FAIR Semantics and the NVS

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The FAIR principles provide guidelines for the publication of digital resources such as datasets, code, workflows, and research objects aiming at making them Findable, Accessible, Interoperable, and Reusable(1). Amongst them, the I of the FAIR promotes interoperability and more specifically principle I2 suggests that metadata should use vocabularies that themselves follow the FAIR principles. Recently, FAIRsFAIR[1] project officially published a first iteration of recommendations for making vocabularies FAIR (2). These recommendations include 17 general recommendations aligned with the different FAIR Principles and 10 Best Practice recommendations. The main objective of these recommendations is to provide a set of guidelines for creating a harmonised and interoperable semantic landscape easing the use and reuse of semantic artefacts from multiple different scientific domains.

The NERC Vocabulary Server (NVS) is an operational service, managed as a shared resource by the British Oceanographic Data Centre (BODC) according to rigorous content governance principles (3). Since the 17 general FAIRsFAIR recommendations will impact terminology providers we volunteered in examining them from an operational terminology service point of view and in this presentation we will share our experience and findings.

The initiative behind this assessment stems from our commitment to serve the marine community with up-to-date and FAIR semantics. Since its inception NVS has undergone incremental enhancements in its model including publishing the versioning of its concepts, the provenance of mappings, allowing interaction via github, being listed in registries like fairsharing.org. In this work, we wish to evaluate the level of compliance of NVS to the FAIR principles according to this first set of recommendations as depicted in Figure 1. Our goal is to help shape the FAIR Semantics recommendations through the lens of a pragmatic approach applied to an existing, well established and operational terminology service.

For this purpose, we are working in partnership with the FAIRsFAIR project that drafted the recommendations, within an international context involving initiatives such as the GO FAIR Inter implementation network[2], the fairsharing.org[3] community, the Research Data Alliance (RDA) Vocabulary Semantic Services Interest Group (VSSIG)[4] and other terminology providers. In order to coordinate these various initiatives, a Task Group (TG) is being set up under the umbrella of the RDA VSSIG to focus on the evaluation of the FAIR Semantics recommendations with respect to semantic artefact services (i.e. repositories and registries). The TG will be used as a platform for collaboration and discussions on the topic.

The first step involves a crude analysis of the compliance of NVS to the 17 general recommendations, planning to be extended to the rest of semantic artefact services (SAS) involved in the RDA dedicated TG. This simple approach will allow the analysis of the practical implementation of these recommendations within each of the SAS. This first analysis will help uncover the diversity of

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[1] https://www.fairsfair.eu/

[2] https://www.go-fair.org/implementation-networks/overview/go-inter/

[3] https://www.FAIRsharing.org

[4] https://www.rd-alliance.org/group/vocabulary-services-interest-group

implementations of each of the recommendations and reveal possible commonalities which should become, for instance, practical recommendations for other SAS. In the meantime, we are analysing the recommendations that are not fulfilled by any repositories and we will propose either a common solution for addressing this recommendation whenever possible or simply refine and clarify the recommendations. We hope our experience can benefit other terminology providers who are currently trying to evaluate and improve the FAIRness of their services and their content.

Rec#	Recommendation	NVS	Other Terminology Service	Comment
P-Rec.1	Use Globally Unique, Persistent and Resolvable Identifier for Semantic Artefacts, their content and their versions	Yes/No	Yes/No	
P-Rec.2	Use Globally Unique, Persistent and Resolvable Identifier for Semantic Artefact Metadata Record	Yes/No	Yes/No	
P-Rec.3	Use a common minimum metadata schema to describe semantic artefacts and their content	Yes/No	Yes/No	
P-Rec.4	Publish the Semantic Artefact and its content in a semantic repository	Yes/No	Yes/No	
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 indexation by any search engines	Yes/No	Yes/No	
P-Rec.6	Build semantic artefacts' search engines that operate across different semantic repositories	Yes/No	Yes/No	
P-Rec. 7	Repositories should offer a secure protocol and user access control functionalities	Yes/No	Yes/No	
P-Rec. 8	Define human and machine-readable persistency policies for semantic artefacts metadata	Yes/No	Yes/No	
P-Rec. 9	Semantic artefacts should be represented using common serialization formats, e.g.,Semantic Web and Linked Data standards	Yes/No	Yes/No	
P-Rec.10	Use a Foundational Ontology to align semantic artefacts	Yes/No	Yes/No	
P-Rec.11	Use a standardized language for describing semantic artefacts	Yes/No	Yes/No	
P-Rec.12	Semantic mappings between the different elements of semantic artefacts should use machine-readable formats based on W3C standards	Yes/No	Yes/No	
P-Rec.13	Crosswalks, mappings and bridging between semantic artefacts should be documented, published and curated	Yes/No	Yes/No	
P-Rec.14	Use standard vocabularies to describe semantic artefacts	Yes/No	Yes/No	
P-Rec.15	Make the references to the reused third-party semantic artefacts explicit	Yes/No	Yes/No	
P-Rec.16	The semantic artefact should be clearly licenced for machines and humans	Yes/No	Yes/No	
P-Rec.17	Provenance should be clear for both humans and machines documented, published and curated	Yes/No	Yes/No	

Figure 1: Initial form to evaluate terminology services alongside the 17 recommendations

References

1. Wilkinson, Mark & Sansone, Susanna-Assunta & Schultes, Erik & Doorn, Peter & Bonino da Silva Santos, Luiz Olavo & Dumontier, Michel. (2018). A design framework and exemplar metrics for FAIRness. Scientific Data. 5. 180118. 10.1038/sdata.2018.118.

2. Le Franc, Yann, Parland-von Essen, Jessica, Bonino, Luiz, Lehväslaiho, Heikki, Coen, Gerard, & Staiger, Christine. (2020). D2.2 FAIR Semantics: First recommendations (Version 1.0). FAIRsFAIR. 10.5281/zenodo.3707985.

3. Moncoiffé, Gwenaëlle and Kokkinaki, Alexandra (2018). The BODC Parameter Usage Vocabulary (PUV) semantic model exposed. Bollettino di Geofisica Teorica ed Applicata. 59, 36. Proceedings of IMDIS 2018