Semantic Treehouse helps pilots implement
Transversal Use Case 1 (TUC 1)

Semantic Treehouse

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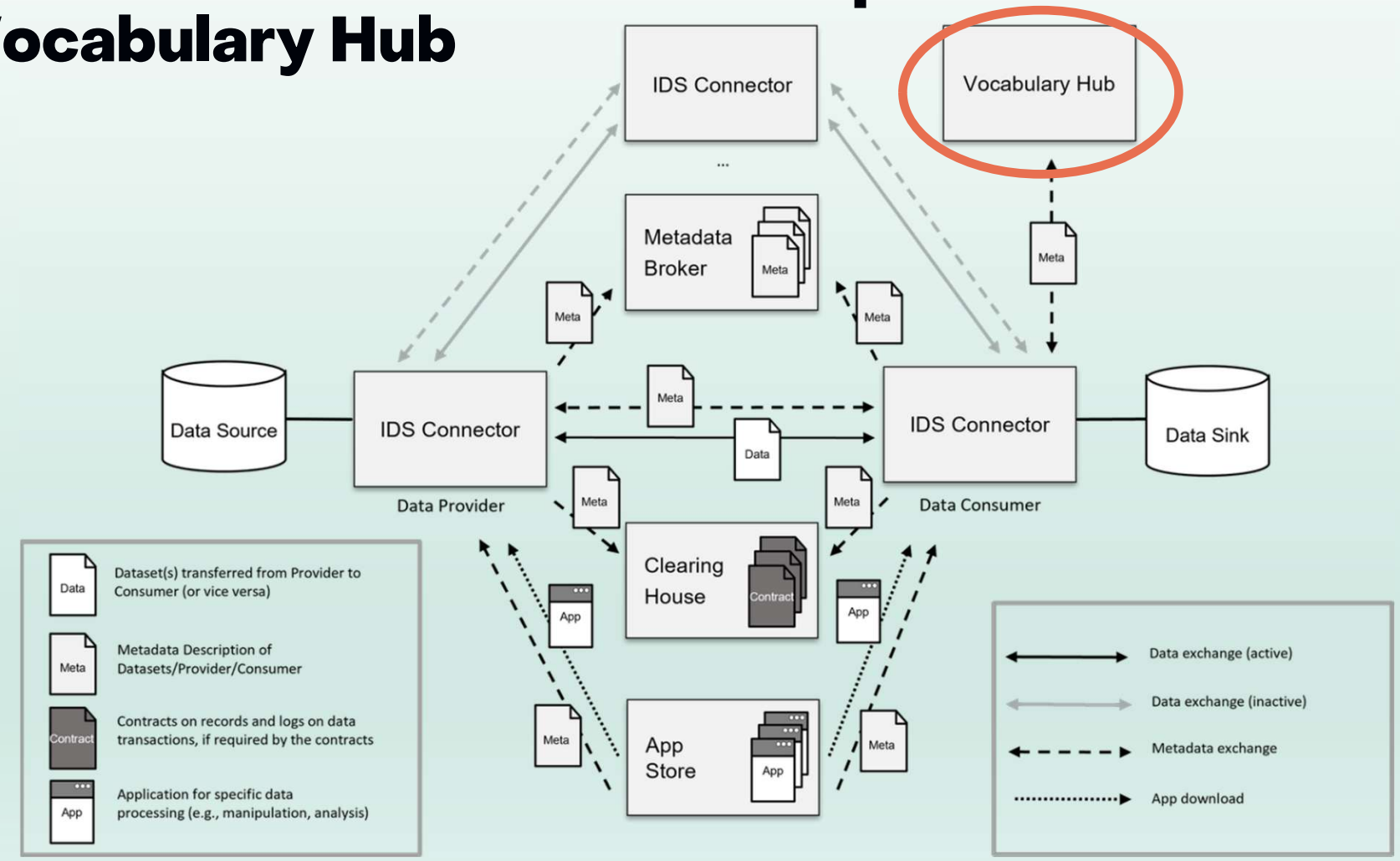
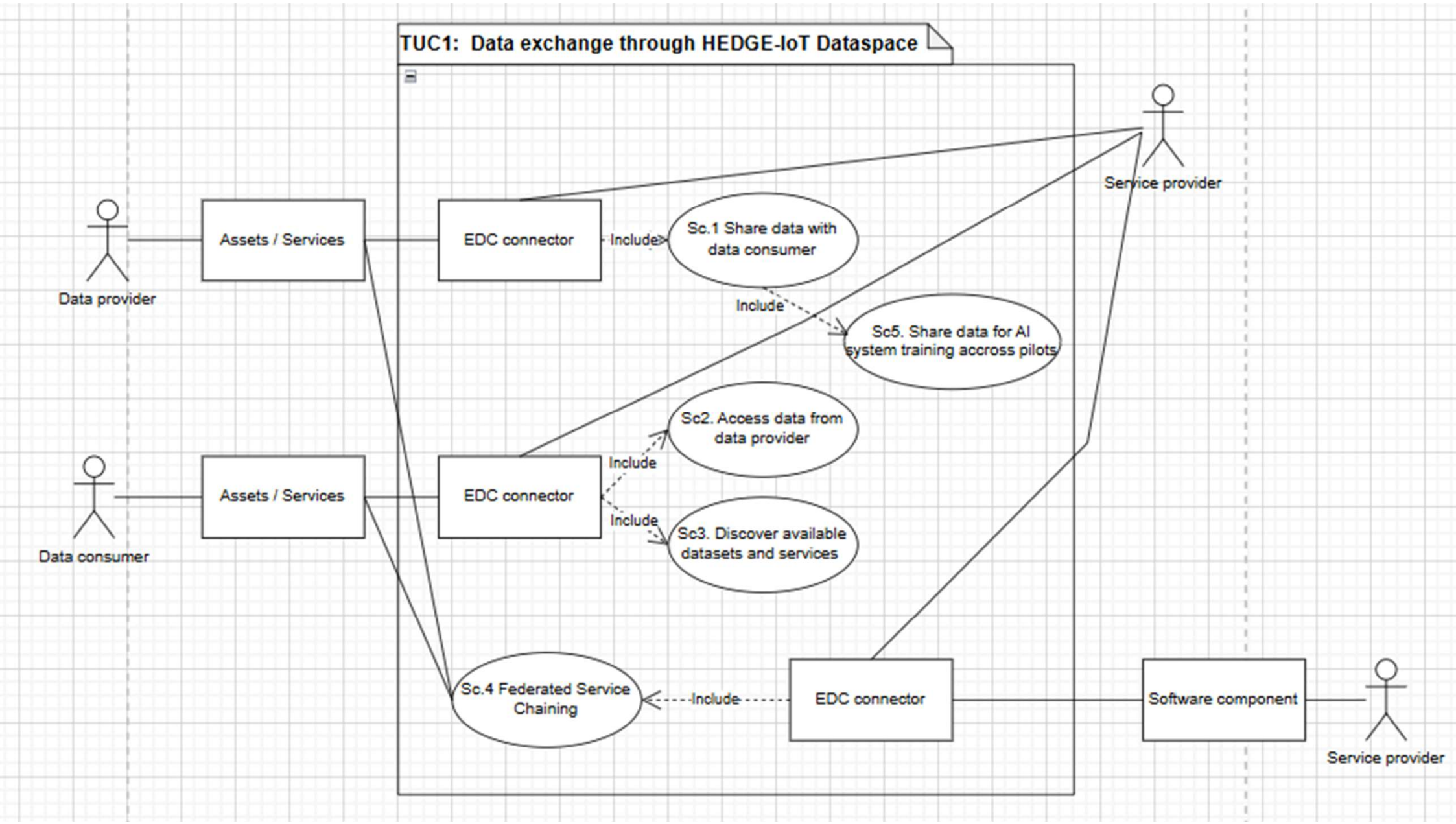
Wouter van den Berg

TNO innovation for life

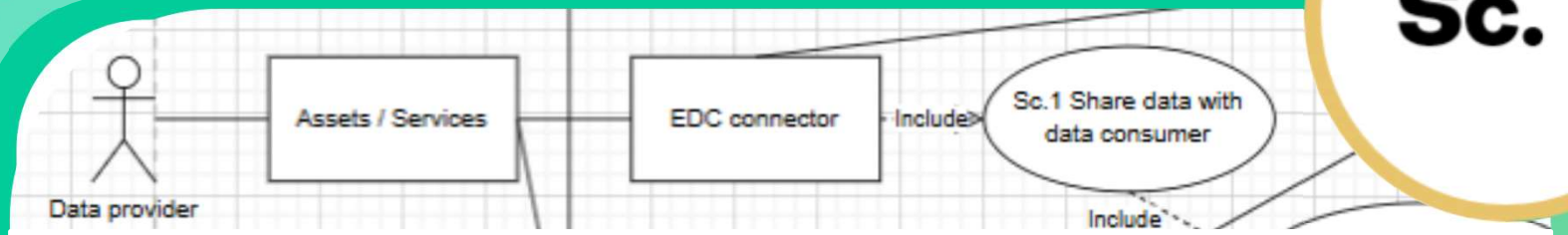
Semantic Treehouse is an implementation of a Vocabulary Hub



Original image taken from: D3.1 HEDGE-IoT Interfaces and Tools for Interoperability


TUC1: Data exchange through HEDGE-IoT Dataspace
Service provider
Data provider
Assets / Services
EDC connector
Include
Sc.1 Share data with data consumer
Include
Sc5. Share data for AI system training accross pilots
Sc2. Access data from data provider
Include
Data consumer
Assets / Services
EDC connector
Include
Sc3. Discover available datasets and services
Sc.4 Federated Service Chaining
Include
EDC connector
Software component
Service provider

Sc. 1



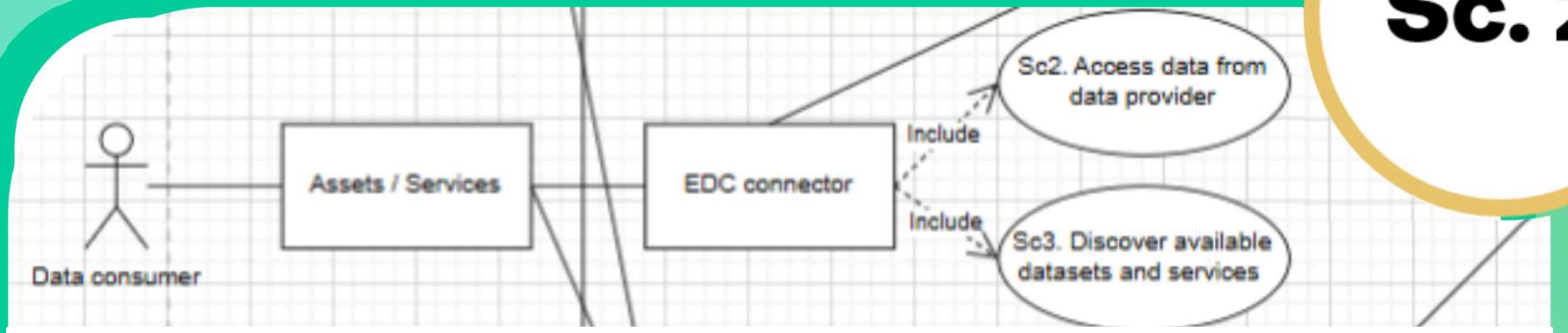
This scenario describes how a data provider makes its dataset or service available within the dataspace.

- The provider prepares the asset, **defines the associated metadata** and access policies, and publishes it through its local EDC connector.
- **The asset becomes discoverable** by other parties via the federated catalog, allowing compliant and secure access negotiations.

Scenario								
Scenario name:	Use of the Dataspace by a Data Provider							
Step No.	**Event**	**Name of process/ activity**	**Description of process/ activity**	**Service**	**Information producer (actor)**	**Information receiver (actor)**	**Information Exchanged (IDs)**	**Requirement, R-IDs**
1	New data available	Create data asset	The data provider creates or selects a dataset or service output intended for external sharing.	CREATE	Data Provider	Data Provider	Inf.01	DE.3
2	Asset identified	Define metadata	The provider defines metadata describing the asset (format, structure, purpose, etc.).	CREATE	Data Provider	Data Provider	Inf.02	MD.5
3	Access control needed	Configure access policy	The provider defines access policies such as allowed consumers, usage rights, and expiration terms.	CREATE	Data Provider	Data Provider	Inf.03	MD.1
4	Asset ready to publish	Register asset in connector	The data asset and metadata are registered in the local EDC connector catalog.	REPORT		EDC Connector	Inf.04	MD.6
5	Publication triggered	Publish asset to dataspace	The asset becomes discoverable in the federated dataspace via the connector's catalog endpoint.	REPORT		Federation Catalog	Inf.05	MD.3
6	Idle	Await request from consumer	No further action until another actor (consumer) discovers and requests the asset.	TIMER	Data Provider	Data Provider	--	--

Facilitated by Vocabulary Hub service provided by Hedge T4.3

Sc. 2

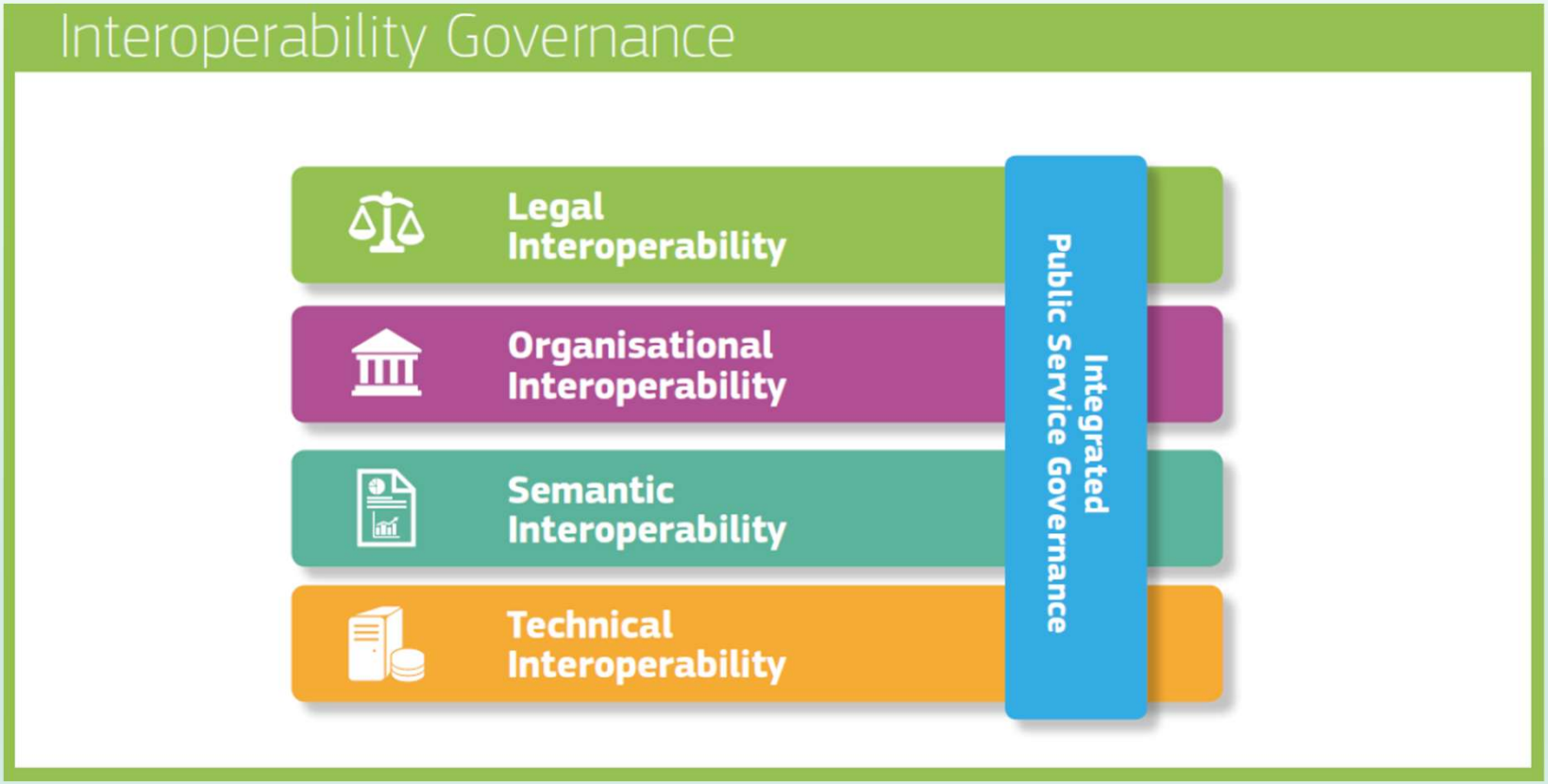


In this scenario, a data consumer interacts with the dataspace to discover and access data assets shared by other parties.

- The consumer queries the catalog, evaluates metadata and policy terms, and initiates a contract negotiation through its EDC connector.
- Upon agreement, the data is securely transferred according to the defined usage rules.

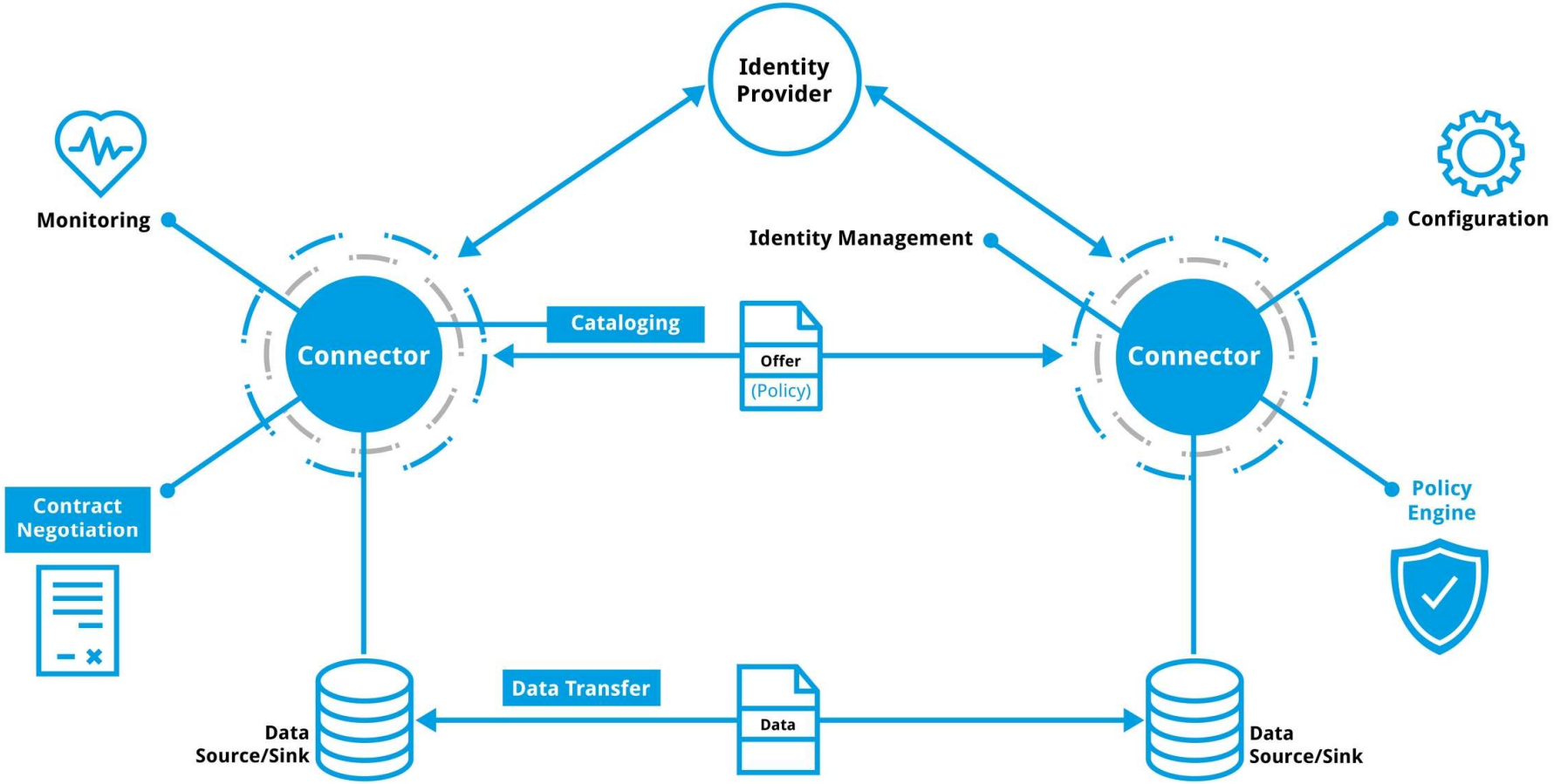
Scenario								
Scenario name:	Use of the Dataspace by a Data Consumer							
Step No.	**Event**	**Name of process/ activity**	**Description of process/ activity**	**Service**	**Information producer (actor)**	**Information receiver (actor)**	**Information Exchanged (IDs)**	**Requirement, R-IDs**
1	Need for external data arises	Discover data asset	The consumer searches the dataspace catalog for relevant data assets.	GET	Catalog	Data Consumer	Inf.06	MD.6
2	Matching asset found	Request asset access	The consumer selects a dataset and initiates a data usage request through its EDC connector.	EXECUTE	Data Consumer	Data Provider	Inf.07	DE.3
3	Negotiation starts	Negotiate contract	The EDC connectors negotiate a usage agreement (contract offer, response, confirmation).	EXECUTE	EDC Connector	EDC Connector	Inf.08	DE.1
4	Contract accepted	Authorize access	Access is granted according to policy and contract terms.	REPORT	EDC Connector	Data Consumer	Inf.09	CR.3
5	Transfer initialized	Retrieve data	The data is securely transferred from the provider to the consumer.	GET	Data Provider	Data Consumer	Inf.10	DE.3
6	Data received	Confirm transaction	The consumer confirms successful receipt and logs the transaction outcome.	REPORT	Data Consumer	EDC Connector	Inf.11	CR.2

European Interoperability Framework (EIF)



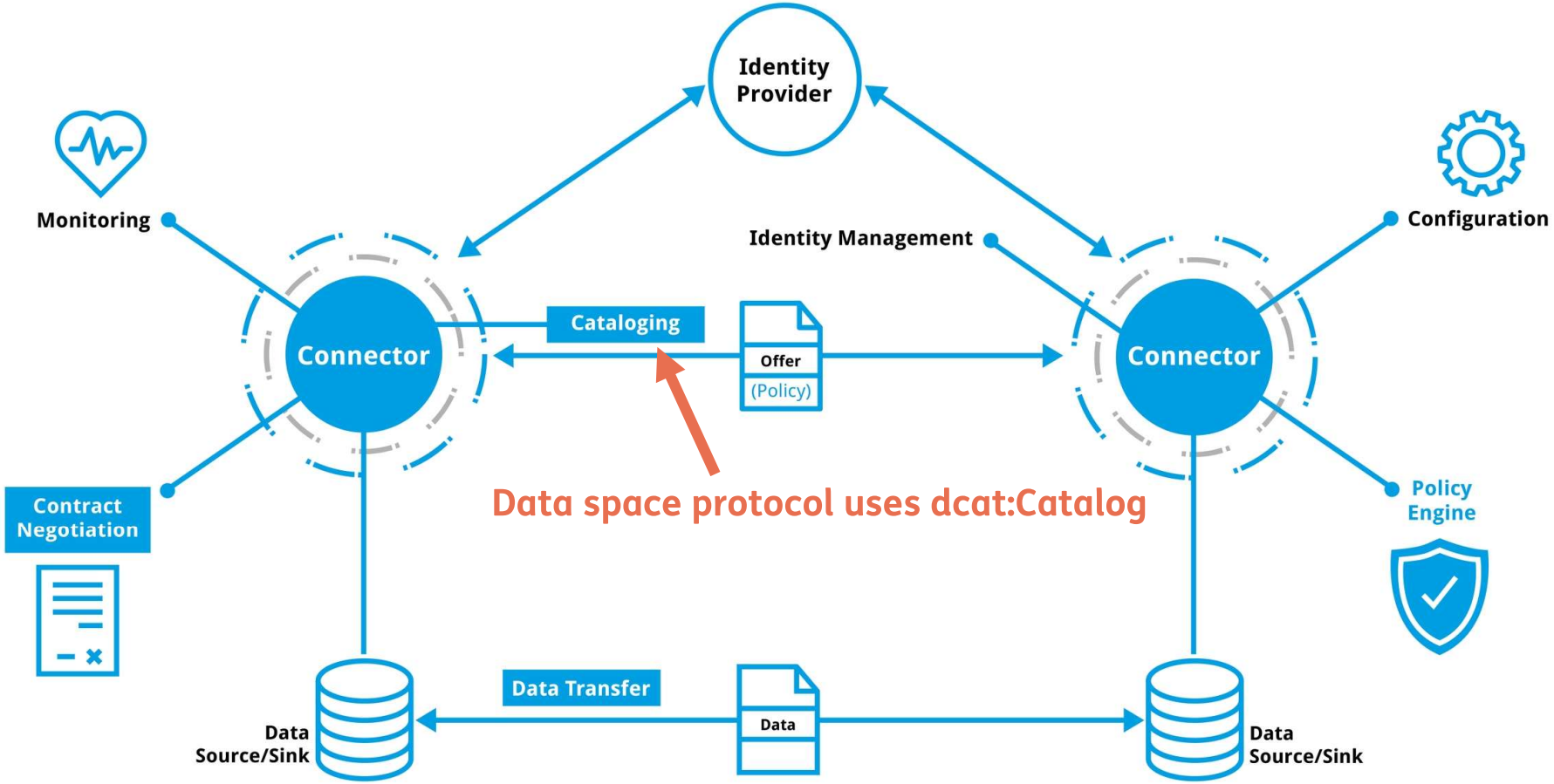
Original image taken from: https://interoperable-europe.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/solution/european-interoperability-framework-eif-toolbox/levels-interoperability

Dataspace Protocol



Original image taken from: https://docs.internationaldataspaces.org/ids-knowledgebase/dataspace-protocol

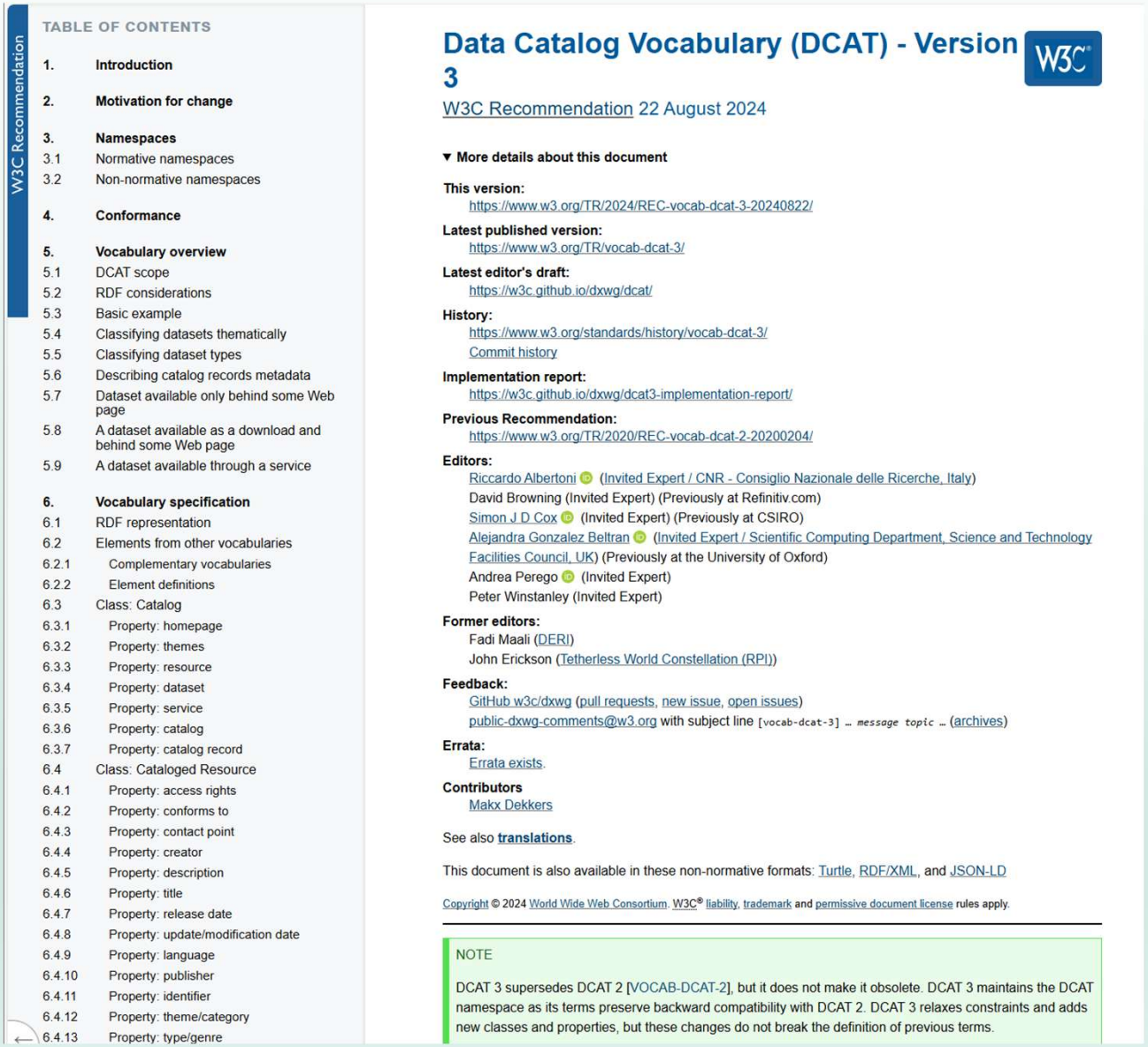
Dataspace Protocol



Original image taken from: https://docs.internationaldataspaces.org/ids-knowledgebase/dataspace-protocol

What is a DCAT?

DCAT is an RDF vocabulary designed to facilitate interoperability between data catalogs published on the Web.



W3C Recommendation

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Data Catalog Vocabulary (DCAT) - Version 3

W3C Recommendation 22 August 2024

▼ **More details about this document**

This version:
https://www.w3.org/TR/2024/REC-vocab-dcat-3-20240822/

Latest published version:
https://www.w3.org/TR/vocab-dcat-3/

Latest editor's draft:
https://w3c.github.io/dxwg/dcat/

History:
https://www.w3.org/standards/history/vocab-dcat-3/
Commit history

Implementation report:
https://w3c.github.io/dxwg/dcat3-implementation-report/

Previous Recommendation:
https://www.w3.org/TR/2020/REC-vocab-dcat-2-20200204/

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Feedback:
GitHub w3c/dxwg (pull requests, new issue, open issues)
public-dxwg-comments@w3.org with subject line `[vocab-dcat-3] … message topic …` (archives)

Errata:
Errata exists.

Contributors
Makx Dekkers

See also **translations**.

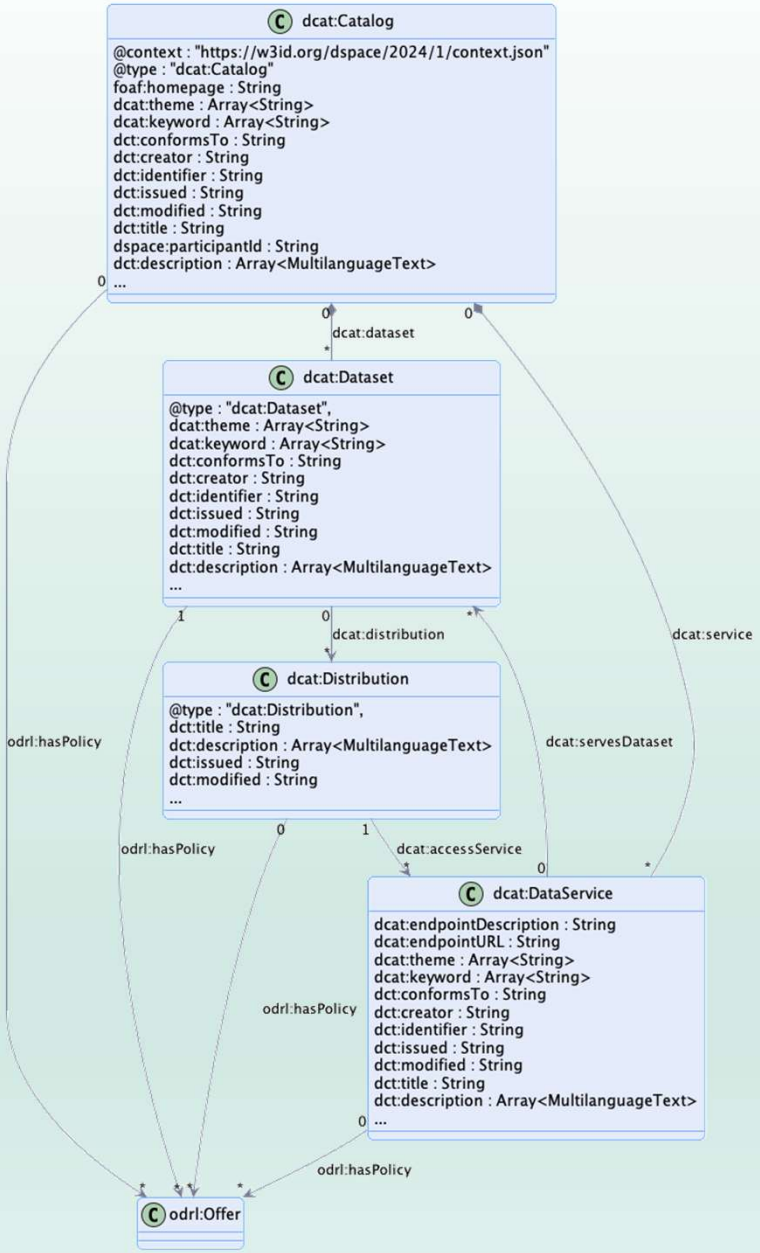
This document is also available in these non-normative formats: Turtle, RDF/XML, and JSON-LD

NOTE

DCAT 3 supersedes DCAT 2 [VOCAB-DCAT-2], but it does not make it obsolete. DCAT 3 maintains the DCAT namespace as its terms preserve backward compatibility with DCAT 2. DCAT 3 relaxes constraints and adds new classes and properties, but these changes do not break the definition of previous terms.

What is a dcat:Catalog?


```
{  "@context": "https://w3id.org/dspace/2024/1/context.json",
   "@id": "urn:uuid:3afeadd8-ed2d-569e-d634-8394a8836d57",
   "@type": "dcat:Catalog",
   "dct:title": "Data Provider A Catalog",
   "dct:description": [{
      "@value": "A catalog of measurement data“
   }],
   "dspace:participantId": "urn:example:DataProviderA",
   "dcat:service": [{
      "@id": "urn:uuid:4aa2dcc8-4d2d-569e-d634-8394a8834d77",
      "@type": "dcat:DataService",
      "dcat:endpointDescription": "dspace:connector",
      "dcat:endpointURL": "https://provider-a.com/connector"
   }],
   "dcat:dataset": [ .... ]
}
```

What is a dcat:Dataset?


```
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      "dct:description": [{
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      }],
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         "dcat:accessService": [{
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            "dcat:endpointURL": "https://provider-a.com/connector"
}]}]}]}
```


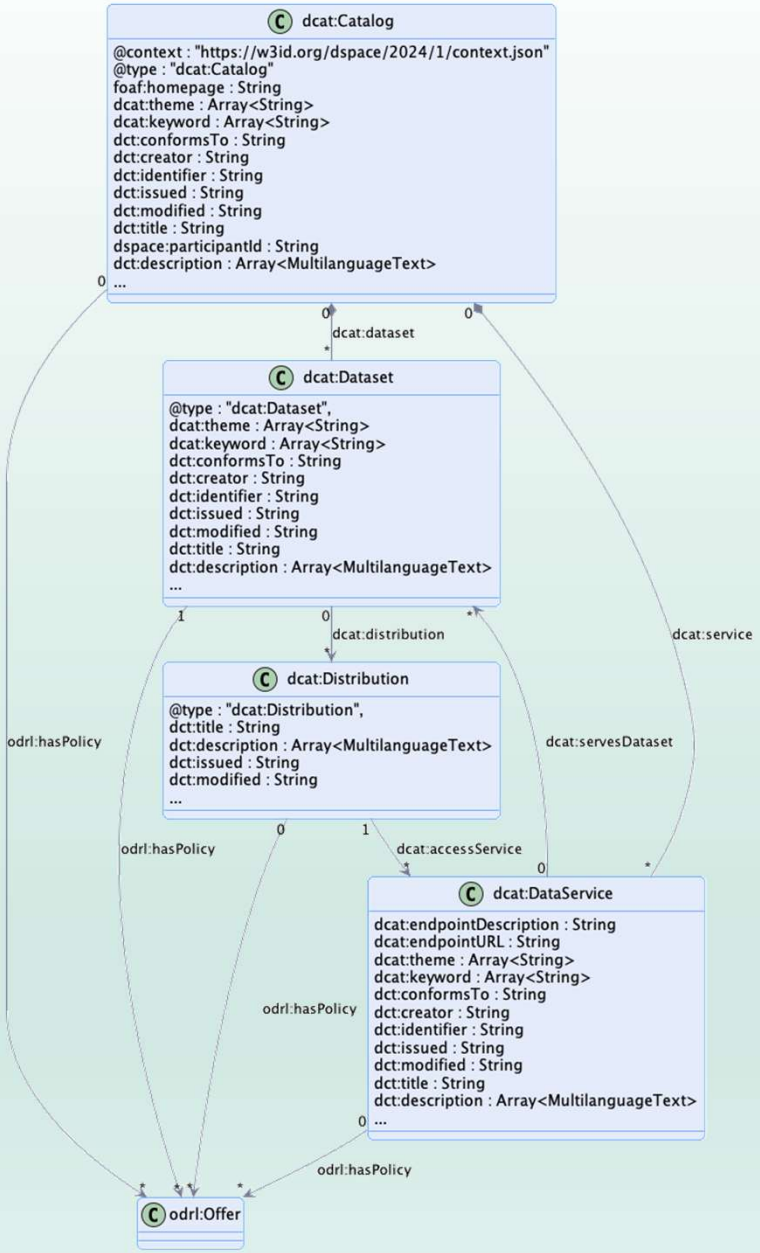

What is dct:conformsTo?


```
{  "@context": "https://w3id.org/dspace/2024/1/context.json",
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   "dct:title": "Data Provider A Catalog",
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   "dspace:participantId": "urn:example:DataProviderA",
   "dcat:service": [{
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      "dct:description": [{
         "@value": “Energy consumption measurement data sample extract",
         "@language": "en"
      }],
      "dcat:keyword": "energy consumption",
      "dcat:distribution": [{
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         "dct:format": "dspace:s3+push",
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}]}]}]}
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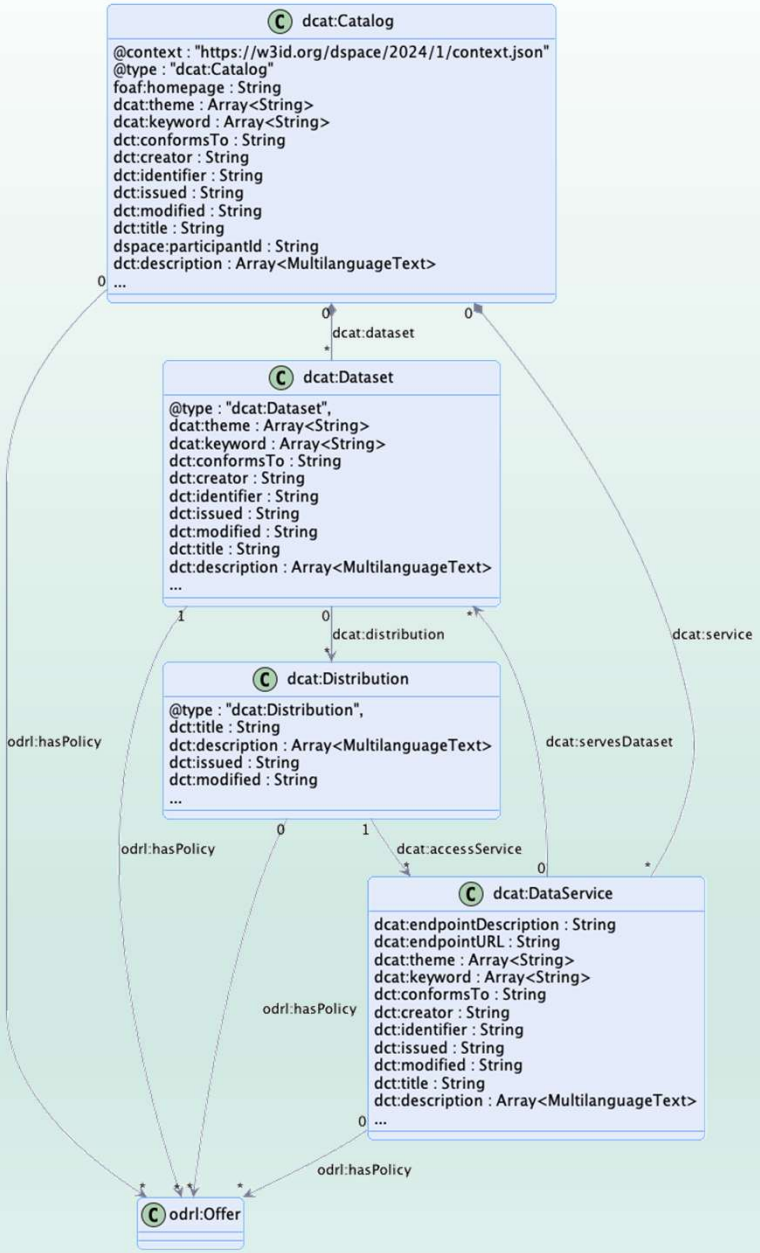

What is dct:conformsTo?


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{  "@context": "https://w3id.org/dspace/2024/1/cor
   "@id": "urn:uuid:3afeadd8-ed2d-569e-d634-8394a
   "@type": "dcat:Catalog",
   "dct:title": "Data Provider A Catalog",
   "dct:description": [{
      "@value": "A catalog of measurement data“
   }],
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}]}]}]}
```


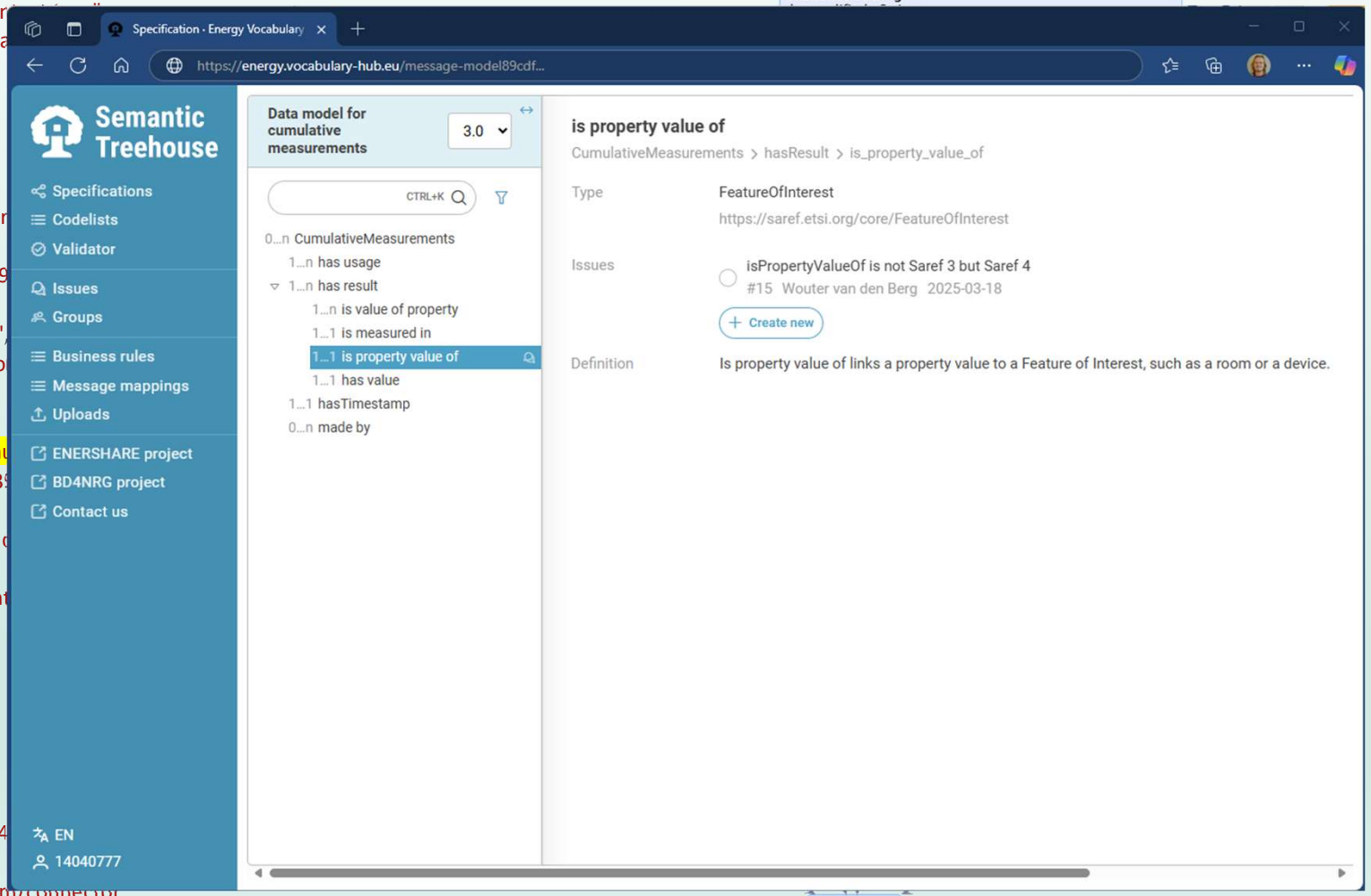

STH demo