FAIR: Principles, Interpretations, Implementation Considerations, Evaluation, Certification, & Convergence
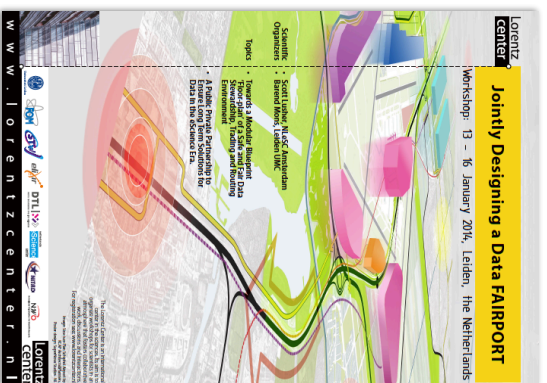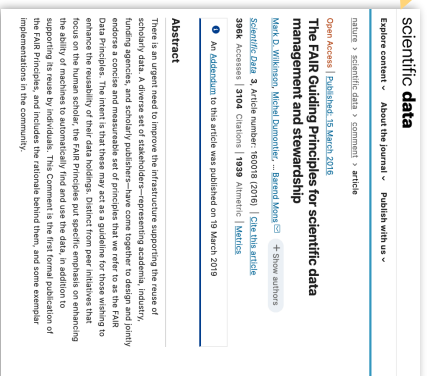
Dr. Erik Schultes, PhD
GO FAIR Foundation
http://orcid.org/0000-0001-8888-635X
erik.schultes@go-fair.org
February 8, 2021

Slides: https://osf.io/vbgu8/
Event: https://indico.neic.no/event/211/

● FAIR Principles

- Interpretations
- Implementation Considerations
- Evaluation
- Certification
- Convergence

Jointly Designing a Data FAIRPORT
Workshop: 13 – 16 January 2014, Leiden, the Netherlands

w w w . l o r e n t z c e n t e r . n l

2014-2016: Formulating the FAIR Principles with an emphasis on machine-actionability

scientific **data**

Open Access | Published: 15 March 2016
The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson, Michel Dumontier, … Barend Mons ✉ + Show authors

Scientific Data 3, Article number: 160018 (2016) | Cite this article
3968 Accesses | 3104 Citations | 1939 Altmetric | Metrics

ⓘ An Addendum to this article was published on 19 March 2019

Abstract

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have come together to design and jointly endorse a concise and measurable set of principles that we refer to as the FAIR Data Principles. The intent is that these may act as a guideline for those wishing to enhance the reusability of their data holdings. Distinct from peer initiatives that focus on the human scholar, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals. This Comment is the first formal publication of the FAIR Principles, and includes the rationale behind them, and some exemplar implementations in the community.

Wilkinson, M., Dumontier, M., Aalbersberg, I., et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018 (2016). https://doi.org/ 10.1038/sdata.2016.18

---

https://www.nature.com/articles/sdata201618

Box 2 | The FAIR Guiding Principles

To be Findable:
F1. (meta)data are assigned a globally unique and persistent identifier
F2. data are described with rich metadata (defined by R1 below)
F3. metadata clearly and explicitly include the identifier of the data it describes
F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:
A1. (meta)data are retrievable by their 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 data are no longer available

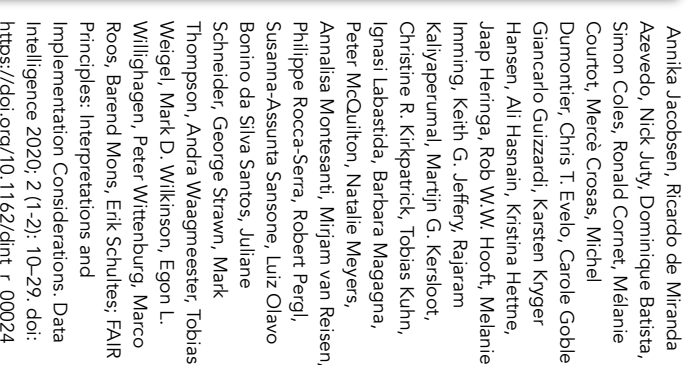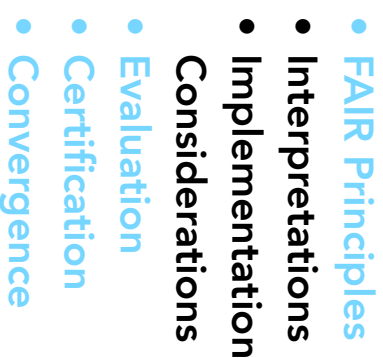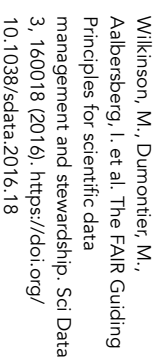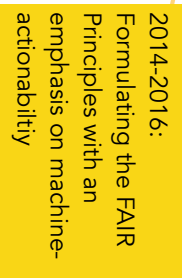**To be Interoperable:**
I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation
I2. (meta)data use vocabularies that follow FAIR principles
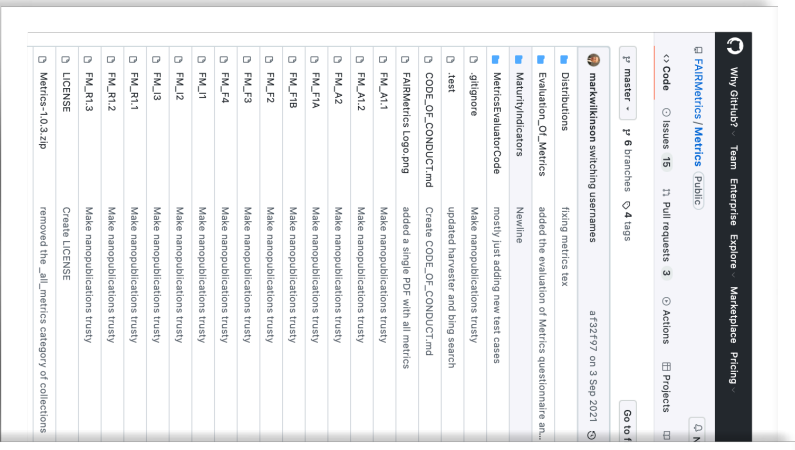I3. (meta)data include qualified references to other (meta)data

To be Reusable:
R1. meta(data) are richly described with a plurality of accurate and relevant attributes
R1.1. (meta)data are released with a clear and accessible data usage license
R1.2. (meta)data are associated with detailed provenance
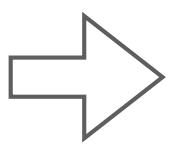R1.3. (meta)data meet domain-relevant community standards

Infrastructure
Domain

2014-2016: Formulating the FAIR Principles with an emphasis on machine-actionability

Interpretations and Implementation Considerations

Annika Jacobsen, Ricardo de Miranda Azevedo, Nick Juty, Dominique Batista, Simon Coles, Ronald Cornet, Mércè Crosas, Michel Dumontier, Chris T. Evelo, Carole Goble, Giancarlo Guizzardi, Karsten Kryger Hansen, Ali Hasnain, Kristina Hettne, Jaap Heringa, Rob W.W. Hooft, Melanie Imming, Keith G. Jeffery, Rajaram Kaliyaperumal, Martijn G. Kersloot, Christine R. Kirkpatrick, Tobias Kuhn, Ignasi Labastida, Barbara Magagna, Peter McQuilton, Natalie Meyers, Annalisa Montesanti, Mirjam van Reisen, Philippe Rocca-Serra, Robert Pergl, Susanna-Assunta Sansone, Luiz Olavo Bonino da Silva Santos, Juliane Schneider, George Strawn, Mark Thompson, Andra Waagmeester, Tobias Weigel, Mark D. Wilkinson, Egon L. Willighagen, Peter Wittenburg, Marco Roos, Barend Mons, Erik Schultes; FAIR Principles: Interpretations and Implementation Considerations. Data Intelligence 2020; 2 (1-2): 10-29. doi: https://doi.org/10.1162/dint_r_00024

- **FAIR Principles**
- **Interpretations Considerations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

Jointly Designing a Data FAIRPORT

Lorentz center

Workshop: 13 - 16 January 2014, Leiden, the Netherlands

www.lorentzcenter.nl

2014-2016: Formulating the FAIR Principles with an emphasis on machine-actionability

Formulating the FAIR Principles as nanopublications (making a FAIR vocabulary)

Vocabulary for the FAIR Principles & the FAIR Principles as nanopublications
https://peta-pico.github.io/FAIR-nanopubs/principles/index-en.html

Ontology Specification Draft

FAIR Vocabulary

Authors:
https://orcid.org/0000-0002-1267-0234
https://orcid.org/0000-0003-4727-9435

This is the formal vocabulary (ontology) describing the FAIR principles.

1. Introduction

This documentation is generated from the nanopublications that you can find here.

2. FAIR Vocabulary Overview

This ontology has the following classes and properties.

Classes

3. Cross reference for FAIR Vocabulary classes, properties and dataproperties

This section provides details for each class and property defined by FAIR Vocabulary.

3.1. Classes

nanopublication
- assertion
- provenance
- publication info

Abstract

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have come together to design and jointly endorse a concise and measurable set of principles that we refer to as the FAIR Data Principles. The intent is that these may act as a guideline for those wishing to enhance the reusability of their data holdings. Distinct from peer initiatives that focus on the human scholar, the FAIR Principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals. This Comment is the first formal publication of the FAIR Principles, and includes the rationale behind them, and some exemplar implementations in the community.

Data Intelligence

MIT Press Direct

FAIR Principles: Interpretations and Implementation Considerations

Volume 2, Issue 1-2
Winter-Spring 2020

Article Contents
- Abstract
- 1. INTRODUCTION
- 2. FROM INTERPRETATION TO IMPLEMENTATION
- 3. INTERPRETATIONS AND IMPLEMENTATION CONSIDERATIONS PER FAIR GUIDING PRINCIPLE
- 4. DISCUSSION
- ACKNOWLEDGEMENTS
- Notes
- REFERENCES

Abstract

The FAIR principles have been widely cited, endorsed and adopted by a broad range of stakeholders since their publication in 2016. By intention, the 15 FAIR guiding principles do not dictate specific technological implementations, but provide guidance for improving Findability, Accessibility, Interoperability and Reusability of digital resources. This has likely contributed to the broad adoption of the FAIR principles, because individual stakeholder communities can implement their own FAIR solutions. However, it has also resulted in inconsistent interpretations that carry the risk of leading to incompatible implementations. Thus, while the FAIR principles are formulated on a high level and may be interpreted and implemented in different ways, for true interoperability we need to support convergence in implementation choices that are widely accessible and (re)-usable. We introduce the concept of FAIR implementation considerations to assist accelerated global participation and convergence towards accessible, robust, widespread and consistent FAIR implementations. Any self-identified stakeholder community may either choose to reuse solutions from existing implementations, or when they spot a gap, accept the challenge to create the needed solution, which, ideally, can be used again by other communities in the future. Here, we provide interpretations and implementation considerations (choices and challenges) for each FAIR principle.

Interpretations and Implementation Considerations

Annika Jacobsen, Ricardo de Miranda Azevedo, Nick Juty, Dominique Batista, Simon Coles, Ronald Cornet, Mélanie Courtot, Mercè Crosas, Michel Dumontier, Chris T. Evelo, Carole Goble, Giancarlo Guizzardi, Karsten Kryger Hansen, Ali Hasnain, Kristina Hettne, Jaap Heringa, Rob W.W. Hooft, Melanie Imming, Keith G. Jeffery, Rajaram Kaliyaperumal, Martijn G. Kersloot, Christine R. Kirkpatrick, Tobias Kuhn, Ignasi Labastida, Barbara Magagna, Peter McQuilton, Natalie Meyers, Annalisa Montesanti, Mirjam van Reisen, Philippe Rocca-Serra, Robert Pergl, Susanna-Assunta Sansone, Luiz Olavo Bonino da Silva Santos, Juliane Schneider, George Strawn, Mark Thompson, Andra Waagmeester, Tobias Weigel, Mark D. Wilkinson, Egon L. Willighagen, Peter Wittenburg, Marco Roos, Barend Mons, Erik Schultes; FAIR Principles: Interpretations and Implementation Considerations. Data Intelligence 2020; 2 (1–2): 10–29. doi: https://doi.org/10.1162/dint_r_00024

- **FAIR Principles**
- **Interpretations Considerations**
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- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

Metrics (interpretations) →

Maturity Indicators (tests) →

2018: First Generation FAIR Metrics
https://github.com/FAIRMetrics/Metrics

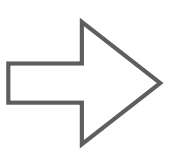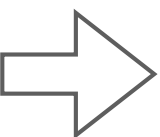Wilkinson, M., Sansone, SA., Schultes, E. et al. A design framework and exemplar metrics for FAIRness. Sci Data 5, 180118 (2018). https://doi.org/10.1038/sdata.2018.118

2019: FAIR Maturity Indicator Gen2-MI-I2B
https://beta.fairsharing.org/FAIRsharing.RCUuvt

https://w3id.org/AmIFAIR

Wilkinson, M.D., Dumontier, M., Sansone, SA. et al. Evaluating FAIR maturity through a scalable, automated, community-governed framework. Sci Data 6, 174 (2019). https://doi.org/10.1038/s41597-019-0184-5

FAIR Principles
Interpretations
Implementation Considerations
● Evaluation
● Certification
● Convergence

A comprehensive comparison of automated FAIRness Evaluation Tools for Healthcare and Life Sciences (SWAT4LS)
Chang Sun, Vincent Emonet and Michel Dumontier
http://www.swat4ls.org

Scientific Programme 2022 | Semantic Web Applications and Tools for Healthcare and Life Sciences (SWAT4LS)

Metrics (interpretations)

Maturity Indicators (tests)

2018: First Generation FAIR Metrics
https://github.com/FAIRMetrics/Metrics

Wilkinson, M., Sansone, SA., Schultes, E. et al. A design framework and exemplar metrics for FAIRness. Sci Data 5, 180118 (2018). https://doi.org/10.1038/sdata.2018.118

2019: FAIR Maturity Indicator Gen2-MI-I2B
https://beta.fairsharing.org/FAIRsharing.RCUuvt
https://w3id.org/AmIFAIR

Wilkinson, M.D., Dumontier, M., Sansone, SA. et al. Evaluating FAIR maturity through a scalable, automated, community-governed framework. Sci Data 6, 174 (2019). https://doi.org/10.1038/s41597-019-0184-5

The "cottage industry" of FAIR Evaluation

- Suffers from abundance!
  - 13 independent FAIR Evaluation platforms**
    → see https://fairassist.org
  - Most are questionnaire-based, a small few are automated
- Some have invented their own FAIR Metrics
- Some partially or wholly adopt the RDA FAIR Maturity Model WG Metrics

** Demonstrates that certain stakeholder communities are clamoring for a solution!

EOSC Task Force, Chair Mark Wilkinson
Apples to Apples: FAIR Evaluation stakeholder meeting
GO FAIR Foundation, February 7 & 10 2022

Value & Limitations

Divergence: caused by differing interpretations of the FAIR Principles and how to test them

The "cottage industry" of FAIR Evaluation

- Suffers from abundance!
  - 13 independent FAIR Evaluation platforms**
    → see https://fairassist.org
  - Most are questionnaire-based, a small few are automated
- Some have invented their own FAIR Metrics
- Some partially or wholly adopt the RDA FAIR Maturity Model WG Metrics
- **Three NEW Evaluators** appeared in the past few months!

Apples to Oranges

Comparison of The Evaluator with F-UJI, on the same URI
(a Catalog record in the Duchenne Muscular Dystrophy FAIR Data Point)

Test of: https://w3id.org/duchenne-fdp/catalog/c36b662c-fc4d-4b9f-a833-d4972a6fc395
Mon, 13 Sep 2021 11:08:19 +0000

F Metrics   A Metrics   I Metrics   R Metrics

20/22 Tests Pass

Summary:

Findable: 1 of 7
Accessible: 0 of 3
Interoperable: 1 of 4
Reusable: 0 of 10

2/24 Tests Pass

FAIR Data Maturity Model

RESEARCH **DATA ALLIANCE**

RDA

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**

- **Evaluation**
- **Certification**
- **Convergence**

The FAIR Data Maturity Model: An Approach to Harmonise FAIR Assessments

Authors: Christophe Bahim ✉, Carlos Casorrán-Amilburu, Makx Dekkers, Edit Herczog, Nicolas Loozen, Konstantinos Repanas, Keith Russell, Shelley Stall

Abstract

In the past years, many methodologies and tools have been developed to assess the FAIRness of research data. These different methodologies and tools have been based on various interpretations of the FAIR principles, which makes comparison of the results of the assessments difficult. The work in the RDA FAIR Data Maturity Model Working Group reported here has delivered a set of indicators with priorities and guidelines that provide a 'lingua franca' that can be used to make the results of the assessment using those methodologies and tools comparable. The model can act as a tool that can be used by various stakeholders, including researchers, data stewards, policy makers and funding agencies, to gain insight into the current FAIRness of data as well as into the aspects that can be improved to increase the potential for reuse of research data. Through increased efficiency and effectiveness, it helps research activities to solve societal challenges and to support evidence–based decisions. The Maturity Model is publicly available and the Working Group is encouraging application of the model in practice. Experience with the model will be taken into account in the further development of the model.

Bahim, C., Casorrán-Amilburu, C., Dekkers, M., Herczog, E., Loozen, N., Repanas, K., Russell, K. and Stall, S., 2020. The FAIR Data Maturity Model: An Approach to Harmonise FAIR Assessments. Data Science Journal, 19(1), p.41. DOI: http://doi.org/10.5334/dsj-2020-041

Widening: What is the FAIR Data Maturity Model and How it Can be Used

Home » Plenaries » Widening: What is the FAIR Data Maturity Model and How it Can be Used

By Shelley Stall

29 JUL 2021

Group(s) submitting the application: FAIR Data Maturity Model WG

Meeting objectives:
The proposed session will bring together people interested in the RDA FAIR Data Maturity Model (FDMM), and other FAIR assessment approaches, to discuss the FAIR DMM model implementation and its use in real life. In particular, we are focused on

- **How to place the FDMM in the larger ecosystem?**
- **How can the FDMM be used to implement FAIR?**
- **How can the FDMM and your FAIR assessment method enable culture change around data and software sharing?**
- **What do you think is missing from the FDMM for your implementation, what are obstacles/constraints in your implementation?**

Evaluating the FAIRness of an implementation

Choosing the implementation under some consideration

- FAIR Principles
- Interpretations
- Implementation Considerations
- **Evaluation**
- Certification
- Convergence

- **Evaluation**

Reusable FAIR Implementation Profiles as Accelerators of FAIR Convergence

Authors

Authors and affiliations

Erik Schultes, Barbara Magagna ✉, Kristina Maria Hettne, Robert Pergl, Marek Suchánek, Tobias Kuhn

Abstract

Powerful incentives are driving the adoption of FAIR practices among a broad cross-section of stakeholders. This adoption process must factor in numerous considerations regarding the use of both domain-specific and infrastructural resources. These considerations must be made for each of the FAIR Guiding Principles and include supra-domain objectives such as the maximum reuse of existing resources (i.e., minimised reinvention of the wheel) or maximum interoperation with existing FAIR data and services. Despite the complexity of this task, it is likely that the majority of the decisions will be repeated across communities and that communities can expedite their own FAIR adoption process by judiciously reusing the implementation choices already made by others. To leverage these redundancies and accelerate convergence onto widespread reuse of FAIR implementations, we have developed the concept of FAIR Implementation Profile (FIP) that captures the comprehensive set of implementation choices made at the discretion of individual communities of practice. The collection of community-specific FIPs compose an online resource called the FIP Convergence Matrix which can be used to track the evolving landscape of FAIR implementations and inform optimisation around reuse and interoperation. Ready-made and well-tested FIPs created by trusted communities will find widespread reuse among other communities and could vastly accelerate decision making on well-informed implementations of the FAIR Principles within and particularly between domains.

Schultes E., Magagna B., Hettne K.M., Pergl R., Suchánek M., Kuhn T. (2020) Reusable FAIR Implementation Profiles as Accelerators of FAIR Convergence. In: Grossmann G., Ram S. (eds) Advances in Conceptual Modeling. ER 2020. Lecture Notes in Computer Science, vol 12584. Springer, Cham. https://doi.org/10.1007/978-3-030-65847-2_13

For your community…

FAIR principle	Question	FAIR enabling resource types
F1	What globally unique, persistent, resolvable identifiers do you use for metadata records?	Identifier type
F1	What globally unique, persistent, resolvable identifiers do you use for datasets?	Identifier type
F2	Which metadata schemas do you use for findability?	Metadata schema
F3	What is the technology that links the persistent identifiers of your data to the metadata description?	Metadata-Data linking mechanism
F4	In which search engines are your metadata records indexed?	Search engines
F4	In which search engines are your datasets indexed?	Search engines
A1.1	Which standardized communication protocol do you use for metadata records?	Communication protocol
A1.1	Which standardized communication protocol do you use for datasets?	Communication protocol
A1.2	Which authentication & authorisation technique do you use for metadata records?	Authentication & authorisation technique
A1.2	Which authentication & authorisation technique do you use for datasets?	Authentication & authorisation technique
A2	Which metadata longevity plan do you use?	Metadata longevity
I1	Which knowledge representation languages (allowing machine interoperation) do you use for metadata records?	Knowledge representation language
I1	Which knowledge representation languages (allowing machine interoperation) do you use for datasets?	Knowledge representation language
I2	Which structured vocabularies do you use to annotate your metadata records?	Structured vocabularies
I2	Which structured vocabularies do you use to encode your datasets?	Structured vocabularies
I3	Which models, schema(s) do you use for your metadata records?	Metadata schema
I3	Which models, schema(s) do you use for your datasets?	Data schema
R1.1	Which usage license do you use for your metadata records?	Data usage license
R1.1	Which usage license do you use for your datasets?	Data usage license
R1.2	Which metadata schemas do you use for describing the provenance of your metadata records?	Provenance model
R1.2	Which metadata schemas do you use for describing the provenance of your datasets?	Provenance model

Evaluating the FAIRness of an implementation

Choosing the implementation under some consideration

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

Abstract

Powerful incentives are driving the adoption of FAIR practices among a broad cross-section of stakeholders. This adoption process must factor in numerous considerations regarding the use of both domain-specific and infrastructural resources. These considerations must be made for each of the FAIR Guiding Principles and include supra-domain objectives such as the maximum reuse of existing resources (i.e., minimised reinvention of the wheel) or maximum interoperation with existing FAIR data and services. Despite the complexity of this task, it is likely that the majority of the decisions will be repeated across communities and that communities can expedite their own FAIR adoption process by judiciously reusing the implementation choices already made by others. To leverage these redundancies and accelerate convergence onto widespread reuse of FAIR implementations, we have developed the concept of FAIR Implementation Profile (FIP) that captures the comprehensive set of implementation choices made at the discretion of individual communities of practice. The collection of community-specific FIPs compose an online resource called the FIP Convergence Matrix which can be used to track the evolving landscape of FAIR implementations and inform optimisation around reuse and interoperation. Ready-made and well-tested FIPs created by trusted communities will find widespread reuse among other communities and could vastly accelerate decision making on well-informed implementations of the FAIR Principles within and particularly between domains.

Schultes E., Magagna B., Hettne K.M., Pergl R., Suchánek M., Kuhn T. (2020) Reusable FAIR Implementation Profiles as Accelerators of FAIR Convergence. In: Grossmann G., Ram S. (eds) Advances in Conceptual Modeling. ER 2020. Lecture Notes in Computer Science, vol 12584. Springer, Cham. https://doi.org/10.1007/978-3-030-65847-2_13

FIP Wizard

https://fip-wizard.ds-wizard.org

3. FAIR Implementation Profile (FIP) Ontology

The diagram below shows the general structure of this model:

FAIR Implementation Profile (FIP) Ontology
https://peta-pico.github.io/FAIR-nanopubs/fip/index-en.html

R1.3

Targets of evaluators

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

---

https://www.go-fair.org/today/FAIR-funder/

GO FAIR - FAIR made easy

2 years ago | More

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Customizable Player.

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1. Austrian Science Fund
2. Canadian Institutes of Health Research
3. National Institute for Health Research (UK)
4. Swiss National Science Foundation
5. Wellcome

CEDAR: Promoting FAIRness at the Source

Mark A. Musen, M.D., Ph.D
Stanford University
musen@stanford.edu

RoRI selects the Stanford Center for Biomedical Informatics Research to lead FAIRware initiative to promote open research outputs.
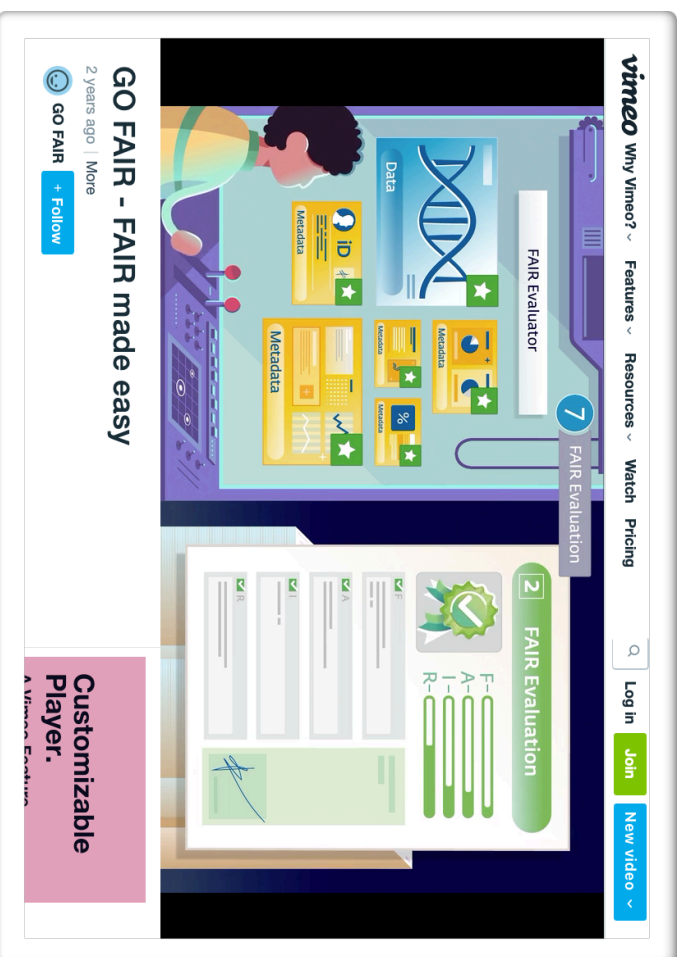
The Research on Research Institute (RoRI) has appointed the Stanford Center for Biomedical Informatics Research (BMIR) to help deliver the RoRI FAIRware project, an initiative to develop new open research tools. Specialising in systems and software design, the Stanford Centre has devised an innovative way to help researchers increase their adoption of the FAIR principles (Findability, Accessibility, Interoperability, Reusability).

Stanford's approach focuses on helping researchers ensure that the datasets they produce are FAIR at the point of creation and will feature extensive consultation with researchers via a series of 'Metadata for Machines' workshops. The M4M workshops are an innovation of the GO FAIR Foundation and allow for quick generation of metadata templates for the description of datasets and other outputs within a given research discipline. The FAIRware tool will use these templates to provide researchers

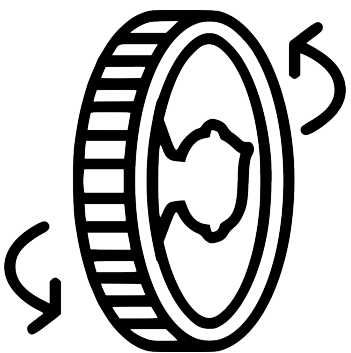2021: https://researchonresearch.org/tpost/vk4f56j6n1-rori-selects-the-stanford-center-for-bio

Qualification

- explicit GFF **interpretations**
- explicit GFF **implementation considerations**
- GFF recommended implementation **choices**

go FAIR foundation
by design

Je doet suggesties

How to GO FAIR by design

DRAFT for expert consultation
See also readable version

Summary and motivation

In their 2020 paper *FAIR Principles: Interpretations and Implementation Considerations'* Jacobsen et al
reminded us that, by intention, the 15 FAIR guiding principles do **not dictate specific technological
implementations**, but instead provide **guidance** when improving Findability, Accessibility, Interoperability
and Reusability of digital resources. While this technology-agnostic position taken by the FAIR Guiding
Principles (FGP, as they were originally published in 2016²) has likely contributed to their rapid and broad
adoption, it has also resulted in some risk that inconsistent **interpretations** regarding their implementation
could lead to implementation choices that are incompatible (non-interoperable) or perhaps even contrary to
the original intentions of the FAIR principles.

To set guarantees on minimal levels of interoperability and **machine-actionability, the GO FAIR Foundation**
(GFF) encourages convergence on implementation choices that are themselves FAIR, widely accessible
and (re)-usable. FAIR implementation choices should ensure interoperability, enable global participation and
convergence towards accessible, robust, widespread and consistent FAIR implementations. In this
document, the GFF declares its own first-draft interpretations and implementation considerations striving for
an Internet of FAIR Data and Services that achieves these objectives, and solicits from trusted FAIR experts

¹ Annika Jacobsen, Ricardo de Miranda Azevedo, Nick Juty, Dominique Batista, Simon Coles, Ronald Cornet, Mélanie Courtot, Mercè Crosas, Michel
Dumontier, Chris T. Evelo, Carole Goble, Giancarlo Guizzardi, Karsten Kryger Hansen, Ali Hasnain, Kristina Hettne, Jaap Heringa, Rob W.W. Hooft, Melanie
Imming, Keith G. Jeffery, Rajaram Kaliyaperumal, Martijn G. Kersloot, Christine R. Kirkpatrick, Tobias Kuhn, Ignasi Labastida, Barbara Magagna, Peter
McQuilton, Natalie Meyers, Annalisa Montesanti, Mirjam van Reisen, Philippe Rocca-Serra, Robert Pergl, Susanna-Assunta Sansone, Luiz Olavo Bonino da
Silva Santos, Juliane Schneider, George Strawn, Mark Thompson, Andra Waagmeester, Tobias Weigel, Mark D. Wilkinson, Egon L. Willighagen, Peter
Wittenburg, Marco Roos, Barend Mons, Erik Schultes; FAIR Principles: Interpretations and Implementation Considerations. Data Intelligence 2020; 2 (1-2):
10–29. doi: https://doi.org/10.1162/dint_r_00024
² Wilkinson, M. D. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. Sci. Data 3:160018 doi: 10.1038/sdata.2016.18
(2016).

FIP Wizard

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

Welcome to
"Apples to Apples"

Thank you for sharing your time!

This deck:
https://tinyurl.com/apples-opening

Mark D Wilkinson
Isaac Peral Senior Investigator
Universidad Politécnica de Madrid
mark.wilkinson@upm.es

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**
- **Convergence**

FIP Convergence Matrix
https://docs.google.com/spreadsheets/d/1jXMwSN0OYJQbtj1iAWGxdWeLCmmCCpLm8Ee5TcyyAfs/edit#gid=1693902587

Convergence by Evaluation, FIPs & Practice

Rob Hooft: FAIR helps to make DMP decisions. Therefore this should be done before the project starts, rather than the end.

- **FAIR Principles**
- **Interpretations**
- **Implementation Considerations**
- **Evaluation**
- **Certification**

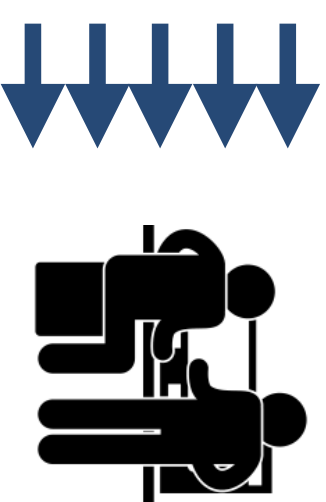- **Convergence**

FIP workshops sponsored by funding agency

FIP Wizard

Red
Blue
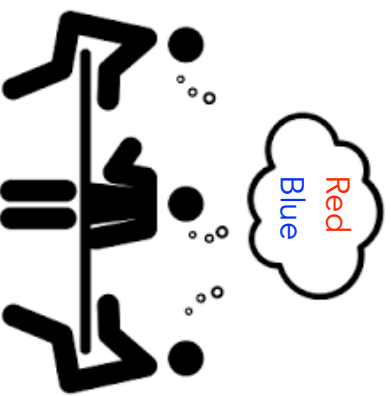
Qualified / Certified FAIR Implementation Profile

Auto-infomred FAIR data management plan (template)

FAIR data management implemented in a project

FAIR principle

F1	What globally unique, persis...
F1	What globally unique, persis...
F2	Which metadata schemas do...
F3	What is the technology that i...
F4	In which search engines are...
F4	In which search engines are...
A1.1	Which standardized commu...
A1.1	Which standardized commu...
A1.2	Which authentication & auth...
A1.2	Which authentication & auth...
A2	Which metadata longevity pl...
I1	Which knowledge represent...
I1	Which knowledge represent...
I2	Which structured vocabularie...
I2	Which structured vocabularie...
I3	Which models, schema(s) d...
I3	Which models, schema(s) d...
R1.1	Which usage license do you...
R1.1	Which usage license do you...
R1.2	Which metadata schemas d...
R1.2	Which metadata schemas d...
R1.2	Which metadata schemas d...

Mapping the FIP onto the DMP
Kristina Hettne, Leiden University Libraries, June 2020

https://github.com/RDA-DMP-Common/hackathon-2020/blob/master/results.md
https://docs.google.com/presentation/d/1h7iTS9gW8A-bOkSjR3qFNPzaU0NOfGJFRtCHZuC78FY/edit?usp=sharing

FAIR well