



# FAIR Semantics

(first recommendations)

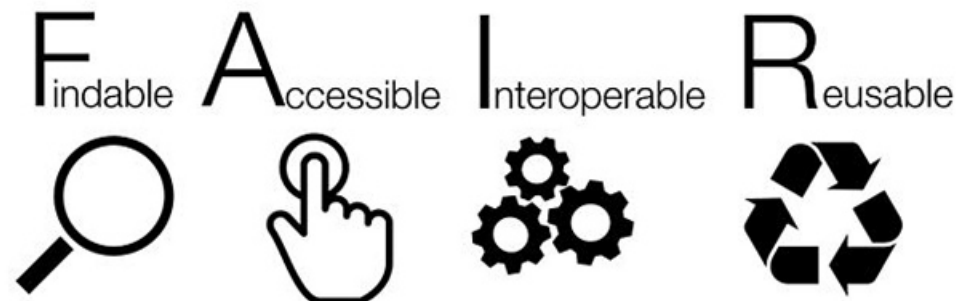
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📅 26 March 2020  
📍 Madrid

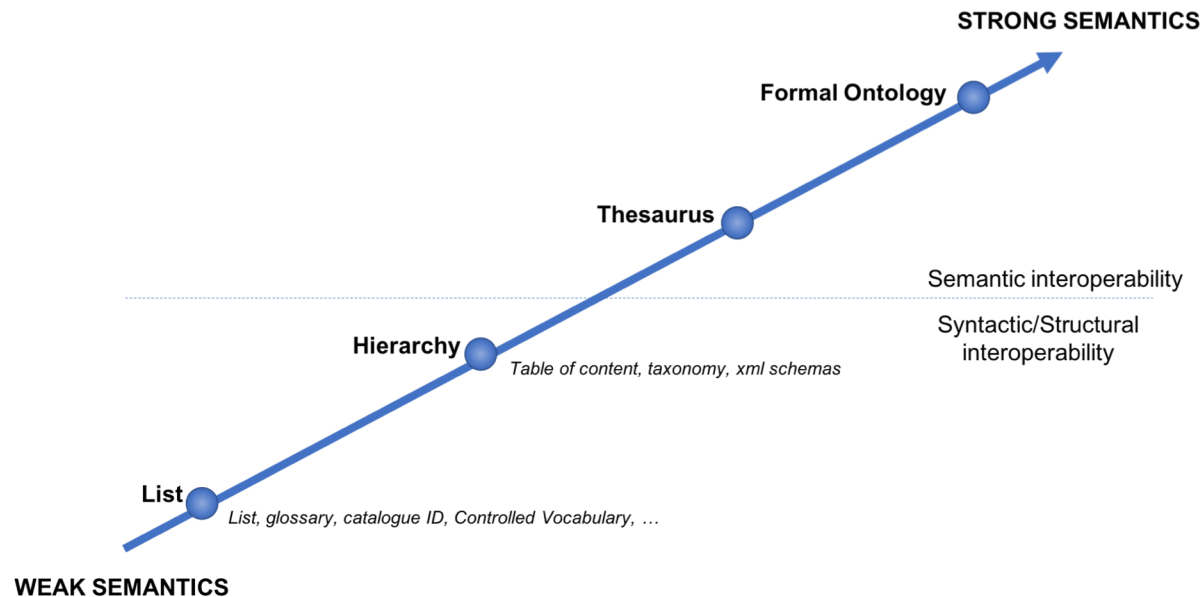


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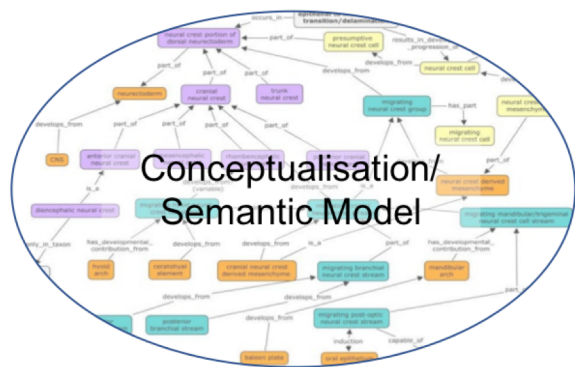
Wilkinson, M. D. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. <https://doi.org/10.1038/sdata.2016.18> (2016)



*“Machine-actionable and -readable formalisation of a conceptualisation enabling sharing and reuse by humans and machines.”*



**Fig 1. Semantic artefact spectrum**

Derived from Obrst L., 2010. Ontological Architectures, [https://doi.org/10.1007/978-90-481-8847-5\\_2](https://doi.org/10.1007/978-90-481-8847-5_2)



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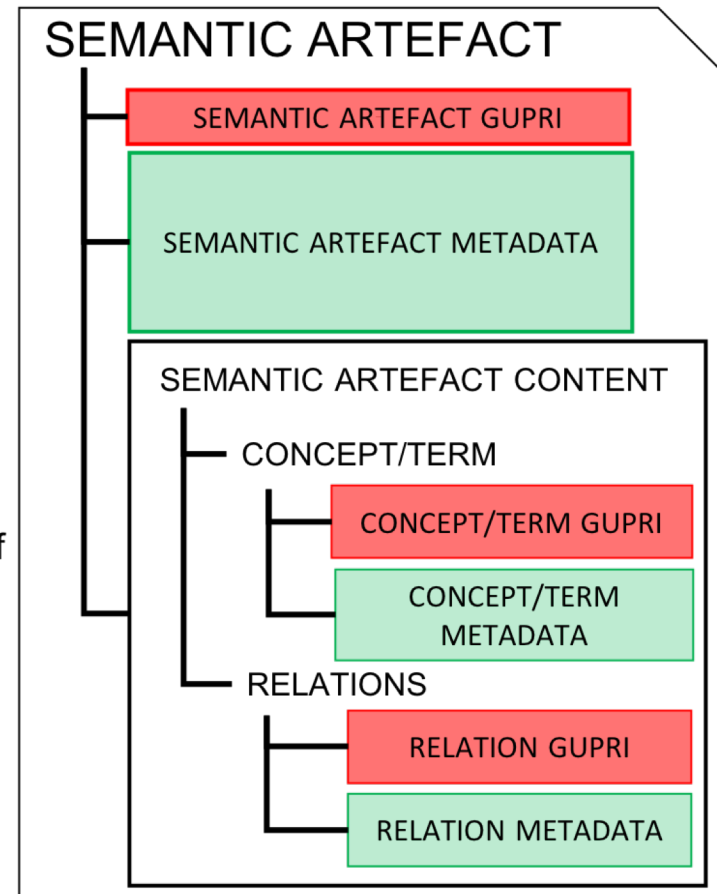


Fig 2. Common structure of semantic artefacts

- 17 preliminary recommendations (P-Rec) related to one or more of the FAIR principles.
- 10 best practice recommendations (BP-Rec) to improve the global FAIRness of semantic artefacts.
- Stakeholders:
  - Practitioners
  - Repositories
  - Semantic Web Community

***P-Rec. 1: Use Globally Unique, Persistent and Resolvable Identifier for Semantic Artefacts, their content and their versions***

- Related FAIR principle: F1
- Related recommendations: W3C Data on the Web (BP-9), OBO Foundry (Principle 3-4), among others.
- Stakeholders: Practitioner and Repository

***P-Rec. 2: Use Globally Unique, Persistent and Resolvable Identifier for Semantic Artefact Metadata Record***

- Related FAIR principles: F1, F3
- Related recommendations: N/A
- Stakeholders: Practitioner and Repository

***P-Rec. 3: Use a common minimum metadata schema to describe semantic artefacts and their content***

- Related FAIR principles: F2, R1.1, R1.2 and R1.3
- Existing recommendations: VOAFA, Ontology Metadata Vocabulary, etc.
- Stakeholders: Practitioner, Repository and Community



***P-Rec. 4: Publish the Semantic Artefact and its content in a semantic repository***

- Related FAIR principle: F4
- Existing technologies: Bioportal, SKOSMOS, etc.
- Stakeholders: Practitioner

***P-Rec. 5: Semantic repositories should offer a common API to access Semantic Artefacts and their content in various serializations for both use/reuse and indexing by any search engines***

- Related FAIR principle: F4, A1, A1.1
- Existing recommendations: OpenAPI, smartAPI, etc.
- Stakeholders: Repository

***P-Rec. 6: Build semantic artefacts' search engines that operate across different semantic repositories***

- Related FAIR principle: F4
- Existing recommendations: N/A
- Stakeholders: Community

***P-Rec. 7: Repositories should offer a secure protocol and user access control functionalities***

- Related FAIR principle: A1.2
- Existing recommendations: N/A
- Stakeholders: Repository

***P-Rec. 8: Define human and machine-readable persistency policies for semantic artefacts metadata***

- Related FAIR principle: A2
- Existing recommendations: N/A
- Stakeholders: Repository

***P-Rec. 9: Semantic artefacts should be represented using common serialization formats, e.g., Semantic Web and Linked Data standards***

- Related FAIR principle: I1
- Existing recommendations: RDF, OWL, SKOS, etc.
- Stakeholders: Practitioner and Repository

***P-Rec. 10: Use a Foundational Ontology to align semantic artefacts***

- Related FAIR principles: I1, I2, I3
- Existing recommendation: Industry Ontology Foundry  
- requirement 8
- Stakeholders: Practitioner

***P-Rec. 11: Use a standardized language for describing semantic artefacts***

- Related FAIR principles: I1
- Existing recommendation: SHACL, SWRL, OntoUML
- Stakeholders: Community



***P-Rec. 12: Semantic mappings between the different elements of semantic artefacts should use machine-readable formats based on W3C standards***

- Related FAIR principles: I1, I3, R1.3
- Existing recommendation: DOOR
- Stakeholders: Practitioner

***P-Rec. 13: Crosswalks, mappings and bridging between semantic artefacts should be documented, published and curated***

- Related FAIR principles: R1.2, R1.3
- Existing recommendation: N/A
- Stakeholders: Practitioner and Repository

***P-Rec. 14: Use standard vocabularies to describe semantic artefacts***

- Related FAIR principles: I2
- Existing recommendation: LOV, OBO Foundry, FAIR Data Point Specification
- Stakeholders: Practitioner and Community

***P-Rec. 15: Make the references to the reused third-party semantic artefacts explicit***

- Related FAIR principles: I3, R1.2
- Existing recommendation: LOV, VoID
- Stakeholders: Practitioner

***P-Rec. 16: The semantic artefact should be clearly licenced for machines and humans***

- Related FAIR principles: R1.1
- Existing recommendation: Creative Common, ODRL
- Stakeholders: Practitioner and Repository

***P-Rec. 17: Provenance should be clear for both humans and machines***

- Related FAIR principles: R1.2
- Existing recommendation: PROV, OBO Foundry (principles 4 and 8)
- Stakeholders: Practitioner

***BP-Rec. 1: Use a unique naming convention for concept/class and relations***

- Existing recommendation: OBO Foundry (principle 12), Industry Ontology Foundry (requirement 11)
- Stakeholders: Practitioner and Community

***BP-Rec. 2: Use an Ontology Naming Convention***

- Existing recommendation: OBO Foundry (principle 3), Industry Ontology Foundry
- Stakeholders: Community

## ***BP-Rec. 3: Use defined ontology design patterns***

- Existing recommendation: N/A
- Stakeholders: Practitioner

## ***BP-Rec. 4: Create mappings validated by domain experts***

- Existing recommendation: N/A
- Stakeholders: Practitioner



## ***BP-Rec. 5: Define workflows between different formats***

- Existing recommendation: N/A
- Stakeholders: Practitioner and Community

## ***BP-Rec. 6: Harmonize the methodologies used to develop semantic artefacts***

- Existing recommendation: OBO Foundry (principle 8), Industry Ontology Foundry (principle 9)
- Stakeholders: Community

## ***BP-Rec. 7: Interact with the designated community and manage user-centric development***

- Existing recommendation: OBO Foundry (principles 9, 11, 16), Industry Ontology Foundry (principles 14, 15, 16)
- Stakeholders: Practitioner

## ***BP-Rec. 8: Provide a structured definition for each concept***

- Existing recommendation: OBO Foundry (principle 6), Industry Ontology Foundry (principle 10)
- Stakeholders: Practitioner

***BP-Rec. 9: The underlying logic of semantic artefacts should be grounded on the domain it intends to describe***

- Existing recommendation: N/A
- Stakeholders: Practitioner

***BP-Rec. 10: Define a set of governance policies for the semantic artefacts***

- Existing recommendation: N/A
- Stakeholders: Practitioner and Repository

Thank you for your attention



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