

FIP Workshops: Making the ENVRI "FIP for purpose" through FAIR Convergence



Welcome to a three-part workshop on FAIR Implementation Profiles (FIPs), organized by ENVRI-FAIR and GO-FAIR as part of the ENVRI week 2022.

FIP INTRODUCTION

2022-01-25 TUESDAY, 09:00-12:00

FIP CONSULTATION

2022-01-28 FRIDAY, 09:00-12:00

FAIR CONVERGENCE

2022-02-22 TUESDAY, 09:00-12:00

REGISTER AT WWW.ENVRI.EU

FIP for Purpose

ENVRI-FAIR's FAIR assessment number 3

- Session 1, January 25 (9:00-12:00 CET): FIP review & revision
- Session 2, January 28 (9:00-12:00 CET): Consultation
- Session 3, February 22 (9:00-12:00 CET): Convergence

Erik Schultes

Barbara Magagna



Slides: <https://osf.io/x2hd9/>

OSF Project: <https://osf.io/7n5yp/>

9:20-10:00
FAIR Enabling Resources & GO FAIR Foundation Qualification
Erik Schultes



FAIR Principles

FAIR Implementations

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:

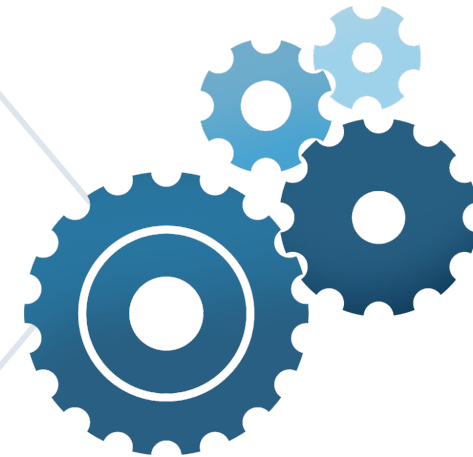
- A1. (meta)data are retrievable by their identifier using a standardized communications protocol
 - A1.1 the protocol is open, free, and universally implementable
 - A1.2 the protocol allows for an authentication and authorization procedure, where necessary
- A2. metadata are accessible, even when the 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



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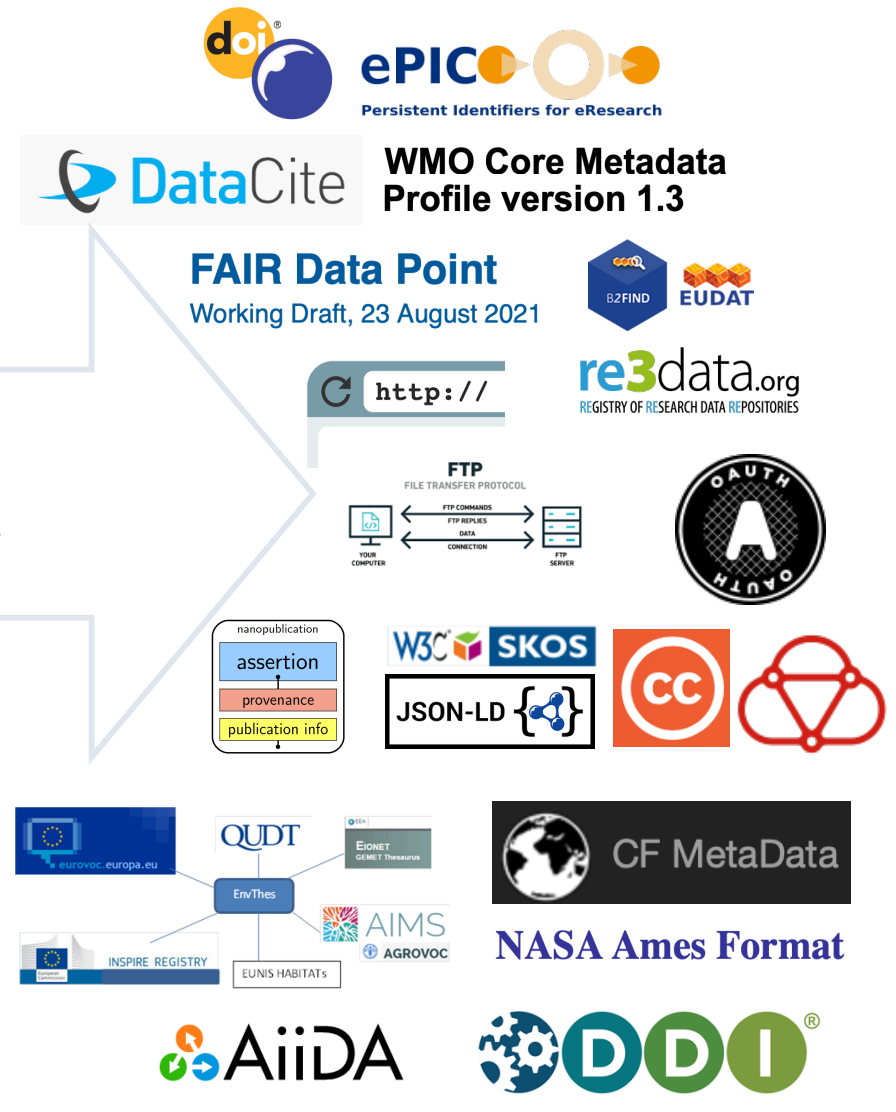
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FAIR Implementations

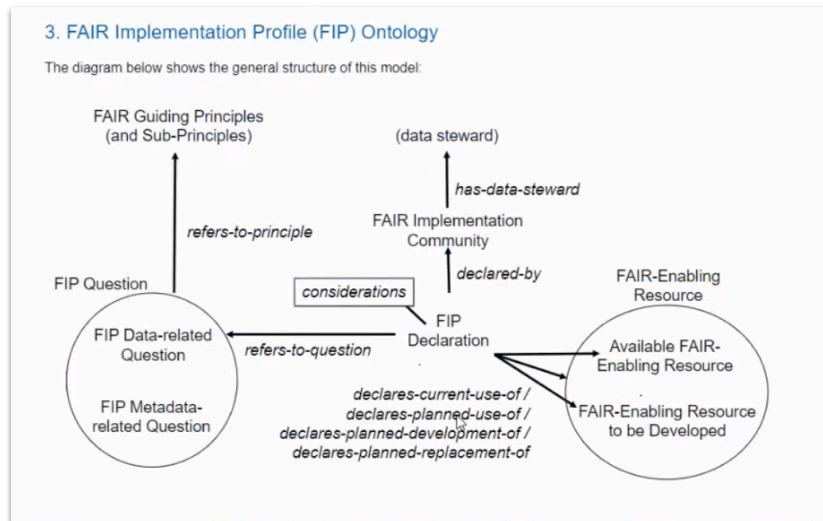


What is a FIP ?

- a list of declared technology **choices** intended to implement each of the FAIR Principles,
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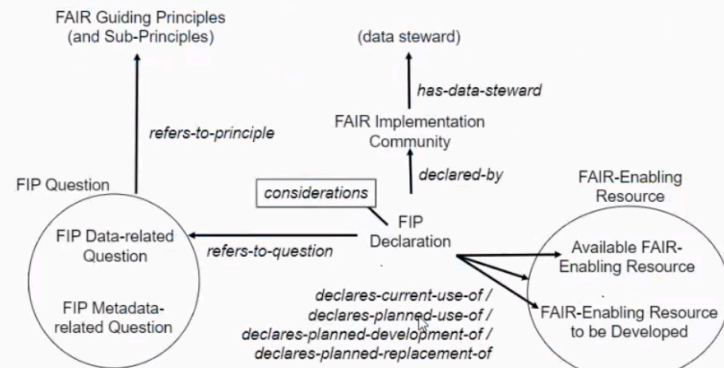
<https://peta-pico.github.io/FAIR-nanopubs/fip/index-en.html>

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3. FAIR Implementation Profile (FIP) Ontology

The diagram below shows the general structure of this model:



<https://peta-pico.github.io/FAIR-nanopubs/fip/index-en.html>



https://link.springer.com/chapter/10.1007/978-3-030-65847-2_13

International Conference on Conceptual Modeling

ER 2020: [Advances in Conceptual Modeling](#) pp 138-147 | [Cite as](#)

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

Conference paper

First Online: 22 December 2020

244

Downloads

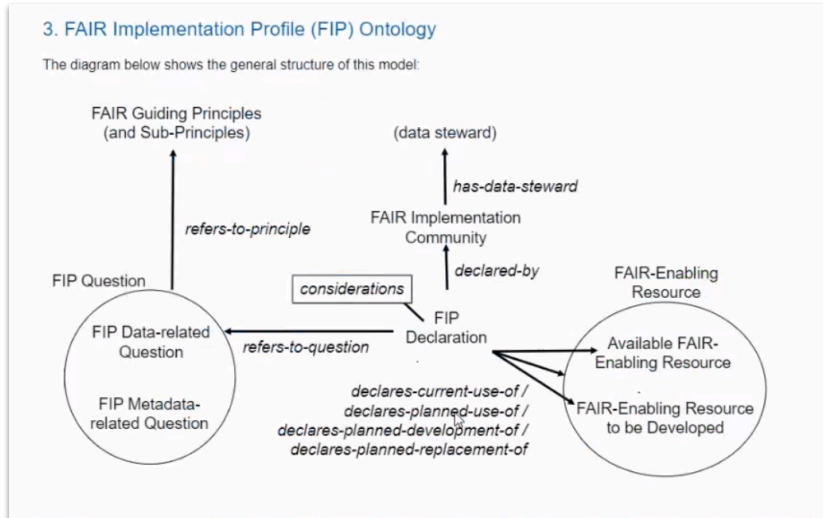
Part of the [Lecture Notes in Computer Science](#) book series (LNCS, volume 12584)

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 interoperability 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 interoperability. 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.

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

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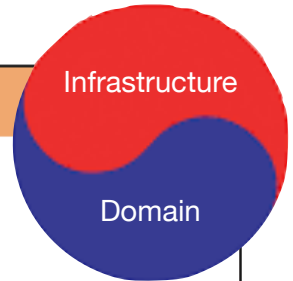
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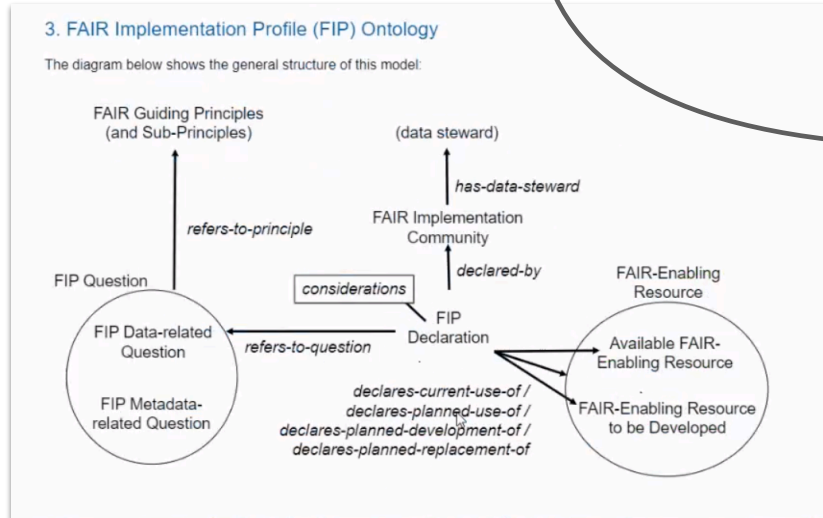
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FAIR Enabling Resources (FERs)

- Techniques, services, schema, protocols, vocabularies, languages, conceptual model, documents...
- Used to implement the FAIR Principles.

FAIR Implementation Community (FIC)

- A group of people who commit to a FAIR implementation (who define a FIP).
- Not necessarily aligned with a traditional communities of practice.
- Large/small
- Formal/informal
- Permanent/temporary



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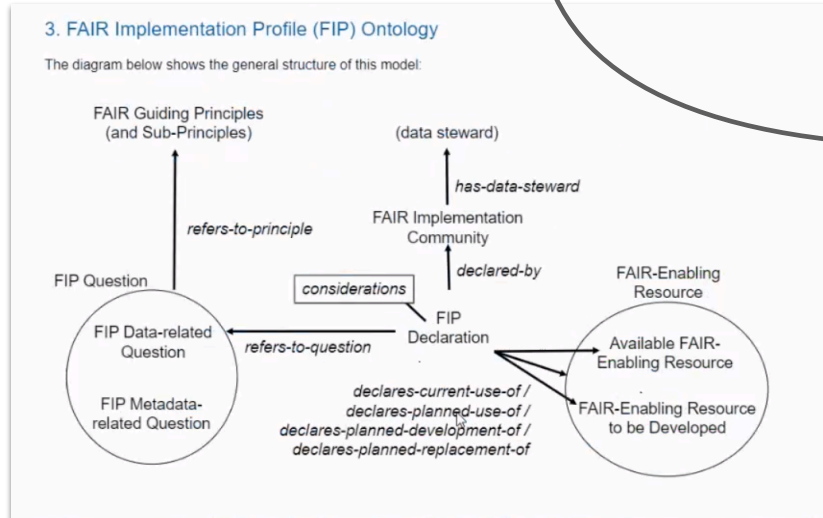
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FIPs provide a **socio-technical** framework

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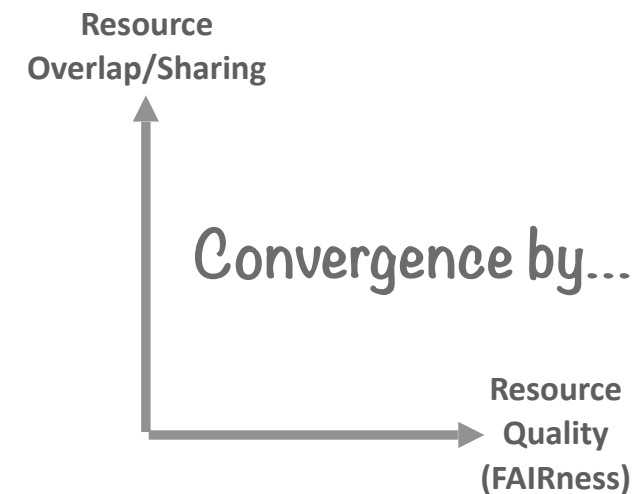
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Why FIPs ?

- FAIR is a **socio-technical** problem in need of **socio-technical** solutions.
- Facilitating FAIR **on-boarding** (reduce the barrier to entry)
 - explicit
 - informed
 - systematic
- **Convergence**
 - FIPs suggest **strategies** that encourage widespread adoption of implementations including the use of domain-relevant community standards (R1.3).
 - This work is closely aligned with FAIR maturity indicators, FAIR evaluation services, and eventual certification of FAIR enabling resources.
 - Translation of decision into practice by embedding implementation choices in data management plans (guiding data stewards).

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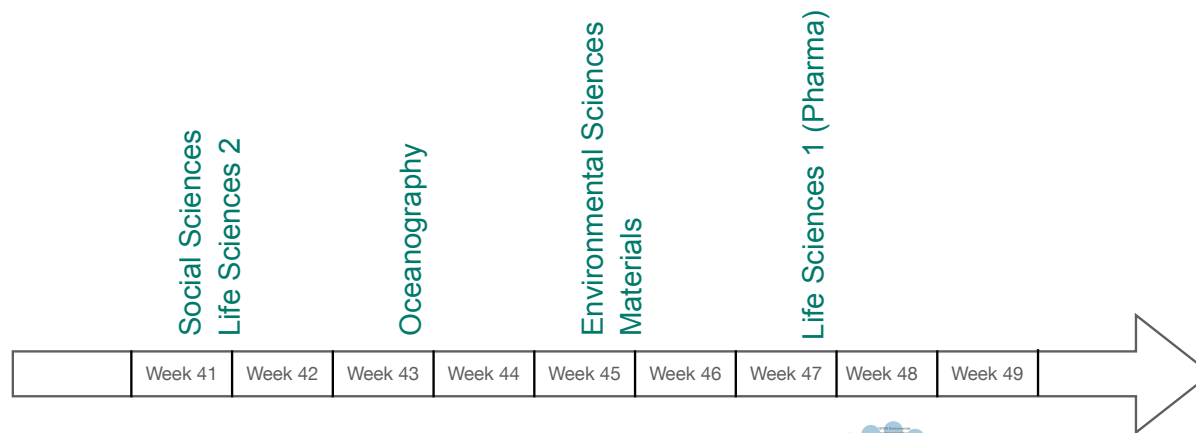


FAIR Enabling Resources

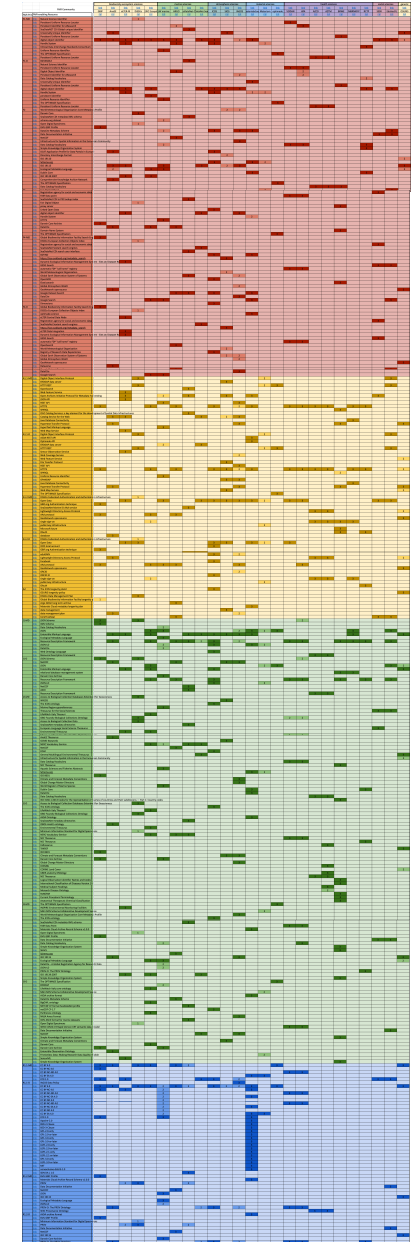
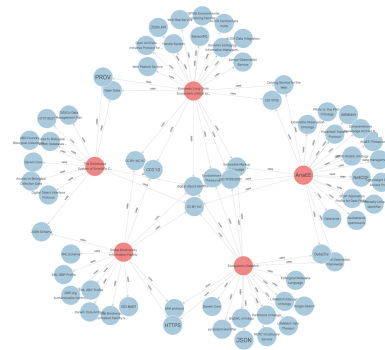
CODATA / GO FAIR

Convergence Symposium Workshops 2020

<https://conference.codata.org/FAIRconvergence2020/>

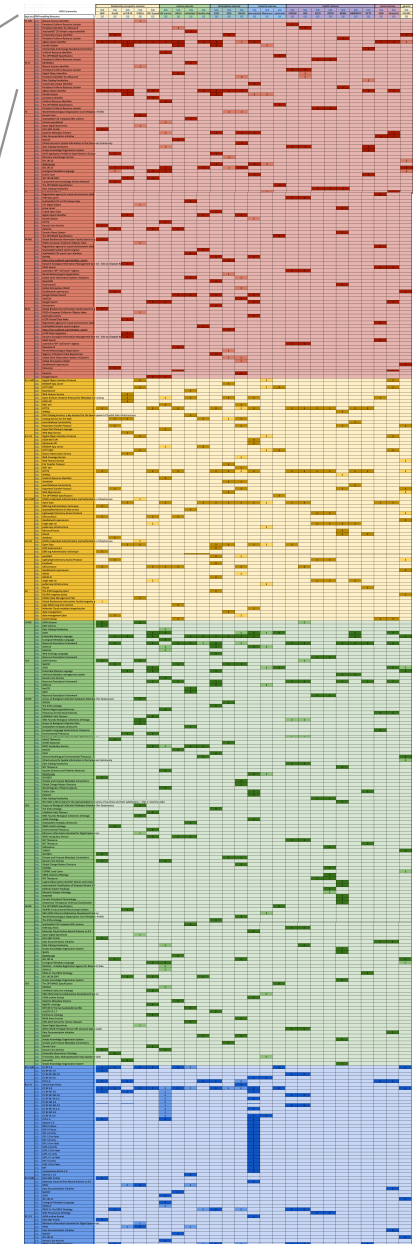


- 6 Workshops
- 25 communities
- 81 participants
- 46 contact hours
- Outputs:
 - Human-readable FIPs <https://osf.io/r2hzc/>
 - FIPs as graphs <https://osf.io/6sbfy/>
 - Convergence Matrix <https://bit.ly/3IKCGFI>



FAIR Enabling Resources

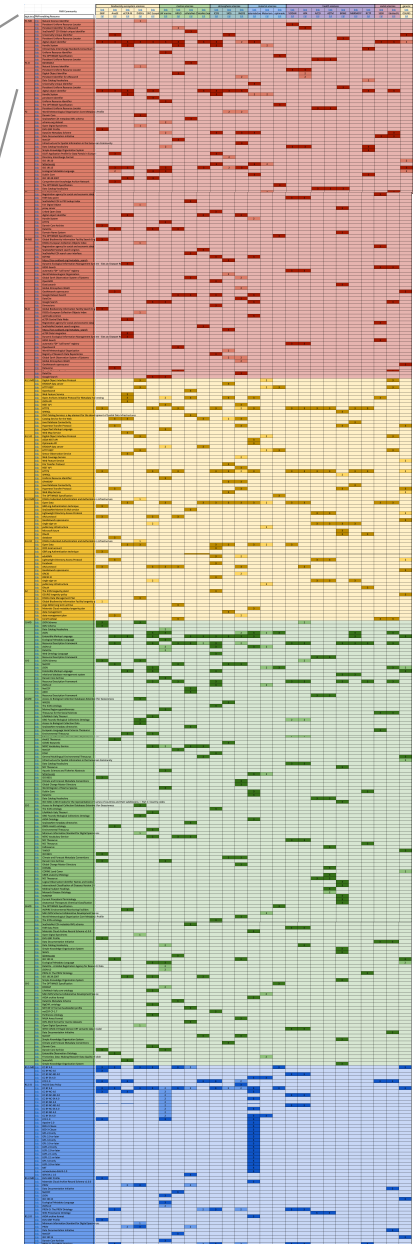
FAIR Prin	FAIR-enabling Resource
F1-MD	link Natural Science Identifier
	link Persistent Uniform Resource Locator
	link Persistent Identifier for eResearch
	link SeaDataNET CDI Global unique identifier
	link Universally Unique Identifier
	link Persistent Uniform Resource Locator
	link digital object identifier
	link Handle System
	link Clinical Data Interchange Standards Consortium
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link Persistent Uniform Resource Locator	
F2	link World Meteorological Organization Core Metadata



FAIR Enabling Resources

- Was a permissive exercise.
- Interpretations were left largely to the user.
- Some FERs were better than others.
- Some FERs were just wrong (type errors).

FAIR Priority	FAIR-enabling Resource
F1-MD	link Natural Science Identifier
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Qualification (not certification)

Why FAIR Qualification?

- Requested by the community
- Preserve original intent of the FAIR Principles
- Drive convergence
- Promote minimal open specs to mitigate vendor lockin

 <https://www.scidatacon.org/virtual-2021/sessions/375/> 

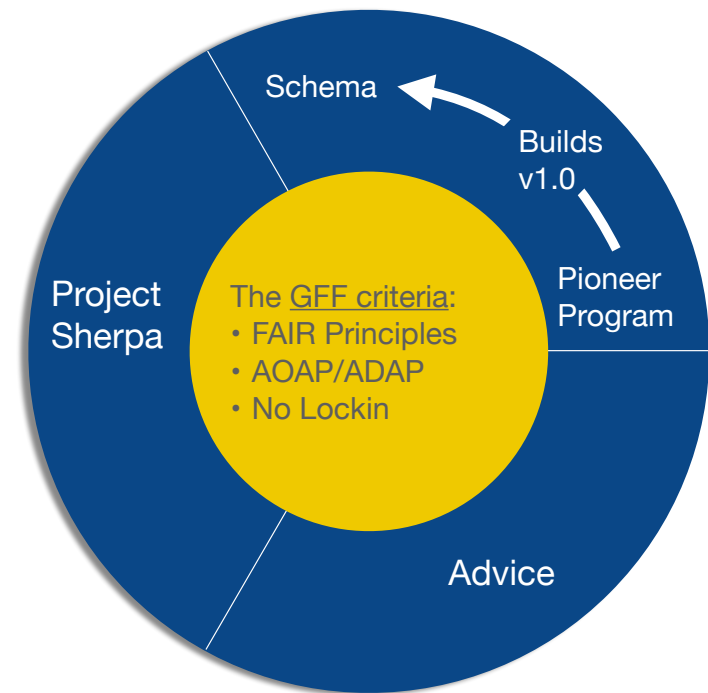
Session Title: Certifying FAIR: The GO FAIR Foundation's Pioneer Program to bootstrap community development of FAIR certification for events, people, and technology

Session Organisers: Erik Schultes, Bert Meerman

Session Description:

Register for the session: <https://us02web.zoom.us/meeting/register/tZAKd-yvqDopE9XbJ6qHua9EPKG9id0dEvDq>

The GO FAIR Foundation (GFF) has been asked by various sectors to provide FAIR certification for FAIR-related resources. This request has come from a broad range of stakeholders and concerns the widely perceived need for independent third-party criteria and validation of resources with respect to the FAIR Principles, for technical components, domain-relevant standards, FAIR-related training, for FAIR implementation events (e.g. M4M and FIP



Open Access | Published: 15 March 2016

The FAIR Guiding Principles for scientific data management and stewardship

Mark D. Wilkinson, Michel Dumontier, [...]Barend Mons 

Scientific Data 3, Article number: 160018 (2016) | [Cite this article](#)

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

FAIR Principles: Interpretations and Implementation Considerations



Annika Jacobsen¹, Ricardo de Miranda Azevedo², Nick Judy¹, Dominique Batista⁴, Simon Coles⁵, Ronald Cornet⁶, Mélanie Courtot⁷, Mercè Crosas⁸, Michel Dumontier², Chris T. Evelo⁹, Carole Goble³, Giancarlo Guizzardi¹⁰, Karsten Kryger Hansen¹¹, Ali Hasnain¹², Kristina Hettne¹³, Jaap Heringa¹⁴, Rob W.W. Hoof^{14,15}, Melanie Imming¹⁶, Keith G. Jeffery¹⁷, Rajaram Kaliyaperumal¹, Martijn G. Kersloot^{6,18}, Christine R. Kirkpatrick¹⁹, Tobias Kuhn¹⁴, Ignasi Labastida²⁰, Barbara Magagna²¹, Peter McQuilton⁴, Natalie Meyers²², Annalisa Montesanti²³, Mirjam van Reisen²⁴, Philippe Rocca-Serra⁴, Robert Pergl²⁵, Susanna-Assunta Sansone⁴, Luiz Olavo Bonino da Silva Santos²⁶, Juliane Schneider²⁷, George Strawn²⁸, Mark Thompson¹, Andra Waagmeester²⁹, Tobias Weigel³⁰, Mark D. Wilkinson³¹, Egon L. Willighagen⁴, Peter Wittenburg³², Marco Roos¹, Barend Mons^{1,26} & Erik Schultes^{26,33}

<https://direct.mit.edu/dint/article/2/1-2/10/10017/FAIR-Principles-Interpretations-and-Implementation>

3.1 Principle F

3.1.1 Principle F1: (meta)data are assigned a globally unique and persistent identifier

1) Interpretation

Principle F1 states that digital resources, i.e., data and metadata, must be assigned a globally unique and persistent identifier in order to be found and resolved by computers. This is the most fundamental of the FAIR principles, as globally unique and persistent identifiers are essential elements found in all of the other FAIR principles. *Globally unique* means that the identifier is guaranteed to unambiguously refer to exactly one resource in the world (please note that *global* should be interpreted as *universal* as there are digital assets outside the world). Therefore, it is *insufficient* for it to be unique only locally (e.g. unique within a single, local database). *Persistence* refers to the requirement that this globally unique identifier is never reused in another context, and continues to identify the same resource, even if that resource no longer exists, or moves. In practice, this often involves using a third-party to generate an identifier that has guaranteed longevity and is project/organization-independent.

2) Implementation considerations

Current *challenges* relate to ensuring the longevity of identifiers – in particular, that identifiers created by a project/community should survive the termination of the project or the dissolution of the community. Obtaining a persistent identifier, therefore, may require reliance on a third-party organization that promises longevity, and maintains these identifiers independently of the project/community. Current *choices* are for each community to choose, for all appropriate digital resources (i.e., data and metadata), identifier registration service(s) such as these that ensure global uniqueness and that also comply with the community-defined criteria for identifier persistence and resolvability.

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Criteria Document

DRAFT for expert consultation

See also [readable version](#)

Summary and motivation

In their 2020 paper *FAIR Principles: Interpretations and Implementation Considerations*¹ 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 digital resources. While this technology-agnostic position taken by the FAIR Guiding Principles (they were originally published in 2016²) has likely contributed to their rapid and broad adoption, it also resulted in some risk that inconsistent **interpretations** regarding their implementation choices that are incompatible (non-interoperable) or perhaps even contrary to the spirit of the FAIR principles.

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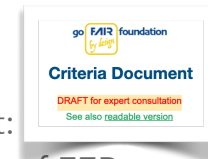


Annika Jacobsen¹, Ricardo de Miranda Azevedo², Nick Judy³, Dominique Batista⁴, Simon Coles⁵, Ronald Cornet⁶, Mélanie Courtot⁷, Mercè Crosas⁸, Michel Dumontier², Chris T. Evelo⁹, Carole Goble³, Giancarlo Guizzardi¹⁰, Karsten Kryger Hansen¹¹, Ali Hasnain¹², Kristina Hettne¹³, Jaap Heringa¹⁴, Rob W.W. Hoof^{14,15}, Melanie Imming¹⁶, Keith G. Jeffery¹⁷, Rajaram Kaliyaperumal¹, Martijn G. Kersloot^{6,18}, Christine R. Kirkpatrick¹⁹, Tobias Kuhn¹⁴, Ignasi Labastida²⁰, Barbara Magagna²¹, Peter McQuilton⁴, Natalie Meyers²², Annalisa Montesanti²³, Mirjam van Reisen²⁴, Philippe Rocca-Serra⁴, Robert Pergl²⁵, Susanna-Assunta Sansone⁴, Luiz Olavo Bonino da Silva Santos²⁶, Juliane Schneider²⁷, George Strawn²⁸, Mark Thompson¹, Andra Waagmeester²⁹, Tobias Weigel³⁰, Mark D. Wilkinson³¹, Egon L. Willighagen⁴, Peter Wittenburg³², Marco Roos¹, Barend Mons^{1,26} & Erik Schultes^{26,33}

https://direct.mit.edu/dint/article/2/1-2/10/10017/FAIR-Principles-Interpretations-and-Implementation



- GFF qualification criteria is a work in progress.
- GFF qualified FERs at present are intended to kick-start the development of trusted, transparent, process to derive community-based, explicit agreements on how to implement FAIR.
- Primary aim: to gain some uniformity among the FERs → FIPs.
- Please consider commenting on the public GFF Criteria document:
- Please engage GFF if you have comments on the GFF qualification of FERs.
- *For the purposes of ENVRI Week:*
 - *We defined FER Types (per FAIR Principle).*
 - *We also applied (light-weight) criteria inspired by the GFF Criteria document.*
 - *We also sought expert opinion (many thanks to Erik Flikkenschild, Ronald Siebes, Zhiming Zhao, Sirko Schindler, Fajar Ekaputra, Kieth Jeffery).*
- Performing this quality control allowed us to create a (slightly) smaller set of more relevant and meaningful FERs as drop-down lists in FIP Wizard II. 
- These are marked by the GFF quality mark.



FP	Resource Type	Resource Type description
F1	Identifier	A service that provides for any digital object (1) algorithms guaranteeing global uniqueness, (2) policy document that guarantees persistence and
F2	Metadata-schema	A schema that specifies metadata fields describing attributes of data or other digital objects.
F3	Metadata-data-linking-mechanism	A technique or service that provides a unique, persistent, bi-directional, machine-actionable link between metadata and the data they describe.
F4	Search-engine	A technique or service that indexes metadata and data and provides search over that index.
A1.1	Communication-protocol	A specification how messages are structured and exchanged.
A1.2	Authentication-and-authorization-technique	A protocol that mediates access to digital objects according to specified conditions
A2	Metadata-longevity-plan	A document that describes the conditions under which metadata are to be provisioned in the future.
I1	Knowledge-representation-language	A language system whereby knowledge can be made processible by machines.
I2	Structured-vocabulary	A controlled list of uniquely identified and unambiguous concepts with their definitions represented using web standards
I3	Data-schema	A knowledge representation that defines qualified relations between entities describing data or other digital objects using controlled vocabulary.
R1.1	Data-usage-license	A document that describes the conditions under which a digital object can be legally used.
R1.2	Provenance-model	A schema that specifies metadata fields describing the origin and lineage of data or other digital objects.

https://docs.google.com/spreadsheets/d/1_hx_yYBRfVoDXAASHoLwxllpv3f-RoNhqZpZX2-AB8M/edit?usp=sharing

FP	Resource Type	Proposed GFF Criteria for accepting the resources as a FER in the FIP Wizard			
F1	Identifier	complies to FER type description	a link to web resource	a specific implementation of a GUPRI service was given	a guarantee of persistence was given
F2	Metadata-schema	complies to FER type description	a link to web resource	the metadata schema has also metadata	the metadata schema has descriptions for each metadata field
F3	Metadata-data-linking-mechanism	complies to FER type description	a link to web resource	has machine-readable metadata describing the mechanism	-
F4	Search-engine	complies to FER type description	a link to web resource	is a specific implementation	-
A1.1	Communication-protocol	complies to FER type description	a link to web resource	is a specific implementation	-
A1.2	Authentication-and-authorization-technique	complies to FER type description	a link to web resource	is a specific implementation	-
A2	Metadata-longevity-plan	complies to FER type description	a link to web resource	the nanopublication longevity plan includes a link an online policy document	-
I1	Knowledge-representation-language	complies to FER type description	a link to web resource	the language is resolvable on the web	-
I2	Structured-vocabulary	complies to FER type description	a link to web resource	the controlled list has a metadata description	-
I3	Data-schema	complies to FER type description	a link to web resource	the conceptual model has a metadata description	the conceptual model uses controlled lists for its schema elements
R1.1	Data-usage-license	complies to FER type description	a link to web resource	the license document is machine-readable	-
R1.2	Provenance-model	complies to FER type description	a link to web resource	has metadata on the data scheme	uses controlled lists for its schema elements

https://docs.google.com/spreadsheets/d/1_hx_yYBRfVoDXAASHoLwxllpv3f-RoNhqZpZX2-AB8M/edit?usp=sharing

FAIR well

