FAIR Digital Objects and FAIR Semantics

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Semantics: a first class citizen for FAIR

- **Interoperable**

  - I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation

  - I2. (meta)data use vocabularies that follow FAIR principles

  - I3. (meta)data include qualified references to other (meta)data

FAIR principles: https://www.go-fair.org/fair-principles/

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    ← **FAIR Semantics**

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FAIR Semantics recommendations

- Based on community inputs

- First version released in March 2020
  - DOI: 10.5281/zenodo.3707984.

- Second version released in January 2021
  - DOI:10.5281/zenodo.4314320

- 17 generic recommendations and 14 best practices recommendations

Recommendations v2

- Alignment with RFC 2119 (MUST, SHOULD, MAY)

  - 9 MUST
  - 7 SHOULD
  - 1 MAY
  - 1 Undertermined

Provide feedbacks: GitHub

GitHub is being used by the team to collect feedback:
https://github.com/FAIRsFAIR/FAIRSemantics

Use of labels:
Please use "Clarification Needed" where you feel like a recommendation lacks clarity

Clarification Needed

Please use "Relevance" to comment on the relevance (or lack thereof) for the stakeholder you represent.

Relevance

Please use "Implementation Example" to suggest practical implementations or initiatives that are missing for this recommendation.

Implemtation Example

It is also possible to submit problems encountered, suggestions, questions, recommendation proposals etc. as issues.

New issue

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Identifier

Rec #	Recommendation	FAIR Principle
P-Rec. 1	Globally Unique, Persistent and Resolvable Identifiers **MUST** be used for Semantic Artefacts, their content (terms/concepts/classes and relations) and their versions	F1
P-Rec. 2	Globally Unique, Persistent and Resolvable Identifiers **MUST** be used for Semantic Artefact Metadata Record. Metadata and data must be published separately, even if it is managed jointly	F1, F3

Metadata

Rec #	Recommendations	FAIR principle
P-Rec 3	A common minimum metadata schema **MUST** be used to describe semantic artefacts and their content	F2, R1.1, R1.2 and R1.3
P-Rec. 8	Human and machine-readable persistence policies for semantic artefacts metadata and data **MUST** be published	A2
P-Rec. 9	Semantic artefacts **MUST** be made available as a minimum portfolio of common serialization formats	I1
P-Rec. 14	Standard vocabularies **SHOULD** be used to describe semantic artefacts	I2
P-Rec. 15	Provenance information regarding the reuse of components from third-party semantic artefacts **SHOULD** be made explicit	I3, R1.2
P-Rec. 16	The semantic artefact **MUST** be clearly licenced for use by machines and humans	R1.1
P-Rec. 17	Provenance **MUST** be clear for both humans and machine	R1.2

Repository

Rec #	Recommendation	FAIR Principles
P-Rec. 4	Semantic Artefact and its content **SHOULD** be published in a trustworthy semantic repository	F4
P-Rec.5	Semantic repositories **MUST** offer access to Semantic Artefacts and their content using community standard APIs and serializations to support both use/reuse and indexation by search engines	F4, A1, A1.1
P- Rec. 6	Build semantic artefacts' search engines that operate across different semantic repositories	F4
P-Rec. 7	Repositories **MUST** offer a secure access protocol and appropriate user access control functionalities	A1.2

« Semantic alignment »

Rec #	Recommendations	FAIR Principles
P-Rec. 10	Foundational Ontologies **MAY** be used to align semantic artefacts	I1, I2, I3
P-Rec. 11	A standardized knowledge representation language **SHOULD** be used for describing complex logical relations (semantic artefact)	I1
P-Rec. 12	Semantic mappings between the different elements of semantic artefacts **SHOULD** be published in machine-readable formats	I1, I3, R1.3
P-Rec. 13	Crosswalks, mappings and bridging between semantic artefacts **SHOULD** be documented, published and curated	R1.2, R1.3

Metadata

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Need for a common description for Semantic artefacts

- DCAT representation of Semantic artefacts

- FDO representation of Semantic artefacts

Need for a common description for Semantic artefacts

- DCAT representation of Semantic artefacts (C. Jonquet, L. Bonino)

- FDO representation of Semantic artefacts (GO FAIR INTER)

FAIRSFAIR
Fostering Fair Data Practices in Europe

Need for a common description for Semantic artefacts

- DCAT representation of Semantic artefacts (C. Jonquet, L. Bonino)

- FDO representation of Semantic artefacts (GO FAIR INTER)

- Minimum Metadata for FAIR Semantic artefact (C. Jonquet)

Minimum metadata for FAIR Semantic Artefacts

- 74 participants

- Selected mandatory, recommended and optional fields from DCAT

- Selected mandatory, recommended and optional fields from extended set of metadata specific to semantic artefacts

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Fostering Fair Data Practices in Europe

Common Minimum Metadata for Semantic Artefact

4 June 2021

09:30 - 13:00 CEST

DCAT-AP for Semantic Artefact

- 74 participants

- Selected mandatory, recommended and optional fields from DCAT

- Selected mandat~~...~~
  and e~~...~~ ~~...~~nded
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  artefacts

LINK WITH FAIR DIGITAL OBJECT?

Common Minimum
Metadata for
Semantic Artefact
_____
4 June 2021
09:30 - 13:00 CEST

Semantic artefacts as FDO

- Discussed during the GOFAIR INTER Hackathon (May 18-19, July 1-2 2020)

- Investigated FDO-F within the context of Linked Data Framework

- Tentative ontology for FDO-F

# Semantic artefact and FDO? A simple use-case

- A csv table of fake hourly measurements of lead concentrations in Tames (time serie)

- Semantic artefacts considered: Complex Properties Model (OWL) and EnvThes (SKOS)

- How do we represent the csv table as FDO? How do we represent semantic artefact as FDO? How do we link both?
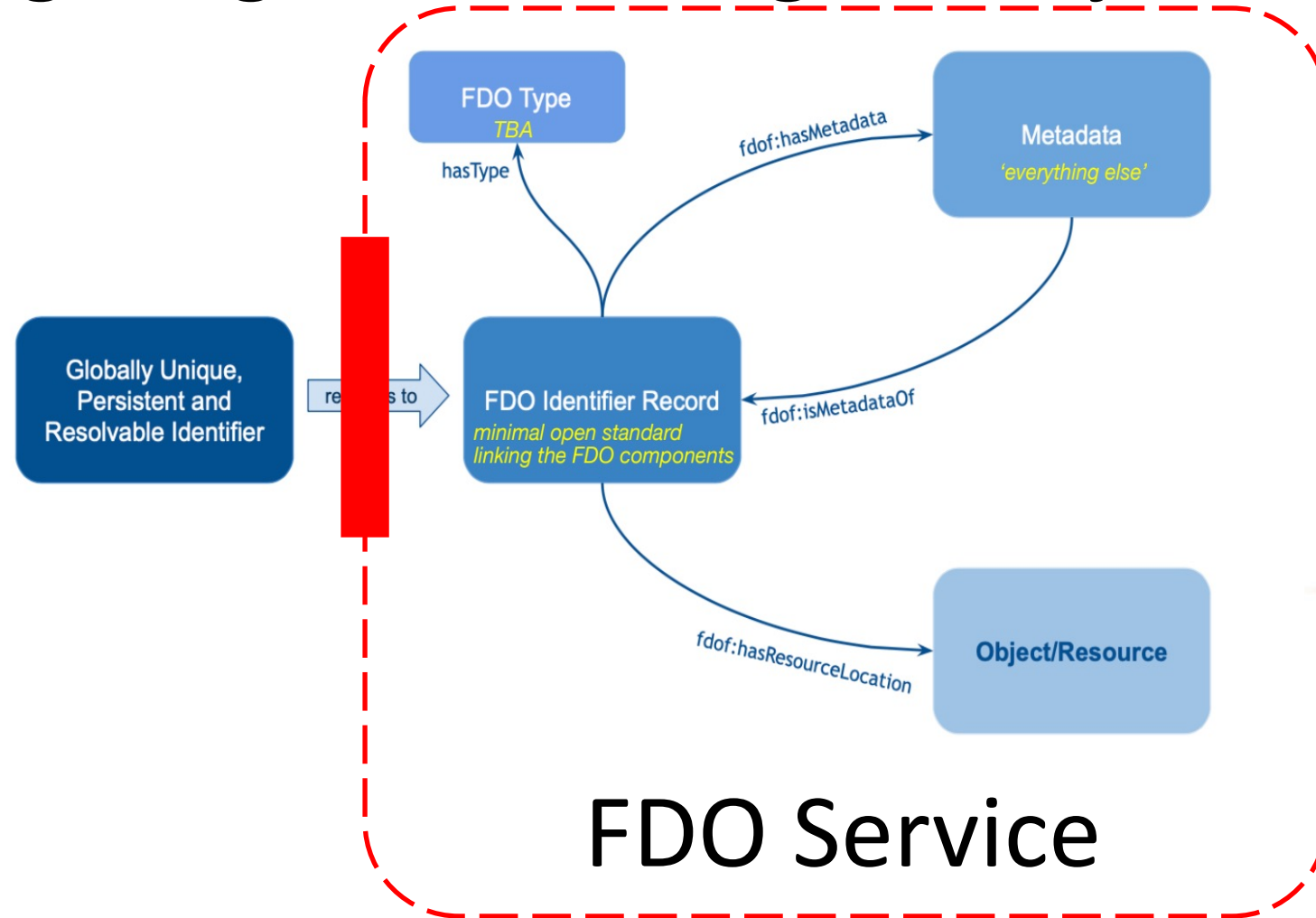
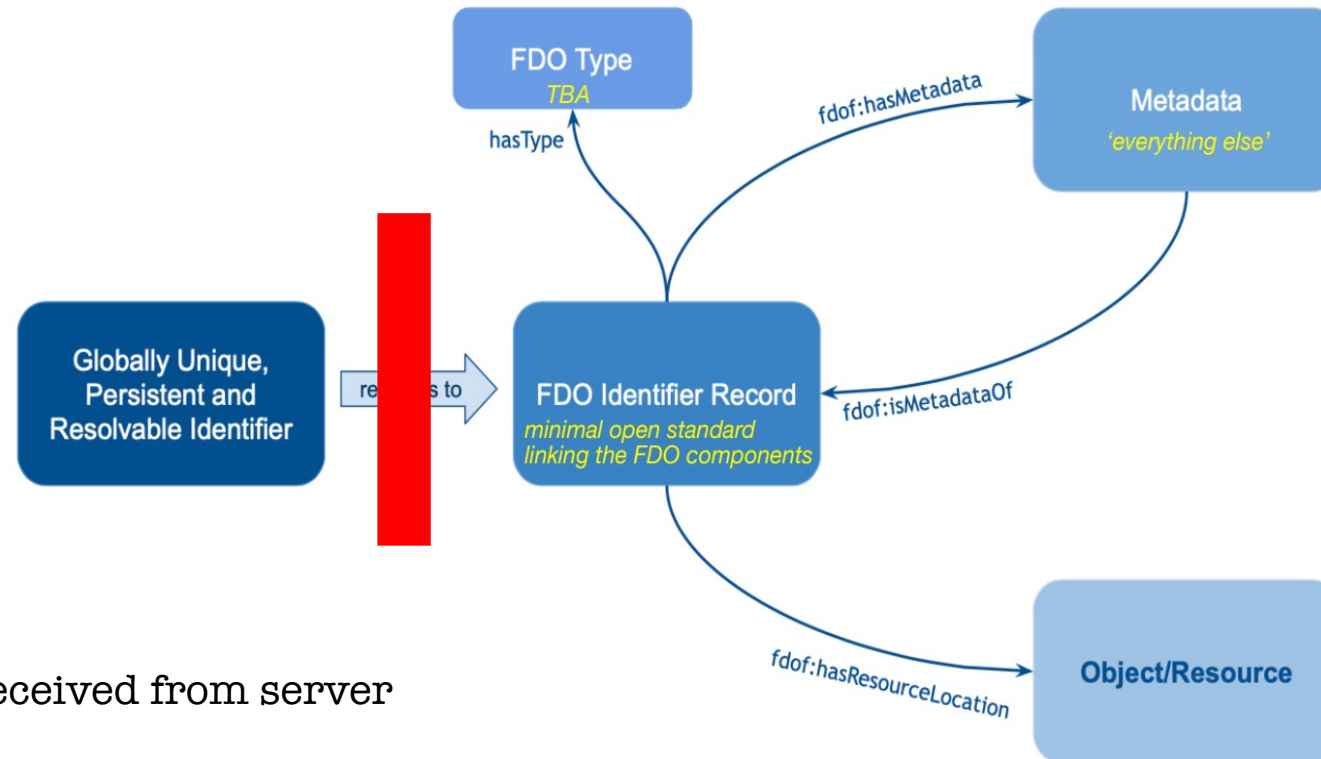# Investigating the FAIR Digital Object
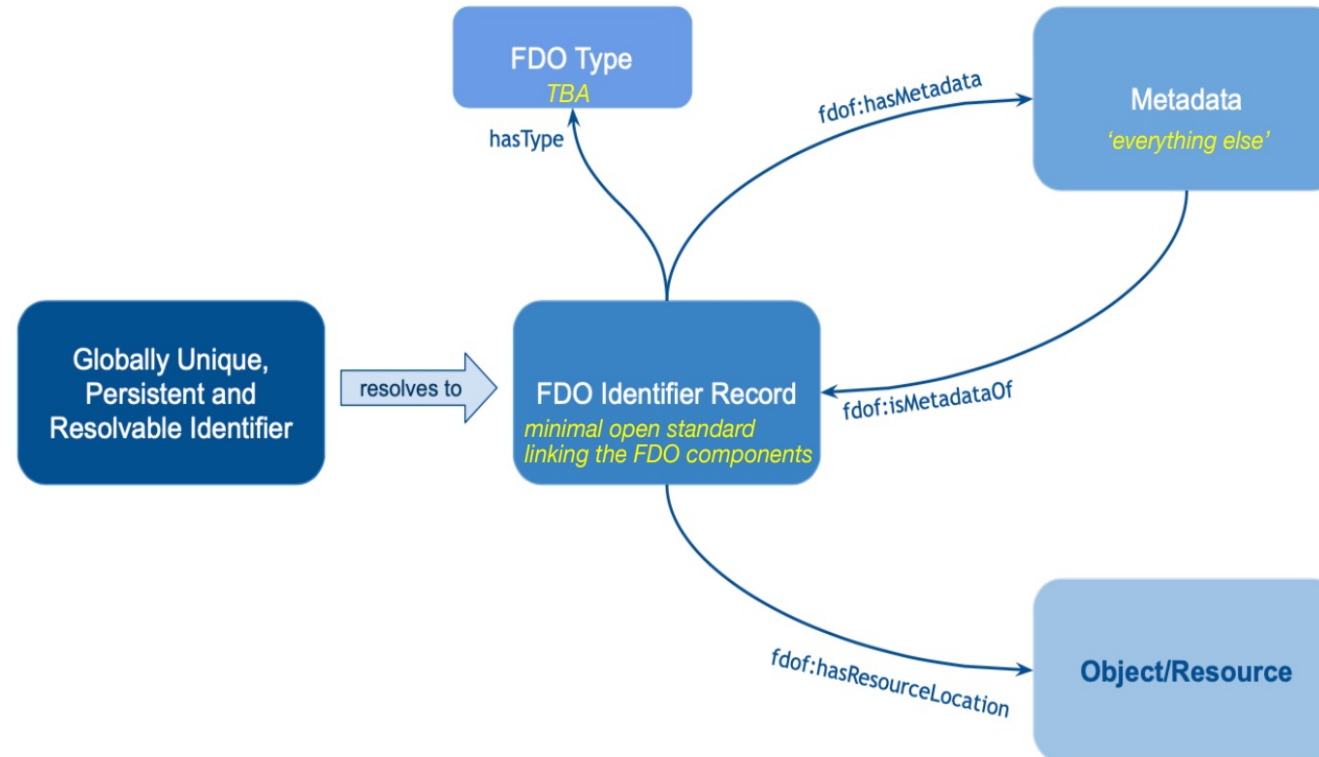
Bonino, 2019

Investigating the FAIR Digital Object
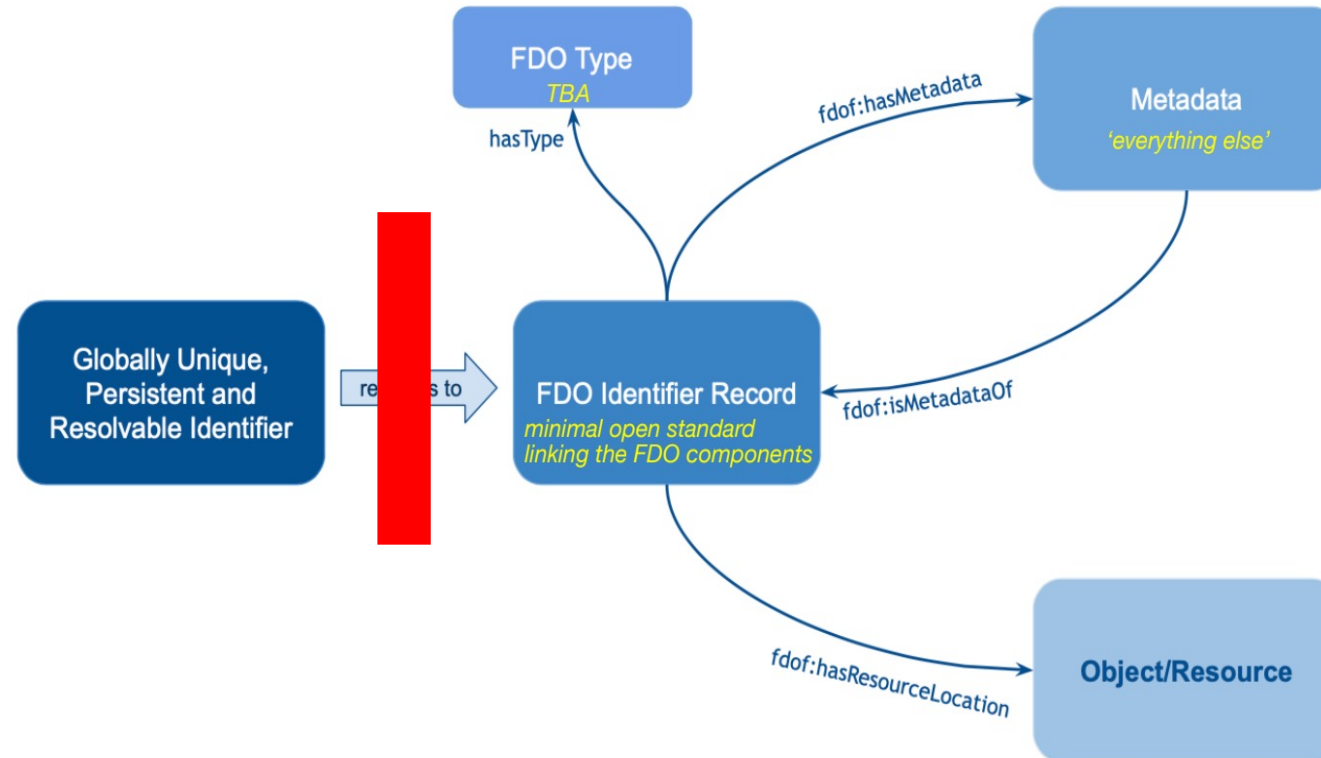
Investigating the FAIR Digital Object

Investigating the FAIR Digital Object

Received from server
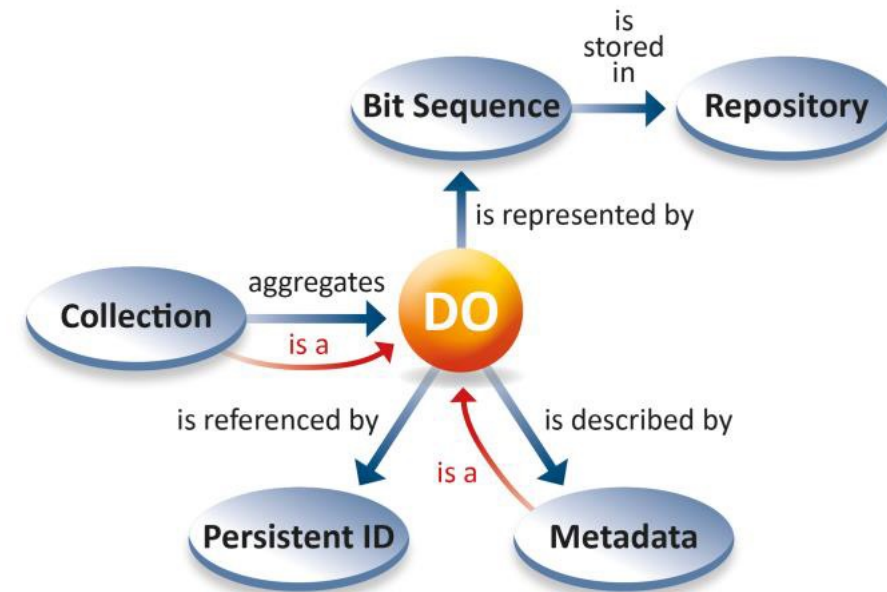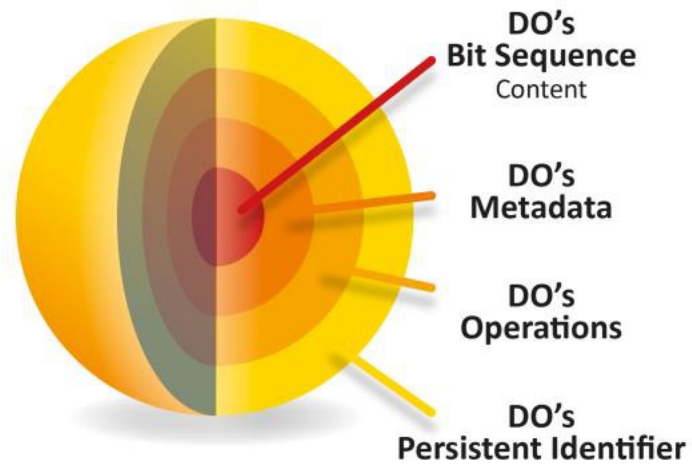
FDO Identifier Record

hasIdentifier: www.example.org/myleadmeasurement-180520/
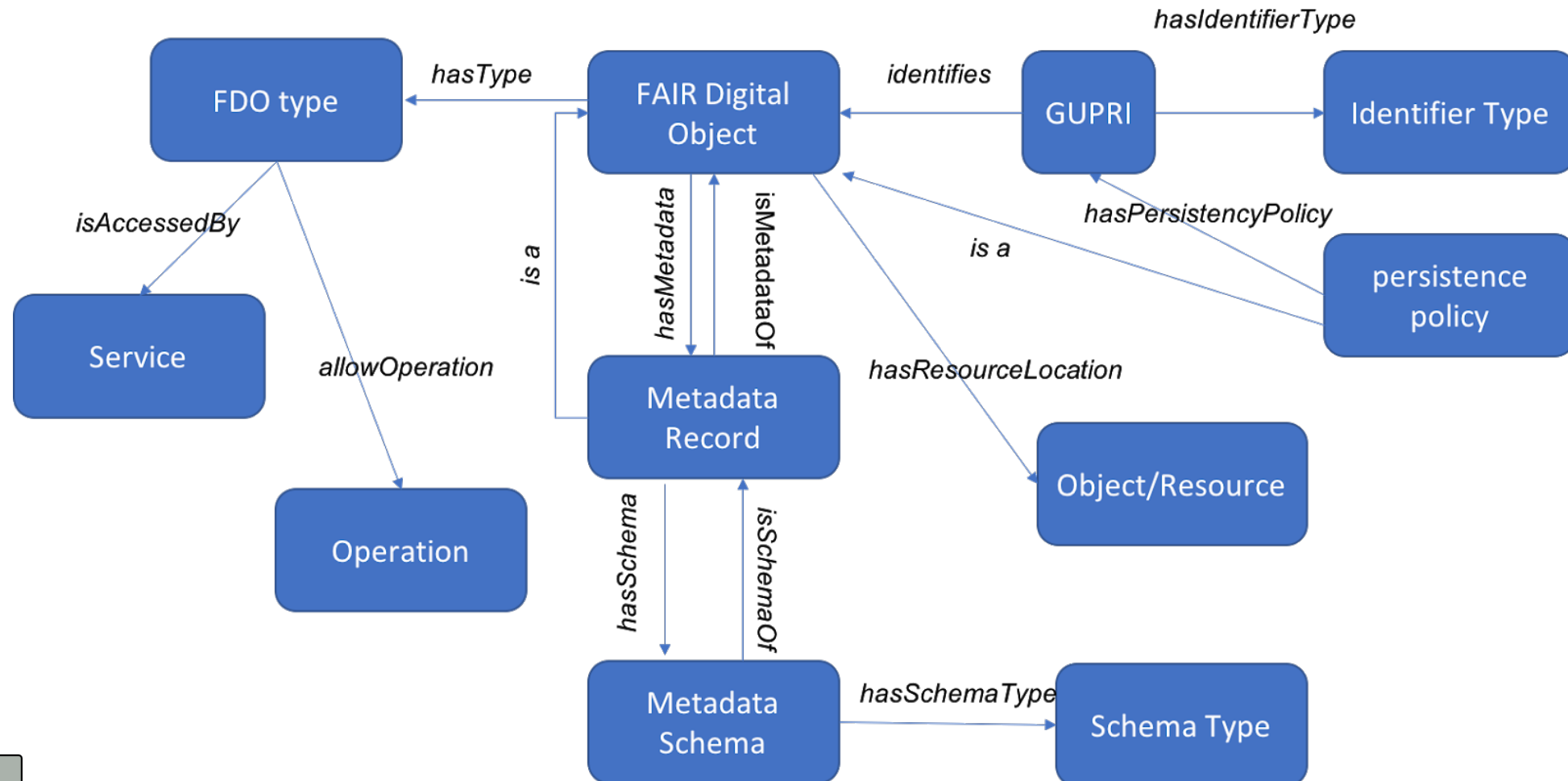hasMetadata: www.example.org/myleadmeasurement-180520/metadata
hasType: csv table
hasResourceLocation: www.example.org/myleadmeasurement-180520/table.csv .

Investigating the origin: Digital Object model

A tentative model

Next steps

- Define operations of the FDO service and model

- Apply model to use-case:

  - FDO description for Semantic artefacts
  - investigate link between data and concepts from semantic artefacts in the context of FDO

- Link with the minimum metadata for FAIR semantic artefacts based on DCAT