Thematic advisory board
Cycle Data Space

2024-06-11 – Casper Van Gheluwe

MegaBITS
Mobilizing Europe's Green Ambition through Bicycles and Intelligent Transport Systems

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Interreg North Sea
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Agenda

- 10h00 – 10h20
  - *Steven Logghe – Digitaal Vlaanderen & Movias*
  - Demonstration of the Flanders Smart Data Space on Traffic Counts
    - What is the added value of data spaces for mobility policy makers?
- 10h20 – 11h00
  - *Aron-Levi Herregodts – imec*
  - Data Space Business Models
    - What are they?
    - How to ensure that a data space is sustainable?
    - What is the added value for data providers or consumers to use a data space?

11h00 – 11h10

Agenda

- 11h10 – 11h30
  - *Casper Van Gheluwe – imec*
  - Cycle data space – Links with EMDS, plans & timing
- 11h30 – 12h00
  - *All of you*
  - Open discussion, ideas & remarks from AB members and partners

MegaBITS – Thematic Advisory Board “Cycle Data Space”

2024-06-11

Casper Van Gheluwe

Contents

1. Recap
2. What is the CDS?
3. Links with deployEMDS
4. Plans upcoming 6 months

Recap

What's our role?

- Upcycling the current Cycle Data Hub
- Connect with other platforms and initiatives
- Lead research on Floating Bicycle Data
- Support impact assessments
- Advise partners on data governance & standardisation
- Exchange our knowledge on ITS and C-ITS solutions

Get your copy now!

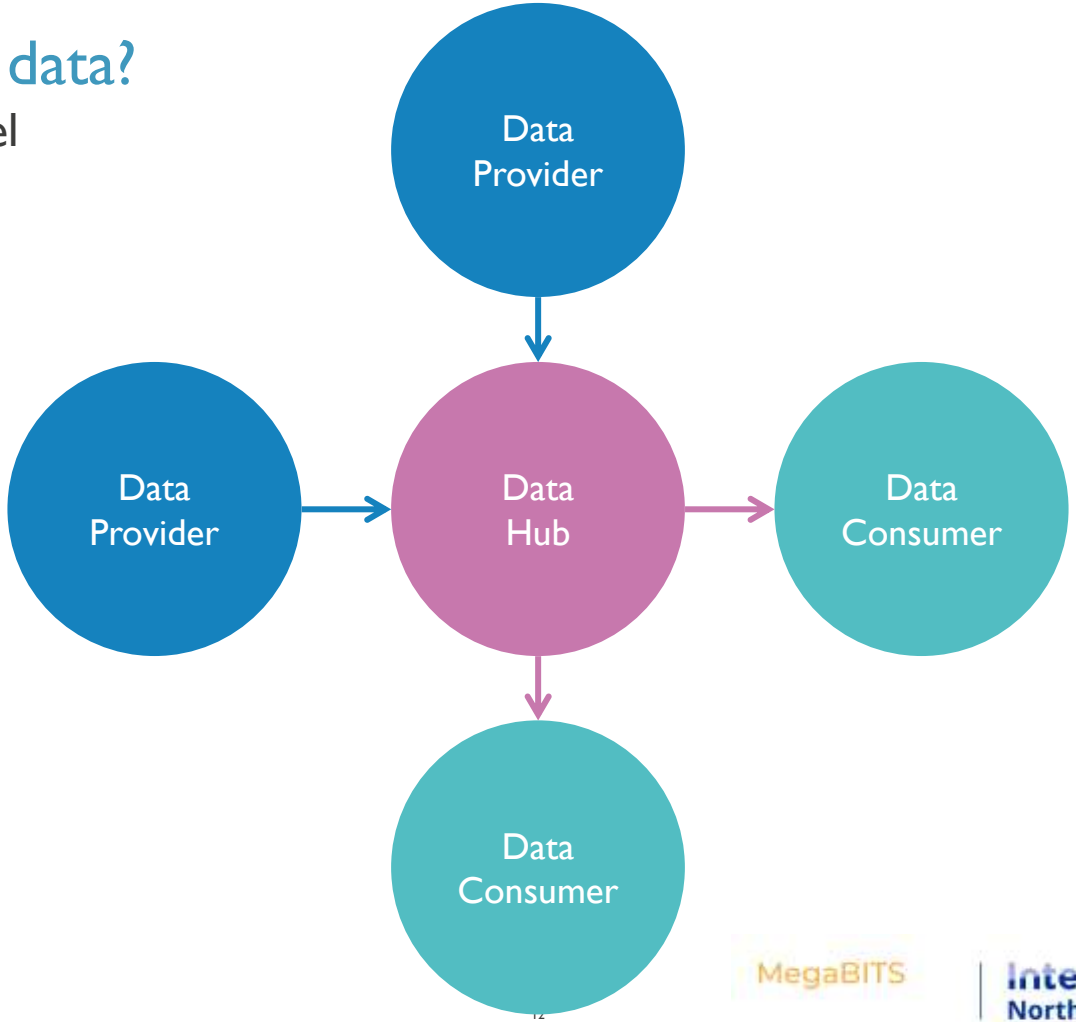
Cycle Data Space

How to share data?

Bilateral, ad-hoc arrangements

How to share data?

Hub & spoke model



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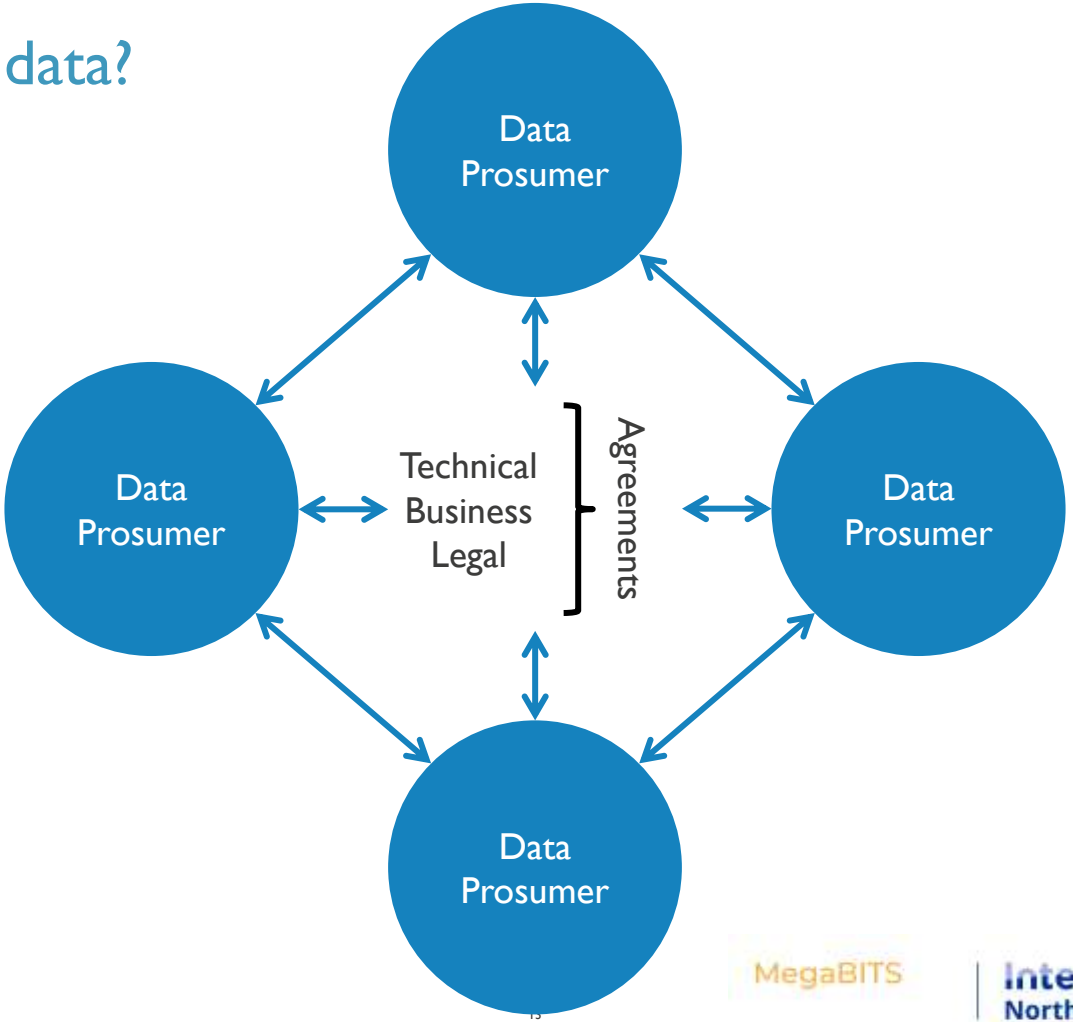
How to share data?

Data spaces



CDH vs. CDS

CDH

Centralized solution

Limited data standardization

Free and open data only

No federation to other data ecosystems

CDS

Decentralized solution

Standardization part of the onboarding

Potential for data economies

Collaboration NAPs and EMDS

Towards a common European mobility data space

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Context

deploy EMDS

PrepDSpace4Mobility

Technical assistance study

Context

PrepDSpace4Mobility

Digital Europe Programme
Oct 2022 – Sep 2023

Map existing data ecosystems

Analyse and recommend common building blocks for a future EMDS

deploy EMDS

Digital Europe Programme
Nov 2023 – Oct 2026

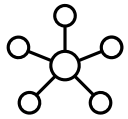
Common technical infrastructure

Common governance mechanisms

Real-life implementation projects

Technical assistance study

Connecting Europe Facility



Interlinking layer

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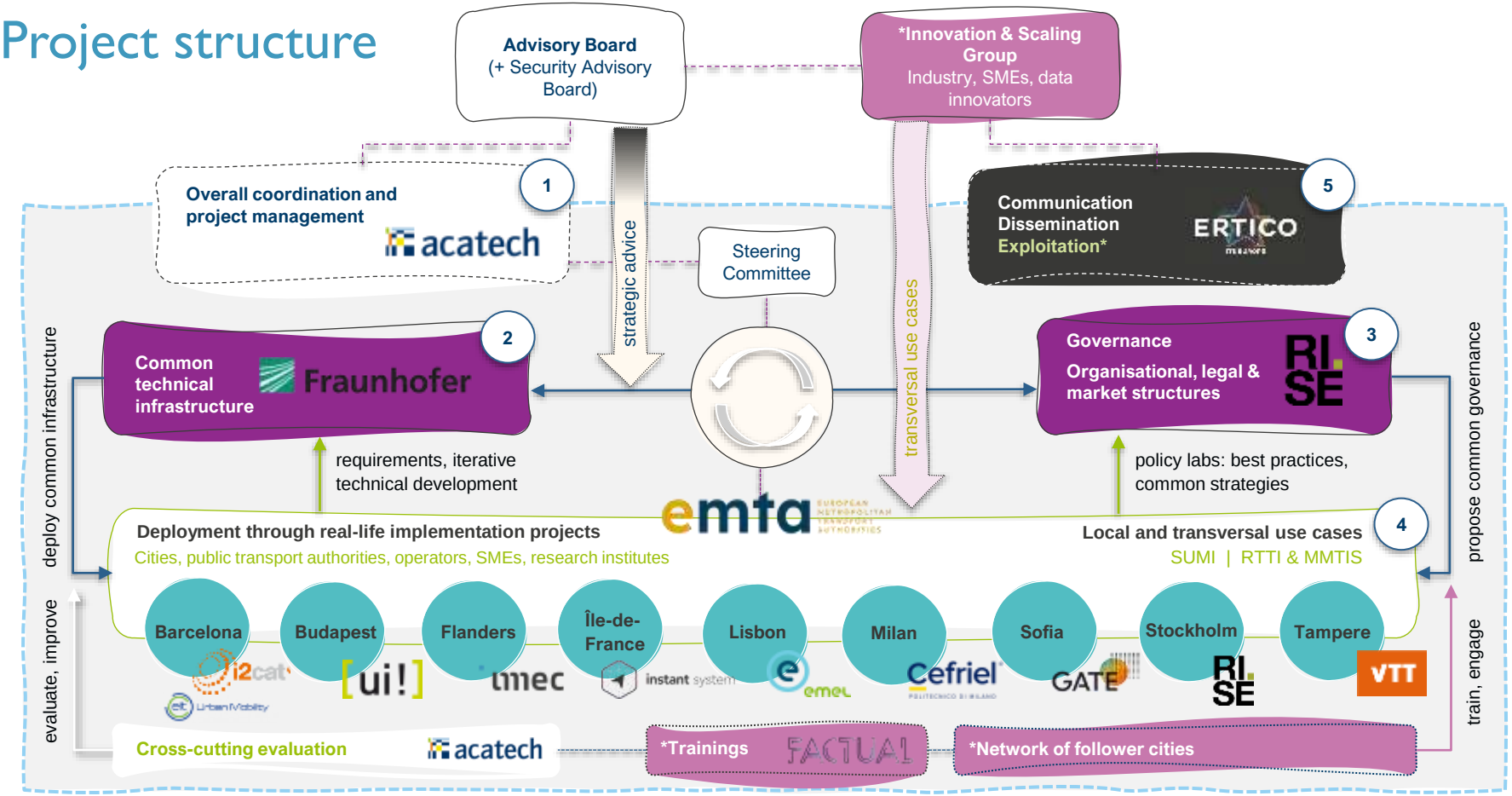
deploy EMDS

Project structure

36 months (Nov 2023 – Oct 2026) | Budget: ~EUR 16 million

38 beneficiaries (cities, regions, technical & domain expertise) | 7 associated partners

Project structure



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."

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EMDS

Methodology

Goal

Define requirements for the data space

Characteristics

- Bottom-up
- Capability-driven
- Based on existing frameworks:
  - Open Data Product Specification (ODPS)
  - DSBA Technical Convergence
  - DSSC Blueprint v1.0

Steps

Canvas design

Intake process

Capability mapping

Read

Canvas design

DATA PRODUCT OFFERINGS | GOVERNANCE | BUSINESS MODELS & STAKEHOLDERS | DATA SPACE FEDERATION

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***

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Canvas design

DATA PRODUCT OFFERINGS | GOVERNANCE | BUSINESS MODELS & STAKEHOLDERS | DATA SPACE FEDERATION

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?		*Multimodal Traffic Counts*	Define/specify the data product offering being analysed in this sheet.	Do0
2	Can you provide a functional description of your data product offering?		*"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.*	Functional description of the data product offering.	Do4
3	What is the scope of the data offering in terms of transport modalities?		*Truck, car, bicycle, pedestrian*	Used for grouping and quantitative analysis.	Do3
4	What is the geographical data product offering scope?		*Flanders*	Used for grouping and quantitative analysis.	Do3
5	What is your data product offering type?		*3) For a federated data space structure, we provide an intermediary service to link VSDS with EMDS*	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?		*FI.01.01 - FI.01.09*	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.	

3. Data product governance

Background	The information in this section will help identify standard practices in data management and product compliance, including industry/domain standards and governance models relevant for various use cases. Data product owners should outline their trust-building processes, which will guide our decision on supporting identity management and data sovereignty, and to see if a fully managed trust model is needed by the data space.				
No	**Question to be answered**	**Answer**	**Example answer**	**Context**	**Reference**
13	Which data model (if any) would you like to use?		*OSLO Verkeersteilingen, MobilityDCAT-AP*	This question refers to the desired conformity of the data sources. Possible answers are for example: OSLO, MMTIS, MDS, DATEX-II, TOMP, GTFS, GTFS-RT, NeTeX, ... or none.	Dp1
14	Are there any requirements for authentication and identification of participants?		*Participants registered to VSDS must be able to claim EMDS data products without re-registering. If they are Flemish citizens, their identity must be linked to 'Mijn burgerprofiel'.*	We need to know if participants are bound to specific identity management governance or processes and verifications when they want to use the data product. Think of claims participants could need, specific identity standards they must adhere to (e.g., EIDAs), domain registries that can identify them (e.g., a company registration registry). Which certification bodies and identity providers are involved?	Dp5
15	Are there any requirements for access control to the data product?		*Participants that want to access the data product should prove they are European citizens or companies with a primary seat in a European country.*	We need to know which claims can be verified by which trust anchor.	Dp6
16	Self asses your data product governance maturity.		*3: up until now only open data in the VSDS, so little experience with governance, but the team agrees on the roadmap.*	We would like you to think carefully about the maturity of the data product governance and to indicate this on a scale from 1 (not discussed yet) to 5 (all partners agree on the roadmap). Please also elaborate on why you chose this number. This self-assessment will allow us to identify mature and early-stage components of the data product offering. The results can be used to prioritise certain building blocks, organise training, cluster	

...

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deployEMDS

Intake process

Example Flanders

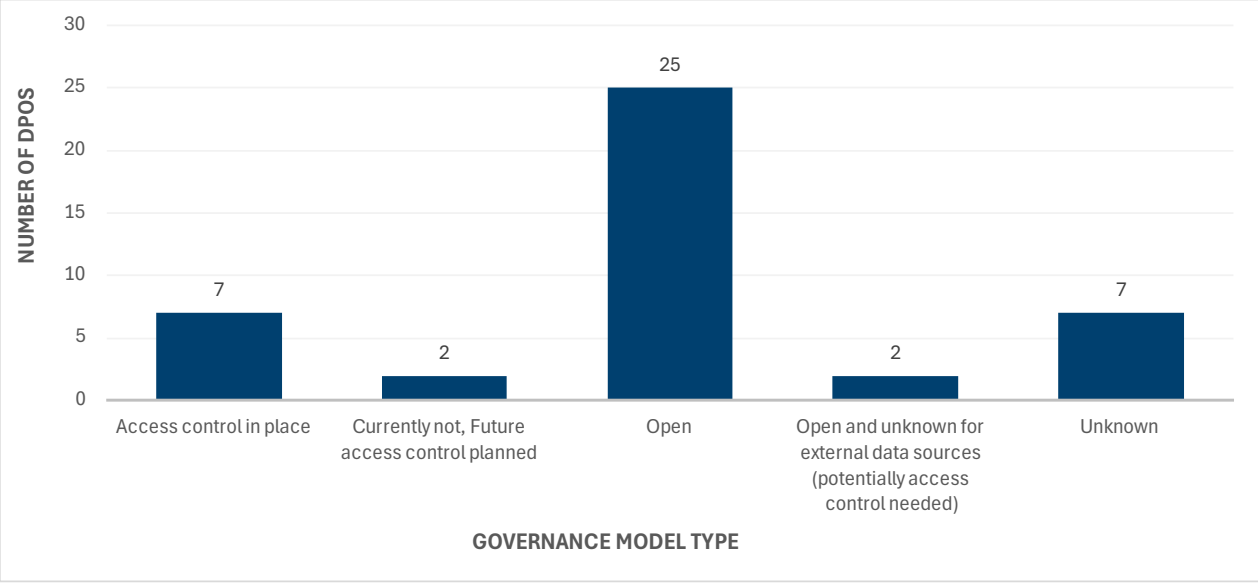
Multimodal Traffic Counts

"Multimodal Traffic Counts is a data product offering designed to provide comprehensive, integrated traffic data across various modes of transportation (feet, bike, car, truck) for traffic managers, city administrations, researchers and other stakeholders. The offering contains nine data sources on traffic counts (including vehicular (cars, buses, trucks), pedestrian, and bicycle traffic). This data is gathered through a mix of sources such as sensors, cameras, both temporary as permanent."

Data sources:

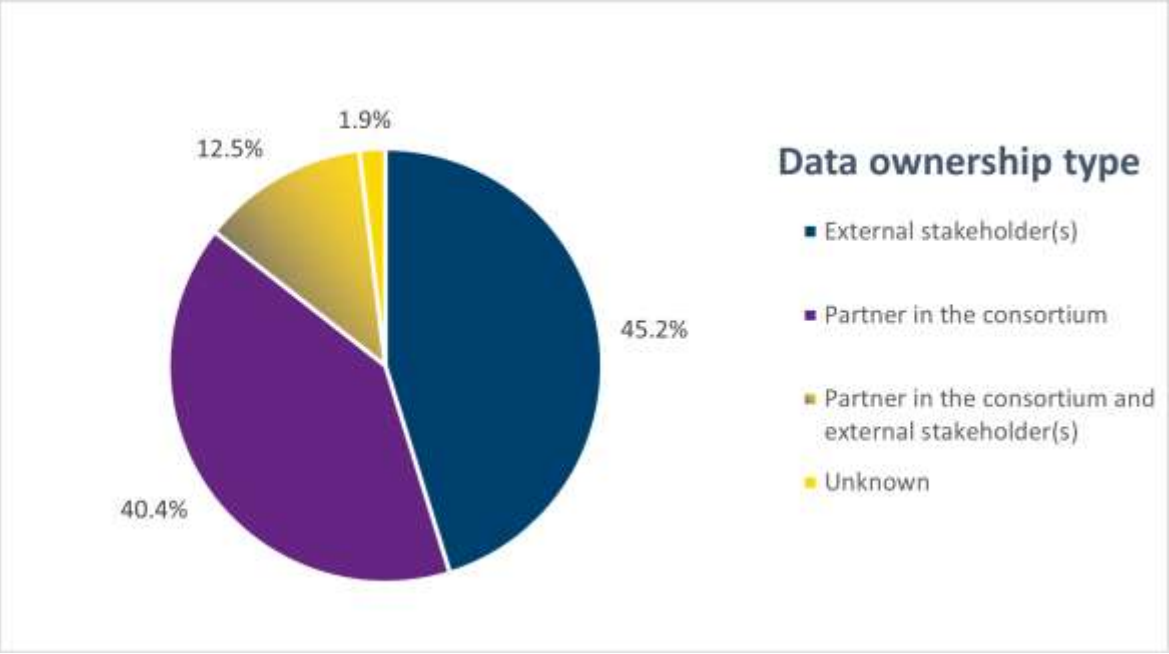
Flanders	FI.01	FI.01.01	FI.DPO.01.01	Permanent Traffic measurements Motorway	Traffic Centre Flanders	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.02	FI.DPO.01.01	Permanent Bike counting Flanders	Agency Road and Traffic	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.03	FI.DPO.01.01	Temporary traffic counting by Geomobility	City of Bruges	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.04	FI.DPO.01.01	Temporary speed smileys by Krycer	City of Affligem	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.05	FI.DPO.01.01	Permanent Bike countings by Signco	City of Antwerp	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.06	FI.DPO.01.01	Citizen Science traffic measurements	Telraam	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.07	FI.DPO.01.01	Smart Camera measurements	City of Genk	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.08	FI.DPO.01.01	Traffic counting by Geosparc	City of Leuven	External stakeholder(s)	No standard	OSLO/DCAT-AP
Flanders	FI.01	FI.01.09	FI.DPO.01.01	Traffic measurement by city of Kortrijk	City of Kortrijk	External stakeholder(s)	No standard	OSLO/DCAT-AP

What are we dealing with?



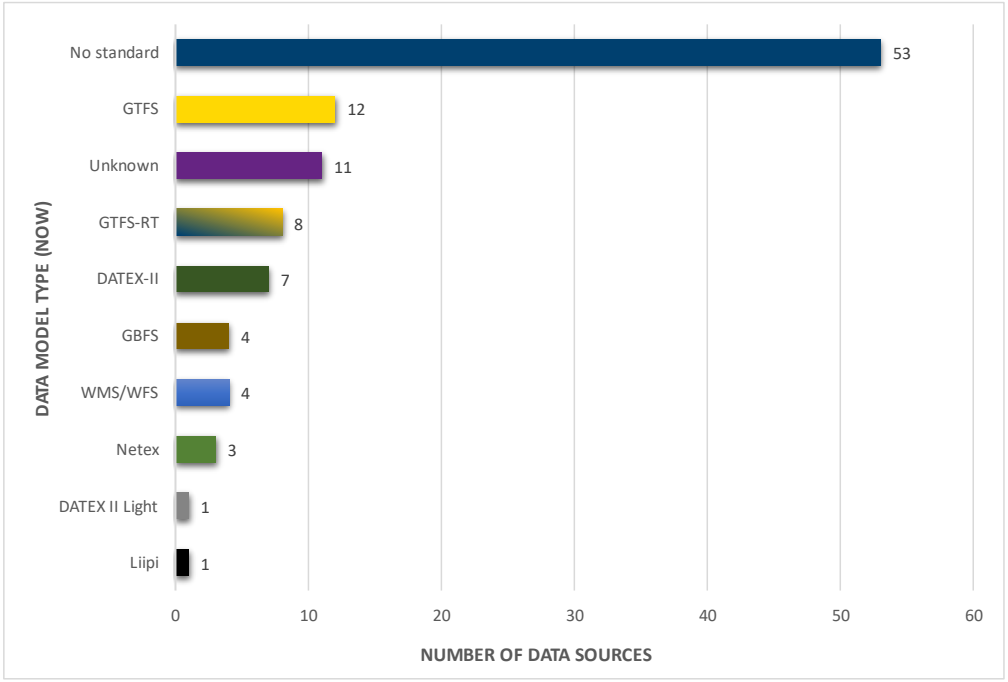
→ A lot of open data

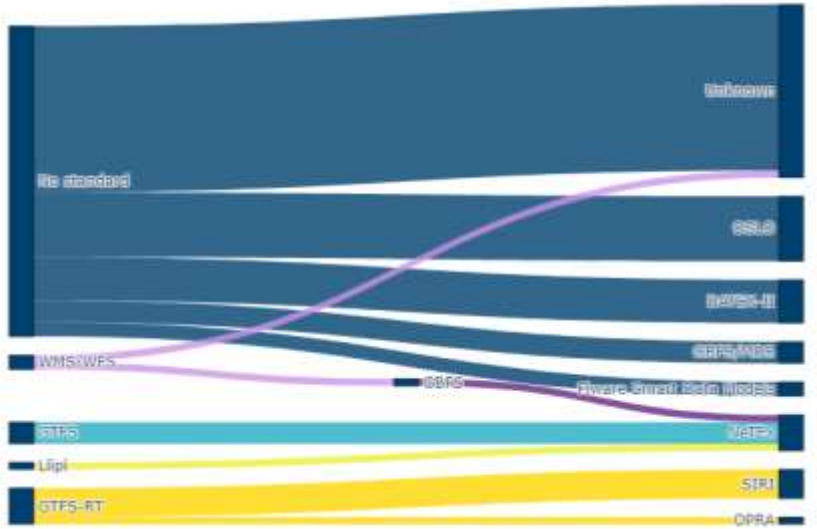
What are we dealing with?



→ A lot of external stakeholders

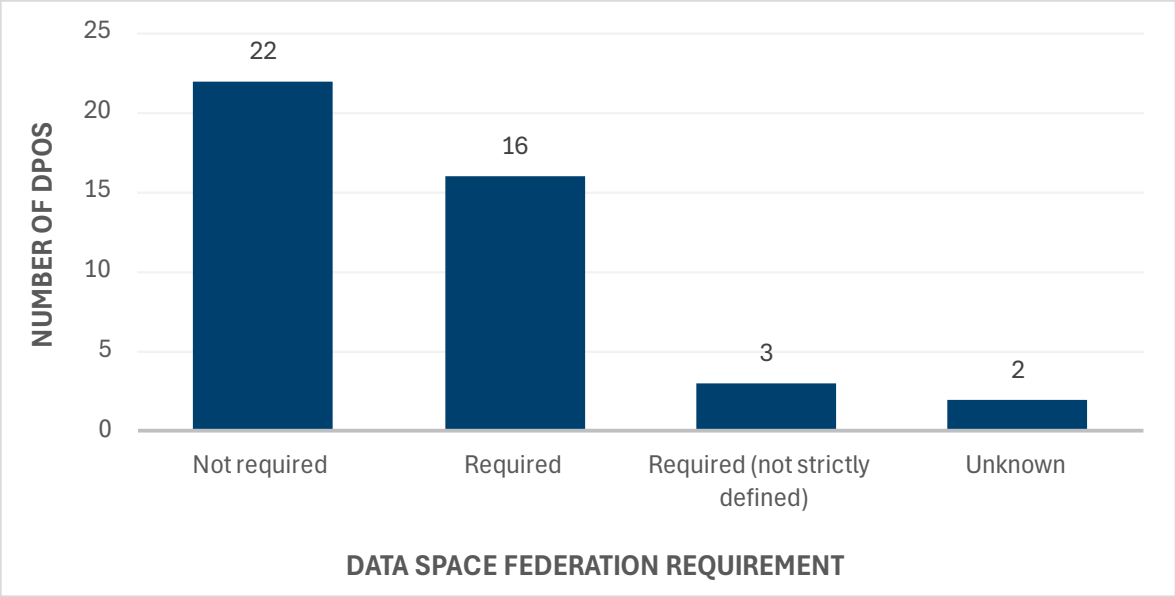
What are we dealing with?





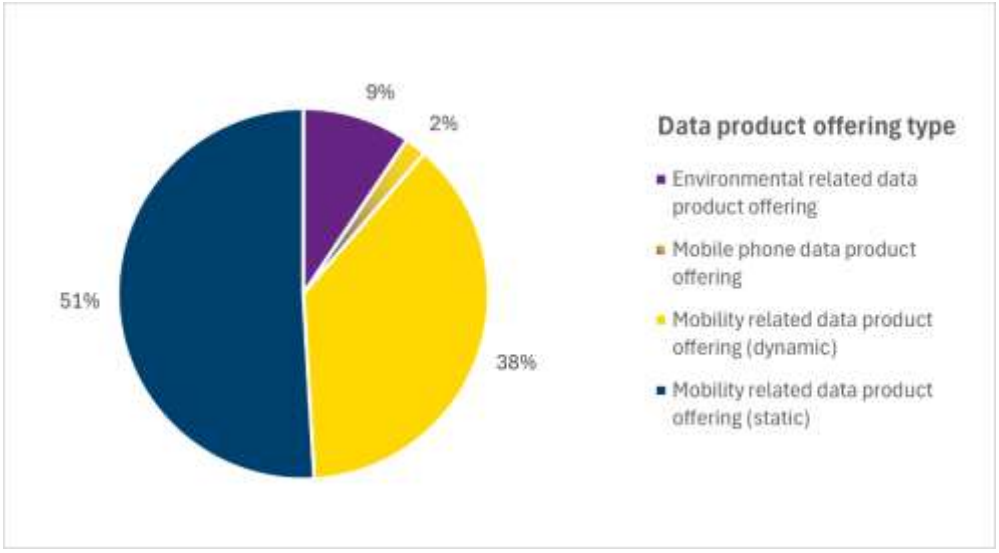
→ Little standardization (for now)

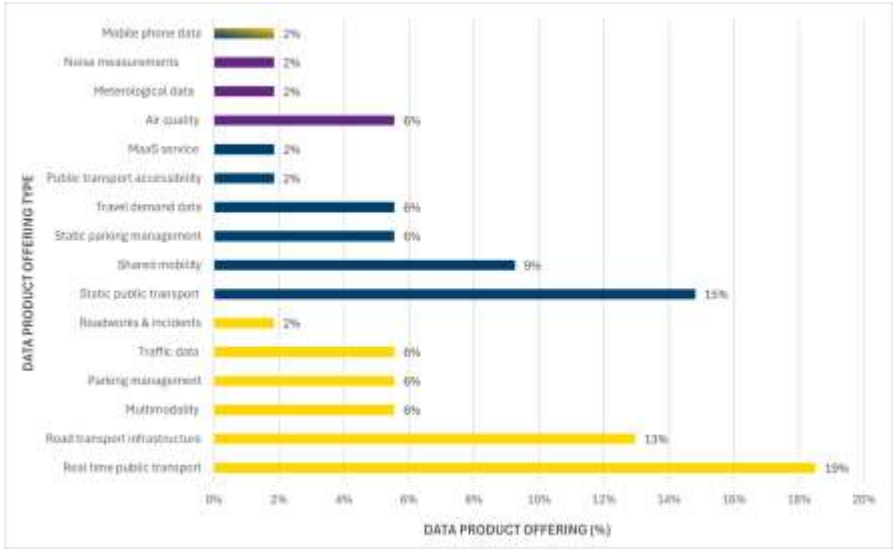
What are we dealing with?



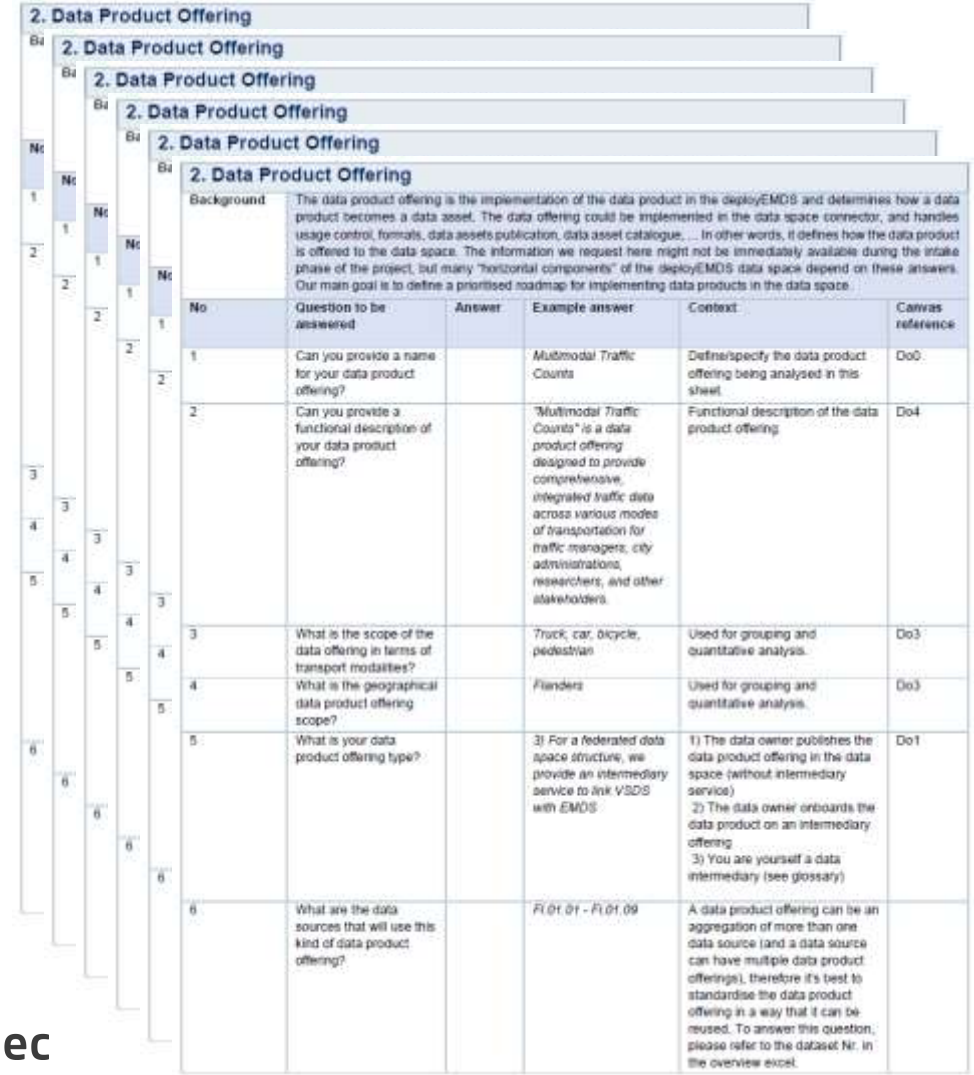
→ Many local data spaces

What are we dealing with?





→ More than mobility data



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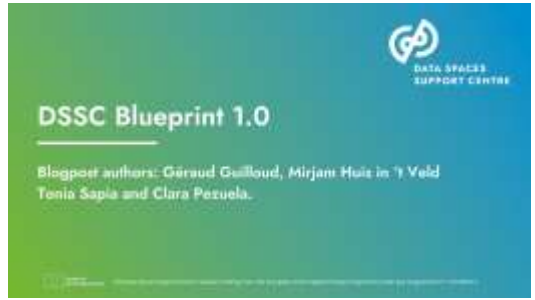
Steps

~~Canvas design~~

~~Intake process~~

Capability mapping



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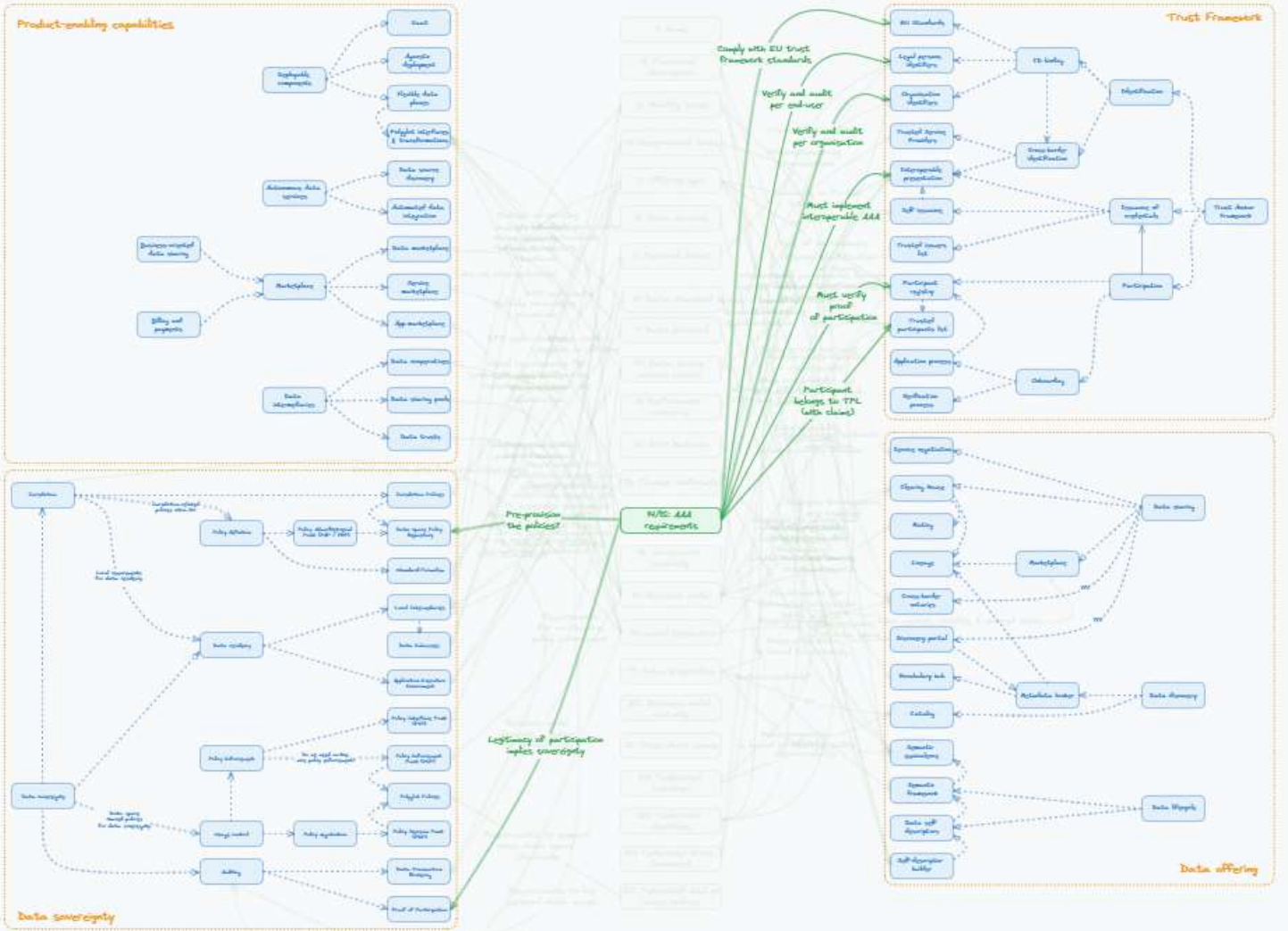
deployEMDS



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dataspace EMDS

Capability mapping

Example Flanders

Question 14-15: Are there any requirements for authentication/identification or access control of participants?

Trusted issuers list

The Trusted Issuer List binds Producers and Consumers when a data sharing agreement has been fulfilled, so that selective access control can be implemented.

Interoperable presentation

Identifiers should support existing identity frameworks that are in use by VSDS.

Answer: at this moment no identification, but we plan to roll out a Control plane with registration/verification by a central authority in our local data space (VSDS). We do not have specific limits defined yet for access control, but it might be an option to only give access to participants who also share data.

Capability mapping

Example Flanders

Question 14-15: Are there any requirements for authentication/identification or access control of participants?

Answer: at this moment no identification, but we plan to roll out a Control plane with registration/verification by a central authority in our local data space (VSDS). We do not have specific limits defined yet for access control, but it might be an option to only give access to participants who also share data.

Trusted issuers list → The Trusted Issuer List binds Producers and Consumers when a data sharing agreement has been fulfilled, so that selective access control can be implemented.

Interoperable presentation → Identifiers should support existing identity frameworks that are in use by VSDS.

	EDC	Fiware	Gaia-X	iShare
Trusted issuers list	✓	✓	✗	✓
Interoperable presentation	✓	✗	✗	


deploy
EMDS
Project deliverable D2.1
Requirements analysis
of the technical infrastructure
Co-funded by

imec

Plans next months

Step 1: Refresh the CDH UI

Request Experiment | Add Dataset | Logout

AI

- Datasets
- Use cases

Datasets

Explore, analyze, and share quality data. Learn more about setting up your own dataset within the dataspace

Search...

Trending datasets

agriculture | energy | environment | mobility

Hyperspectral camera bands 3

Imec ~ 01/09/23 - 20/09/23

CSV ~ 10 KB

Public Car Parks in Brussels

Brussels ~ 2019

CSV ~ 1 KB

Agriculture emissions

Vito ~ 2011-2021

CSV ~ 1229 KB

Compiled report on total CO2 emission and energy consumption

Vito ~ 2011-2021

CSV ~ 92413 KB

1 2

Next →

https://test.citcom.imec-apt.be/home/urn:li:dataset:(urn:li:dataPlatform:csv,brupar,PROD)

Request Experiment | Add Dataset | Logout

Datasets

Use cases

Hyperspectral camera bands 3

Owned by Imec

Dataset with 120 different frequence range layers from infrastructure on vijfhoek De Bruul.

Request access

Sample download

Version	2021-10-18T10:40:00Z
Asset Type	FILE_SYSTEM
Storage Type	csv

About:

Each IoT device collected a total of seven different readings from the four sensors on a regular interval. Sensor readings include temperature, humidity, carbon monoxide (CO), liquid petroleum gas (LPG), smoke, light, and motion. The data spans the period from 07/12/2020 00:00:00 UTC – 07/19/2020 23:59:59 UTC. There is a total of 405,184 rows of data. The sensor readings, along with a unique device ID and timestamp, were published as a single message, using the ISO standard Message Queuing Telemetry Transport (MQTT) network protocol. Below is an example of an MQTT message payload.

Context:

The data was generated from a series of three identical, custom-built, breadboard-based sensor arrays. Each array was connected to a Raspberry Pi devices. Each of the three IoT devices was placed in a physical location with varied environmental conditions.

Hyperspectral Camera

Belgium / Mechelen / De Bruul

Agriculture emissions

Owned by VITO

Non-energy-related emissions of N2O and CH4 (in tonnes of N2O and CH4 and kilotons of CO2 equivalents per year) for the agricultural sector and this for all Flemish municipalities.

About:

This dataset contains the non-energy-related emissions of N2O and CH4 (in tonnes of N2O and CH4 and kilotons of CO2 equivalents per year) for the agricultural sector and this for all Flemish municipalities from 2011 to 2021. Each row in this dataset provides an estimate of emissions per pollutant (CH4 or N2O) and covers one full calendar year and the territory of one municipality (defined by a NIS code). For the pollutant CH4, a distinction is made between emissions related to manure storage and digestion processes (defined by type). For the pollutant N2O, a distinction is made between emissions related to manure storage and soil (defined by type).
The CH4 emissions (from digestion processes and manure storage) per municipality and the N2O emissions (from manure storage) are estimated on the basis of the number of animals per municipality and an emission factor per animal category. The Flemish Land Agency (VLM) provides municipal data on the number of animals per animal category from the Manure Bank. The CH4 and N2O emission factors per animal category are supplied by the Flemish Environment Agency (VMM) and come from the VMM calculation models, in particular the CH4 VEE and N2O model. These models are also used in drawing up the emissions inventory for Flanders.
The N2O emissions from the soil (direct and indirect) are estimated on the basis of the total emissions in Flanders. To rescale the Flemish figures to municipal level, a distribution key is used: ratio of hectares of cultivated land per municipality compared to hectares of cultivated land in Flanders. The total N2O emissions released (directly & indirectly) from the soil in Flanders are supplied by the Flemish Environment Agency (VMM). These emissions are calculated with the N2O model of the VMM. For the total hectare of cultivated land in Flanders, we refer to the figures from the Manure Bank provided by the Flemish Land Agency.
The global warming potential (GWP) of CH4 and N2O based on the IPCC 2006 guidelines and the SEAP guidebook (part II) are used for conversion of CH4 and N2O emissions to CO2 equivalents. The global warming potential (GWP) of CH4 and N2O based on the IPCC 2006 guidelines and the SEAP guidebook (part II) are used for conversion of CH4 and N2O emissions to CO2 equivalents.
Important. When opening and importing the open dataset, take the character encoding into account. The character encoding may cause some characters to be displayed incorrectly or the file to have to be converted first. The CSV file uses ANSI character encoding. The columns are separated by a comma and the '.' notation is a decimal point. No separation for thousands is applied.

Indication of reliability

The reliability indicator distinguishes between three levels. Each level indicates to what extent the estimates can be used for monitoring local trends and impact of local policy measures.

Reliability indicator level 1:
- The figure is derived from local measurements/counts
- the figure is an accurate reflection of local reality
- the evolution of the figure over the years allows the impact of local efforts to be monitored.

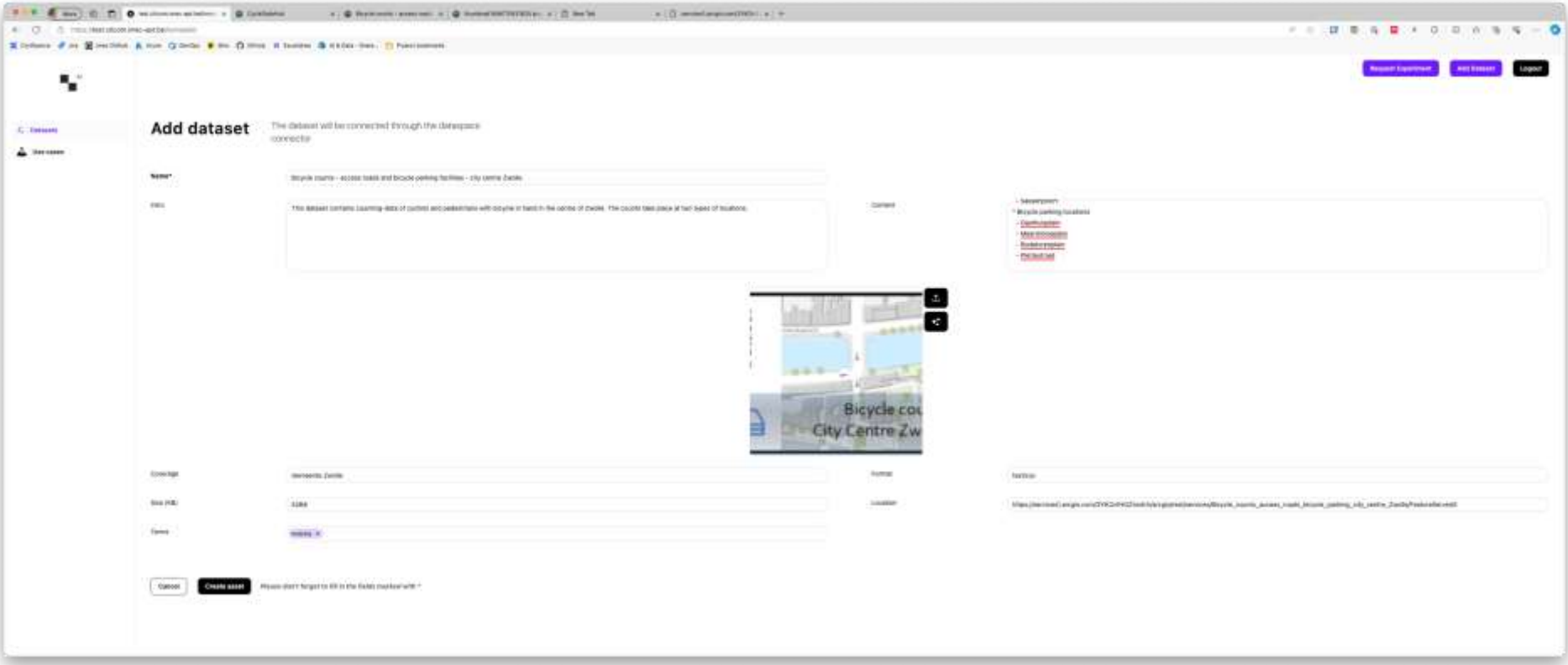
Reliability indicator level 2:
- The figure is derived from a combination of local measurements/counts and non-local (Flemish) data/parameters
- the figure is a less accurate reflection of local reality
- the evolution of the figure over the years nevertheless allows a trend to be derived and linked to local efforts.

Reliability indicator level 3:
- The figure is derived from non-local (Flemish) data/parameters
- the figure is not an accurate reflection of local reality – or at most coincidental
- the evolution of the figure over the years follows the Flemish trend and cannot be attributed to local efforts.

Context:

This dataset is created by the Flemish Institute for Technological Research (VITO) on behalf of the Flemish government.

Flanders


Add dataset
The dataset will be connected through the dataspace connector
Bicycle cou
City Centre Zw

Add dataset

The dataset will be connected through the dataspace connector

Refreshed CDH UI

Next steps

- MegaBITS-ify the styling
- Refine and add some features
  - Map viewer
  - Geographic overview of data sets
  - Data categories
  - Links with BID
  - Better tagging system
  - Improve and interoperable AAA

Ready for the European Mobility Data Space!

- Make data catalog available in machine-readable mobilityDCAT-AP
- Onboard some existing bicycle traffic counts in the VSDS Traffic Counts?

Step 2: Data Space “Lite”

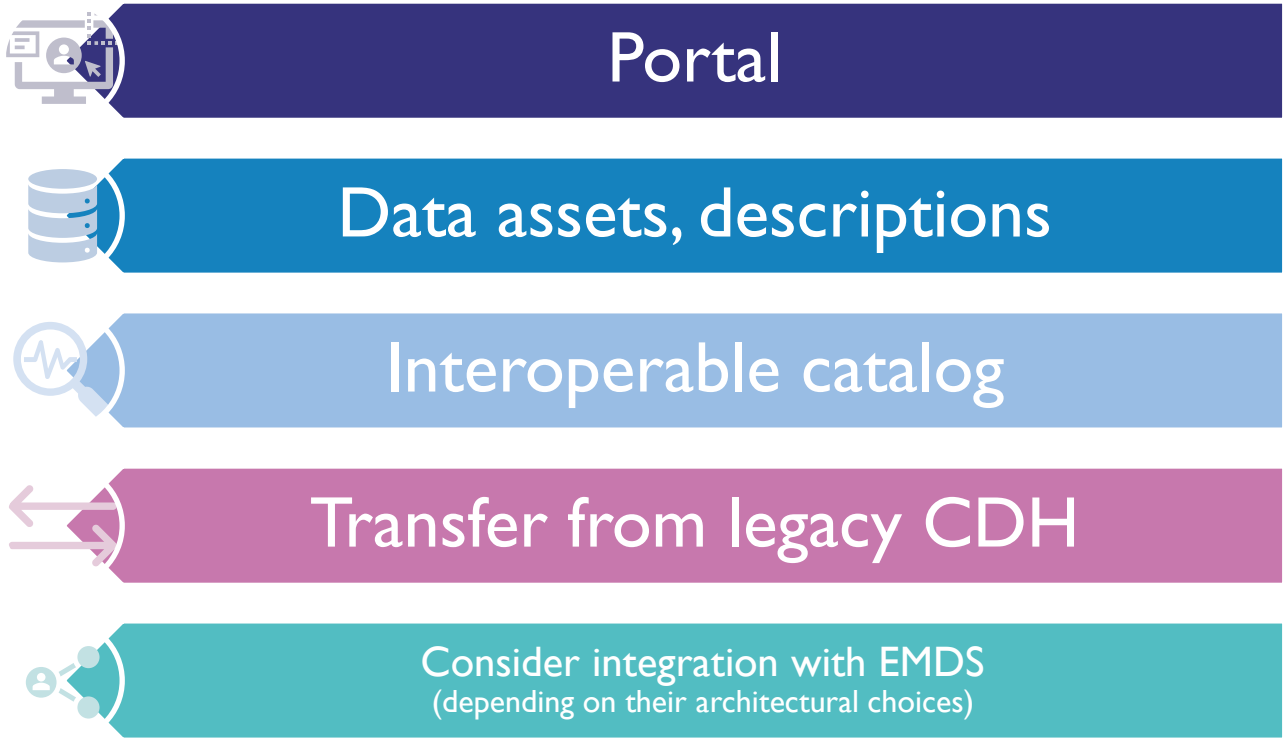
Data Space "Lite"

Why?

- Ecosystem is still very much in movement
  - deployEMDS
  - DG MOVE EMDS study
  - Federation vs. centralized approach?
- No data space building blocks with sufficiently high TRL exist
  - Would be too unstable
- Unclarity on long-term sustainability and business model
  - To be discussed further within the consortium

Data Space "Lite"

What will we do?



Questions or remarks?

Thanks!

MegaBITS

Mobilizing Europe's Green Ambition through Bicycles and Intelligent Transport Systems