



Establishing semantic interoperability across data spaces

a solution for sharing vocabularies



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Contact



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[TNO Data Ecosystems](#)



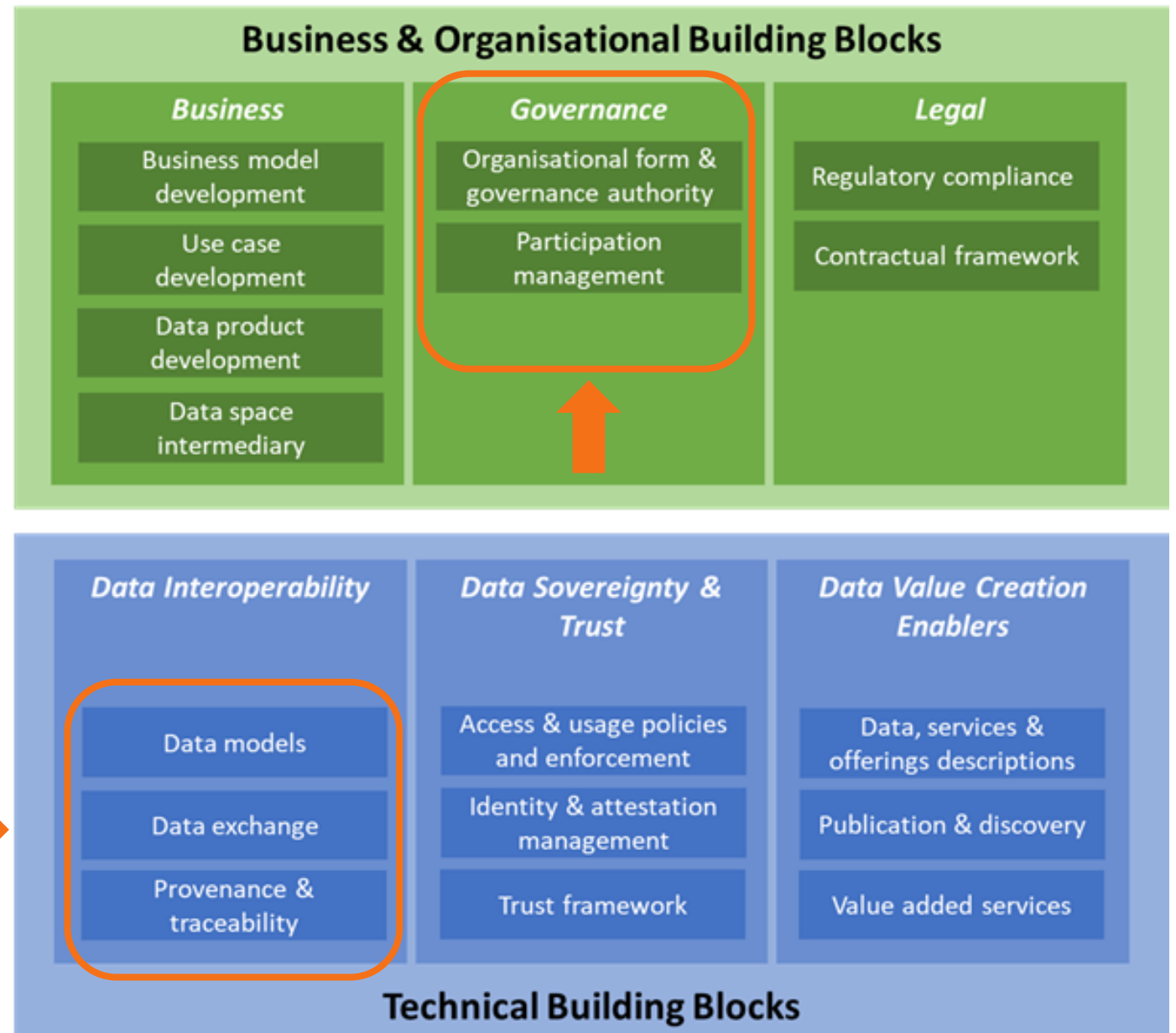
<https://semantic-treehouse.nl>

You might know me from:

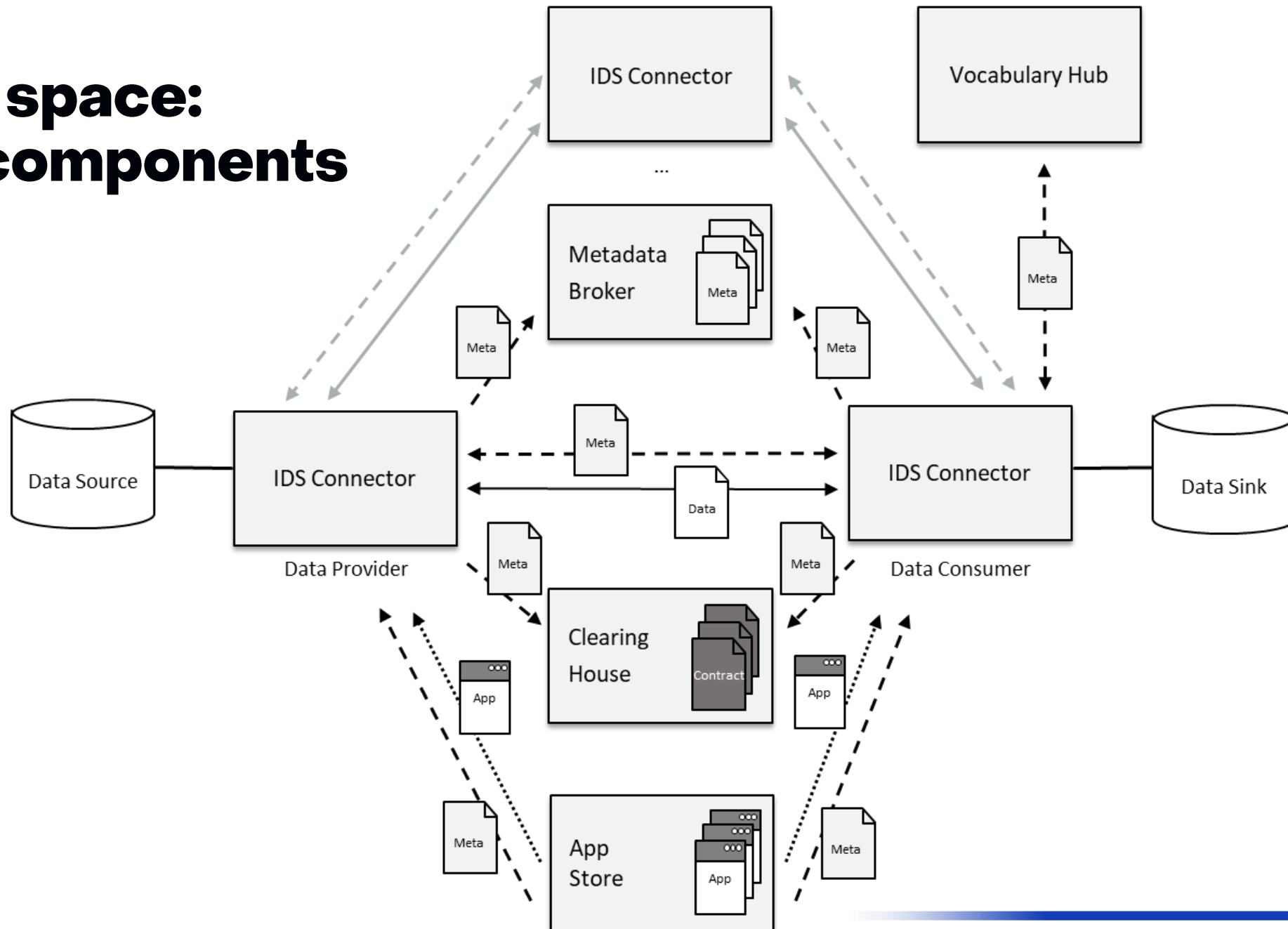
- European data space projects, e.g.:
 - Energy (BD4NRG, Enershare, Hedge-IoT, int:net)
 - Agriculture (ZeroW)
- E-invoice / EDI standardisation (NL & EU)
- Active in IDSA community
- Member of Semantic Treehouse team at TNO

Data spaces: DSSC

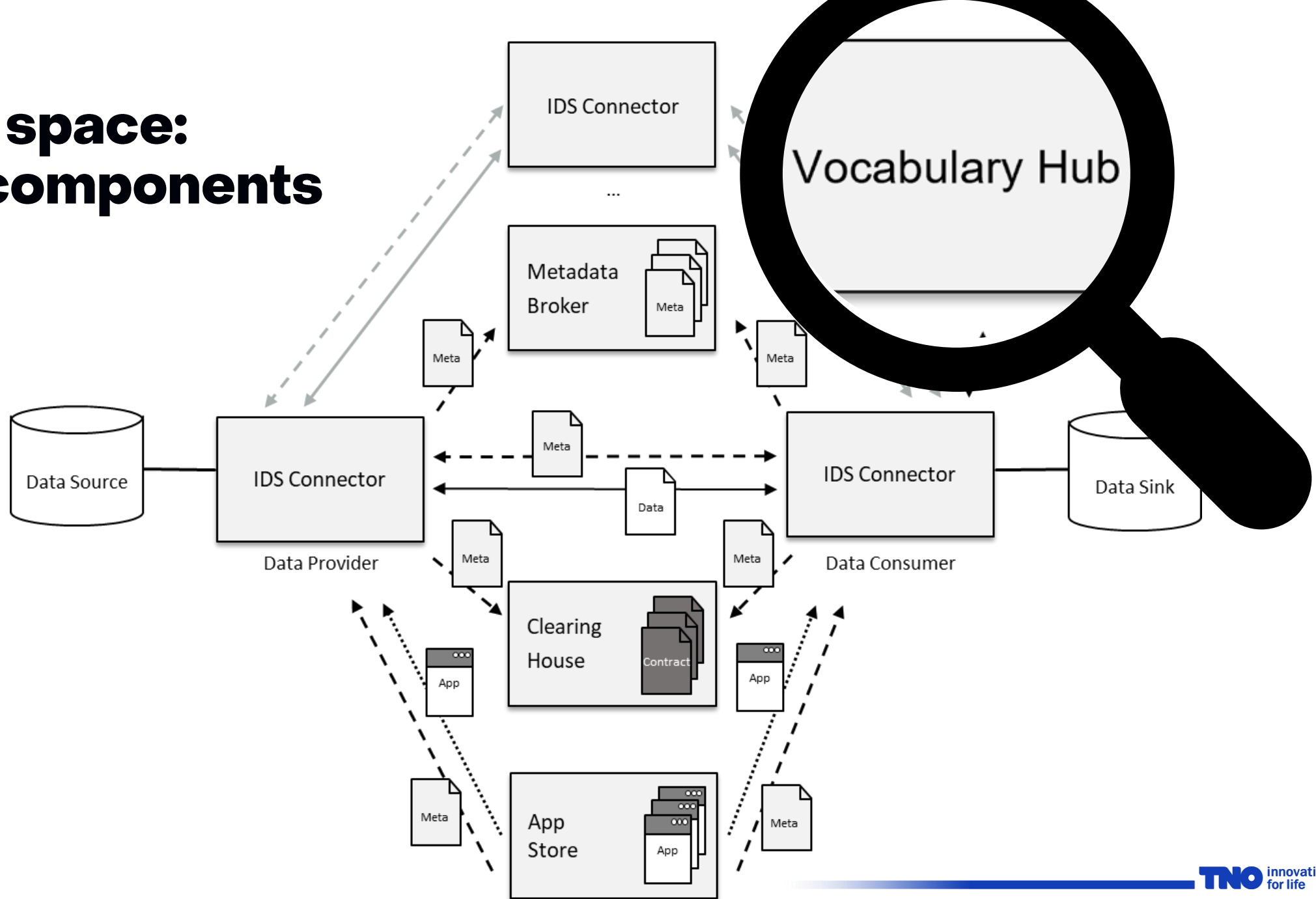
- Data spaces as a social technical system:
- Semantic interoperability is a technical issue
- Semantic interoperability is an organisational issue



Data space: IDS components

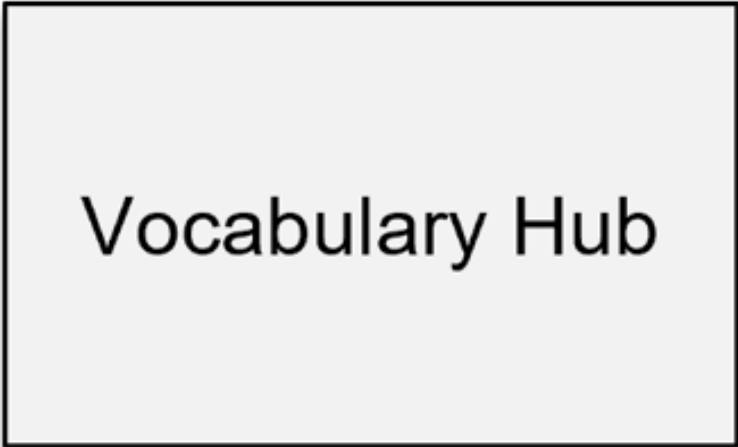


Data space: IDS components



The vocabulary hub component

How does it help the whole system to achieve semantic interoperability?



Vocabulary Hub

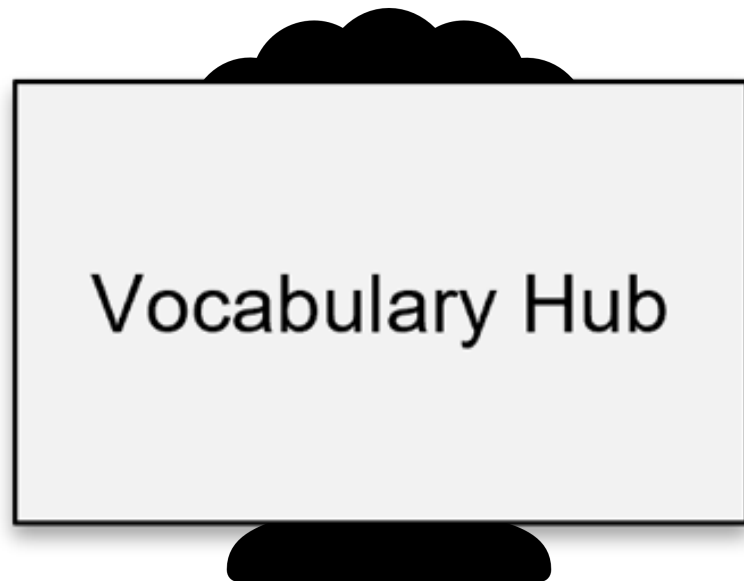
- a platform to host, maintain, publish, and document the (domain) vocabularies.
- the management platforms for data schemes
- universal location that
 - stores vocabularies and
 - enables collaboration between participants
 - to harmonise single vocabularies and create a common set of harmonised vocabulary standards for the given data space

Vocabulary Hub implementations



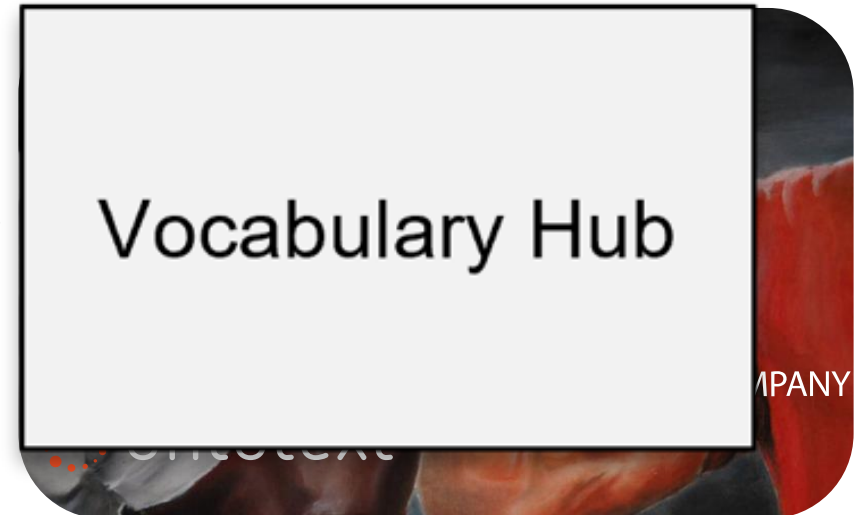
Vocabulary Hub implementations

Vocabulary Hub implementation of type X



TNO innovation
for life

Vocabulary Hub implementation of type Y



Vocabulary Hub federation

Strong focus on wind turbine maintenance



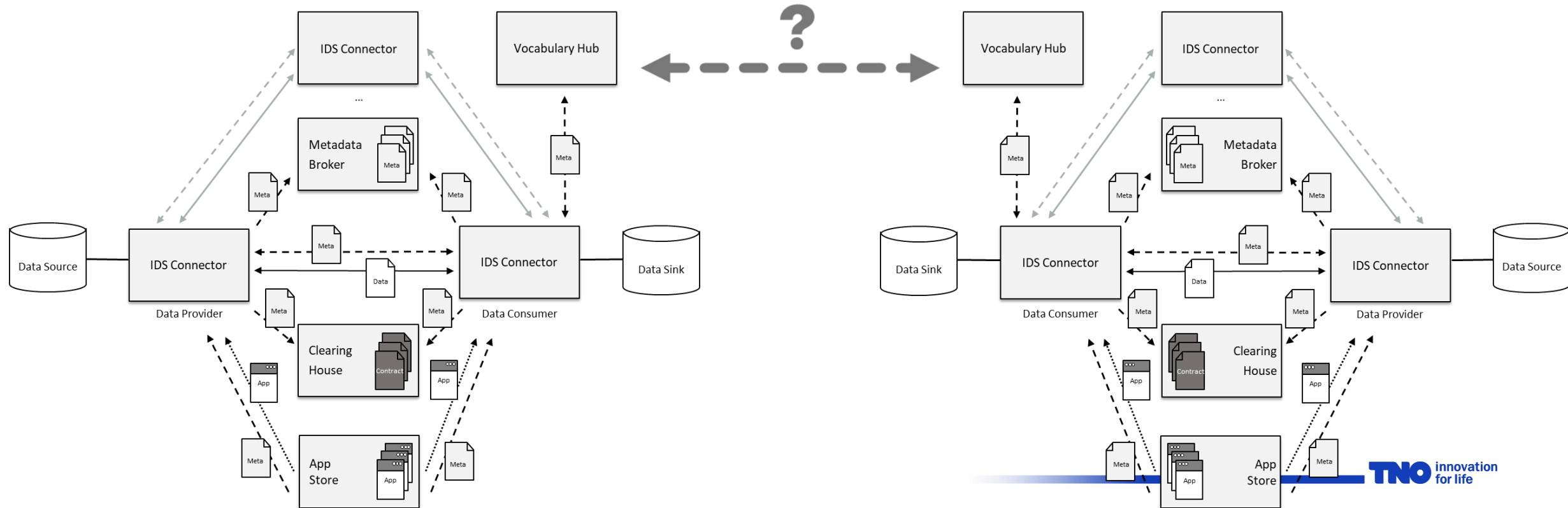
Enershare

The Energy Data Space for Europe

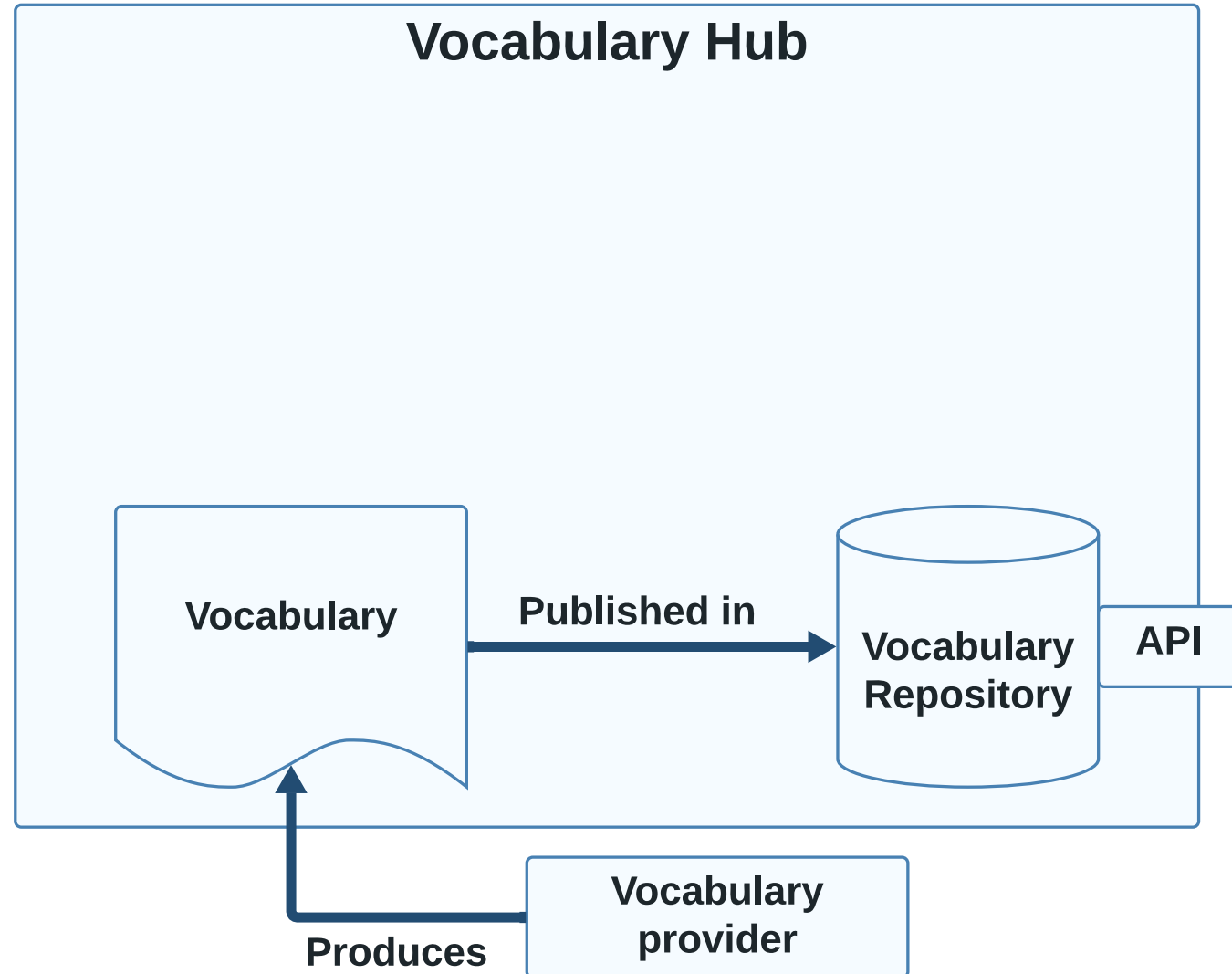


UNDERPIN

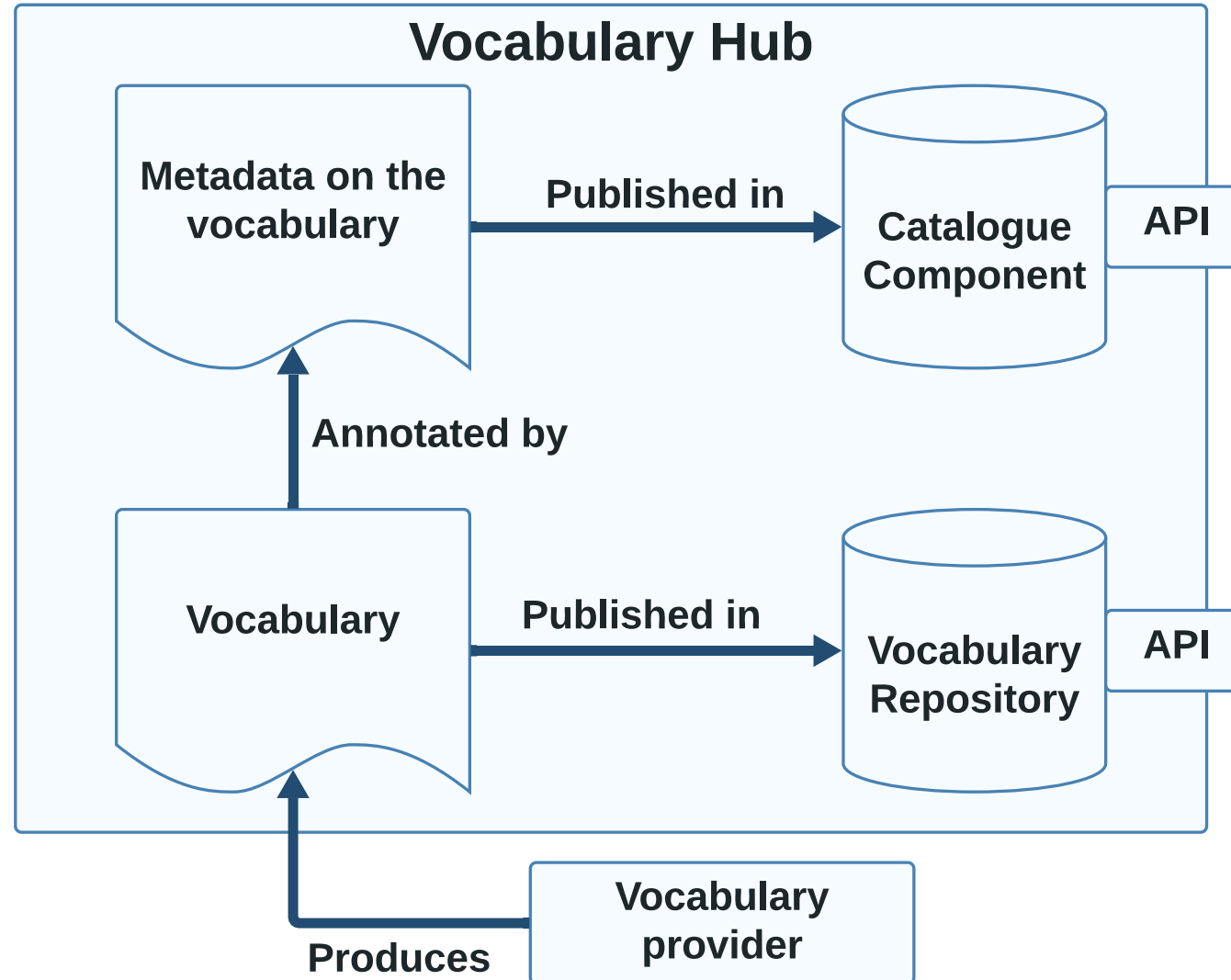
Some focus on wind turbine maintenance



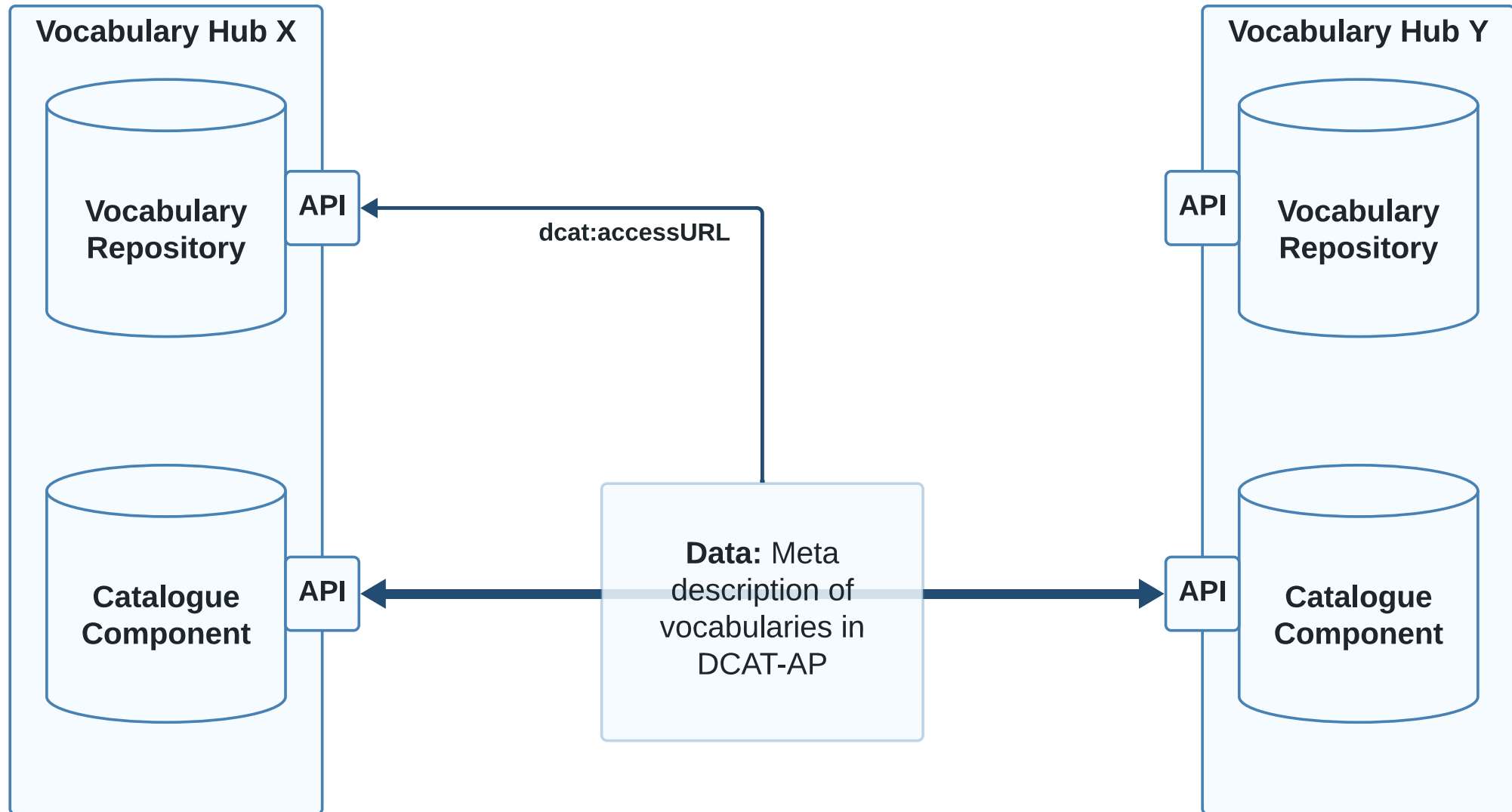
Vocabulary Hub design



Vocabulary Hub design for federation



A solution for sharing vocabularies



A solution for sharing vocabularies: DCAT

Metadata on the vocabulary

```
{  
  "name": "ProductDataSchema",  
  "version": "1.0",  
  "description": "Schema for  
representing basic product  
data.",  
  "author": "John Smith",  
  "createdDate": "2023-10-06"  
}
```

DCAT-AP Catalogue description

```
{  
  "dct:title": "Product Data Catalogue",  
  "dct:description": "A centralised repository for managing diverse vocabularies  
regarding product data",  
  "dct:publisher": {  
    "foaf:name": "TNO"  
  },  
  "dcat:dataset": {  
    "dct:title": "ProductDataSchema",  
    "dct:description": "Schema for representing basic product data.",  
    "dct:creator": {  
      "foaf:name": "John Smith"  
    },  
    "dcat:distribution": {  
      "dcat:accessURL": "https://example.org/product-data-model"  
    }  
  }  
}
```

Implementation

 **Semantic Treehouse**

Specifications

Codelists

Validator

Issues

Groups

People

Organizations

Accounts

Business rules

Message mappings

Uploads

ENERSHARE project

BD4NRG project

Contact us

Specifications

ENERSHARE vocabularies public

Name	Type	Description	Version	
Platoon Ontology	ONTOLOGY	The main Enershare ontology glues together all of the Enershare modules	v1.2 - 2024-03-14	Graph view Tree view Export ttl
Enershare Maintenance Ontology	ONTOLOGY	The Enershare Maintenance ontology		
Enershare Price property Ontology	ONTOLOGY	The Enershare Price property ontology		
Enershare Flexibility Ontology	ONTOLOGY	The Enershare Flexibility ontology		
Enershare System Ontology	ONTOLOGY	The Enershare System ontology		
Enershare Wind Turbine Ontology	ONTOLOGY	The Enershare wind turbine vocabulary for the Enershare project.	v1.0 - 2023-12-18	Graph view Tree view Export ttl
Enershare Device Ontology	ONTOLOGY	The Enershare Device vocabulary for the Enershare project.	v1.0 - 2024-02-06	Graph view Tree view Export ttl
Enershare Property Ontology	ONTOLOGY	The Enershare Property vocabulary for the Enershare project.	v1.0 - 2023-12-19	Graph view Tree view Export ttl
Enershare Building Ontology	ONTOLOGY	The Enershare Building vocabulary for the Enershare project.	v1.1 - 2024-05-17	Graph view Tree view Export ttl

CTRL+K

+

Export to DCAT

Semantic Treehouse structure	DCAT-AP
Project	DCAT Catalogue
Specification	DCAT Dataset
Version of a specification	DCAT Dataset
Distribution of a specification	DCAT Distributions

Implementation

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 BD4NRG project

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Ontology

Enershare Maintenance Ontology :

The Enershare maintenance vocabulary for the Enershare project.

Version		Publication date	Documentation	See also
Enershare Maintenance Ontology v1.0	Graph view Tree view Export ttl	2023-12-21		
Enershare Maintenance Ontology v1.1	Graph view Tree view Export ttl	2024-04-25		

[Release notes](#)

Semantic Treehouse structure	DCAT-AP
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Vocabulary Hub federation – a vision

**Semantic Treehouse**

🔗 Specifications

☰ Codelists

🔍 Validator

🔔 Issues

👤 Groups

👤 People

📅 Organizations

👤 Accounts

☰ Business rules

☰ Message mappings

📶 Uploads

🔗 ENERSHARE project

🔗 BD4NRG project

🔗 Contact us

Enershare_Pilot1_AnomalyDetection2024-05-15↔

CTRL+K 🔍

1...1 WindTurbine

- ▷ 0...n has average wind speed
- ▷ 0...n Nacelle test
- ▷ 0...n Nacelle
- ▷ 0...n has nominal power
- ▷ 0...n Blade

Add specificationⓧ

Mappings

- Platoon WindTurbine Ontology v1.4
- Time v2016
- Enershare Property Ontology v1.0
- Enershare Wind Turbine Ontology v1.0

Search

Underpi▼

- UNDERPIN WTG ontology
- UNDERPIN Refineries ontology

Let's work together



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! Let's connect vocabulary hubs!

? Should we create and collaborate on a new DCAT profile; a so called DCAT-DM (Data Models) profile?



SEMANTIC
TREEHOUSE

Thank you

