



FAIR 4 Research Software (FAIR4RS) SC21

Michelle Barker, Neil Chue Hong, Morane Gruenpeter, Leyla Jael Castro, Jennifer Harrow, Daniel S. Katz, Carlos Martinez, Paula A. Martinez, Fotis Psomopoulos

Copy of slides: tinyurl.com/FAIR4RS-SC21

research data sharing without barriers
rd-alliance.org

November, 2021

Motivation - *Software is not just another type of data*

- FAIR Principles, are intended to be applied to **all digital objects** ([Wilkinson et al. 2016](#))
- This WG focuses on the **adaptation and adoption** of the FAIR principles to research software

Recommendation n°5 :

*Recognise that FAIR guidelines will require **translation for other digital objects** and support such efforts.*

2020: 'Six Recommendations for Implementation of FAIR Practice'

([FAIR Practice Task Force EOSC, 2020](#))

Recommendation n° 2 :

*Make sure **the specific nature of software** is recognized and not considered as “just data” particularly in the context of discussion about the notion of FAIR data.*

2019: the Opportunity Note by the French national Committee for Open Science's Free Software and Open Source Project Group ([Clément-Fontaine, 2019](#))

Introduction #FAIR4RS

- A joint **RDA** Working Group, **FORCE11** Working Group, and Research Software Alliance (**ReSA**) Taskforce.
- Coordinating of a range of existing community-led discussions on:
 - How to define and effectively apply FAIR principles to research software,
 - How to achieve adoption of these principles.

Endorsed by RDA
Sep 2020
Completing its work
in March 2022



<https://www.rd-alliance.org/group/fair-4-research-software-fair4rs-wg/case-statement/fair-research-software-wg-case-statement>

Research Software vs. Software in Research

Research Software includes source code files, algorithms, scripts, computational workflows and executables that were created during the research process or for a research purpose. Software components (e.g., operating systems, libraries, dependencies, packages, scripts, etc.) that are used for research but were not created during or with a clear research intent should be considered software in research and not Research Software. This differentiation may vary between disciplines.

Subgroup3- Research Software definition report (before publication) linked from the landing page of the FAIR4RS WG
<https://www.rd-alliance.org/groups/fair-research-software-fair4rs-wg>

Development of the FAIR4RS Principles

- Intent and methods of the FAIR Guiding Principles taken as starting point:
 - “maximize the added-value gained by contemporary, formal scholarly digital publishing”
 - “to ensure transparency, reproducibility, and reusability.”
- The FAIR Principles are aspirational, and FAIR is not binary
- Software encompasses many forms, which may benefit different users
 - Source code is often the most useful form to understand the software, and the easiest form to apply the FAIR4RS Principles.
- Many software engineering practices are relevant to the FAIR4RS Principles

Considerations

- The challenges of guiding without giving guidance that would only work in certain situations
 - In particular, the community looking for a checklist they can follow, which is not the same as principles
- The difficulties of jargon and making the principles understandable to a broad audience
- The wording of the principles – moving away from modal language towards aspirational descriptions

FAIR Principles for Research Software

Hong, N. P. C., Katz, D. S., Barker, M., Lamprecht, A.-L., Martinez, C., Psomopoulos, F. E., Harrow, J., Castro, L. J., Gruenpeter, M., Martinez, P. A., & Honeyman, T. (2021). FAIR Principles for Research Software (FAIR4RS Principles). Research Data Alliance. DOI: [10.15497/RDA00065](https://doi.org/10.15497/RDA00065)

Findable

Findable: Software, and its associated metadata, is easy to find for both humans and machines.

F1. Software is assigned a globally unique and persistent identifier

- F1.1. Different components of the software are assigned distinct identifiers representing different levels of granularity
- F1.2. Different versions of the same software are assigned distinct identifiers

F2. Software is described with rich metadata

F3. Metadata clearly and explicitly include the identifier of the software they describe

F4. Metadata are FAIR and are searchable and indexable

Accessible

Accessible: Software, and its metadata, is retrievable via standardized protocols.

A1. Software is retrievable by its identifier using a standardized communications protocol

- A1.1. The protocol is open, free, and universally implementable
- A1.2. The protocol allows for an authentication and authorization procedure, where necessary

A2. Metadata are accessible, even when the software is no longer available

Interoperable

Interoperable: Software interoperates with other software through exchanging data and/or metadata, and/or through interaction via application programming interfaces (APIs), described through standards.

- I1. Software reads, writes and exchanges data in a way that meets domain-relevant community standards
- I2. Software includes qualified references to other objects

Reusable

Reusable: Software is both usable (it can be executed) and reusable (it can be understood, modified, built upon, or incorporated into other software).

R1. Software is described with a plurality of accurate and relevant attributes

- R1.1. Software is given a clear and accessible license
- R1.2. Software is associated with detailed provenance
- R1.3. Software meets domain-relevant community standards

R2. Software includes qualified references to other software

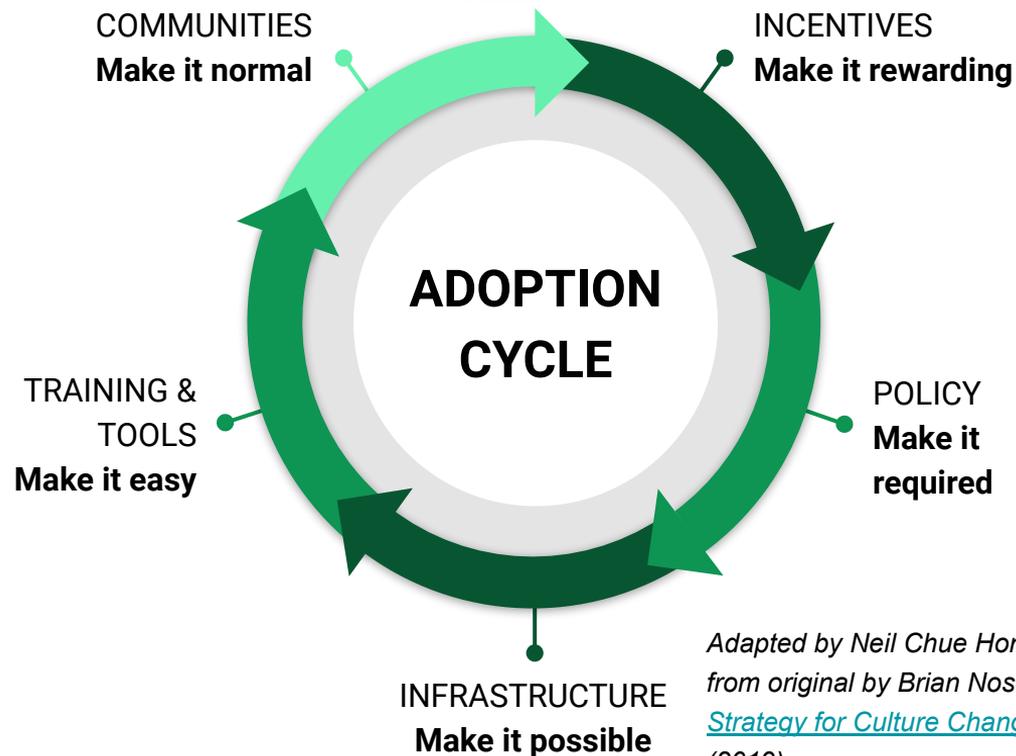
Who is responsible for FAIR software?

Who is expected to apply FAIR?

- And why?

“...the application of the FAIR4RS Principles is the responsibility of the owners (who are often the creators) of the software, not the users.”

“The FAIR4RS Principles are also relevant to the larger ecosystem and various stakeholders that support research software (e.g., repositories and registries).”



Adapted by Neil Chue Hong from original by Brian Nosek: [Strategy for Culture Change](#) (2019)

Use cases

Use cases by adopters of FAIR4RS principles include:

- Australian Research Data Commons (ARDC)
- Netherlands eScience Center
- German Aerospace Center (DLR)

Is your organisation interested in working with us to provide a use case for the principles, to get the benefits of early adoption?

Do you have resources on how to make research software FAIR?

FAIR4RS Roadmap

Aims to make implementation of FAIR4RS Principles a reality:

1. Mapping of existing projects that look at applying some of the elements of the FAIR principles to research software into framework to improve strategic alignment
2. Identification of opportunities for existing FAIR data initiatives to incorporate a focus on FAIR research software.

Groups:

- **FAIR 4 Machine Learning - includes modeling**
- **Metrics Working Group**
- **Life Sciences Working Group**, with ELIXIR providing a pilot use case.
- **FAIR for Virtual Research Environments (VREs) Working Group**
- **FAIR4RS skills and training curriculums**

Get involved!

- Join the RDA [group](#) and be part of the mailing list
- Come to [events](#)
- Follow the [steering committee meeting minutes](#)
- Visit and read the publications on [Zenodo](#)
- Review the bibliography collected on [Zotero](#)

All this information is detailed on the [community engagement channels page](#)

Acknowledgements

- 240 members of FAIR4RS WG
- Steering committee members

- Alfred P. Sloan Foundation and Wellcome Trust for support

Copy of slides: tinyurl.com/FAIR4RS-SC21