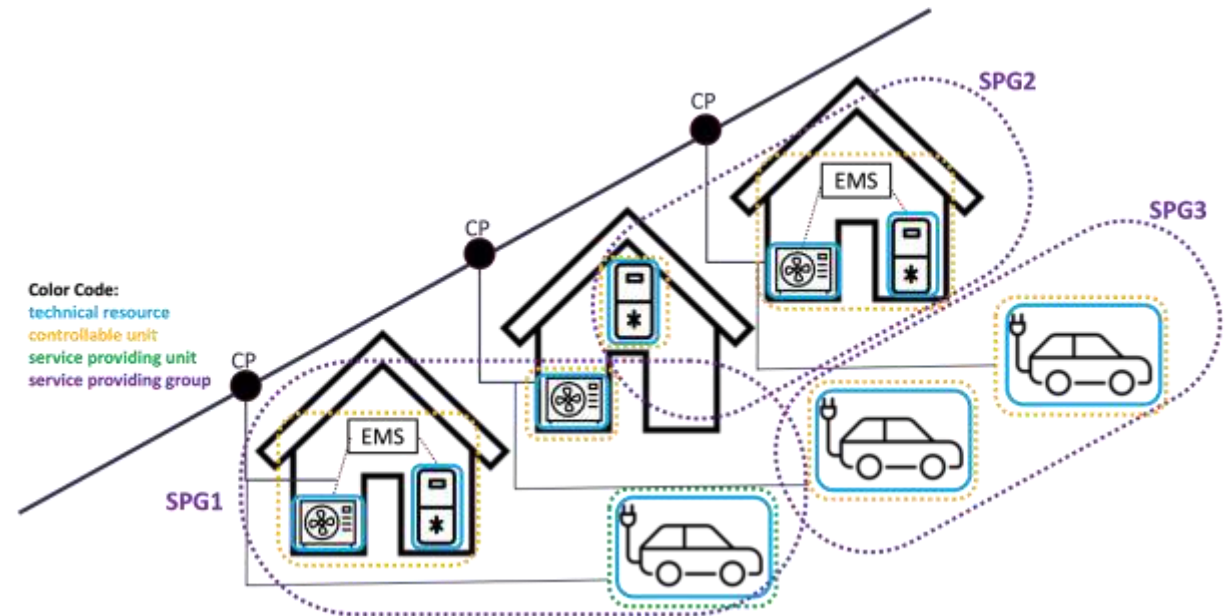


USE CASE 1

Data Exchange as implied by NC Demand Response



TSO-DSO Active System Report Recommendations



New Flexibility code drafting team exchanges

Dataspace for Explicit Prosumer Participation

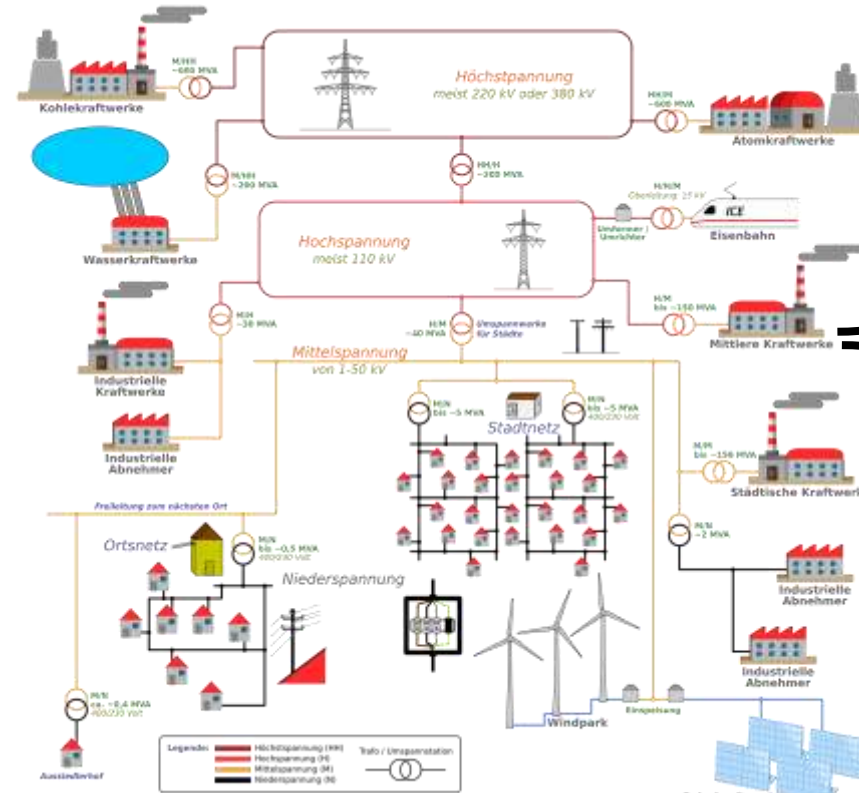
USE CASES 2

Virtual Power Plant for Renewable and C&I Demand side flexibility

(Future)

Dataspace for Explicit Prosumer Participation

- DER Master data synchronization (day ahead)
- Automatic -BRP Switching
- Real-time DER performance monitoring
- Automatic metering and consumption data acquisition for settlement
- Tracking of Guarantees of Origins across value chains
- Operate across multiple Member States through harmonized interfaces



Follow-up H2020 call objectives

Current situation

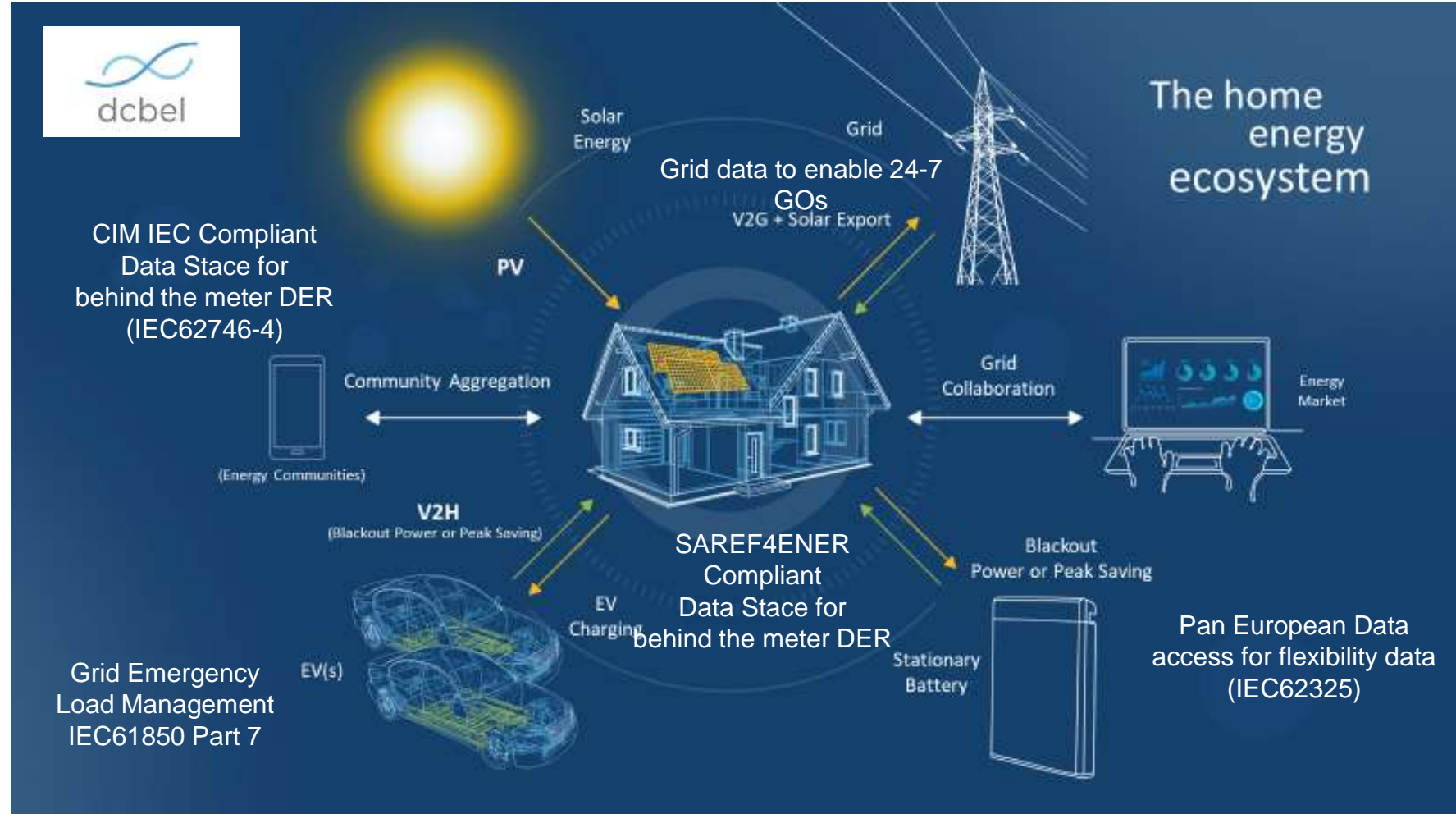
- < 1000 Assets across Europe
- Limited spread across Memberstates
- Proprietary hardware for Realtime connectivity
- Difficulty to synchronize master data and reconcile settlements

Future targets

- Access > 10.000 Assets
- Harmonize market APIs across Member States
- Open hardware APIs
- Real-time master data synchronization & Guarantees of Origins
- Real-time DER switching

USE CASE 3

Residential Energy Optimisation in future Netzero homes integrating PV self consumption, storage and V2X

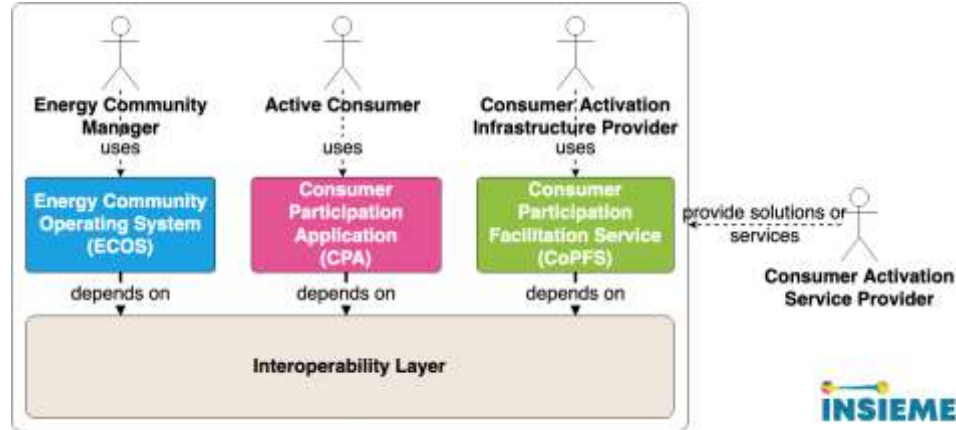


Dataspace for implicit Prosumer Participation

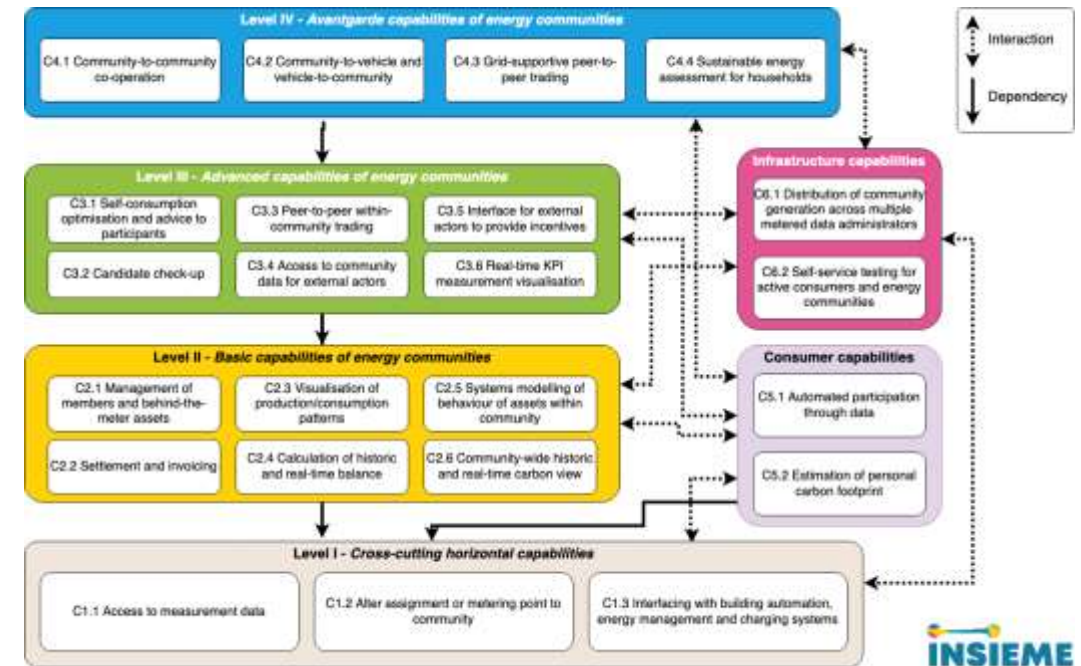
USE CASES 4

Digital multi-sided platforms for energy communities

(Future)



Follow-up H2020 call objectives



Dataspace for energy communities

USE CASES 5

Interoperable framework for energy savings

(Future)

Dataspace for building efficiency

Follow-up H2020 call objectives

Discussions with Member States
Highlight importance of low cost & incentives as success criteria
For consumer: ease of use, clear added value through the application
For providers: promotion, broad adoption of smart meters
Impact proportional to degree of adoption

ETRA landscaping study
Provision of applications and platforms to consumers by:
Retailers and DSOs
TSOs
3 rd parties with non-personalised information of retail prices
3 rd parties with personalised information of consumption and production in real time
National energy data platforms

Building on experiences in Member States and with existing applications

Today - 2023: Blueprint (1st generation) Supported by H2020-Interconnect (2M€ investment)
Data: public data, anonymised data from smart meters, data voluntarily provided by the user through the application
Target: Different groups of users by region, Electric vehicle owners, households, solar panel owners, ...
Recommendations: Avoid consumption, Eco tips, energy bill reduction, incentivise load shifting
Intervention: Manual by the user
Implementation: Reference frameworks for interoperability framework with DSO and TSO interfaces, reference back-end and front-end for the application
Piloting: in 10 Member States supported through open calls for funding for SMEs, service providers, ...

2024 +: Blueprint (2nd generation) Planned to be supported by DIGITAL (5M€ investment)
Data: Real-time consumption data from meters, contracts,...
Target: Extended functionality with customised features
Recommendations: Personalised per application user
Intervention: Automated by intermediary/service provider



Smart Grids Task Force - Expert Group 3 -
Level of service according to functionalities of applications:
Level 1: General guidance/tips on energy efficiency
Level 2: + Critical state alerts and warnings, but still with general information
Level 3: + Information on available incentives and related support
Level 4: + Simplified incentives and rewards for active engagement
Level 5: + Customised advice, supported by steered action and incentives

European Energy Savings Reference Framework





<https://digital-strategy.ec.europa.eu/en/news/first-generation-blueprint-common-european-reference-framework-energy-saving-applications>

USE CASES 6

24-7 Carbon-free Energy Matching and Granular Carbon Accounting

Data Collection

FlexiDAO can automate the collection of granular "Scope 2" data on its clients' behalf from different sources, or allow for manual upload.

-  ENERGY CONSUMPTION (hourly/monthly)
-  ENERGY PRODUCTION (hourly/monthly)
-  CO2 EMISSIONS (hourly/monthly)
-  ENERGY ATTRIBUTE CERTIFICATE (EACs) (annual/hourly)

INPUT-API

UPLOADER

Data Aggregation

Data is ingested, cleaned and processed into relevant insights for decision making and reporting

 FLEXIDAO
Data engine

Data Analysis

Customers can use Flexidao's SaaS dashboards to analyse information or can export the data to their software platforms to enable other use cases

DASHBOARDS (SAAS)

DATA EXPORT

OUTPUT-API

DOWNLOADER

CUSTOMER'S SOFTWARE ENVIRONMENT (automated)

CSV/XLSX (manual data exports)



- Granular Scope 2 Carbon Accounting.
- Renewable energy procurement decisions.
- Renewable energy contracts, certificates and emissions in one place.
- Understand your 24/7 Carbon free performance and KPIs.

Dataspace for Granular Carbon Accounting

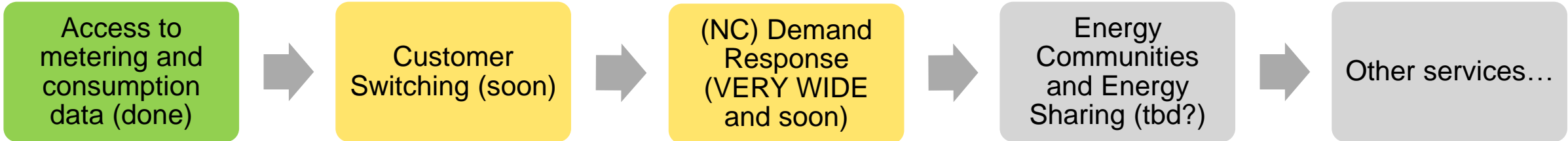
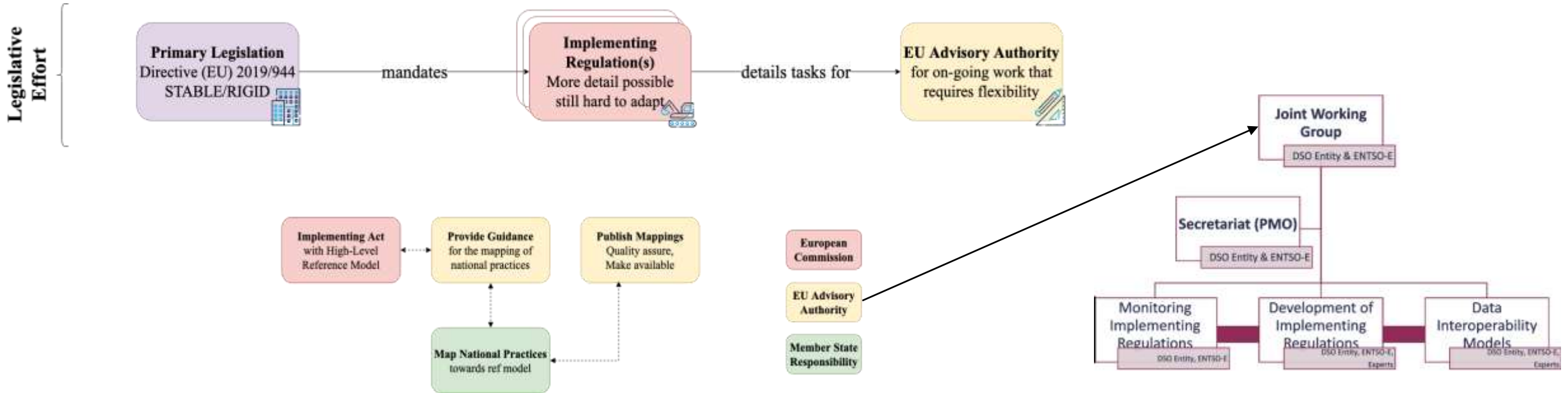


EDDIE VISION

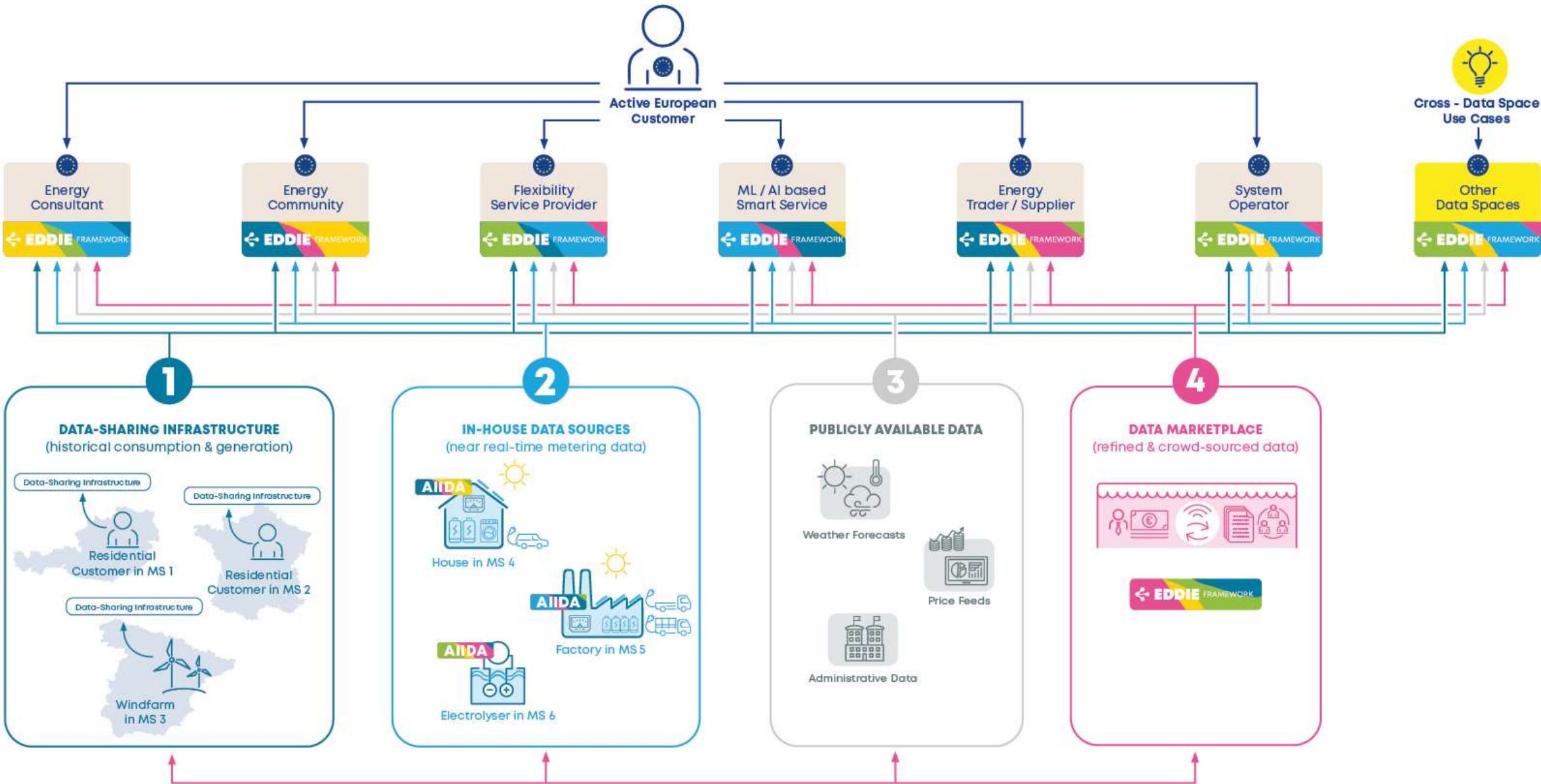
Technical Implementations of European Reference
Models



Basis: Recommendations coined in 2019 EU SGTF Report *Towards Interoperability within the EU for Electricity and Gas Data Formats and Procedures* (to tackle Articles 19, 20, 23, 24 et al. of Dir (EU) 2019/944)

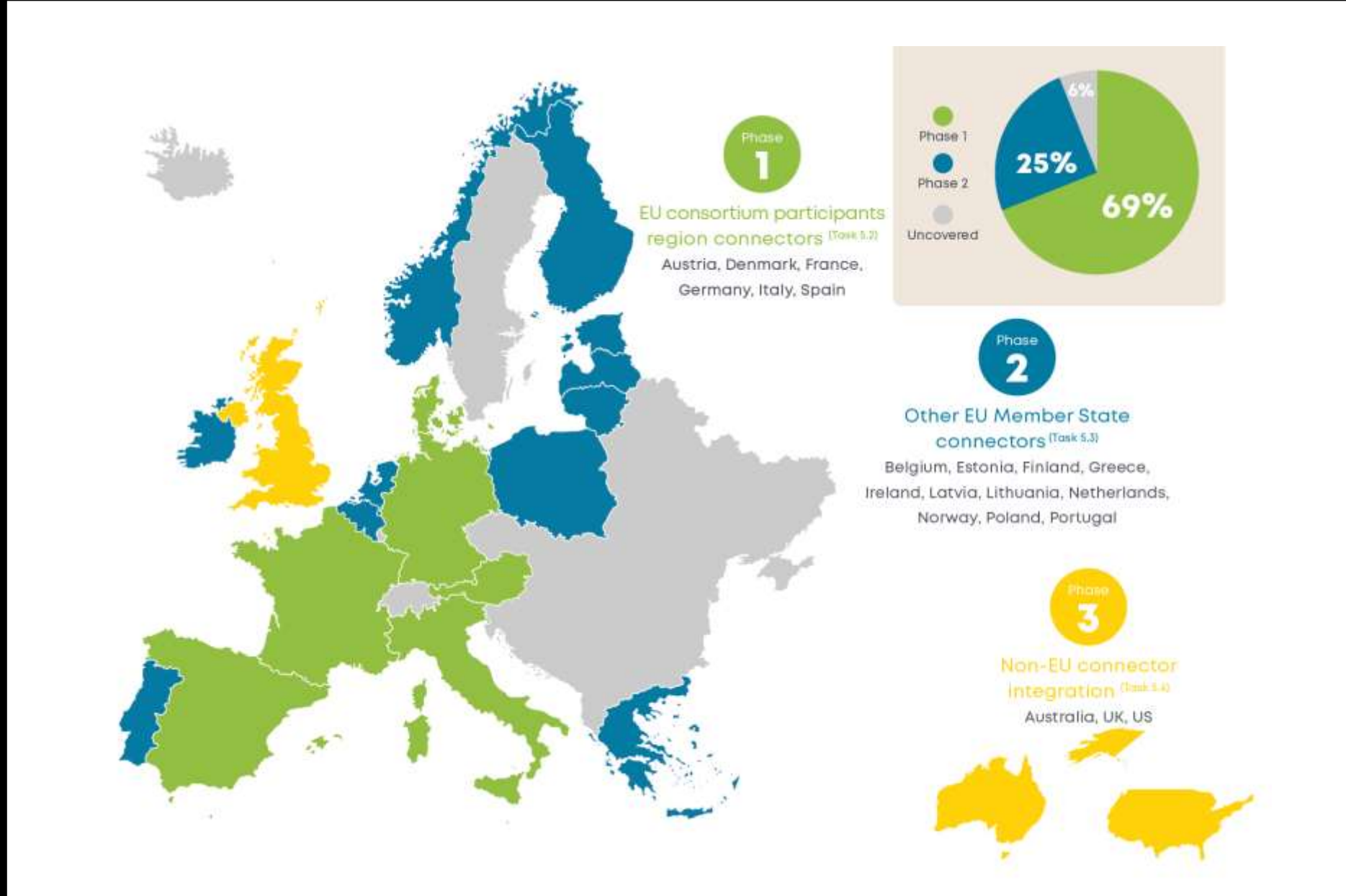


CORE VISION

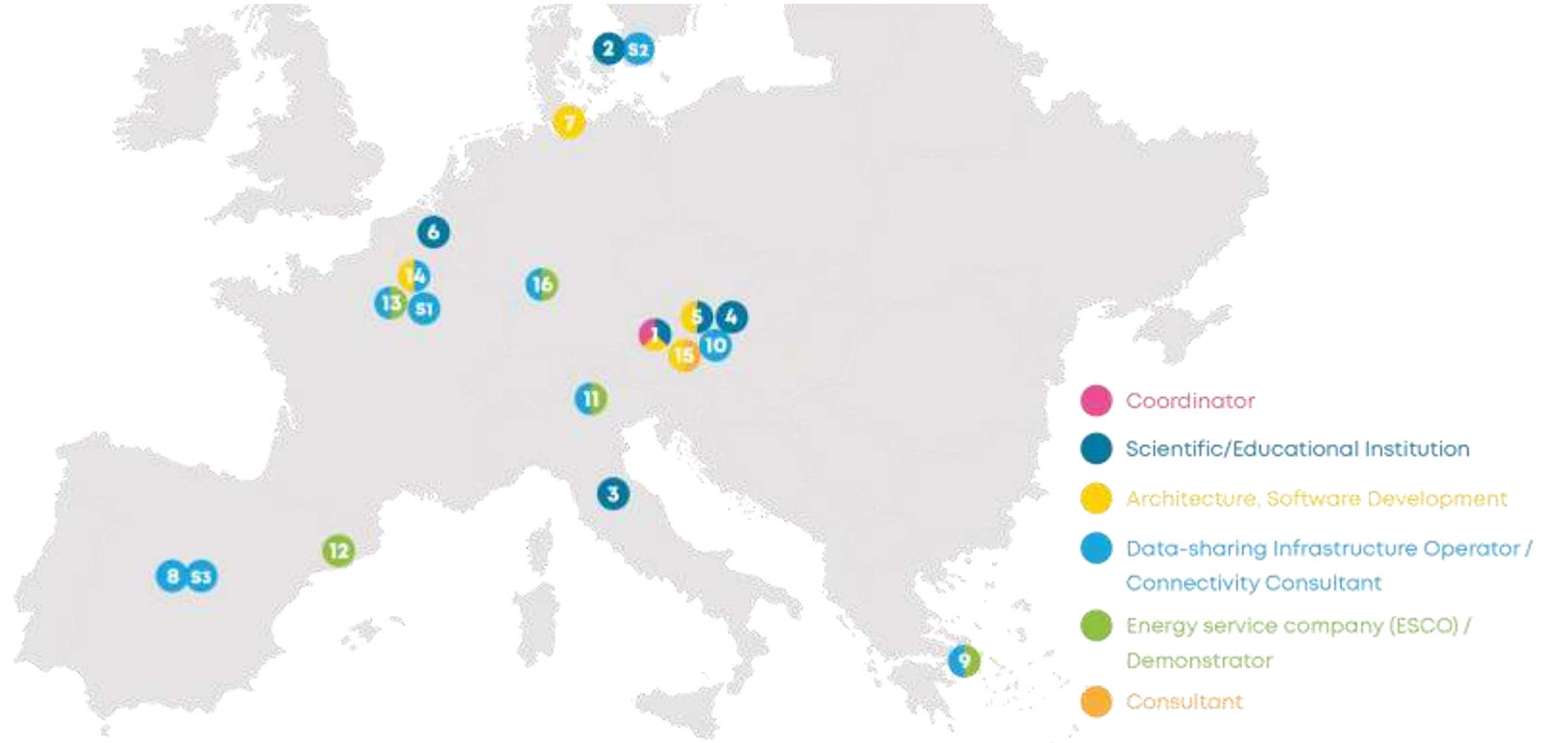


REGIONAL COVERAGE

EDDIE
Interoperability
approach is
applicable
throughout EU
MSs and beyond

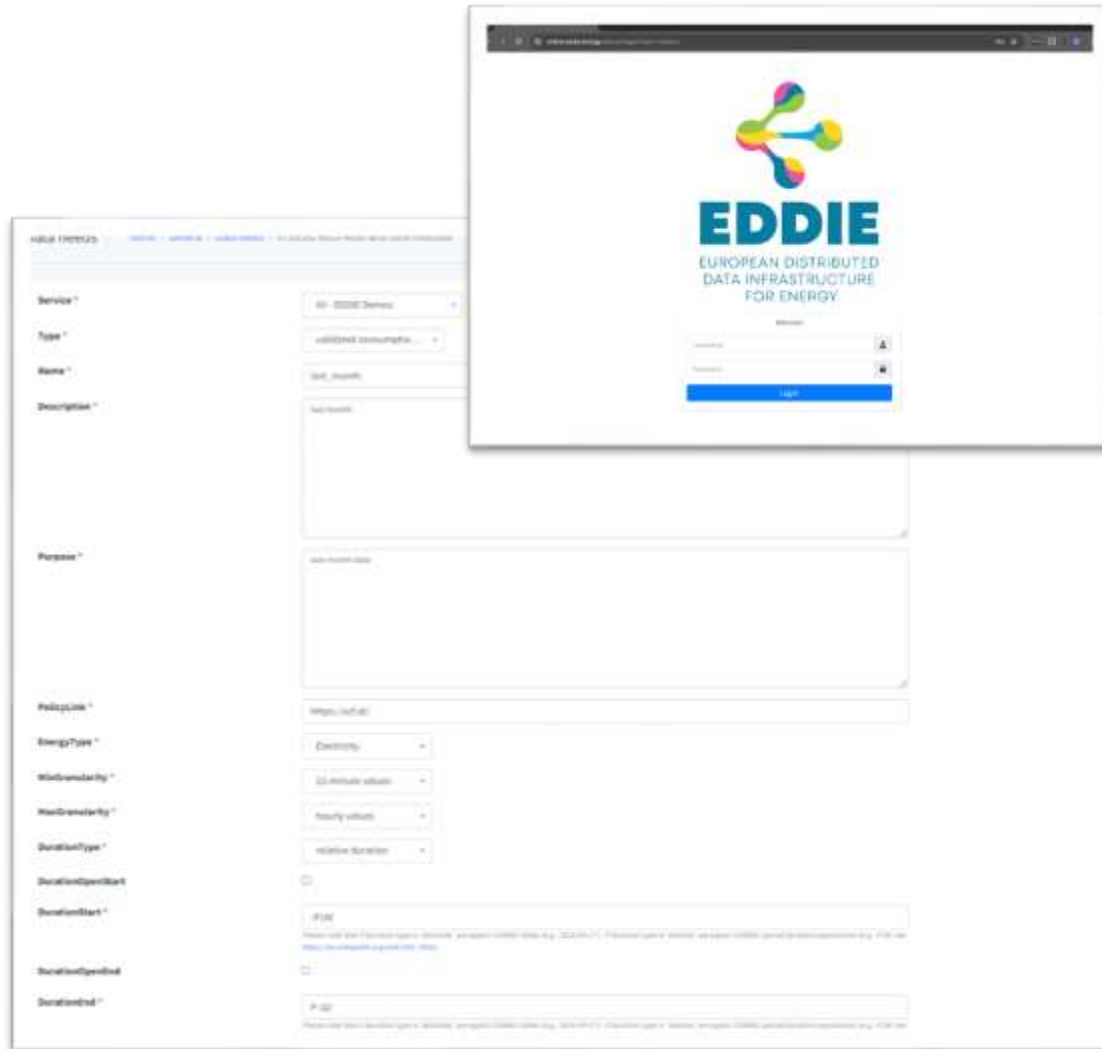


TEAM EDDIE



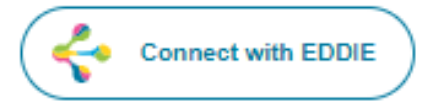
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| <ul style="list-style-type: none"> 1 University of Applied Sciences Upper Austria – Campus Hagenberg – Research and Development, Hagenberg 2 Copenhagen School of Energy Infrastructure, Department of Economics, Copenhagen Business School, Copenhagen 3 European University Institute, Florence 4 University of Vienna, Faculty of Computer Science, Cooperative Systems Research Group, Vienna 5 Austrian Institute of Technology, Center for Digital Safety & Security, Competence Unit Cooperative Digital Technologies, Vienna 6 The Lisbon Council for Economic Competitiveness and Social Renewal asbl, Brussels 7 PONTON GmbH, Hamburg 8 Asociación de Empresas de Energía Eléctrica (aelec), Madrid 9 DEDA – Public Gas Distribution Networks – Single Member S.A., Athens | <ul style="list-style-type: none"> 10 EDA Energiewirtschaftlicher Datenaustausch GmbH, Vienna 11 Südtiroler Energieverband, Bozen 12 FlexiDAO, Barcelona 13 Digital4Grids, Paris 14 EASEE Gas, Paris 15 Entarc.eu, Waidhofen/Ybbs 16 ETA+ GmbH, Stuttgart <p>Support:</p> <ul style="list-style-type: none"> S1 Enedis, Paris S2 Energinet, Copenhagen S3 Plataforma Datadis C.B., Madrid |
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Admin Backend (Online)



Service Provider Website or App

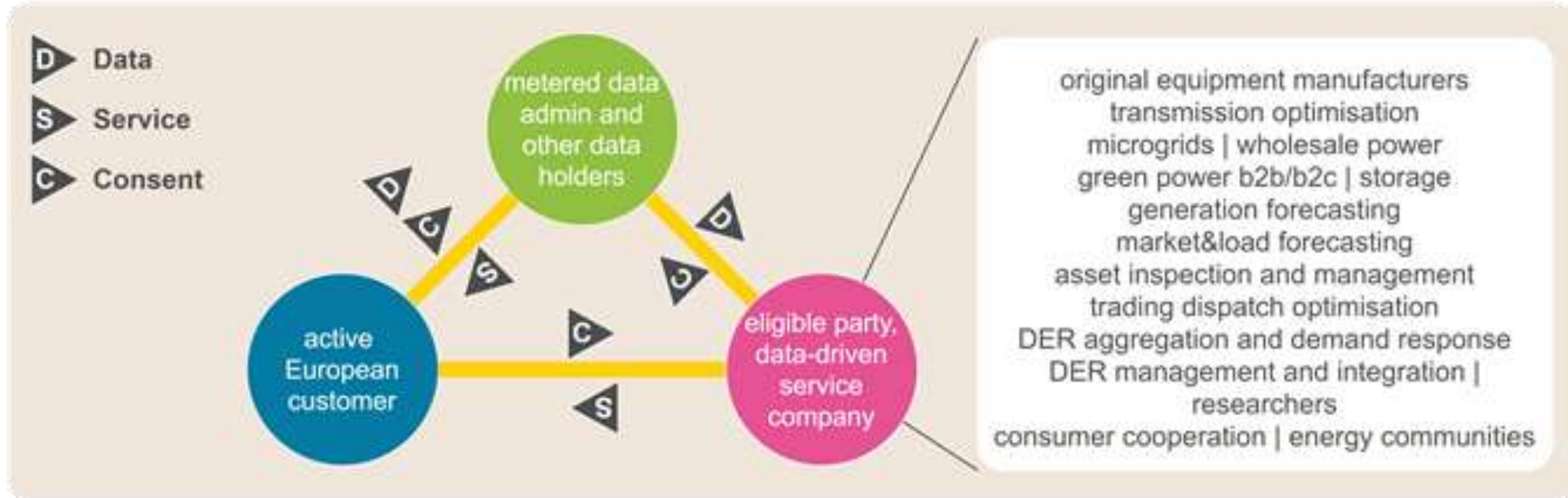
EDDIE Connect - button:



Opens Popup tailored to Data Need:



Backend Integration via Kafka or REST API





HOW TO ENGAGE

Stakeholder Engagement and Next Steps

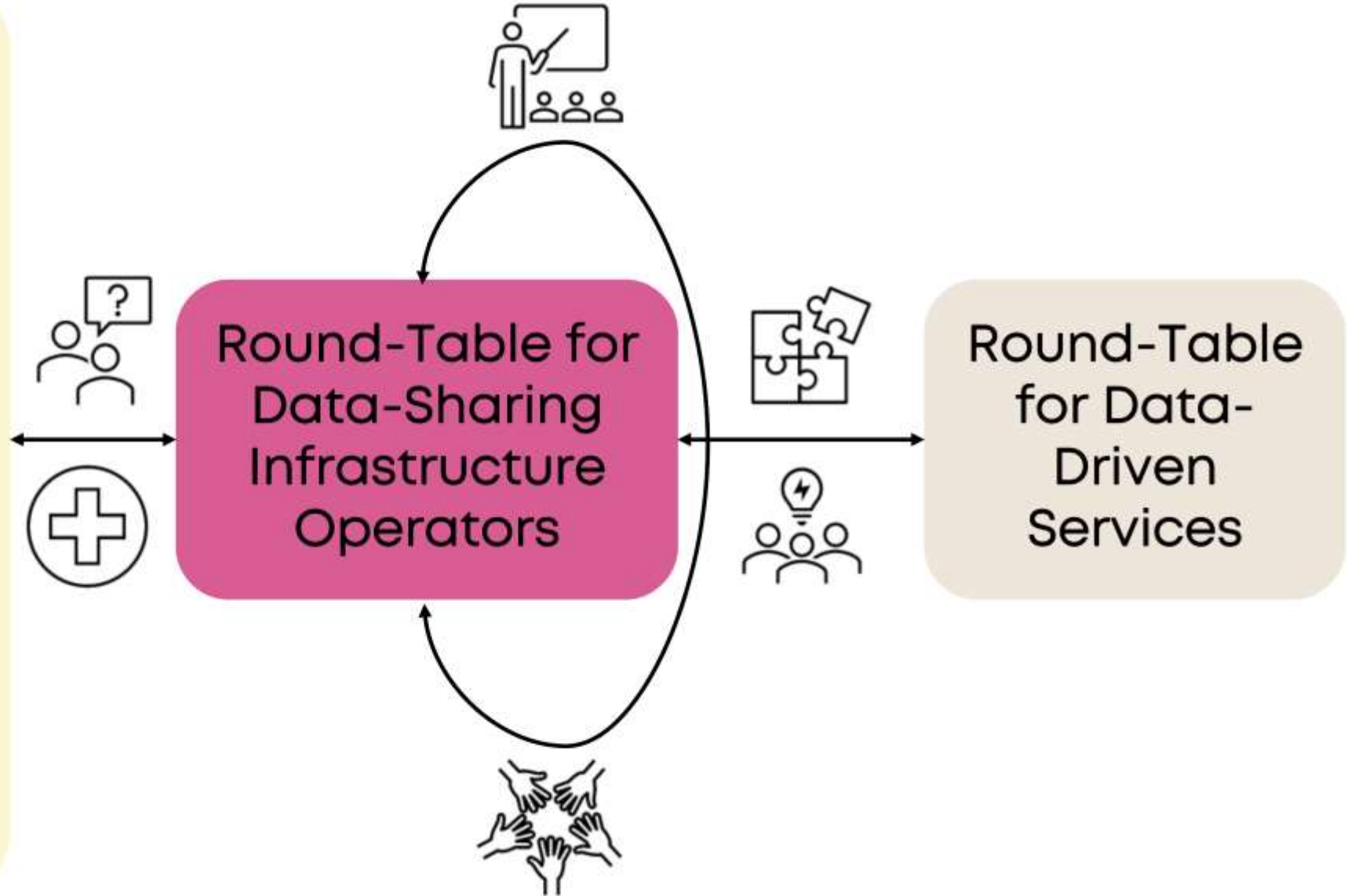


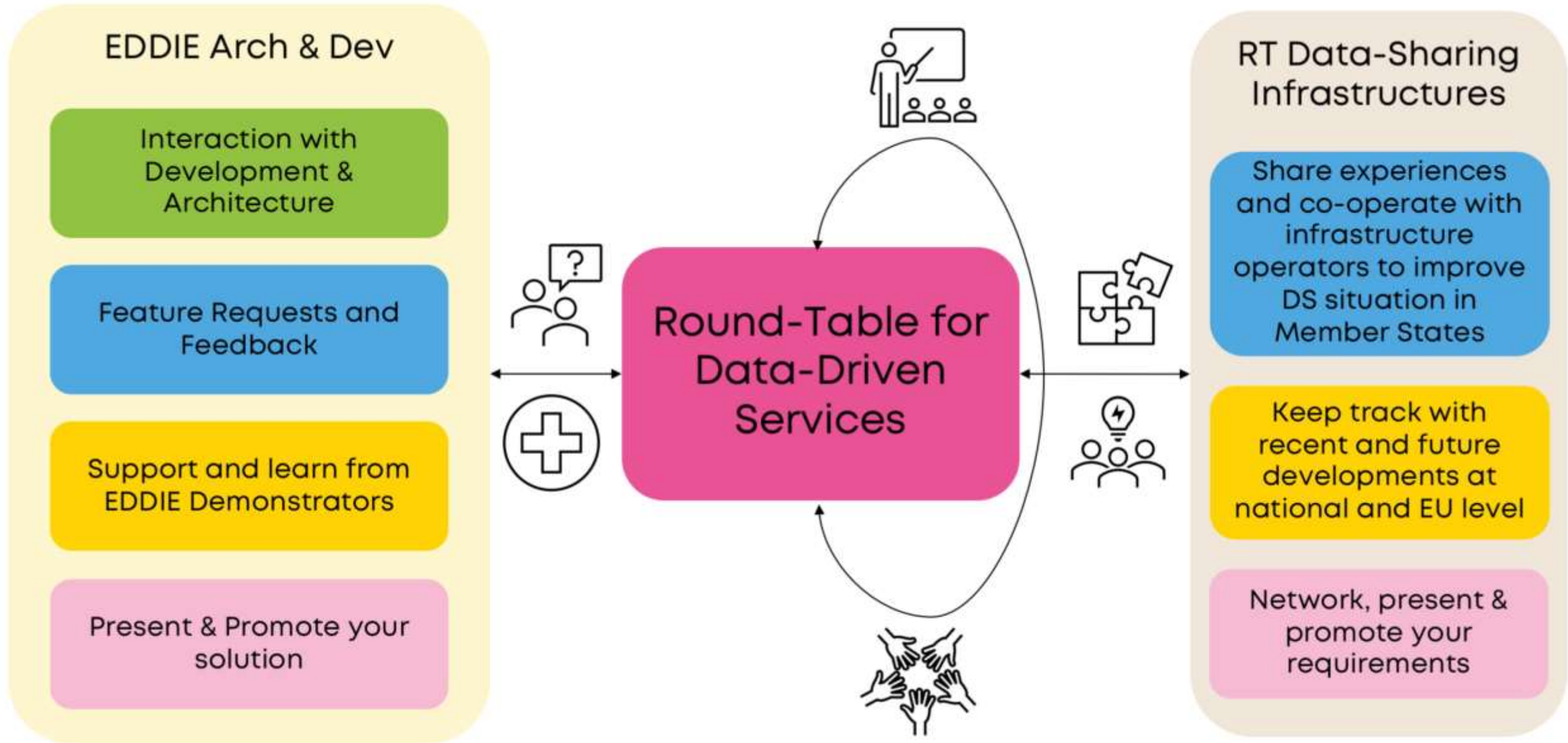
Developers

Phase I
AT,DE,ES,FR,IT

Phase II
BE,EE,FI,IE,GR,LI,L
V,NL,NO,PL,SE

Phase III
AU,UK,US, et al.





NEXT PLANNED ACTIONS

- Many deliverables and reports upcoming in June
- For a meetup at EUSEW contact georg.hartner@eddie.energy
- End user tests June/July 2024 - for test account write to georg.hartner@eddie.energy
- InnoNet Project (AT)
- Data Space as a Service (operational Sept)
- ECLIPSE Project (starting Sept `24)
- INSIEME CEEDS Project (if accepted April `24)

- Consulting activities organised by entarc.eu (office@entarc.eu)



THANK YOU

<https://eddie.energy>
office@eddie.energy





Energy

Project Enershare

Massimo Bertoncini

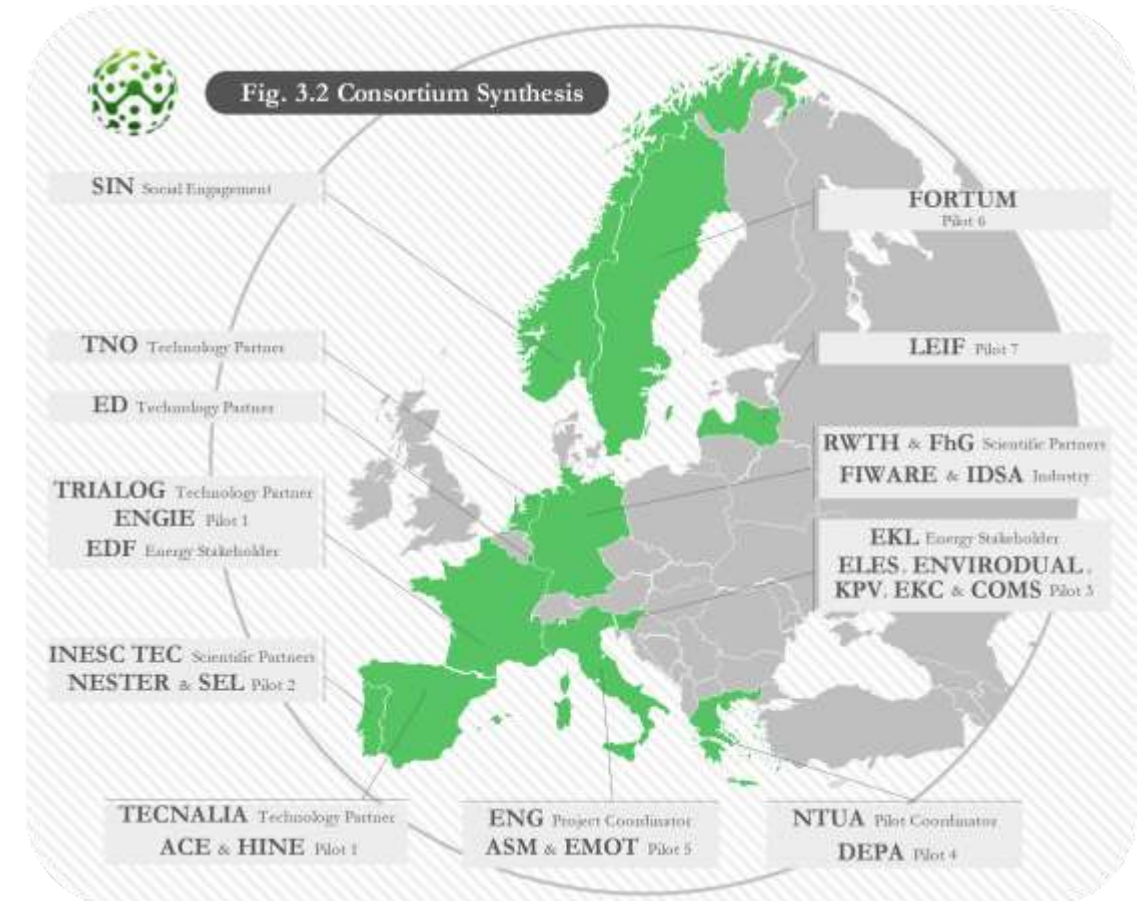


The Energy DataSpace as a techno-economic digital ecosystem to manage the energy transition

Massimo Bertoncini
Project Coordinator
Engineering Ingegneria Informatica
Trieste, 6th June 2024

Project Identity Card

- ENERSHARE- European Common Energy Data Space framework enabling data sharing-driven across- and beyond- energy services
- **Project Goal** - To develop and demonstrate a European Common Energy Data Space which will deploy an 'intra-energy' and 'cross-sector' interoperable trusted Energy Data Ecosystem
- Starting Date: 1st July 2022 – Duration: 36 months
- Total Costs: 9.537.658,75 Euro,
EU contribution: 7.999.712,00 Euro (Innovation Action)
- Partners: **28 + 2 Affiliated Entities** (Linked Third Parties)
- Country Coverage: 11 Countries
 - Italy, Slovenia, France, Greece, Spain, Latvia, Portugal, Norway, Finland, The Netherlands and Luxembourg



Technical reqs & challenges for Energy DataSpace

- Different **heterogeneous architectures for digitization layer along smart energy grids and systems**
 - ranging from fully **centralized** to **partially decentralized ones** (at least over certain dimensions, such as data storage);
 - Mostly **limited in scope**, offering a **limited range of services** tailored to provide:
 - neutral yet transparent consumer access to metering data, facilitating supplier switching or market trading platforms for flexibility coordination and management;
 - Insufficient focus and lack of **use cases and services spanning over a cross-value chain dimension**
- **Insufficient Interoperability at the interplay among Energy and Data Value Chains**
 - Lack of **standardized and/or harmonized interfaces** on some stakeholder interactions (es. on the aggregator vs prosumer (EFI, SAREF, MODBUS, OpenADR) due to large variety of devices and data models;
 - Lack of **interoperability and insufficient harmonization among role models** (es SGAM, USEF, HERM)
 - **Energy & Data Value chains are captured in separated and isolated manner**
- Maturity of near-real time data-driven platforms and services to support **energy systems management not at scale yet**



Policy & Business reqs & challenges for Energy DataSpace

- New actors in the energy ecosystem
 - Energy Communities, consumers center stage
- **Need for appropriate governance models and underlying compensation legal/business framework for a combined regulated & market-oriented sector**
 - Lack of **cross-stakeholders** and **cross-domain sharing economy based business models**
 - **Value propagation** from sharing energy data is not appropriately shared along energy value chain
- Strong requirements for high level **cyber and physical security of energy infrastructure**
- Reluctance of **energy consumers in sharing data for privacy** concerns
- **Which governance model to adopt for the CEEDS management is still unclear**

Why ENERSHARE DataSpace?

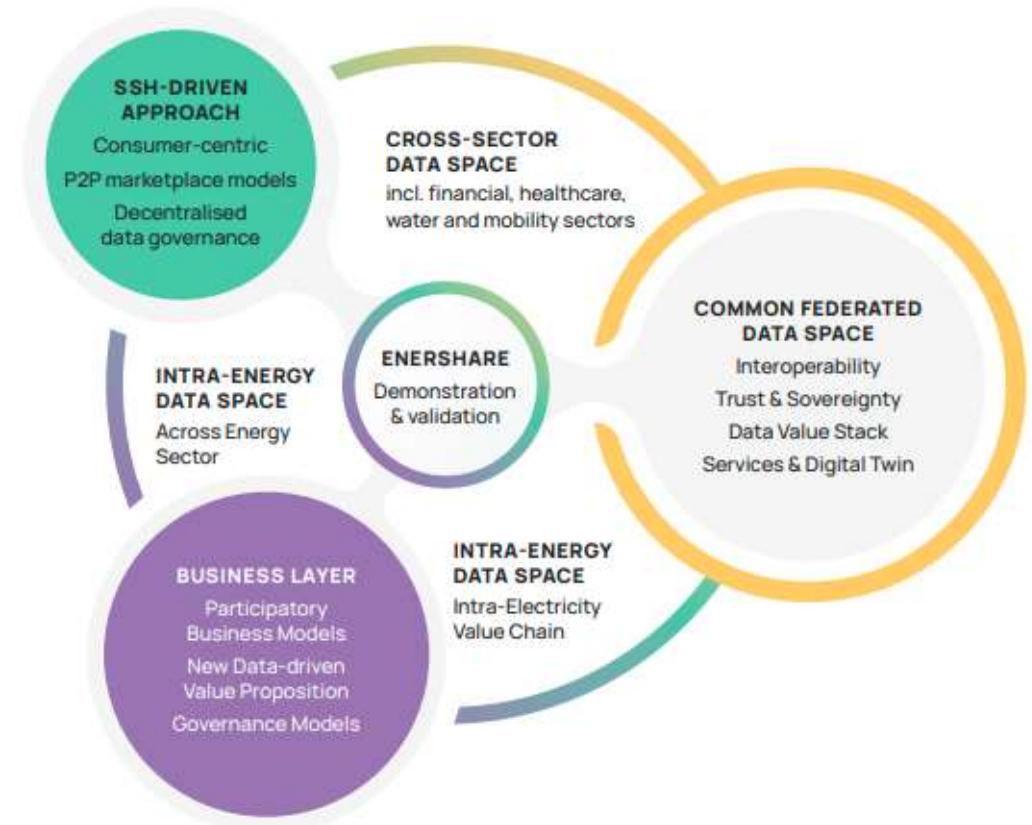
- **Energy Data Spaces**

- may contribute to **increased system-level cross-value chain energy and resource-efficient consumer-centric energy systems**, and **better yet greener quality of life**
- facilitate **new energy-centered cross-value chain data-driven services**, which may:
 - increase the **customers portfolio of energy operators**
 - Es.: energy fingerprinting-based services (es comfort, wellness. Mobility, personal safety)
 - **opening up to new non energy stakeholders** (e-mobility, care service providers, security providers, building/facility operators, real estates,...) to offer **bundles of services**, which include as well energy services (es. paying KWh as Kms...)
 - **Speeding up and operationalize the transition towards a decentralized renewable-based energy system** for improved **EU-level security of supply** (see Ukranian-Russia war ...)
 - Involve **energy consumers** in a **virtuous ecosystem/mechanisms of reciprocal energy and beyond energy added value services** while bringing energy future in their hands



Vision

- to enable the **European Common Energy Data Space** which will deploy an 'intra-energy' and 'cross-sector' interoperable and trusted **Energy Data Ecosystem** where...
- ...private consumers, business (energy and non-energy) stakeholders and regulated operators will be able to **access, share and reuse**, based upon voluntary agreements (or legal obligations where such obligations are in force):
 - Large sources of currently fragmented and dispersed data;
 - Data-driven cross-value chain (energy and non-energy) services and Digital Twins for various purposes.



Project Scope & Key aspects – 1 of 2

- *To develop, deploy and validate a first-of-its-kind **Reference Implementation (RI)** for **Common European Energy Data Space (CEEDS)**, which includes a number of Technological and standardizable Building Blocks*
- *Leveraging on and aligning with a number of leading edge **initiatives** (IDSA, GAIA-X, FIWARE, DSSC) and **projects** (CEEDS HE projects via IntNet project, INTERCONNECT, BD4NRG, OneNet, TwinEU, among the others)*
- ***Use cases- based extended “across-energy” and “cross-sector” interoperability**, while aligning with SGAM and IEC families of standards, as well as on SAREF and other IoT ontologies*
- ***Trust Building Blocks** which include use-cases/pilot-based adaptation and validation of existing **Usage Access Control Tech** components*



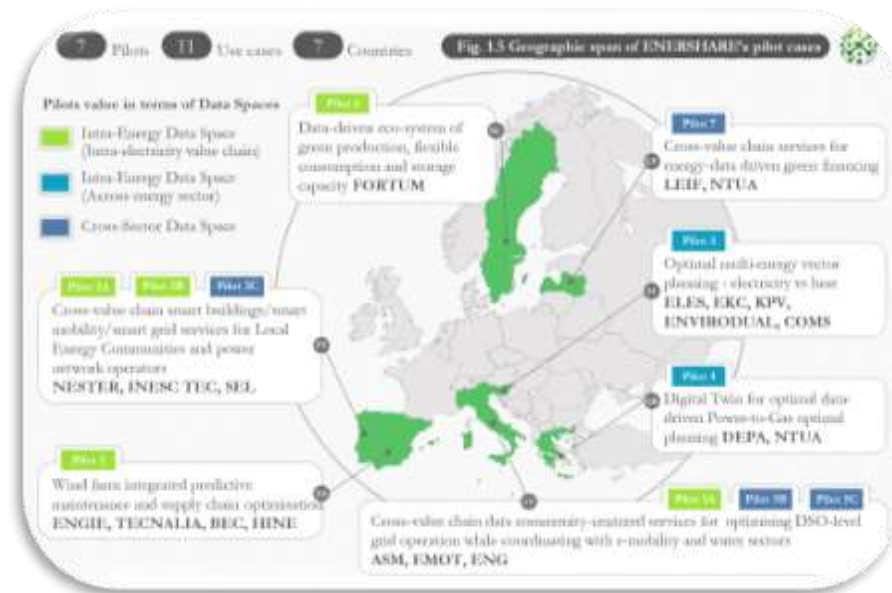
Project Scope & Key aspects – 2 of 2

- *Combining **SSH approaches with sharing economy and cross-value chain business models** to bring the **consumer perspective** center stage and deploy **blockchain based marketplaces** enabling P2P tokenized energy (EV recharging prioritization, home security, assets maintenance,...) versus data assets/services (data models, datasets, computing resources) exchange and reciprocal beyond-financial compensation*
 - *new business and governance models able to capture, share and effectively propagate the **value of energy data sharing** along all the **energy AND data value chain stakeholders***
- *data-driven **across-energy** and **cross-sector services** enabled by and deployed on the top of the ENERSHARE CEEDS*



Use cases vs pilots

- *Pilots versus Use cases mapping*
- **12** Use cases along **7** real-life pilots
- **Intra-Energy Data space:**
 - “intra-electricity value chain”
 - “across energy sector”
- **Cross-Sector Data Space.**



	Pilot 1	Pilot 2	Pilot 3	Pilot 4	Pilot 5	Pilot 6	Pilot 7
DSO							
TSO							
Cross-Sector							
Customer Interaction							
Flexibility							
Mobility							
Household data							
Wind energy							

Use cases Families

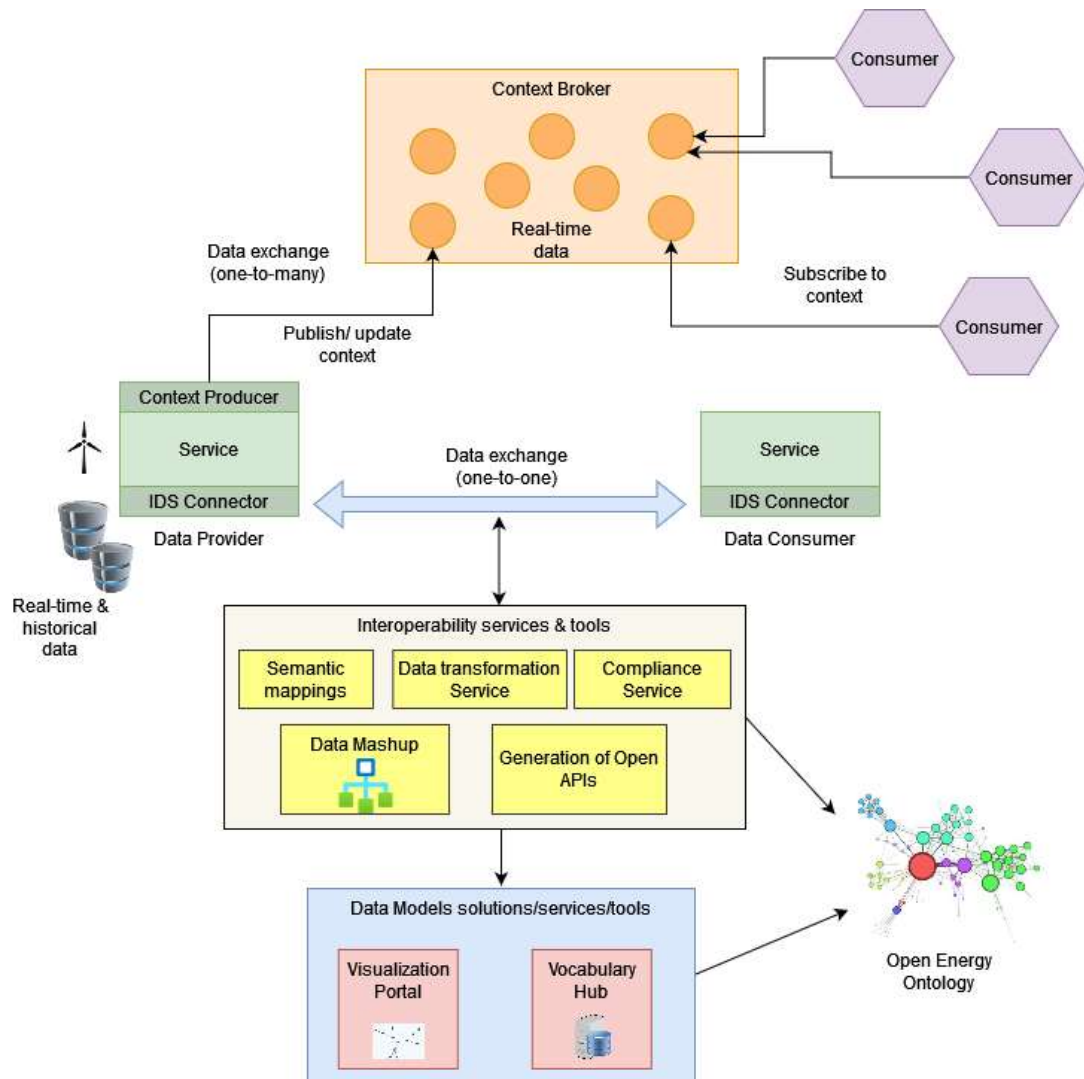
- **Cross-sector Local Energy Communities**
 - *Cross-value chain smart buildings/smart mobility/smart grid services for Local Energy Communities and power network operators – Portugal*
 - *Cross-value chain data community-centered services for optimising local energy consumption and DSO-level grid operation while coordinating with e-mobility and water sectors – Italy*
- **Renewables integration in smart energy grids**
 - *Wind farm integrated predictive maintenance and supply chain optimisation – Spain*
 - *Data-driven aggregation of green production, flexible consumption, and storage capacity – Sweden*
- **Cross-energy/cross-sector integration with electricity grid**
 - *Optimal multi-energy vector planning - electricity vs heat – Slovenia*
 - *Digital Twins for optimal data-driven Power-to-Gas optimal planning – Greece*
 - *Cross-value chain services for energy-data driven green financing – Latvia*



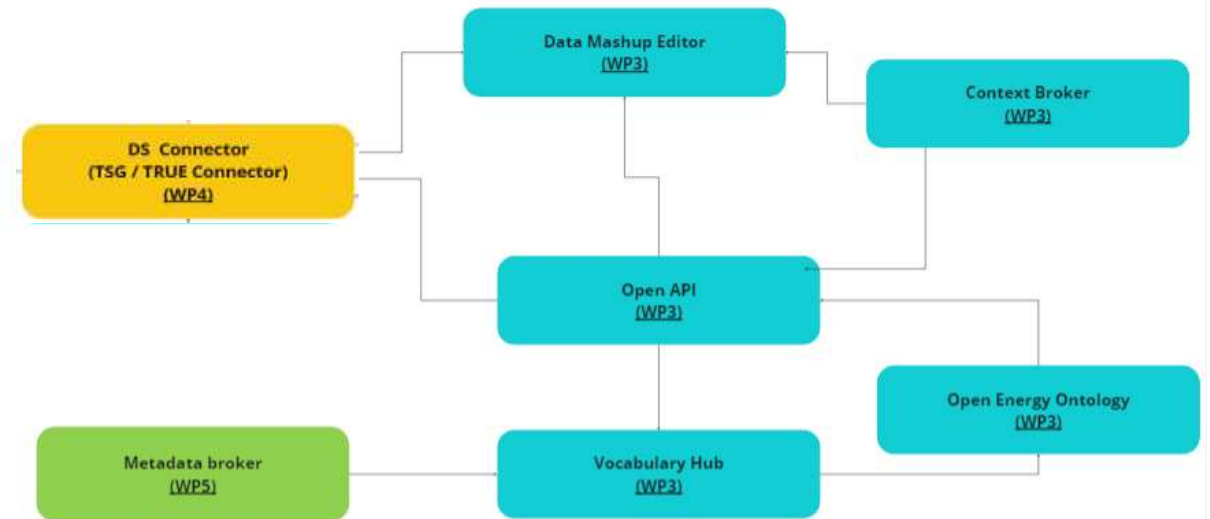
Use cases based Interoperability – Ongoing work

- Gap analysis (BRIDGE Use cases repository, **GAIA-X White paper**) while keeping the focus on
 - electricity-centered “across-energy” and “cross-sector” use cases
 - Interaction **between Energy and Data Value chains** (es Data Aggregator role undertaken by Energy Aggregator)
- Detailed scenario description and **mapping of market roles** from **BOTH** the **energy** (DSO, TSO, aggregators) and **Data** (Data provider, data Consumer, Data Aggregator, Data Community) value chains
- Usage of **UML (IEC 62559-2 standard)**, use case templates, to identify gaps among projects and align with and contribute to BRIDGE Data Management WG Use Case Repository and with and Energy Vertical GAIA-X WG use cases looking at the cross-sector and data value chain angles
- **Functional components (first version) for semantic interoperability, Tools and services for Data Models & Open APIs for including Vocabulary Hub, Data Mash-Up, Compliance and Transformation Service have been delivered to support extended intra-energy and cross-sector Data Space interoperability**
- Leveraging on incremental **Minimum Viable Product (MVP) aligned to ENERSHARE Reference Architecture (Component-level interoperability)**

Interoperability Architecture



INTERNAL/EXTERNAL RELATIONSHIP



Open APIs

Main achievements:

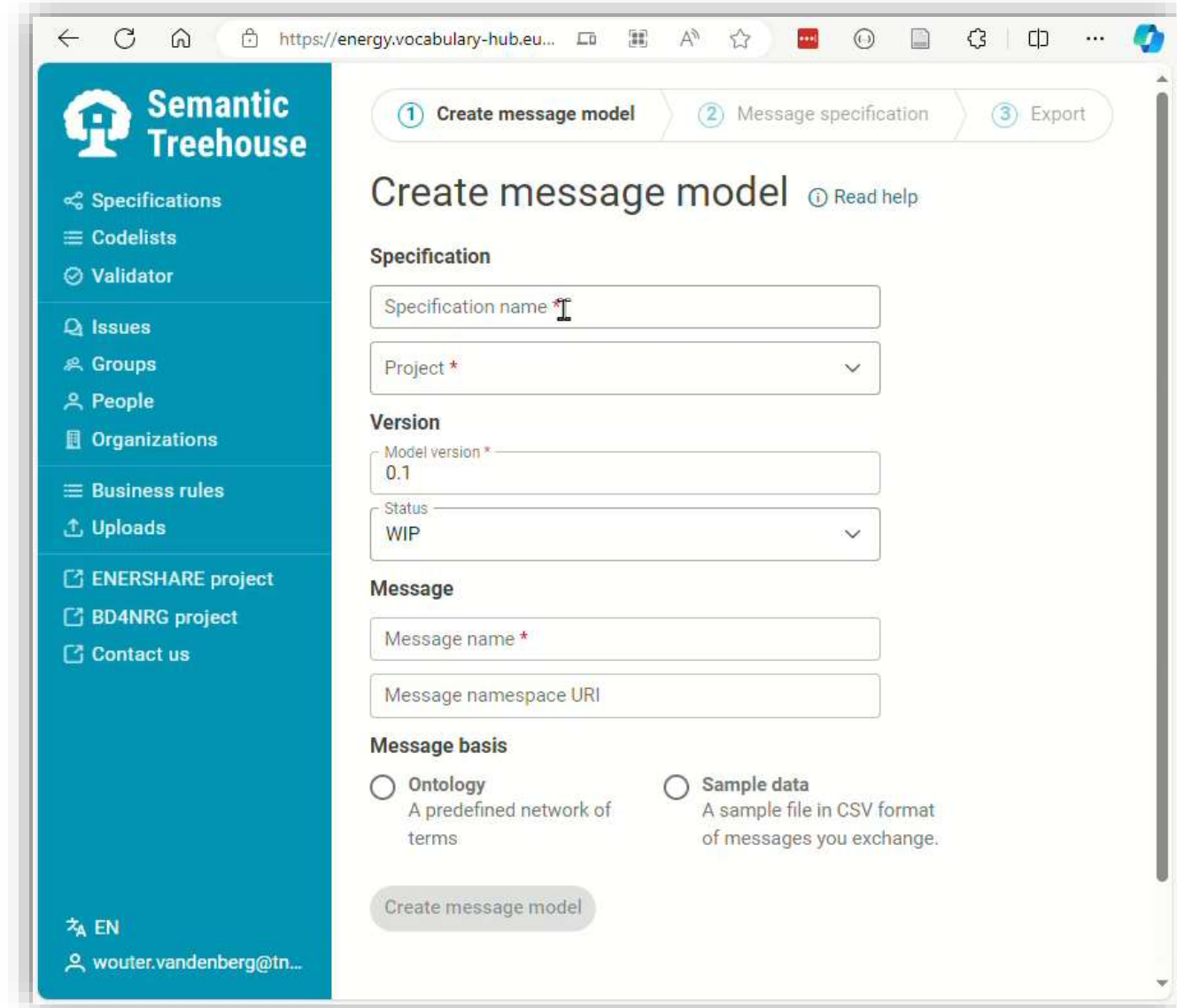
The Enershare project Vocabulary Hub
<https://energy.vocabulary-hub.eu/>

Take aways:

Tool to generate OPEN API specs in a series of steps:

1. Select starting point in common ontology
2. Refine message specification
3. Generate schema of your choice
 - XML / XSD
 - JSON Schema
 - Open API Specification (OAS)

RML mapping is included to facilitate transforming to linked data



The screenshot shows the 'Create message model' interface of the Semantic Treehouse tool. The browser address bar displays 'https://energy.vocabulary-hub.eu...'. The interface features a blue sidebar with navigation options: Specifications, Codelists, Validator, Issues, Groups, People, Organizations, Business rules, and Uploads. Below these are project links for ENERSHARE project, BD4NRG project, and Contact us. At the bottom of the sidebar, it shows the user's language as EN and their email as wouter.vandenberg@tn... The main content area has a progress bar with three steps: '1 Create message model' (active), '2 Message specification', and '3 Export'. The title is 'Create message model' with a 'Read help' link. The form includes sections for 'Specification' (Specification name, Project), 'Version' (Model version: 0.1, Status: WIP), and 'Message' (Message name, Message namespace URI). The 'Message basis' section offers two radio button options: 'Ontology' (A predefined network of terms) and 'Sample data' (A sample file in CSV format of messages you exchange). A 'Create message model' button is at the bottom.

Open APIs for energy data-driven service interoperability

Main achievements:

- *Data Transformation Service*
- *Data Compliance Service*

Take aways:

Data Transformations (RML mappings):

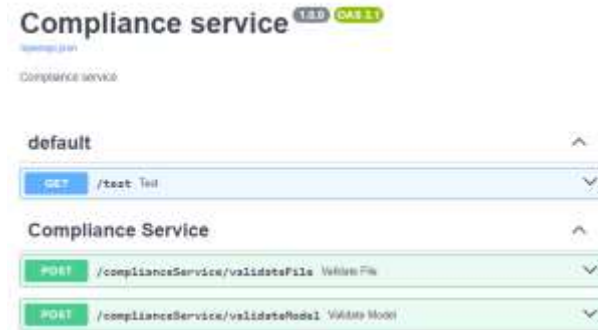
- *at the provider (for services in production)*
- *at the consumer (for low latency or big volume data exchange)*

Compliance:

- *Allows to easily validate connectors' inputs & outputs according to Open APIs specification*
→ *Shacl files per pilot*



<https://transformation.enershare.urban.tecnalia.dev/docs>



<https://compliance.enershare.urban.tecnalia.dev/docs>



Open APIs for energy data-driven service interoperability – Pilot 1

GENERATION OF OPEN APIs

- Pilot 1: Anomaly detection of wind turbine components
- Input & output params are mapped to ontology:
 - WindFarm id
 - WindTurbine id
 - Timestamp
 - Blade Pitch angle (degrees) + Wind speed (m/sg) OR GeneratorTorque (KN/m)
 - Nacelle Temperature (°C)
 - Stator Winding temperature (°C)
 - Generator Active Power (kW)
 - Generator Current (A)

Main achievements:

- *Open APIs for message payload (JSON-LD, JSON, NGSI-LD)*

Service description	name	Input param ontology mapping	example
Detects GENERATOR anomalies for the measurements in a given timestamp and returns synthetic/simulated data used to determine the health status.	timestamp	time:Instant xsd:inXSDDateTime	2019-08-24T00:00:00Z
	windfarm id	plt:WindFarm rdfs:label	FRBRT
	windturbine id	plt:OnshoreWindTurbine rdfs:label	91840
	nacelle temperature	plt:Nacelle plt:hasAverageTemperature seas:TemperatureProperty seas:TemperatureEvaluation	"@type": "cdt:temperature", "@value": "27.54 Cel"

Take aways (per pilot):

- Shacl files to validate JSON-LD
- RML mapping files

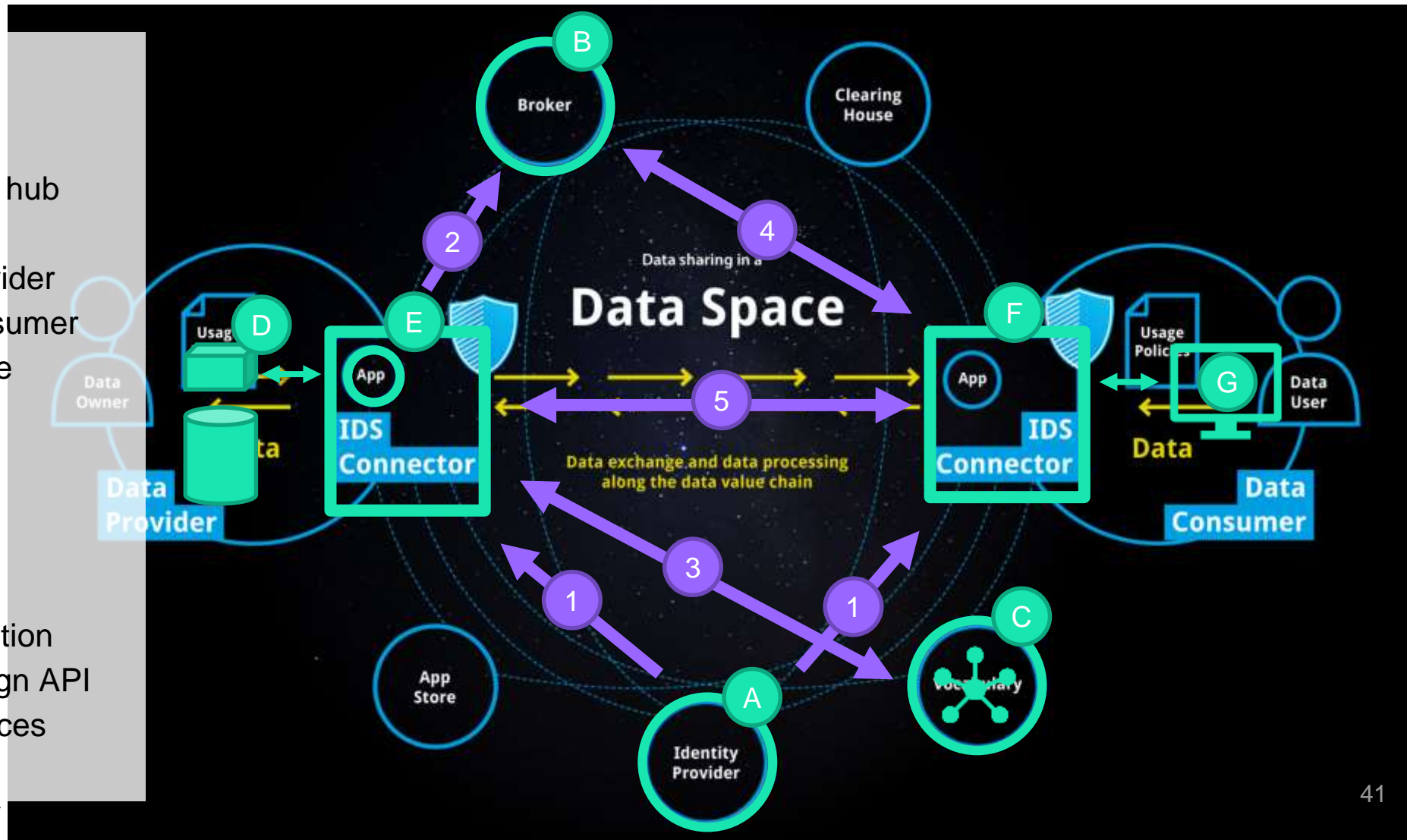
Architectural overview of MVP-1

Components:

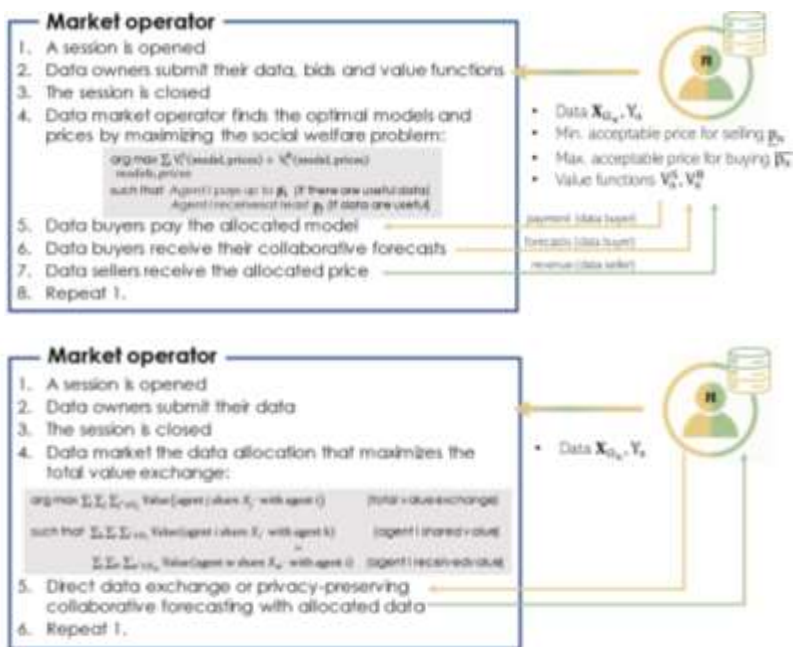
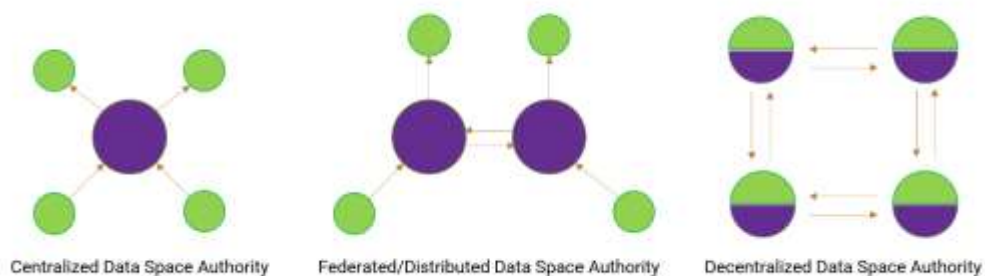
- A: Identity provider
- B: Metadata broker
- C: Ontology + vocabulary hub
- D: Data set + service
- E: Connector of data provider
- F: Connector of data consumer
- G: UI to show data service response

Processes:

- 1: Onboarding + identity provisioning
- 2: Self description publication
- 3: Schema wizard to design API
- 4: Discovery of data services
- 5: Data exchange



ENERSHARE governance models and participatory business models



Topics Addressed

- Data governance **definitions** and **framework**
- Analysis of different **EU legislation**
- Analysis of different **initiatives/platforms/projects**
- Questionnaire template for collection of **Pilots' requirements** for data governance
- **Data sharing incentives** for non-regulated and regulated domain entities

Takeaways:

- **Gap analysis**, based on existing initiatives/platforms/projects
- Identified **topics for the questionnaire**, which will be the basis for the Data Space Governance Models
- **2 incentive mechanisms** for non-regulated domain entities
- EU and local regulations for **regulated domain entities**

Data sharing incentive and business models design for regulated and non-regulated domains

Topics Addressed

- Development of **3 algorithmic solutions** for encouraging data sharing via **data monetization**
- Development of **1 algorithmic solution** to promote data sharing by facilitating **equitable value exchange (data-by-data)**

Takeaways

- Current models can be used for data monetization in load and RES forecasting
- But also for predictive maintenance, e.g., data exchange regarding failure modes
- Cover both regression and classification tasks

		Data split	Machine Learning Task		Bid Structure	
			Regression	Classification	Seller	Buyer
Data monetization	Fixed budget market	Features	■	■	Fixed price per feature	Fixed price per forecast OR price as a function of accuracy
		Observations	■	■	Fixed price OR price w.r.t. data value	Fixed price OR price w.r.t. data value
	Data relevance market	Features	■	■	Min price + value function (satisfaction with a certain price/value)	Max price + value function (satisfaction with a certain price/accuracy)
		Observations	■	■		
	Social welfare maximization market	Features	■	■	No bids. Only data exchange according to its mutual value	
		Observations	■	■		
Data-by-data		Features	■	■		
		Observations	■	■		

■ Implemented in ENERSHARE

■ Future extension/work

Thank you!

Enershare has received funding from [European Union's Horizon Europe Research and Innovation programme](#) under the Grant Agreement No 101069831



Enershare

The Energy Data Space for Europe

enershare.eu





Energy

Project Omega-x

Bruno Traverson



omega-x



Orchestrating an interoperable sovereign federated Multi-
vector Energy data space built on open standards and ready
for GAia-X

Trieste Symposium

June 6th 2024

Strategic aspects of interoperability testing and data spaces

Semantic Interoperability for Energy
Data Spaces

Bruno Traverson
EDF R&D

bruno.traverson@edf.fr



START
05/2022



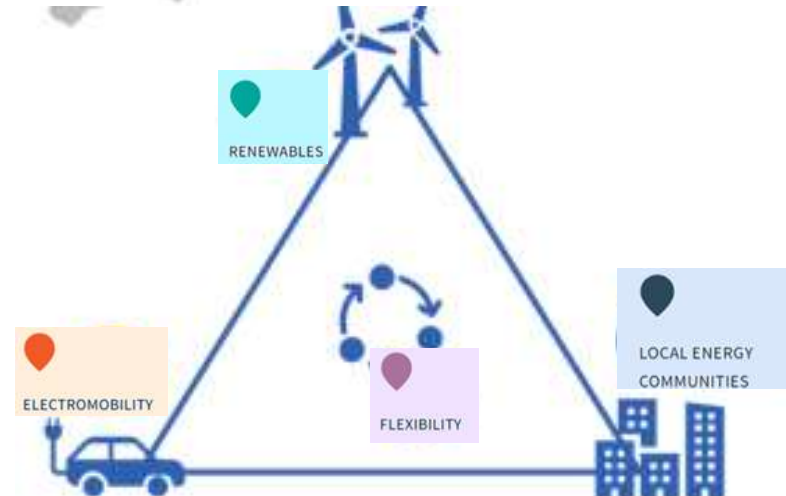
FUNDING
8M€

END
04/2025



LEADPARTNER
Atos

PARTNERS
30



Purpose

To ensure that data providers and service providers in Omega-X data space have a **common understanding** of shared datasets.



Drivers

- ✓ Conformance to energy domain **standards** (IEC CIM, IEC 61850,...)

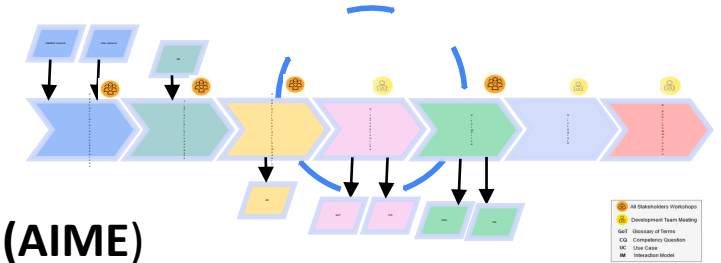


- ✓ Support of **FAIR** data principles (Energy Data Act)

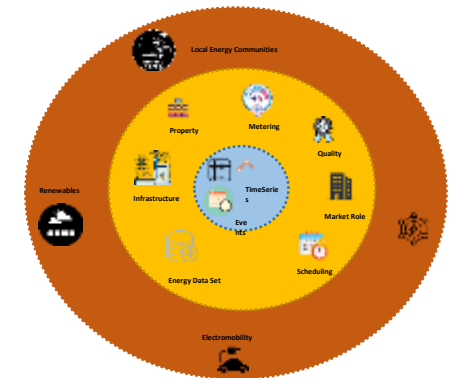


Achievements

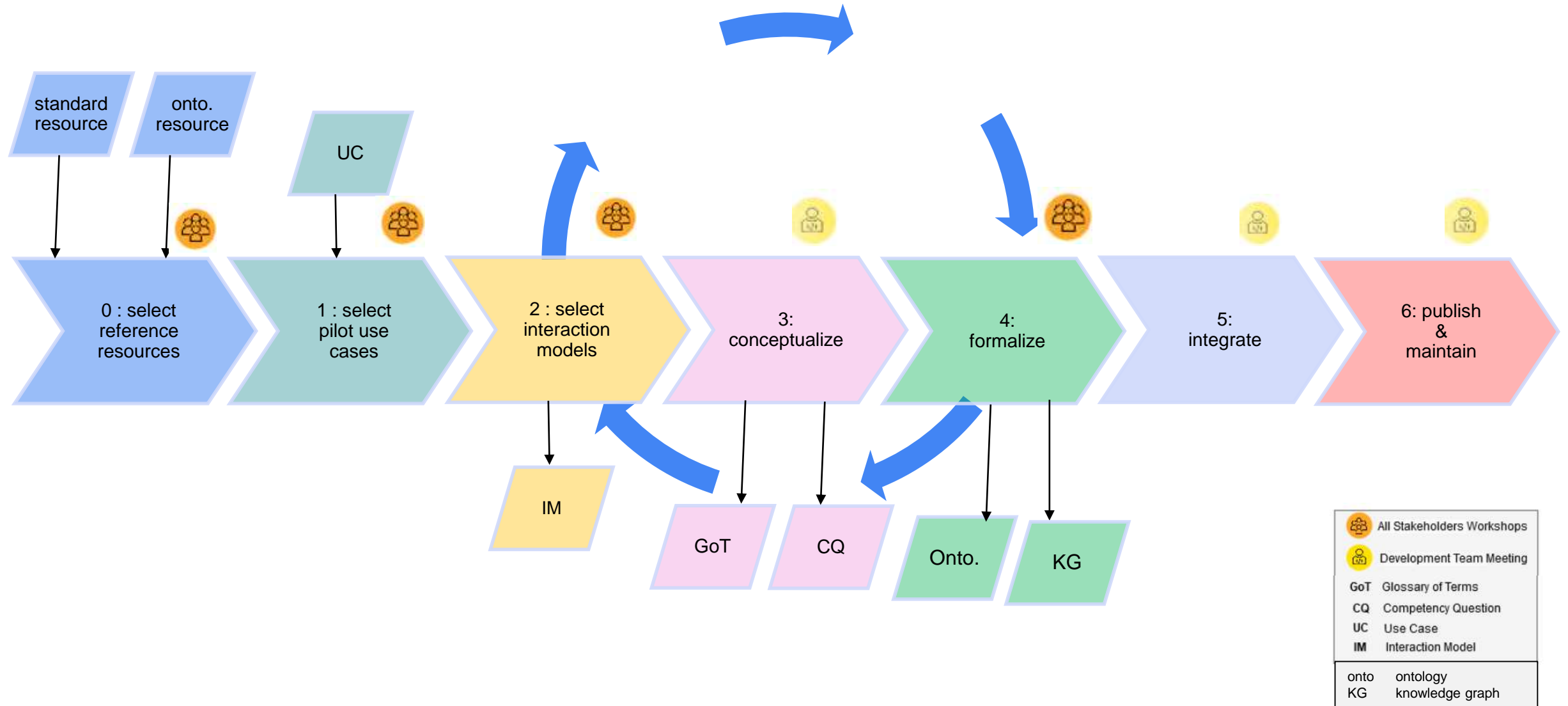
- ✓ **Agile Interaction model-based Methodology for Energy dataspaces (AIME)**
An agile methodology focused on use case requirements.



- ✓ **Common Semantic Data Model (CSDM)**
A knowledge representation organized in multiple dimensions.

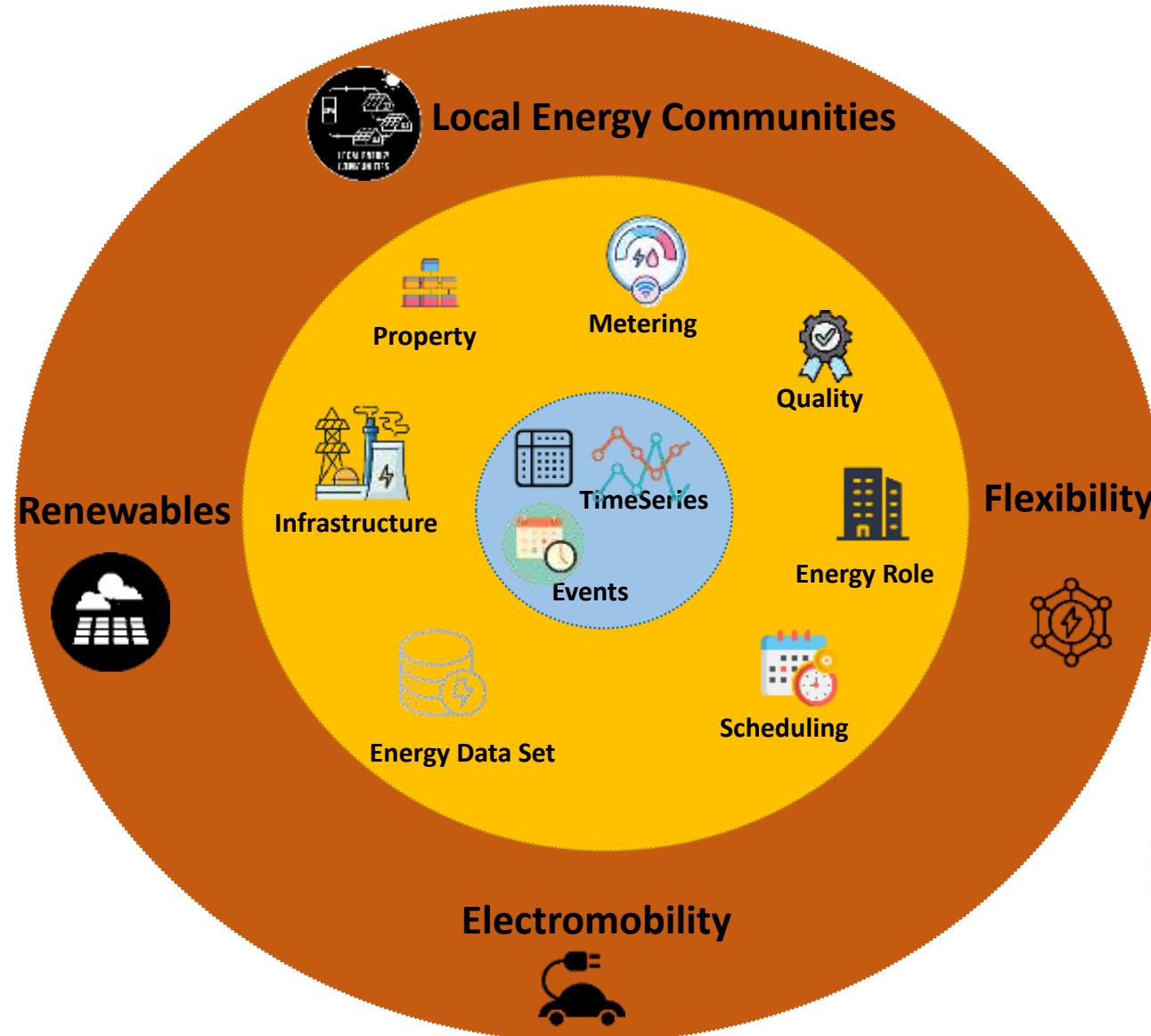


Agile Interaction Model based Ontology Development Methodology (AIME)



	All Stakeholders Workshops
	Development Team Meeting
GoT	Glossary of Terms
CQ	Competency Question
UC	Use Case
IM	Interaction Model
onto	ontology
KG	knowledge graph

- 12 ontological modules
 - 8 common modules shared by all UC Families
 - 4 specific modules dedicated to each UC Family



For more detailed information

AIME and CSDM published on omega-x.eu/

CSDM modules available on w3id.com/omega-x

Four Interoperability levels

Intra-UCF

4 modules dedicated to Omega-X Use Case Families

REN, LEC, FLEX, EM

Inter-UCF

8 common modules to support a shared access to all datasets:

ETS, EDS, PROP, INFRA, ROLE, EME, SCHED, QUAL

Sister Projects

Exchange about AIME and CSDM with Enershare, Eddie ...

AIME, CSDM

Standards

Semantization of data models: IEC CIM, IEC 61850, IEC DLMS-COSEM

Alignment with reference ontologies: seas, saref

Implementation of IEC SRD 63417 recommendations

Thank you very much for your attention.
Questions?




Transportation

Project DeployEMDS

Laure de Cock



DO SOMETHING GREAT



Don't
Panic!

imec

The European mobility data space

Pushing the boundaries of
mobility data exchange

Dr. Laure De Cock



deploy
EMDS

Context



The image shows the cover of the European Commission's report titled "Sustainable & Smart Mobility Strategy: Putting European transport on track for the future". The cover features a green background with a large circular graphic on the left containing silhouettes of people and a circuit-like pattern. The European Commission logo is at the top, and a small inset image of a train is at the bottom right.

**SUSTAINABLE & SMART
MOBILITY STRATEGY**

Putting European transport on track for the future



The image shows the cover of the European Commission's report titled "The European Data Strategy". The cover has a vibrant, abstract background with purple, blue, and yellow wavy patterns. The title is enclosed in a white rectangular frame.

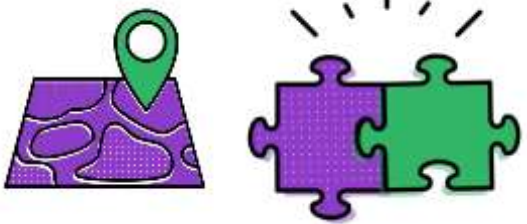
**THE
EUROPEAN
DATA STRATEGY**

#DigitalEU

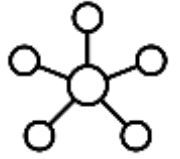
Context



PrepDSpace4Mobility



Technical assistance study



Use cases



Barcelona



Budapest



Flanders



Tampere



Île-de-France



Lisbon



Milan



Sofia



Stockholm

Use cases



Flanders

“Making the exchange of traffic measurements understandable, exchangeable, re-usable and future proof; by using standards, data space technology, building an ecosystem and a clear governance.”



Sofia

“Delivering MaaS by implementing a multimodal mobility solution involving public transport and green on-demand mobility services.”



Milan

“Optimising the entire local public transport mobility network consisting of the provinces of Pavia, Lodi, Monza-Brianza and the Metropolitan City of Milan, through the integration of multiple data sources.”



Canvas sessions



Survey the expectations of the data space participants



Stimulate a 'data space state of mind' in the implementation sites



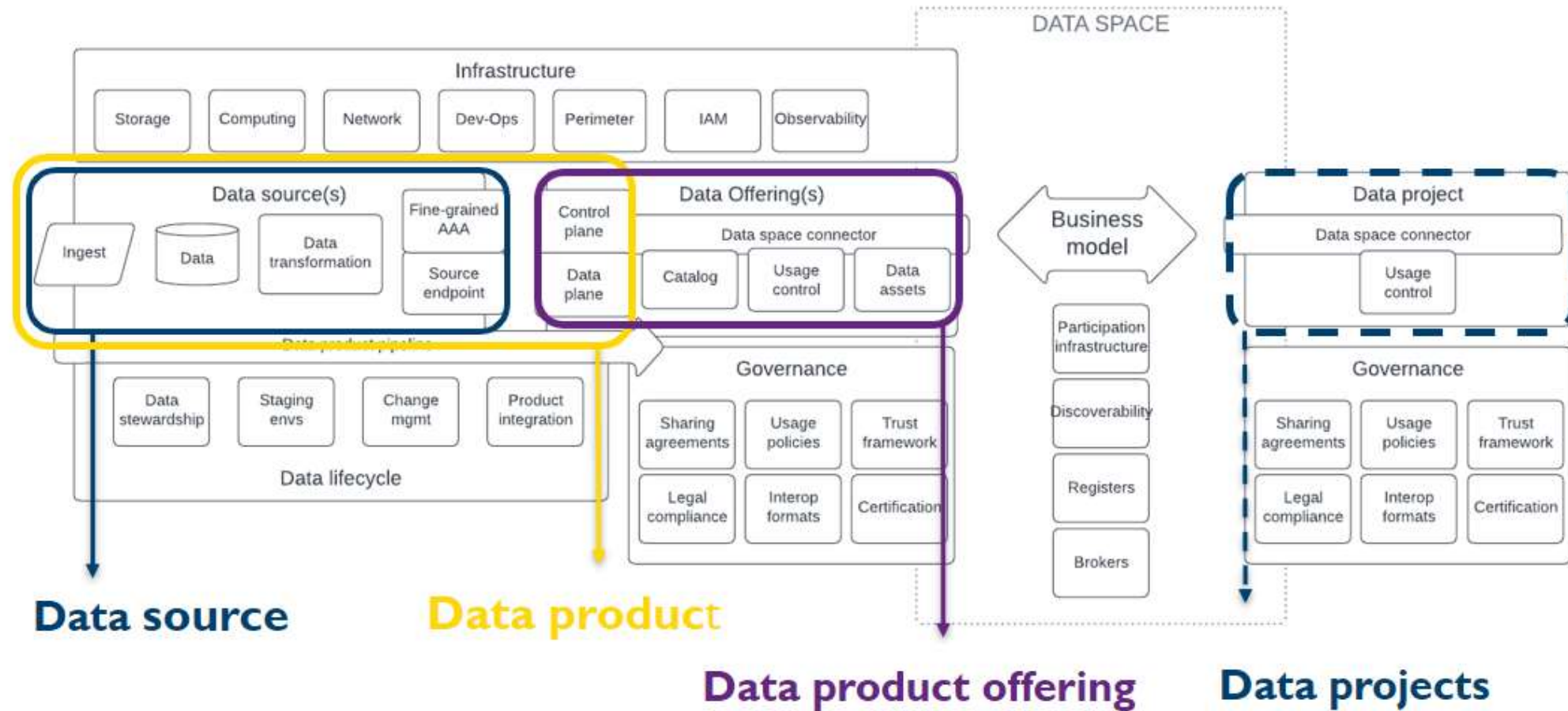
Identify relevant technologies, data sharing protocols and access control mechanisms in implementation sites



By using data space ***core concepts***



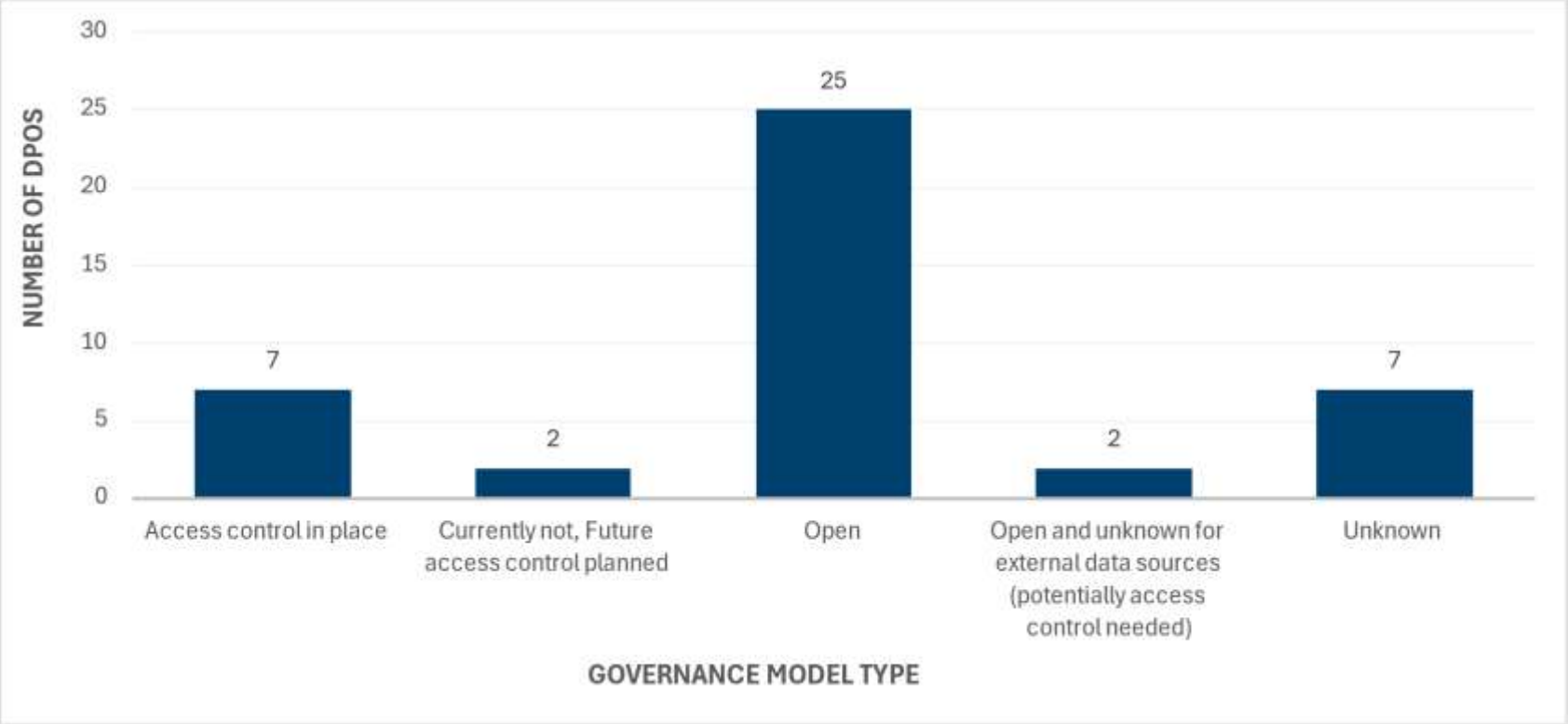
Canvas sessions



<https://opendataproducts.org/>
<https://dssc.eu/page/knowledge-base>

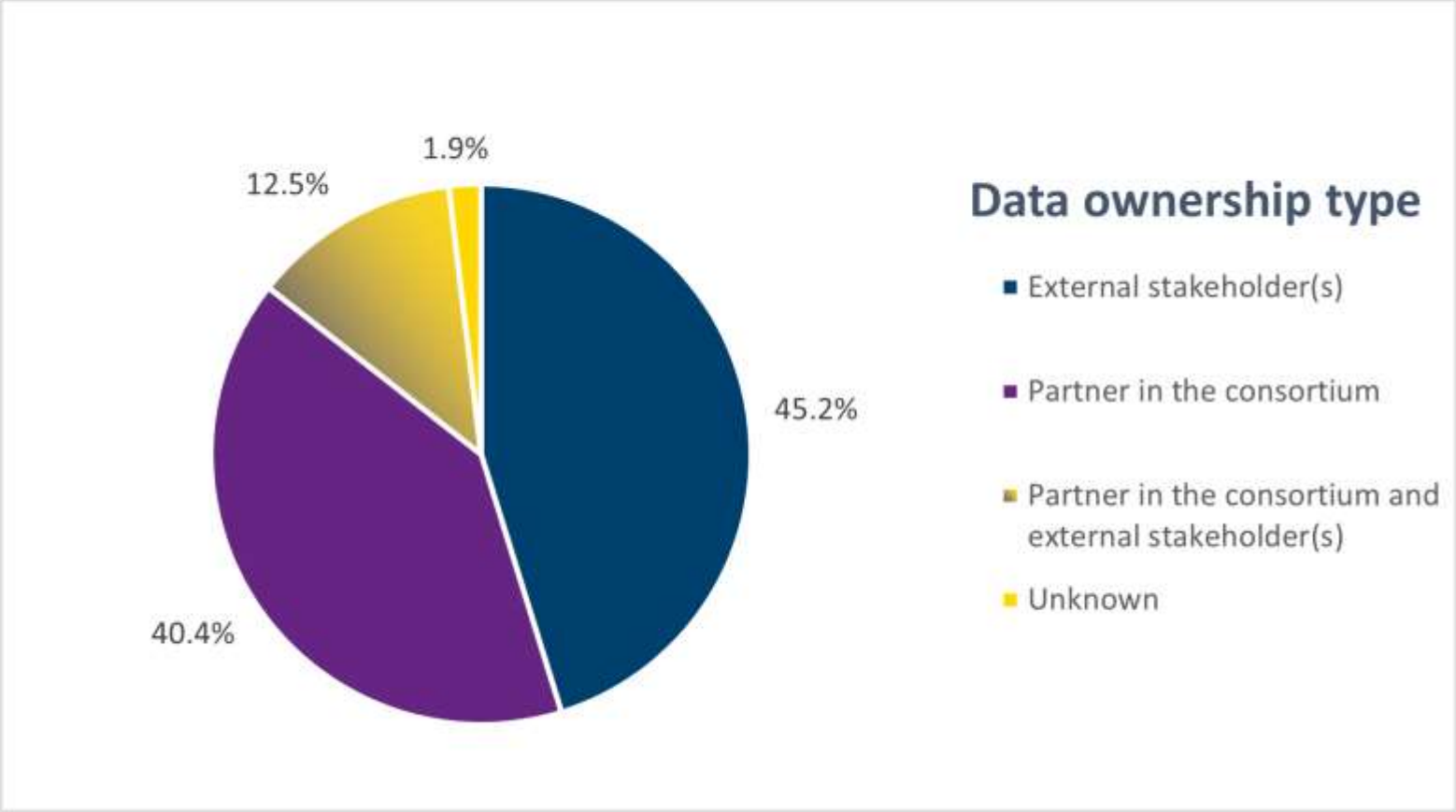


What are we dealing with?



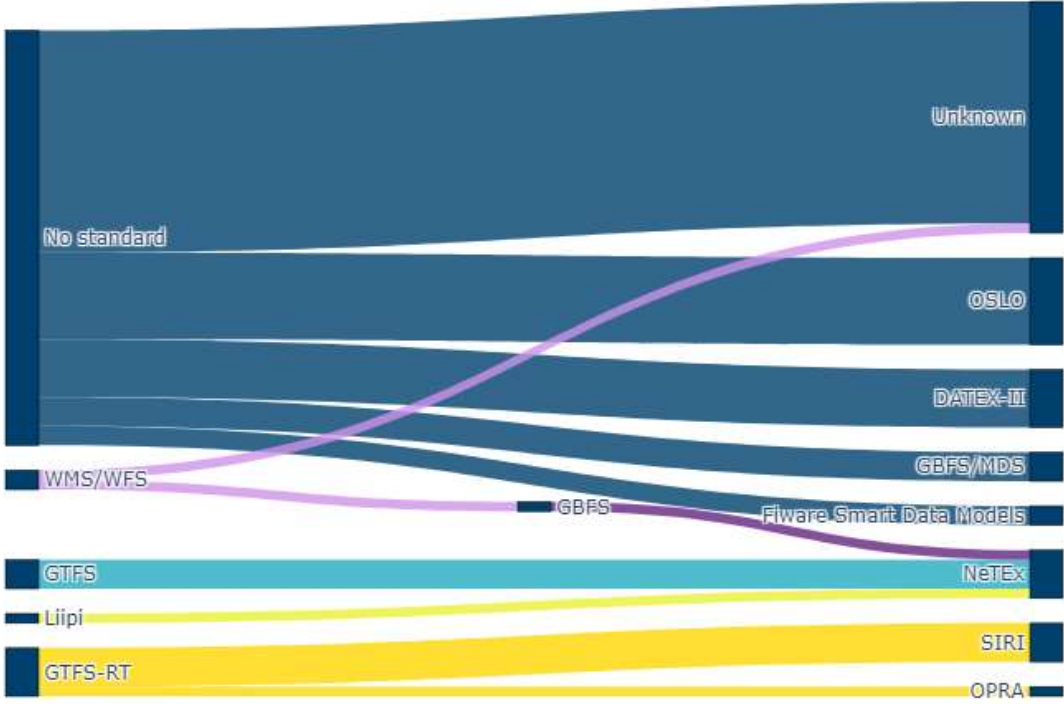
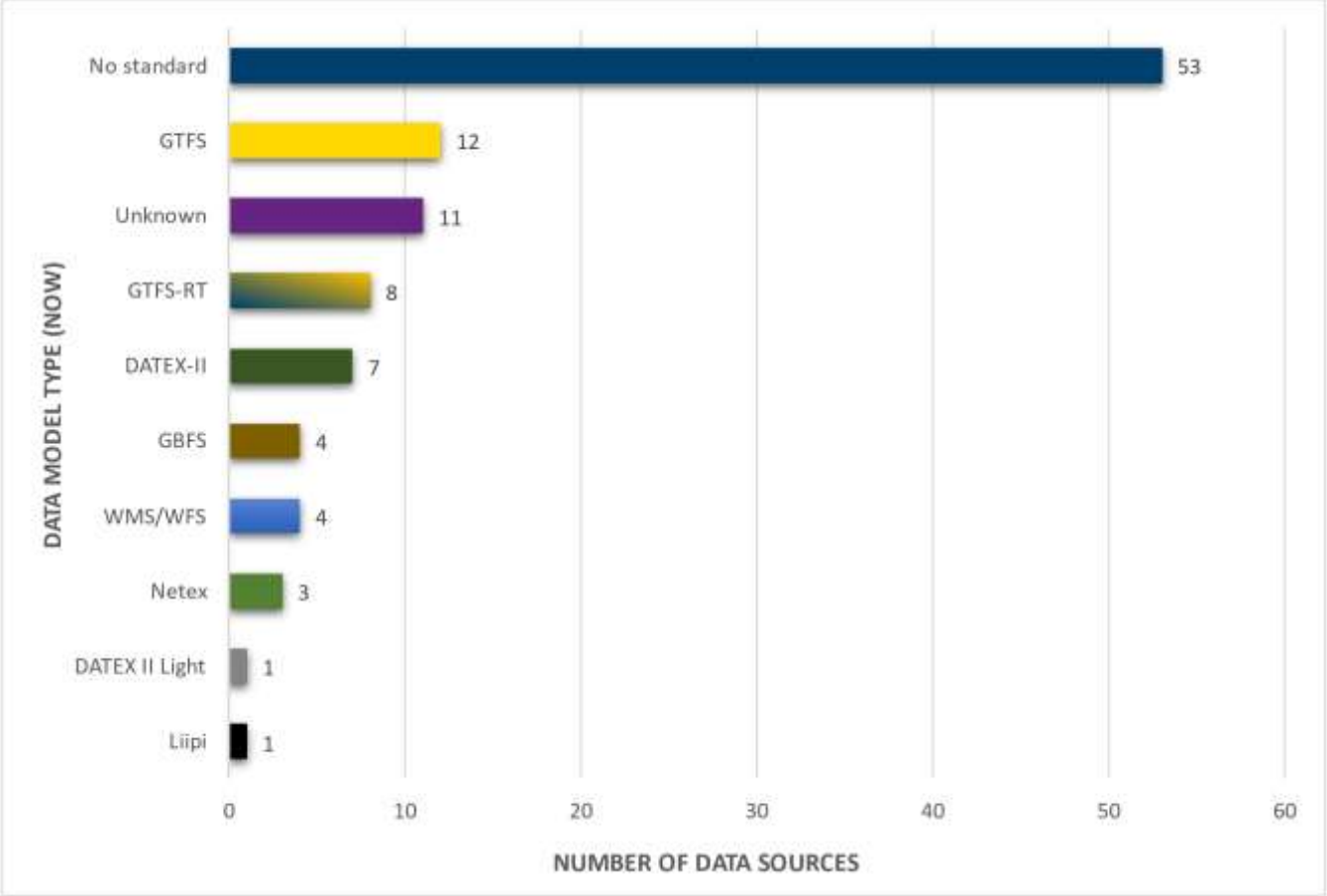
→ A lot of open data

What are we dealing with?



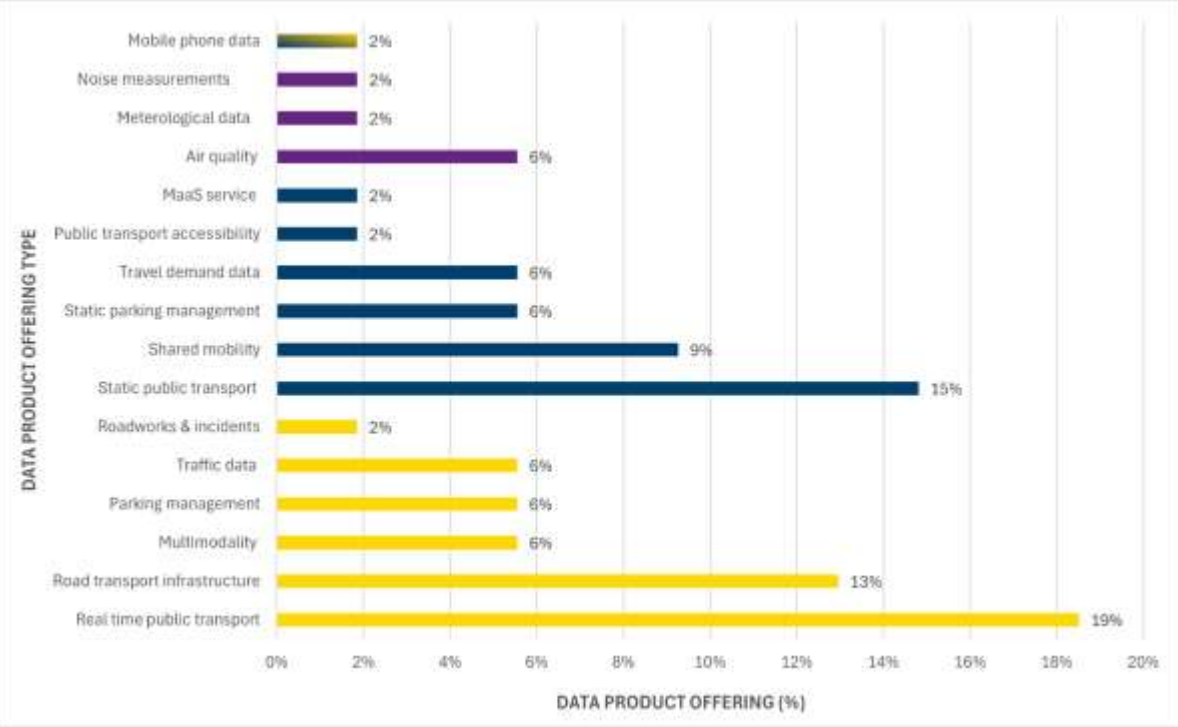
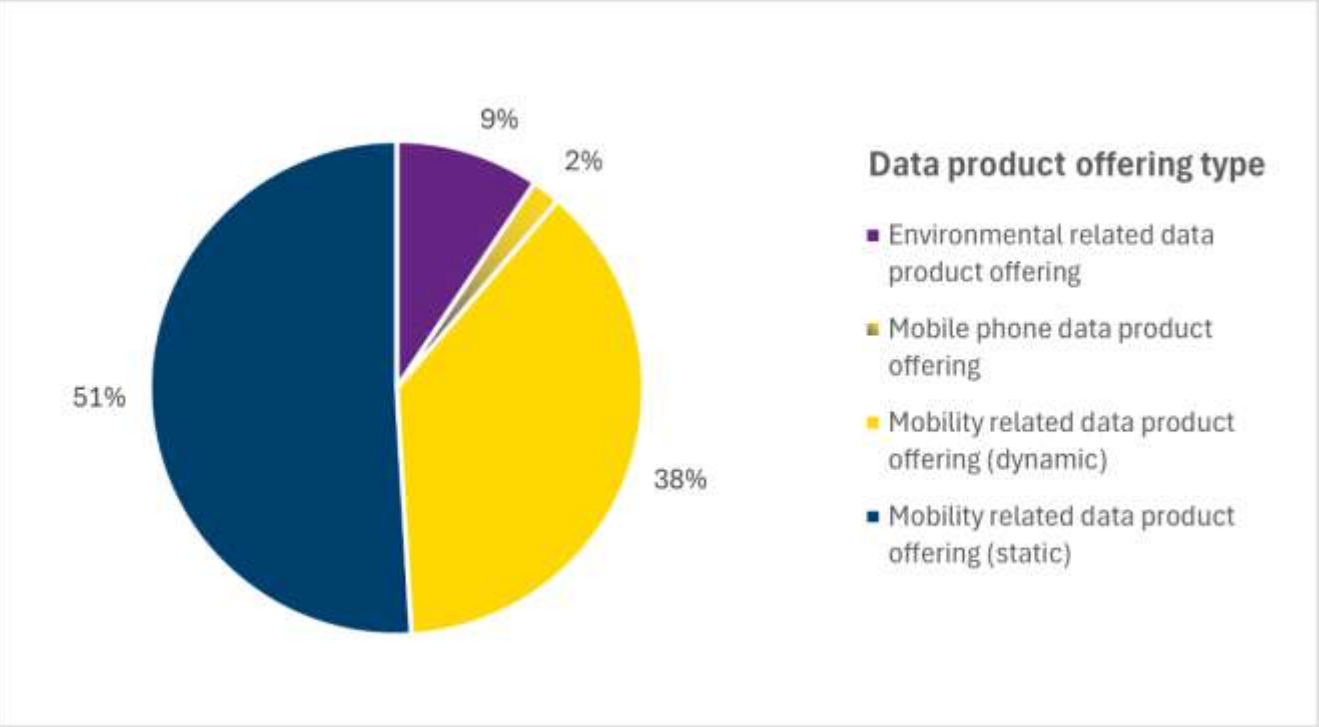
→ A lot of external stakeholders

What are we dealing with?



→ Little standardization (for now)

What are we dealing with?



➔ More than mobility data

2. Data Product Offering					
Background					
The data product offering is the implementation of the data product in the deployEMDS and determines how a data product becomes a data asset. The data offering could be implemented in the data space connector, and handles usage control, formats, data assets publication, data asset catalogue, ... In other words, it defines how the data product is offered to the data space. The information we request here might not be immediately available during the intake phase of the project, but many "horizontal components" of the deployEMDS data space depend on these answers. Our main goal is to define a prioritised roadmap for implementing data products in the data space.					
No	Question to be answered	Answer	Example answer	Context	Canvas reference
1	Can you provide a name for your data product offering?		<i>Multimodal Traffic Counts</i>	Define/specify the data product offering being analysed in this sheet.	Do0
2	Can you provide a functional description of your data product offering?		<i>"Multimodal Traffic Counts" is a data product offering designed to provide comprehensive, integrated traffic data across various modes of transportation for traffic managers, city administrations, researchers, and other stakeholders.</i>	Functional description of the data product offering.	Do4
3	What is the scope of the data offering in terms of transport modalities?		<i>Truck, car, bicycle, pedestrian</i>	Used for grouping and quantitative analysis.	Do3
4	What is the geographical data product offering scope?		<i>Flanders</i>	Used for grouping and quantitative analysis.	Do3
5	What is your data product offering type?		<i>3) For a federated data space structure, we provide an intermediary service to link VSDS with EMDS</i>	1) The data owner publishes the data product offering in the data space (without intermediary service) 2) The data owner onboards the data product on an intermediary offering 3) You are yourself a data intermediary (see glossary)	Do1
6	What are the data sources that will use this kind of data product offering?		<i>FI.01.01 - FI.01.09</i>	A data product offering can be an aggregation of more than one data source (and a data source can have multiple data product offerings), therefore it's best to standardise the data product offering in a way that it can be reused. To answer this question, please refer to the dataset Nr. in the overview excel.	

Steps



Canvas sessions

Capability mapping

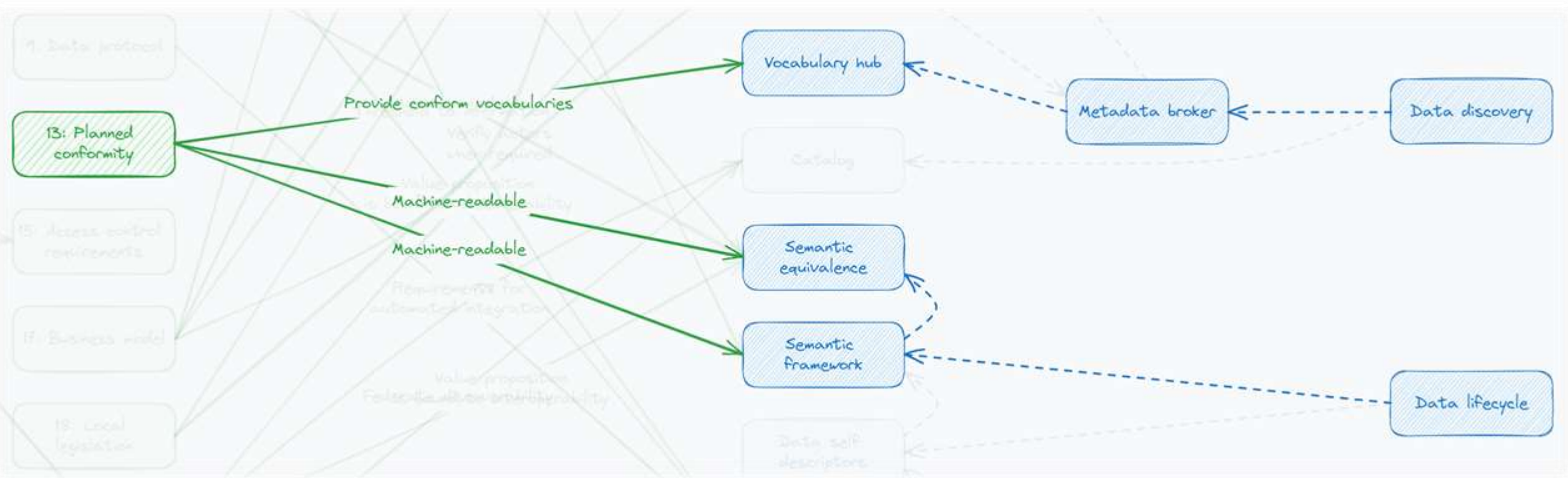


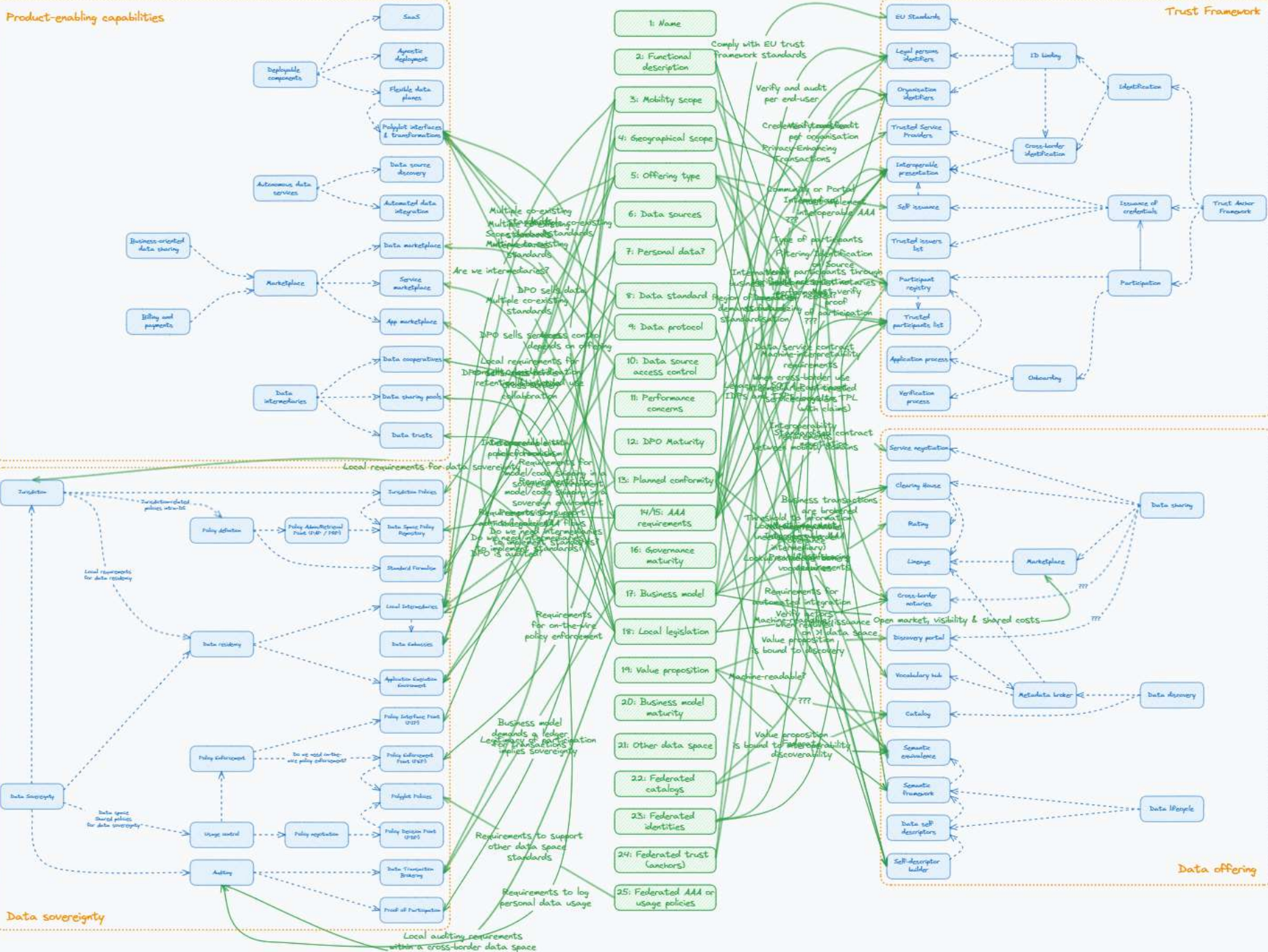
DSSC Blueprint 1.0

Blogpost authors: Géraud Guilloud, Mirjam Huis in 't Veld
Tonia Sapia and Clara Pezuela.

DATA SPACES SUPPORT CENTRE

Capability mapping







Question 13: Which **data model** would you like to use (within 5 years from now)?

*Answer: OSLO and mobility
DCAT-AP*

Provide vocabularies

A **vocabulary hub** will be needed to provide vocabulary definitions and semantic resources.

Semantic equivalence

Data descriptors (metadata) should support frameworks such, as OSLO. Data providers should provide documentation on the frameworks used to improve **interoperability**.

Capability mapping

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Example Flanders

	EDC	Fiware	Gaia-X	iShare
A vocabulary hub will be needed to provide vocabulary definitions and semantic resources.	✓	✓	✗	✗
Data descriptors (metadata) should support frameworks such, as OSLO. Data providers should provide documentation on the frameworks used to improve interoperability .				✗



Lessons learnt

A bottom-up approach is not perfect...

#	Onboarding & participation	Requirement	Rationale
ONB.1	Application Process	Aspiring Participants are required to undergo an application process (i.e., submit a Participation Request to the data space), before receiving an Identifier. The aspiring Participant must provide enough trustable information to build a Self-Descriptor.	74% coverage
ONB.2	Application Process	Data intermediaries act on behalf of their Data Product Owners, onboarding them on the data space and requesting for them an Identifier.	74% coverage
ONB.3	Application Process	The Participation Request is carried out on an Onboarding Portal that provides an interactive user interface and an API with equivalent capability to allow orchestrated onboarding. The Onboarding Portal should not be open, rather it requires a Participation Request subscription account, to avoid spurious usage or DoS attacks. The Onboarding Portal is maintained by the data space authority.	Best practice
...		[...]	
ONB.8	Simplified Trust of Participants	Participants that successfully registered are automatically considered as Trusted Participants.	Best fit

... but it helped to promote a 'data space state of mind' and resulted in a technology-neutral framework

Thanks to <https://opendataproducts.org/> and <https://dssc.eu/page/knowledge-base>



Project deliverable D2.1

Requirements analysis of the technical infrastructure



Public Service

X-Road 8 Spaceship

Petteri Kivimäki

X-ROAD® 8 "SPACESHIP": TRANSFORMING EXISTING DATA ECOSYSTEMS INTO DATA SPACES

6 June 2024

Nordic Institute for Interoperability Solutions (NIIIS)

DIGITAL SOCIETY SOLUTIONS AND CROSS-BORDER COOPERATION



Non-profit association to ensure the development and strategic management of X-Road® and other cross-border solutions for digital government infrastructure.

niis.org



Open-source software and ecosystem solution that provides unified and secure data exchange between organisations.

x-road.global



A free and actively maintained open-source component for joining one or more eDelivery policy domains.

edelivery.digital

X-ROAD®
DATA EXCHANGE
LAYER

X-Road® is open-source software and ecosystem solution that provides unified and secure data exchange between organisations.

X-Road® is licensed under the MIT open-source license and is a digital public good verified by the Digital Public Good Alliance.

24

ECOSYSTEMS

DEPLOYED BY GOVERNMENTS OR OTHER
ORGANISATIONS

155
COUNTRIES

REPRESENTED IN THE
X-ROAD COMMUNITY

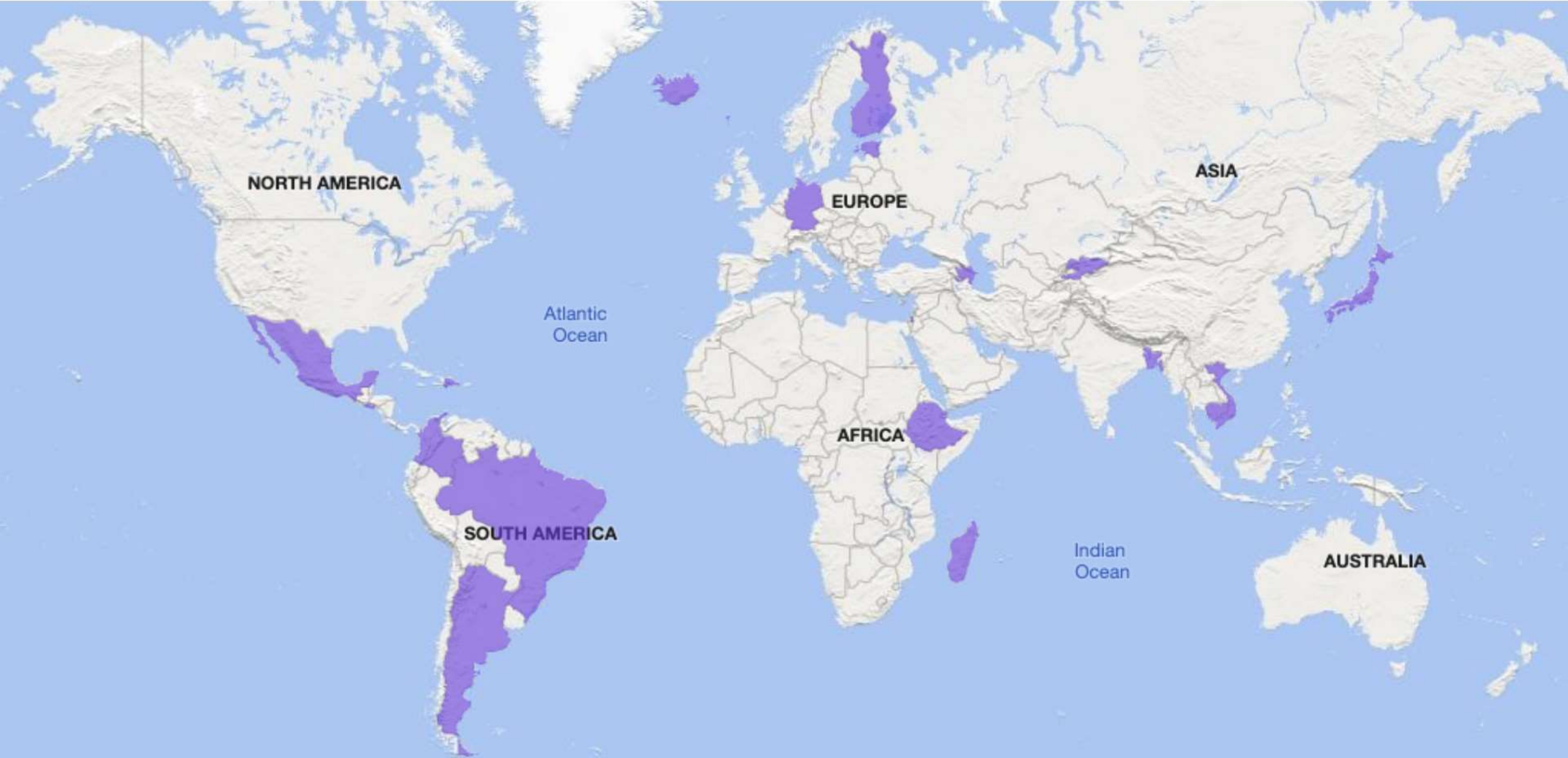
3900
MEMBERS

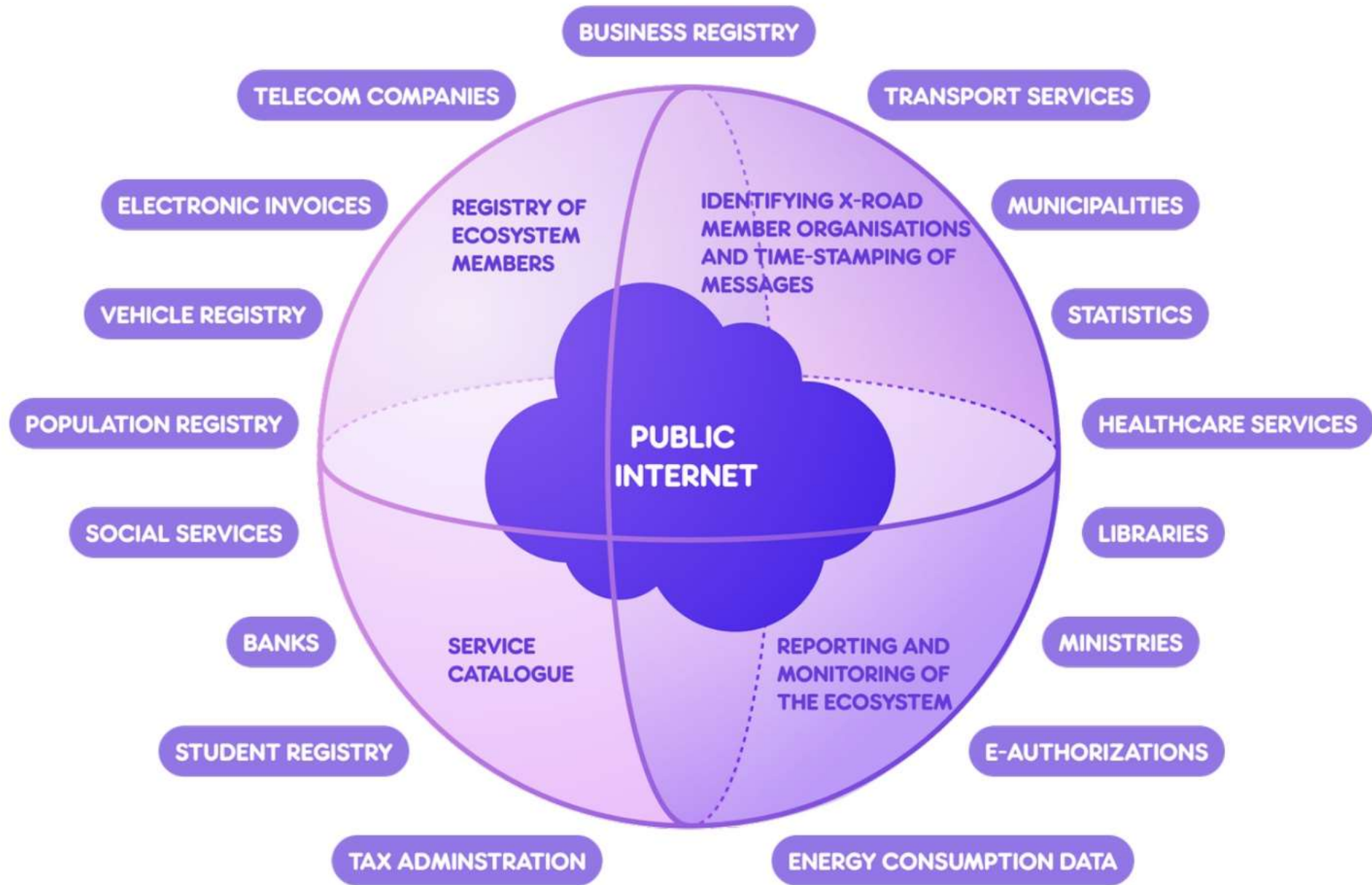
PARTICIPATING IN THE
X-ROAD COMMUNITY

542M
END USERS

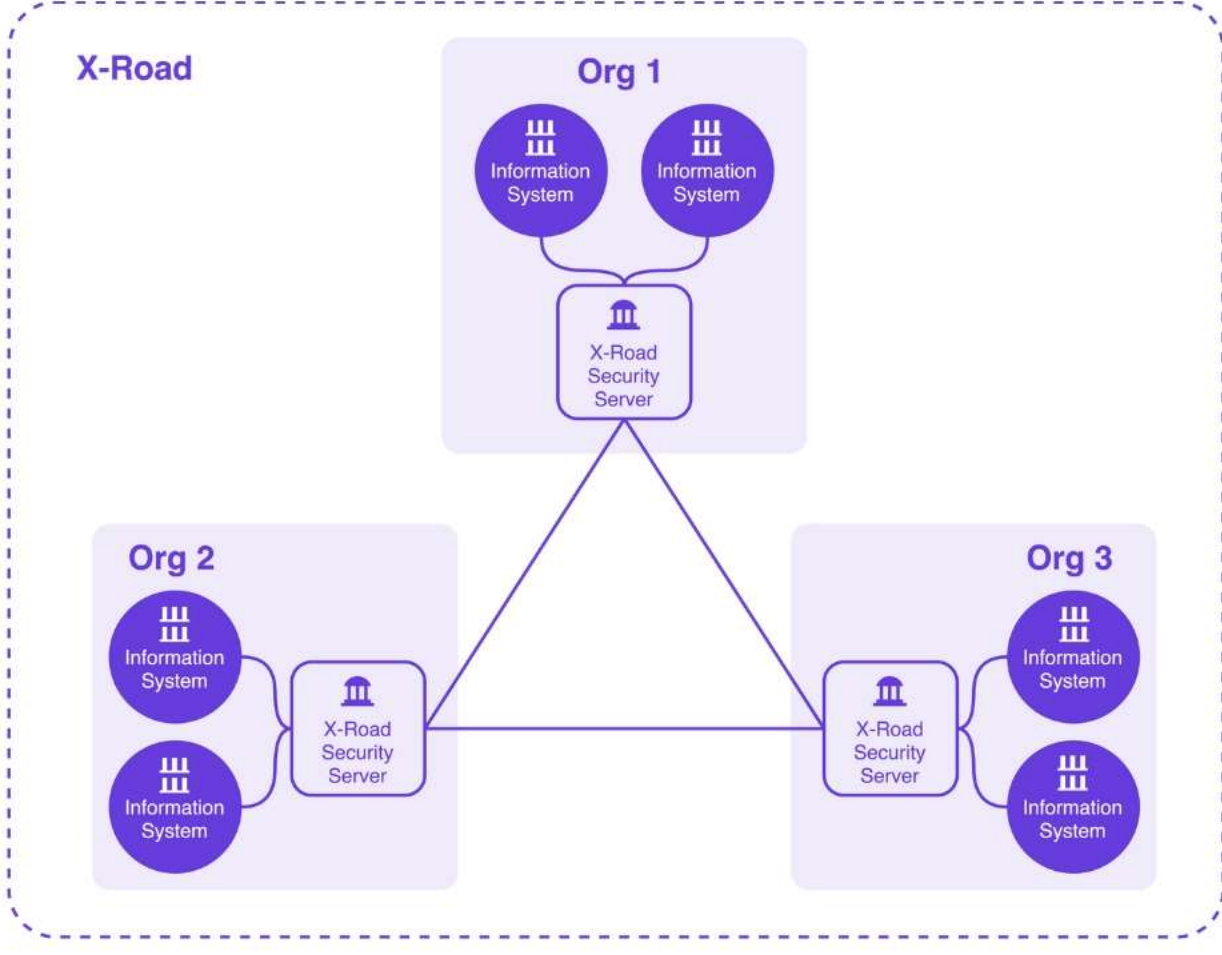
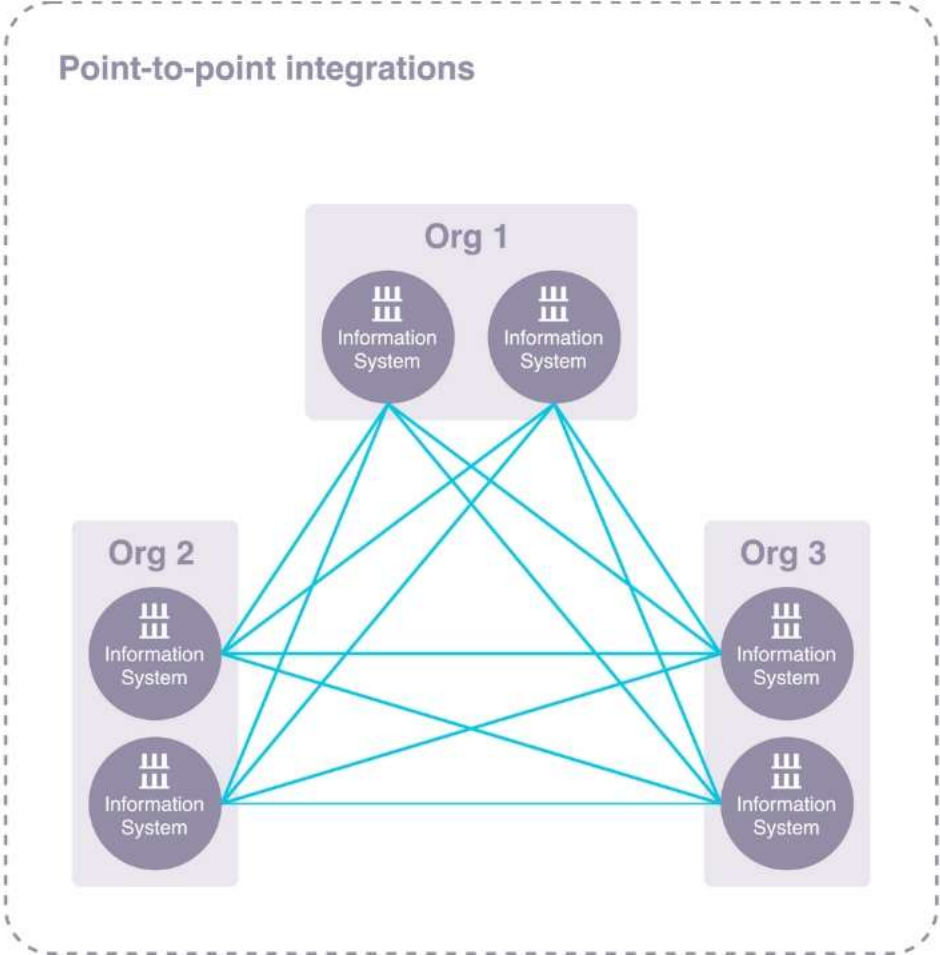
WORLDWIDE

COUNTRIES WITH X-ROAD ECOSYSTEMS

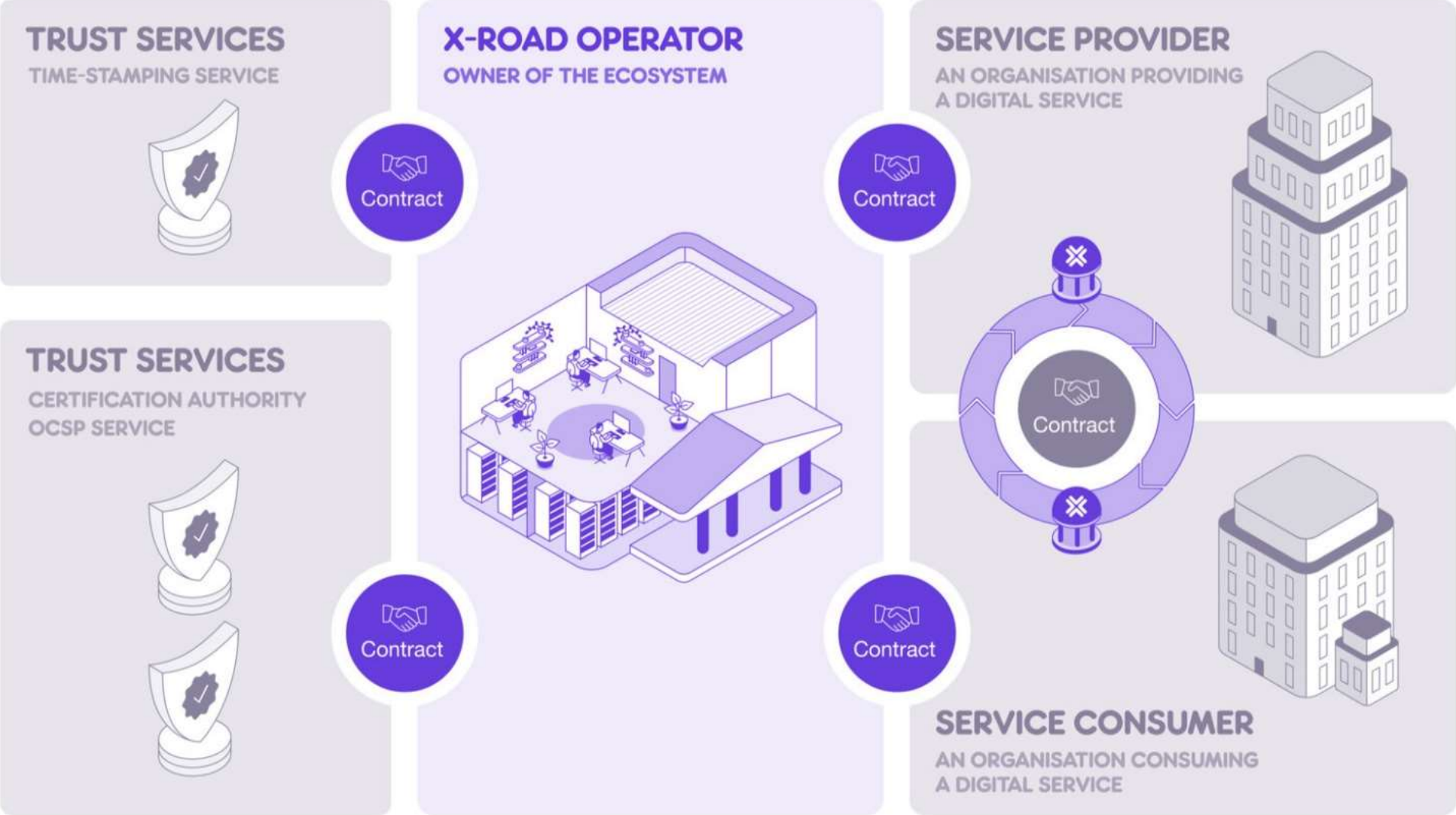




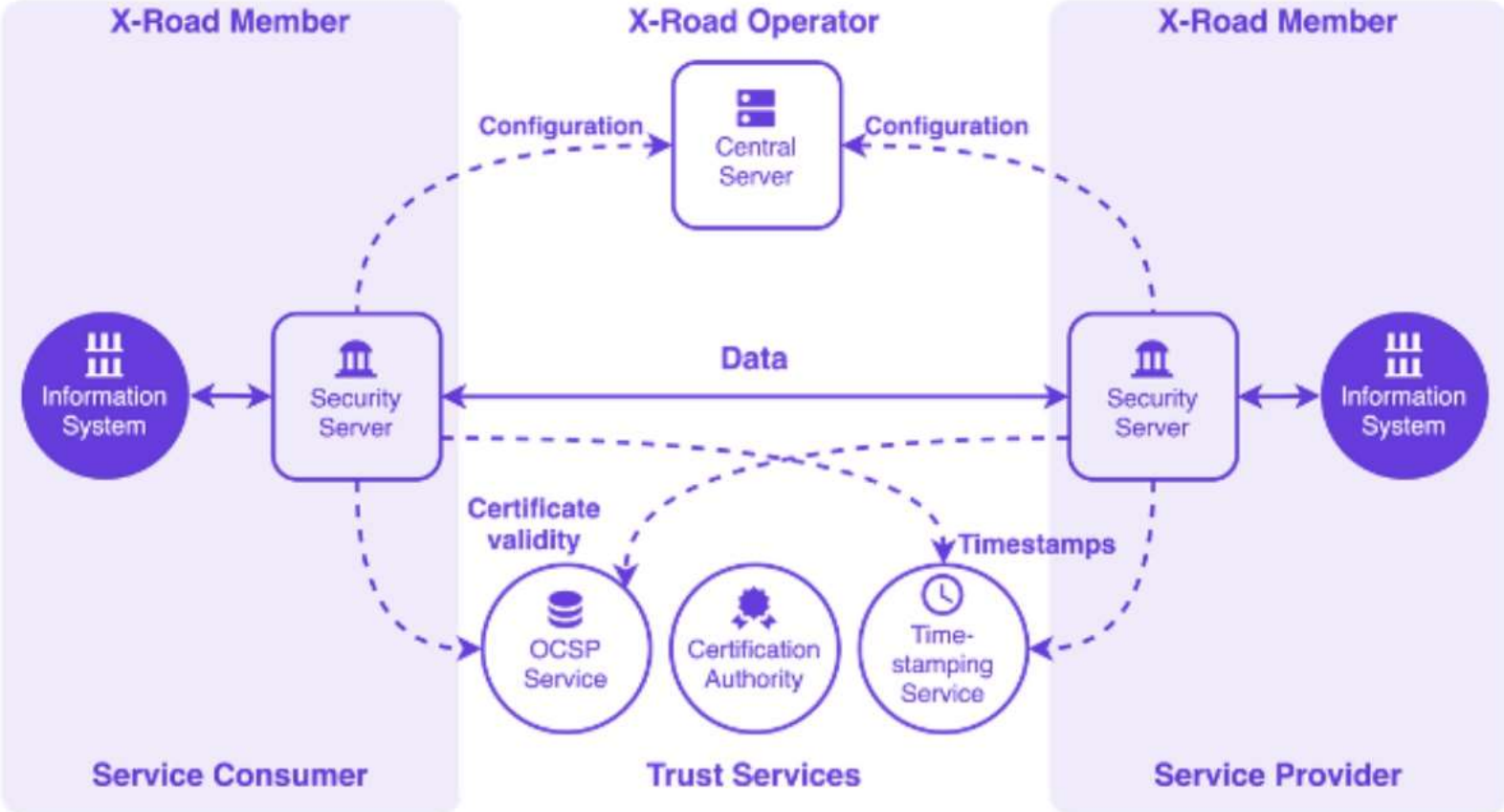
X-ROAD VS POINT-TO-POINT



X-ROAD ECOSYSTEM

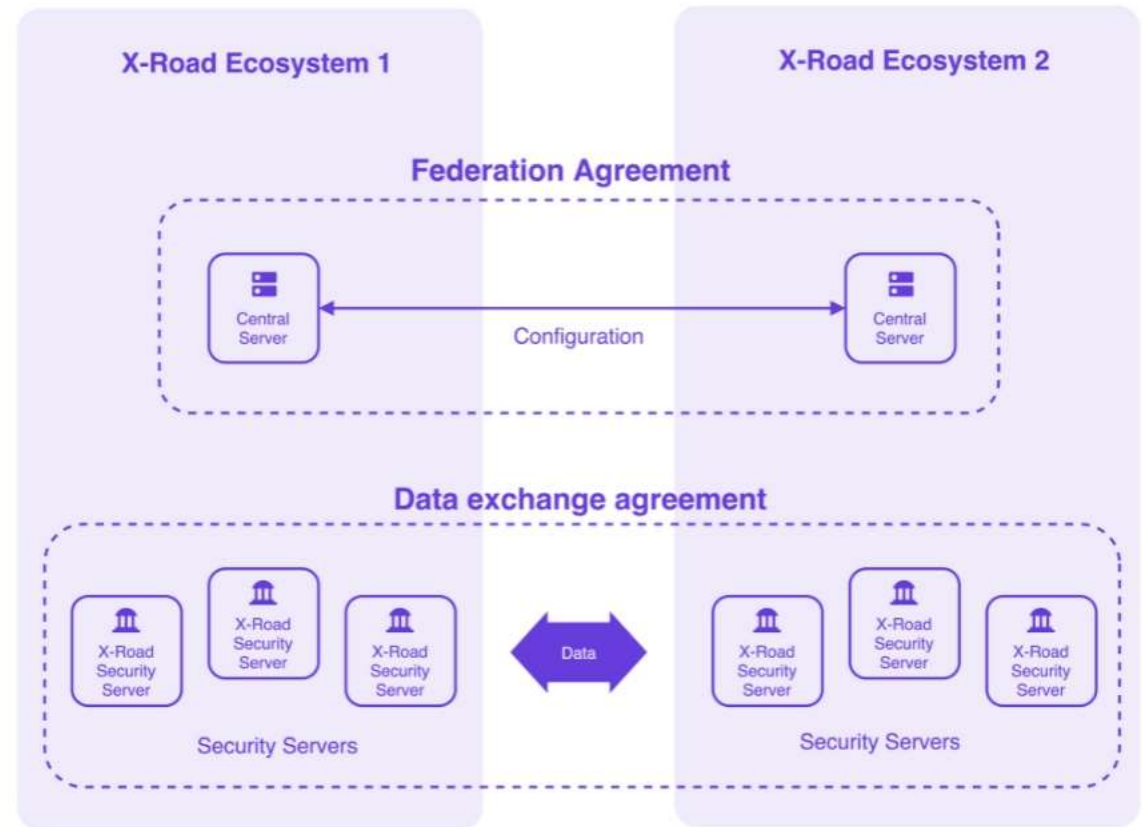


DATA EXCHANGE IN X-ROAD



TRUST FEDERATION

- Federation is a one-to-one relationship between two ecosystems.
- Members of the federated ecosystems can publish and consume services with each other as if they were members of the same ecosystem.
- Federation is not only about technology – administrative and/or legal agreements are also needed between:
 - X-Road operators of the federated ecosystems.
 - Member organisations that exchange data (data exchange parties).



TOWARDS A DATA SPACE SOLUTION

TRANSITION TO A DATA SPACE TECHNOLOGY



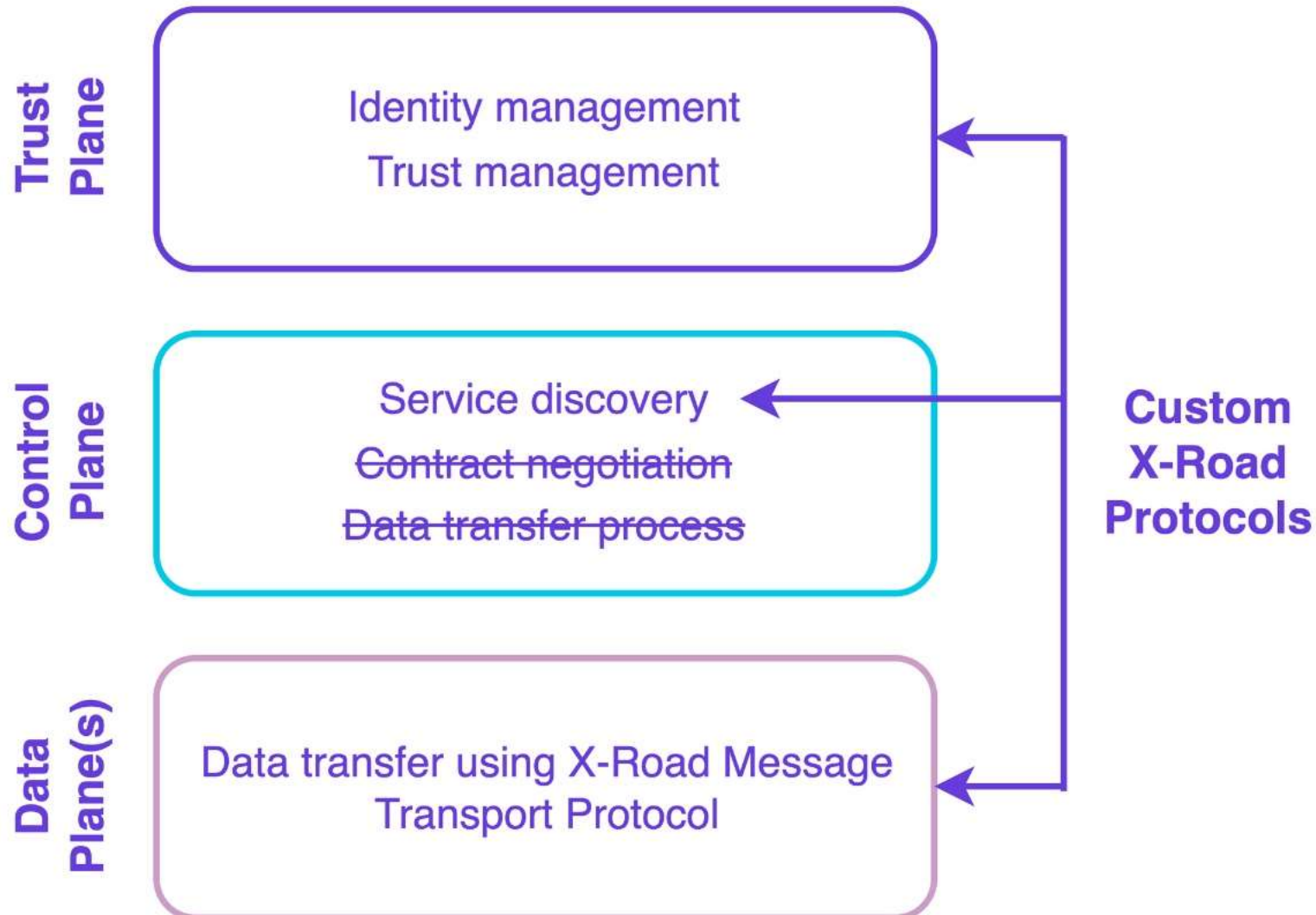
Current state

X-Road has its own custom protocol stack and being interoperable with other data exchange ecosystems requires building and maintaining custom ecosystem-specific gateway solutions. NIIS is alone responsible for maintaining and developing X-Road.

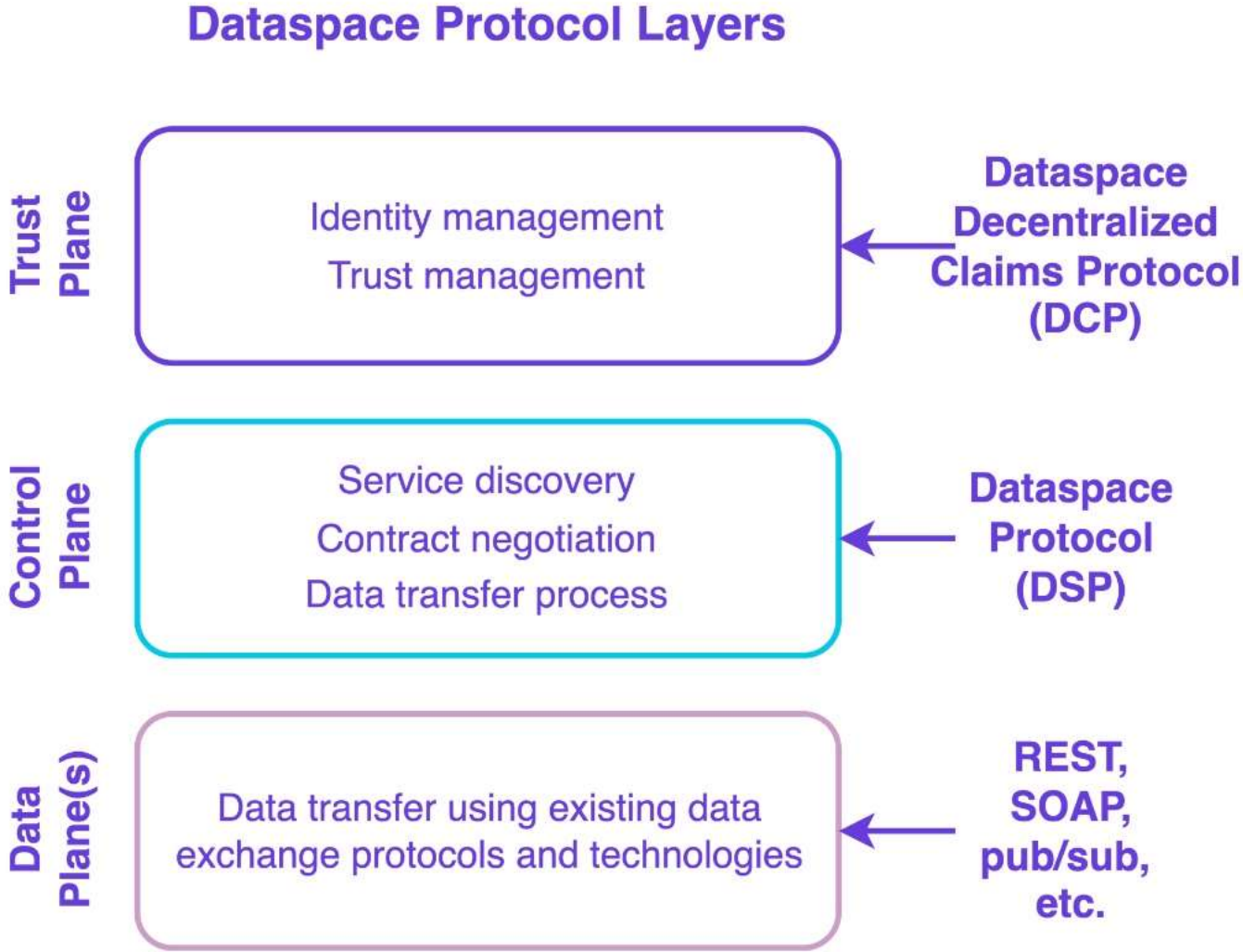
Target state

X-Road uses the standard data space protocols and is interoperable with other data exchange ecosystems following the same standards and specifications. X-Road is based on existing open-source components that are maintained by their international developer communities. NIIS contributes to the maintenance, but the main focus is in developing new business features for the NIIS members.

THE CURRENT X-ROAD PROTOCOL STACK



THE DATA SPACE PROTOCOL STACK



X-ROAD 8 “SPACESHIP”

The X-Road 8 “Spaceship” nurtures the proven ecosystem model and security while it takes X-Road to the next level by providing a solid data space infrastructure.

NIIS aims to replace X-Road’s custom protocol stack with the data space protocol stack and align X-Road’s trust framework with the Gaia-X trust framework.

Close to the current concept of the X-Road ecosystem, data space is a distributed system defined by a governance framework that enables secure and trustworthy data transactions between participants while supporting trust and data sovereignty.

The aim is to ensure smooth integration with previous X-Road versions for backwards compatibility, and minimize the changes required for information systems when transitioning to X-Road 8.



X-ROAD® 8



Are you ready to explore data spaces?

[x-road.global/
spaceship](https://x-road.global/spaceship)

Agenda morning session



Welcome

- Keynote to the vision of digitalisation, Alexander Markowetz
- Activities on the European SET-Plan, Stavros Stamatoukos, DG Energy
- Introduction of activities in the energy sector: CEtPartnership, HE project int:net

Data Space development and interoperability in the different sectors

- **Healthcare:** myHealth@EU
- **Agriculture:** standardisation activities
- **Energy:** Project EDDIE, Project ENERSHARE, Project OMEGA-X
- **Transportation:** Project DeployEMDS
- **Public Services:** X-Road® 8 "Spaceship"

Lunch Break

14:00 Behind the scenes tour (IHE) Connectathon test floor

15:00 Interactive Session on practical views to interoperability testing