



OSTRAILS

Open Science Plan-Track-Assess Pathways

FAIR Assessment – LSRI - Conceptual Requirements

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Introduction and Task Management

This document describes a FAIR benchmark and associated components tailored to the needs of the LS-RI cluster within OSTRails as part of work package 4. This document is a human-readable, narrative description of this community's requirements for FAIR assessment of databases for any digital object type within the life sciences, without the inclusion of technical details. It follows the [Assess-IF](#) and, once complete, can be used as a starting point for the creation of required technical components.

This document is a work in progress and has been published to show the current state of the benchmark version as per the version listed at the top of this document. Only those principles implemented in the current version are present in this document. Iterative refinement and development will occur and be marked by further versions of this document and associated Assess-IF components.

The following arguments should be passed to this benchmark:

- Mandatory: The DOI or URL of the FAIRsharing record for the database being assessed.

This document was created using a template found at <http://doi.org/10.5281/zenodo.17901311>. This template can be copied and used within any community to begin preparations for a FAIR benchmark specific to your needs.

The tables below should be used to keep track of your progress and provide attribution.

FAIR Assessment Conceptual Components - Roadmap		
Task	Status	Notes
1: Benchmark – narrative requirements	Completed	This benchmark evaluates life science databases as there are too many disparate digital object types to capture all.
2: All metrics - narrative requirements	In progress	Mark as complete when all of your metric sections in this document are completed. Iterative refinement may be required before completing step 4.
3: Related standards, databases and	In progress	Any standards, databases and collections that are required for the correct running of your

collections - registration with FAIRsharing		benchmark should be registered with FAIRsharing and listed in the 'Related Records' area of the metrics sections.
4: Completed first draft of document	In progress	Once all parties are happy with this document, the first draft is complete, and the next task may begin.
5: Benchmark - registration with FAIRsharing	Completed	https://fairsharing.org/7456
6: All metrics - registration with FAIRsharing	In progress	https://fairsharing.org/7455 , https://fairsharing.org/7163 , https://doi.org/10.25504/FAIRsharing.IEZbPK , https://doi.org/10.25504/FAIRsharing.NHCOCK

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Overview

The Assessment Interoperability Framework (Assess-IF) being used by this community aims to create a uniform approach for defining and running tests (and specifically FAIR tests in the context of this document) by:

- Giving the community the power to choose what FAIR means to them:** Until now, using a FAIR tool such as those listed at <https://fairassist.org/tools> meant either selecting from among the benchmarks for FAIR that a given tool provides (which may

be unclear or hard to understand exactly what's being tested) or a formal collaboration with tool(s) to ensure they provide a custom FAIR assessment solution for your needs. The Assess-IF allows you to explicitly state how your community defines FAIR, and exactly how it should be tested, measured, weighted and scored.

2. **Encouraging transparency in assessment behaviours:** To date, FAIR assessment has been characterised by disparate behaviours and scores arising from independently authored FAIR Assessment tools, which themselves vary in the level of transparency they exhibit for their tests and benchmarks. The Assess-IF methodology encourages all tools and assessment platforms to register their assessment components (e.g. benchmarks, metrics) in a searchable manner, with rich metadata explaining what is being tested, why, and how. The Assess-IF allows you not only to define FAIR according to your community requirements but also provides a way of making those definitions clear, visible, reusable and extendable. Benchmarks that cannot be discovered via a search, and do not describe themselves sufficiently, do not themselves meet the minimum expectations for FAIRness and make it harder to understand if a particular tool interprets FAIR the way your community requires it to be interpreted.
3. **Defining a consistent report format for assessments:** Because the reports are designed to be understood by any tool, the user can have a wider range of independent tools to select from. Being able to move these reports from one tool to another also allows the user to contextualise their tests, and to explore results from different perspectives.
4. **Enabling Automatic FAIR Testing via APIs:** by creating shared APIs among the different domains (FAIR, SKG, DMP, maDMP) it becomes possible to “embed” assessments into existing tooling. For example, a DMP authoring tool will be able to “call out” to a FAIR Assessment tool to obtain real-time information about the FAIRness of a digital object while the DMP is being written or updated.

Summary of component types

The Assess-IF has seven main “components”, split according to three main categories: **conceptual** components define FAIR for a community in human-readable terms, **software** components provide the actual tests and interpretations of those tests, and **data** components store the results of running an assessment. This template helps you to fully specify the conceptual components for your community definition of FAIR and gives you jumping off points to create the software components and ultimately run assessments to produce data in the form of test results. As such, we have provided a short description of each component so that you can understand the wider framework at a very high level.

The **conceptual components** are:

1. **Dimensions/principles:** Dimensions (for this template, our dimensions are the FAIR Principles) are designed to be subject- and implementation-agnostic criteria or high-level goals that may be refined for communities as described in this template. More information on the FAIR principles can be found in the FAIR Principles FAIRsharing record (<https://doi.org/10.25504/FAIRsharing.WW110U>), which provides a wealth of information about them as well as linking to individual records describing all sub-principles.
2. **Benchmarks:** Community-specific groupings of metrics. They provide a narrative describing how a community defines FAIR. Communities can choose the granularity of their benchmarks with regards to subject area and digital object type. Specifically, this means that benchmarks may be agnostic of object type or subject area, or may be scoped as tightly as required by the benchmark authors.
3. **Metrics:** Narrative description that a Test must wholly implement. Each metric should implement exactly one dimension (e.g. one sub-principle from the FAIR Principles). Metrics may be domain-agnostic or not.

A detailed understanding of the remaining components (below) is not required for the purposes of this template, but a short description of each is provided for completeness.

The **software components** are:

1. **Tests:** The instantiation of metrics, executed to assess a digital object in accordance with the metric linked to the test.
2. **Scoring Algorithms:** The instantiation of benchmarks, executed to create community-specific value judgements on the outcomes of tests. They specify the exact set of tests which are to be run by the assessment service together with weightings for each of these tests. Algorithms contextualise the sum of all test results for a given benchmark into a final quantitative assessment result.

The **data components** are:

1. **Test Results:** The output of running a test over a digital object. A test result also contains provenance metadata about the process followed to create it.
2. **Test Result Sets:** A set of test results, together with their respective metadata.
3. **Benchmark Scores:** Obtained after executing a scoring algorithm over a set of test results. The benchmark score includes a value, a log and a link to the test results used to obtain the score.

Types of Metrics

Symbols

- ☑ indicate a Generic metric.
- 💡 indicates a Specialised metric.
- 📖 indicates a section providing more information.

When a community uses this document to describe a benchmark and related metrics, the metrics can be one of two types.

Within OSTRails, all principles have corresponding **generic metrics** except for the following: I2, R1.2, R1.3, which communities must **specialise** for their requirements. Such specialised metrics generally need to consider the requirements of both the specific discipline and digital object type being assessed by the benchmark.

Generic Metrics

☑ If a section is labelled **generic**, then all benchmarks should be able to implement the generic metric rather than needing to define a community-specific metric. Generic metrics are those that cover domain-agnostic features, therefore applicable to any discipline, irrespective of the type of digital object being evaluated.

Specialised Metrics

💡 If a section is labelled **specialised**, then the principle is considered highly domain specific, and we suggest that all communities create their own metric to suit their requirements.

Refinements and sufficiency

Small modifications to existing generic metrics may optionally be added as **refinements** to a generic metric within a community document. These are intended to allow communities to specify exactly where a field can be found, e.g. a licence field, within their metadata. These will either be implemented as a specialised test (rather than using the already-created generic test associated with a generic metric) or as a specialised metric. Iterative updates to this document will determine which is appropriate.


While the classification of **generic** and **specialised** metrics is useful and is intended to make it easier to create assessments, there will be circumstances where a given **generic** metric is a *necessary* part of the assessment for a community but is also *insufficient* to wholly describe that community's requirements for that principle.

For example, perhaps a community wishes to specifically check for a particular type of DOI (e.g. one minted by an approved service of their choice) in addition to the presence of any GUPRI type (“any GUPRI” is the definition of the generic F1 GUID metric). In such a case, **refinements** are not appropriate (because the underlying generic metric is *necessary* but not *sufficient*); instead, **specialised** metrics linked to a principle that already has a **generic** metric are appropriate. In this example, the community should use two metrics, both of which are linked to FAIR F1-GUID: one will be the **generic** metric for FAIR F1-GUID and the other will be a new **specialised** metric with the added requirement.

FAIR Assessment of Life Science Repositories and Knowledgebases Benchmark

This benchmark, including a complete description, supporting documentation and a full list of associated metrics, can be found at <https://fairsharing.org/7456>.


FAIR Principles F1: (Meta)data are assigned globally unique and persistent identifiers

 For more information on this principle, including documentation and justifications for the implementation of this principle, please see <https://doi.org/10.25504/FAIRsharing.a2cea7>.

This principle is very commonly split into its distinct components of the identifiers being 1) GUPRIs, and 2) persistent. These sub-principles are F1-GUID (<https://doi.org/10.25504/FAIRsharing.b7f1ab>) and F1-PID (<https://doi.org/10.25504/FAIRsharing.e226cb>).

FAIR Principles F1-PID: (Meta)data are assigned persistent identifiers

Specialised metric: FAIR Metric ARK F1-PID - persistent identifiers for database content

 **We do NOT use the generic metric ‘FAIR Maturity Indicator - Identifier Persistence’** but **instead** uses the specialised metric found at **‘FAIR Metric ARK F1-PID - persistent identifiers for database content’**. This metric parses the FAIRsharing database record metadata and checks that the referenced database mints persistent identifiers.

FAIR Principles F1-GUID: (Meta)data are assigned globally unique and persistent identifiers

✓ We are using the **generic** metric.

💡 We are also using a **specialised** metric.

For details of both, please see the subsections below.

FAIR Maturity Indicator - Identifier Uniqueness - Gen2-MI-F1A

✓ This is a **generic metric**.

📖 For more information on this **generic metric**, including documentation and justifications, please see <https://doi.org/10.25504/FAIRsharing.NHCOKK>.

LS-RI uses the **generic** metric and its associated generic test to check if the identifier being passed to the benchmark is a GUPRI, but this is insufficient for our needs and therefore will only be given a low weighting. More importantly to our benchmark are the type(s) of identifier schemas used by the database referenced in the FAIRsharing record. Therefore, we have also created the **specialised** metric below, which is of primary importance as it will test that the referenced database mints GUPRIs.

Specialised Metric: FAIR Metric ARK F1-GUPRI - Globally unique, persistent and resolvable identifiers for database content

💡 We are using a **specialised** metric. '[FAIR Metric ARK F1-GUPRI - Globally unique, persistent and resolvable identifiers for database content](#)'. This metric parses the FAIRsharing database record metadata and checks that the referenced database mints GUPRIs.

FAIR-A2: metadata are accessible, even when the data are no longer available

📖 For more information on this principle, including documentation and justifications for the implementation of this principle, please see <https://doi.org/10.25504/FAIRsharing.7c4d7f>.

FAIR Maturity Indicator - Metadata persistence

✓💡 **We use the generic metric** '[FAIR Maturity Indicator - Metadata persistence](#)' but have written our own **specialised** test. We have done this to ensure that the

FAIRsharing metadata for the evaluated database record is always checked for a persistence policy.