Interoperability Building Blocks: The Flemish Smart Data Space approach

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Public Authorities

- Addresses
- Taxes
- Environment
- Cadaster
- Company Registry
- Council Decisions
- Transport infrastructure
- Demographics
- Health
AS-IS

Many different ways (and standards) to exchange data, both on the publisher side and on the consumer side.

TO-BE

Publishers use the same semantic and technical standards, consumers can retrieve data anywhere with the same interface.
FLENDISH SMART DATA SPACE

INTEROPERABLE
The ability of multiple systems to communicate and interact with each other.

DECENTRALISED
We facilitate. Accountability remains with data providers and consumers.

NEW BUSINESS MODELS - PUBLIC AND PRIVATE PLAYERS

DATA CONSUMERS

WORKBENCH
Reusable building blocks for publishing and consumption of Linked Data

DATA PROVIDERS

STANDARDS
Semantic (OSLO) Technical (LDES)

ECOSYSTEMS

GOVERNANCE
The European Interoperability Framework as a starting point

- **Legal level**: To ensure that organizations under different legal jurisdictions and frameworks can share data with common legally binding conditions.

- **Organizational level**: To let stakeholders align goals, expectations, responsibilities and business processes.

- **Semantic level**: To ensure that format and meaning of shared data is preserved and understood.

- **Technical level**: To provide software and hardware components for controlled, sovereign and secure sharing of data.

Source: New European Interoperability Framework
Semantic interoperability: OSLO (Open Standards for Linked Organisations)

https://data.vlaanderen.be/ns
OSLO methodology

- Goal: consensus around data standard supported by various stakeholders
- **OSLO Process and method** for registering, developing, changing, phasing out and changing data standards

1. Register standard under development
2. Develop a specification
3. Publishing and technical assessment
4. Publishing and technical assessment
5. Publishing and technical assessment

- Standard phasing out?
  - Yes
  - No
- Substantial changes?
  - Yes
  - No

Revision period of the standard
Technical Interoperability:
LDES (Linked Data Event Streams) an API for all APIs

The Flemish Smart Data Space provides technical building blocks to create uniform data exchange interfaces based on LDES.
LDES is maintained and developed within the SEMIC initiative

**Linked Data Event Streams (LDES)**

**What is LDES?**

A Linked Data Event Stream (LDES) is a new data publishing approach which allows you to publish any dataset as a collection of immutable objects. The focus of an LDES is to allow clients to replicate the history of a dataset and efficiently synchronise with its latest changes.

At the heart, a Linked Data Event Stream can be interpreted as a publishing strategy by which a data provider allows multiple third parties to stay in sync with the latest version of the data source in a resource and cost-effective manner. In that sense, LDES is a way out from the so-called "API maintenance hell", as described by Pieter Colpaert from UGent.
LDES Building blocks: **Publishing**

A data publisher publishes its data in the Flanders Smart Data Space as an LDES via data processing pipelines.
LDES Building blocks: **Consuming**

Data consumers tap into LDES data in the Flemish Smart Data Space and can create consumption pipelines according to their needs.
Use case: traffic measurements data space

**Telraam**
What: Pedestrians, bikes, cars, bus/freight
How fast: Every hour
Where: 80% Flanders - 20% abroad
Amount: 2,000
Onboarding: end of november

**Vlaams Verkeerscentrum**
What: Cars, bus/freight
How fast: After completion of interval
Where: Whole Flanders
Amount: 2,500
Onboarding: 2024

**AWV – Agentschap Wegen & Verkeer**
What: Bikes
How fast: Every 24 hours
Where: Whole Flanders
Amount: 100
Onboarding: december

**Krycer**
What: Cars, bus/freight (smiley signs: speed)
How fast: Realtime data
Where: data owner municipality of Ternat
Amount: 5 to 10
Onboarding: 2024

**Geomobility**
What: Bikes, cars, bus/freight
How fast: Telecamigns historic data
Where: data owner Brugge
Amount: 48
Onboarding: november

**Signco**
What: Bikes, Cars, bus/freight
How fast: Telecamigns historic data
Where: data owner Antwerp
Amount: 100
Onboarding: 2024

**Stad Genk**
100 smart cameras

**Geosparc**
Leuven traffic measurements
Use case: traffic measurements data space

AI-based user application, answering to the question:

“Show me all measurements for cars between 15h and 16h for which the count is higher than 70”
Use case: water data space

Setup Water Data Space
Identification of stakeholders and use cases (e.g., CIW)

IoW – Sensors for water quality
“Virtual” aggregation of the water sensor network

Smarter water metering
Efficient publishing and consumption of water sensor data in the VSDS
Use case: water data space

Preliminary work using the VSDS building blocks. By using LDES, water quality can be analyzed and aggregated in real-time. This allows emerging trends, deviations from the norm and even alarming situations to be detected.
Next steps

Further align with the international initiatives for Data Spaces
Takeaways

- Semantic and technical **interoperability is possible** in collaborative and standard-based ecosystems.

- The value of interoperability becomes tangible in terms of **productivity** and operational costs reductions.

- Legacy **organisational mindsets** remains to be the biggest obstacle for achieving data interoperability.
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