FAIR Signposting

FAIR Signposting: Exposing the Topology of Digital Objects on the Web

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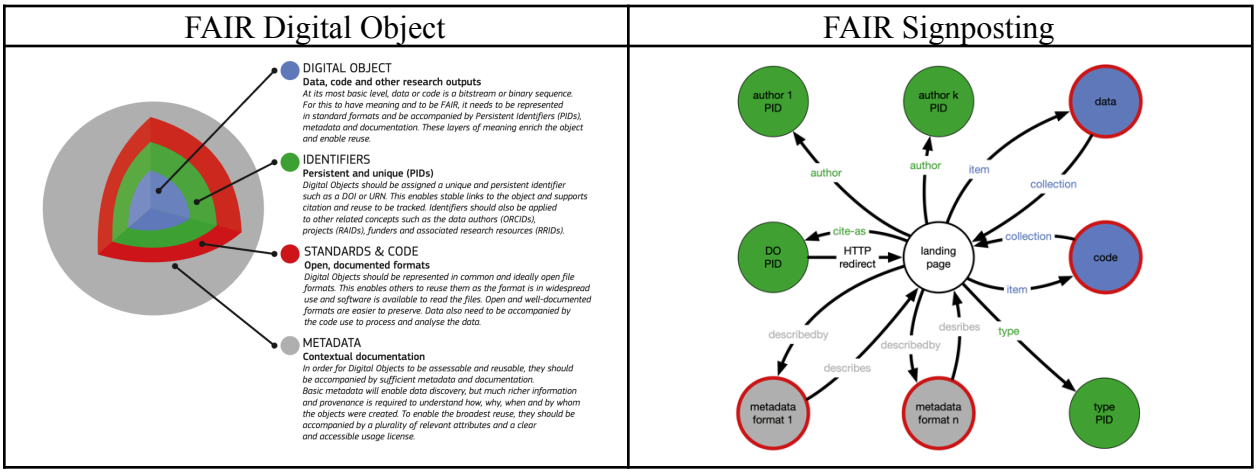
The Signposting effort started around 2015 in an attempt to address a long-standing problem regarding machine interaction with scholarly objects on the web. Omnipresent landing pages support human interaction with scholarly objects by providing descriptive metadata and links to content. But those pages are not optimized for use by machine agents that navigate the scholarly web. For example, how can a robot determine which links on a landing page lead to content and which to metadata? And, how can a bot distinguish those links from the myriad of other links on the page? Signposting addresses this by suggesting some purposely simple, yet standard-based patterns for using typed web links[1] to unambiguously point from a landing page to descriptive metadata (`describedby` link), content resources (`item` link), persistent identifier (`cite-as` link), etc.

It is fair to say that the effort initially didn't gather a lot of attention nor momentum. But that changed when, in 2020, the FAIR Signposting Implementation Guideline was published. FAIR Signposting goes beyond merely suggesting patterns and specifies concrete, well-documented and illustrated recipes that developers can follow to add Signposting support to repository platforms or to implement compliance checks in FAIR assessment tools. It provides details regarding the precise semantics of the select set of link relation types, their cardinality, best practice recommendations for license and vocabulary URIs, levels of support, etc.



An extra boost for Signposting came when it became clear[2] that FAIR Signposting essentially provides a web-centric model (above figure, right) for the notion of the FAIR Digital Object (above figure, left) as described and depicted in the 2018 EC Expert Group report "Turning FAIR into Reality"[3]. FAIR Signposting exposes the topology of a FDO on the web and does so by using the simplest possible ingredients. The choice for simplicity is motivated by a desire to minimize implementation and maintenance costs and is inspired by experience with numerous

[1] https://doi.org/10.17487/RFC8288
[2] https://doi.org/10.5281/zenodo.7977333
[3] https://doi.org/10.2777/1524

standardization efforts over the years. The choice for web-centricity is about the availability of off-the-shelf tools and expertise as well as a realistic prospect of long-term sustainability.

The EOSC task force for FAIR Metrics and Data Quality organized a series of "Apples to apples" hackathons and workshops, and have reported on FAIR Signposting and its uptake[4]. It highlights Signposting as a mechanism for guiding FAIR consuming machine-agents to locate the globally unique identifiers, data records and metadata records, and the challenge for FAIR assessment tools to make consistent evaluations without these elements.

A series of detailed benchmarks for signposting[5] have been created by the hackathons, that include identified test cases for each FAIR principle. For instance, https://w3id.org/a2a-fair-metrics/55-rda-r1-01m-t5-type-unresolve/ is a negative test case of a Signposting FDO where each of the `rel=type` have resolution errors. Such benchmarks are used by evaluation tools like F-UJI, as well as Signposting clients like the signposting Python library and command line tool.

The FAIR-IMPACT project's first support action had funded 18 participants contributing to FAIR assessments as well as 14 participants implementing Signposting and RO-Crate in their repositories and code bases. Among the latter, Signposting support was developed for University of Novi Sad's Research Information System DOSIRD UNS, Simula created a Signposting extension for CKAN to be used by the Norwegian Research Data Archive, ZBMed developed Signposting for GitHub Pages[6]. Signposting linkset support was developed for InvenioRDM (used by Zenodo) and using HTML headers in Tunisia's Scientific and Technical Information Portal by Tunisia National University Center of Scientific and Technical Documentation. EURAC Research's Environmental Data Portal also added detailed signposting and new metadata serializations, here the use of profiles in signposting was highlighted.

Several FAIR-IMPACT participants had planned to work on Signposting support in Dataverse, but that was concurrently implemented by the Dataverse community and relatively complete. For these participants, focus moved to upgrading and testing Signposting in their instances as well as contributing to RO-Crate support in Dataverse to get richer metadata.

When reaching out to the US NIH's Generalist Repository Ecosystem Initiative (GREI), its members (including Dataverse and InvenioRDM/Zenodo, Figshare, OSF, Vivli, Mendeley Data and Dryad) indicating many of them were developing support for Signposting as well as user-provided metadata.

A growing list of adopters of Signposting, including repositories and data platforms, shows the interest in and feasibility of implementing Signposting. These adopters highlight that it is easy to retrofit Signposting, but that the learning curve of other FAIR standards mean that providing detailed metadata is more demanding.

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[4] https://doi.org/10.5281/zenodo.10490289
[5] https://w3id.org/a2a-fair-metrics/
[6] https://doi.org/10.37044/osf.io/gmk2h