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## FAIR Semantics, Interoperability, and Services

FAIRsFAIR is working actively to produce recommendations on technologies that support semantic interoperability in a sustainable way, and practices that support FAIRness.

Specifically, we aim to:

- Improve the semantic interoperability of research resources by specifying FAIR metadata schemas, vocabularies, protocols, and ontologies
- Provide solutions for interoperability requirements and machine accessibility for FAIR-aligned repositories
- Formulate guidelines and recommendations for FAIR-enabling services
- Assess to what extent the FAIR principles can be applied to research software

**On this page you can find summary information about our key outputs in each of these areas as at December 2020. Click on the links to access comprehensive newspaper pieces, the associated reports, and further reading material.**

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## Improve the semantic interoperability of research resources by specifying FAIR metadata schemas, vocabularies, protocols, and ontologies

Based on studies of public information, especially EOSC infrastructure efforts, and on limited surveying and interviews, documented in [D2.1 Report on FAIR requirements for persistence and interoperability 2019](#), FAIRsFAIR published [D2.2 FAIR Semantics: First recommendations](#), the first iteration of a set of guidelines for creating FAIR semantic artefacts. The report proposes 17 preliminary recommendations related to one or more of the FAIR principles and 10 best practice recommendations to improve the global FAIRness of semantic artefacts. A comprehensive revision of the report, [D2.5 FAIR Semantics Recommendations Second Iteration](#) was published in December 2020.

[D2.4 2nd Report on FAIR requirements for persistence and interoperability](#), published in August 2020 and written specifically for researchers, data stewards, and service providers, is a guide to the use of PIDs, metadata, and semantic interoperability. A further iteration of these guidelines will be published later in the project. Feedback and suggestions for improvement will be most welcome as comments on the public Google Docs version of the report at [https://docs.google.com/document/d/1h8yAlK8o3SCjG\\_tgE\\_fIB66F68aomMe6MuDv5oDK-4U/edit](https://docs.google.com/document/d/1h8yAlK8o3SCjG_tgE_fIB66F68aomMe6MuDv5oDK-4U/edit)

### Associated webinars:

- [Persistence and interoperability in FAIR research data management](#)
- [Clearing some of the highest FAIR hurdles: PIDs, Metadata, and Semantic Interoperability for Data Stewards and Service providers](#)
- [Clearing some of the highest FAIR hurdles: PIDs, Metadata, and Semantic Interoperability for Researchers](#)



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## Provide solutions for interoperability requirements and machine accessibility for FAIR-aligned repositories

The report [2.3 Set of FAIR data repositories features](#) provides guidelines to enable repositories not only to host FAIR digital objects, but also to be FAIR themselves. The recommendations were collected in the workshop “Building the data landscape of the future: FAIR Semantics and FAIR Repositories” which took place in Espoo Finland in October 2019.

The non-technical requirements tabled in the report relate to service level and other agreements between users and repositories or communities and data providers. They include amongst others:

- Each repository to have a PID
- Repositories to be listed in registries of repositories
- Explicit data deletion policy to detail roles and responsibilities
- Technical support to be provided for predefined file formats
- Community standards and ontologies from public registries to be reused

The report provides a comprehensive list of technical features aimed at improving interoperability and grouped by category. Categories dealt with include:

- Metadata for digital objects
- Machine-readable and interpretable metadata about repository itself
- PID policies
- Data object and file requirements

Additional technical requirements are that repositories should acquire a machine-readable license and provide a search interface that enables findability.

**Associated webinar:** [FAIRification of Services – Two Examples](#)

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## Formulate guidelines and recommendations for FAIR-enabling services

The [Assessment report on FAIRness of services \(D2.7\)](#) proposes an assessment framework for the FAIRness of services. Aimed at a target audience of data service owners, the model contains concrete recommendations to improve different aspects of services (FAIR enablement, quality of service, openness & connectivity) as well as more social aspects of services (user centricity, trustworthiness and ethical & legal aspects).

**Associated report** [M2.10 Report on basic framework on FAIRness of services](#)

**Associated webinar:** [FAIRification of Services: Two Examples](#)



**Associated workshop:** [FAIR Certification of Repositories and other Data Services](#)

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## Assess to what extent the FAIR principles can be applied to research software

The FAIRsFAIR extra milestone dedicated to software as a research output, [M2.15 Assessment report on 'FAIRness of software'](#) (October 16, 2020) presents the state-of-the-art of software in the scholarly ecosystem alongside 10 high-level recommendations for organisations seeking to define FAIR principles or other requirements for research software in the scholarly domain.

**Associated webinar:** [FAIR + Software: decoding the principles](#)

**Associated blog post:** [Decoding the FAIR principles: are they relevant to software?](#)

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### Further reading:

[Recommendations for Services in a FAIR Data Ecosystem](#) - Journal article

[FAIR Certification of Repositories - The User Perspective](#)

[The Question of Persistent Identifiers](#)

[Metadata and Interoperability](#)

[Ten things you can do to support FAIR data culture](#)

[Services to support FAIR data: From recommendations to actions](#)

