Web Tutorial 1: Introduction to Research Data Management

TC IM 1449: Research Data Management and the European Open Science Cloud

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Content

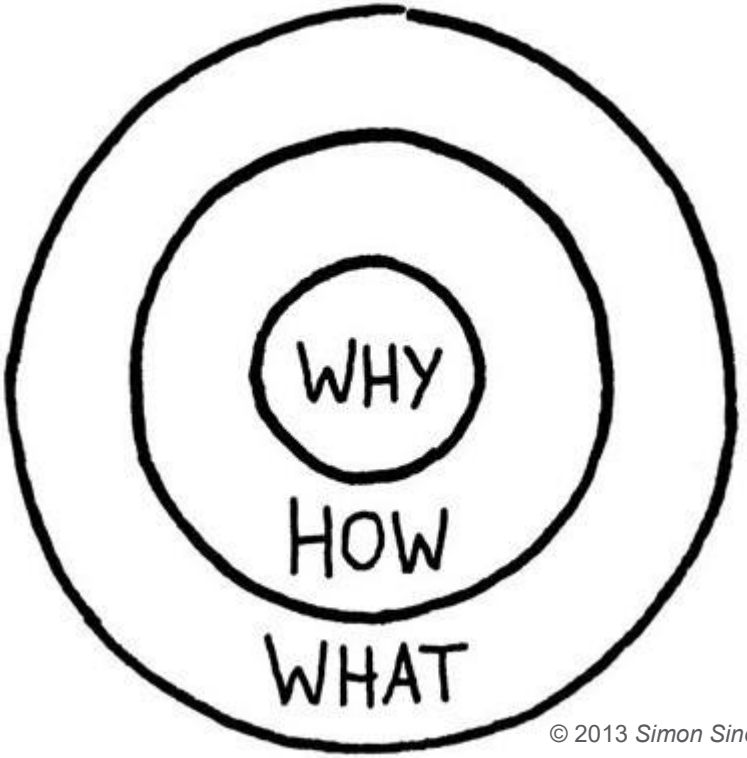
- Part 1: Intro to Research Data Management (RDM)
- Part 2: Intro to RDM in metrology (i.e. EMPIR projects)
- Part 3: Intro to Data Management Plans (DMPs)
- Part 4: Intro to Metadata
- Part 5: Intro to RDM in EURAMET projects

General Introduction

- Why RDM?
- Whereby of RDM
- RDM related definition(s)

TC IM 1449 Tutorials

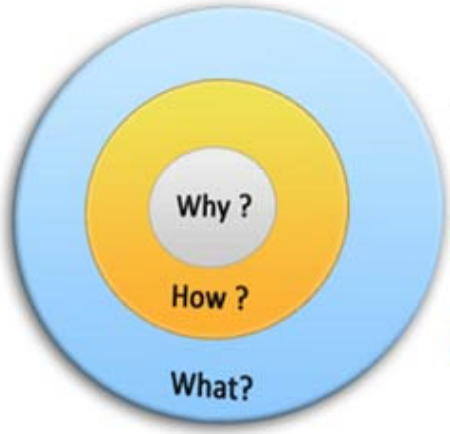
- ➢ Guidance for researchers
- ➢ Motivation for adopting FAIR
- ➢ Aim at EOSC-ready



Source: https://simonsinek.com/commit/the-golden-circle

But Why RDM?

- **Digital technologies** now are used very widely in research, and this is enabling new research and scientific paradigms.
- Research funders and publishers know that digital research data can be expensive to produce but inexpensive to share, making **reusability** more feasible and desirable.
- The challenge is to **ensure digital research findings** can be reproduced and cited.



Why = The Purpose

What is your cause? What do you believe?

How = The Process

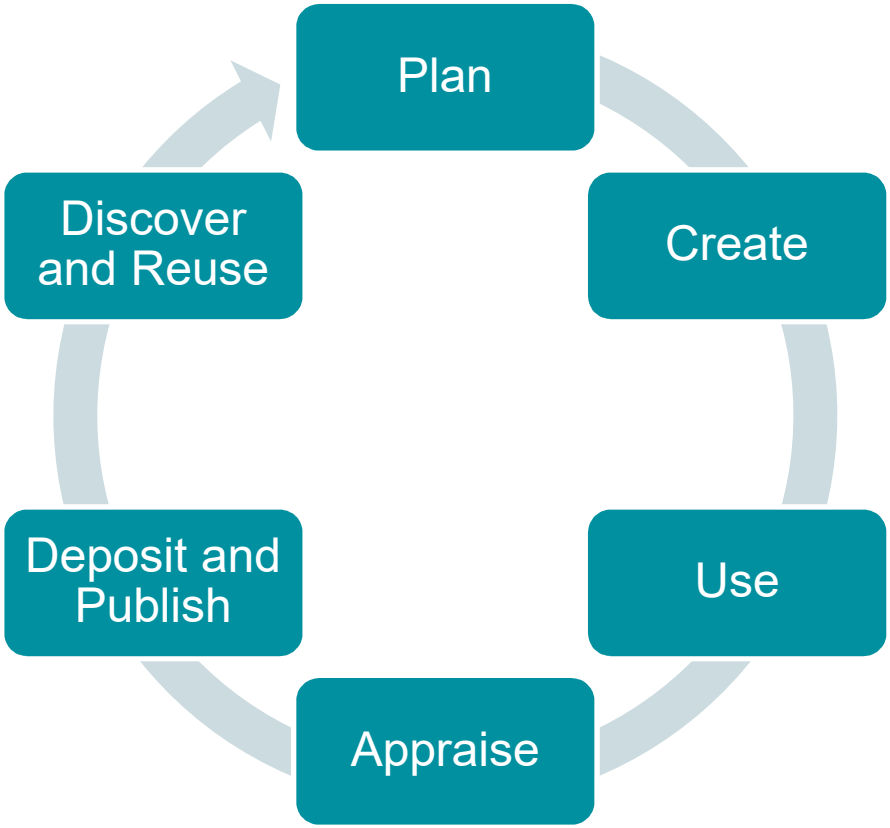
Specific actions taken to realize the Why.

What = The Result

What do you do? The result of Why. Proof.

Source: Digital Curation Centre: https://www.dcc.ac.uk/

Whereby of RDM



Source: Digital Curation Centre: https://www.dcc.ac.uk/

RDM definition

Research data are (digital) information which is created during scientific activity (e.g. measurements, observations, surveys, literature search, etc.).

They constitute the fundament of any scientific work and collect their results.

Source: https://www.forschungsdaten.info/praxis-kompakt/glossar/#c269824

RDM related definition(s)

RDM planning: support and services for planning activities typically performed before research data is collected / created.

Active data infrastructure: facilities to store data being actively used in current research activities, to provide access to that storage and tools to assist in working with the data.

Data stewardship: tools and services to aid in the description, deposit, and continuity of access to completed research data outputs.

Data management support: awareness raising and advocacy, data management guidance and training.

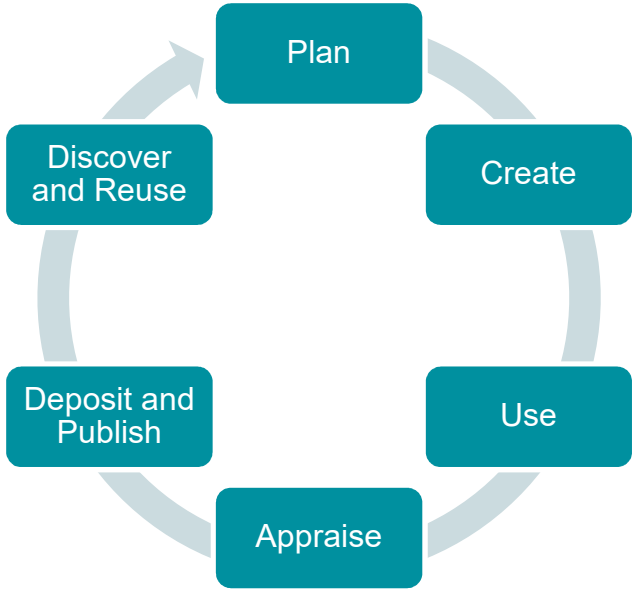
Source: https://www.dcc.ac.uk/resources/developing-rdm-services/rdm-strategy-moving-plans-action#Definitions

Part 1: Introduction to Research Data Management

Summary Part 1: **Data management is part of good research practice**

Why do we need to manage research data?

- To make research easier!
- To stop yourself drowning in irrelevant stuff
- In case you need the data later
- To avoid accusations of fraud or bad science
- To share data so others can use and learn from it
- To get credit for producing the data



Whereby of RDM:

Summary of reason:

- To increase efficiency
- To ease sharing / re-use
- To reduce data losses

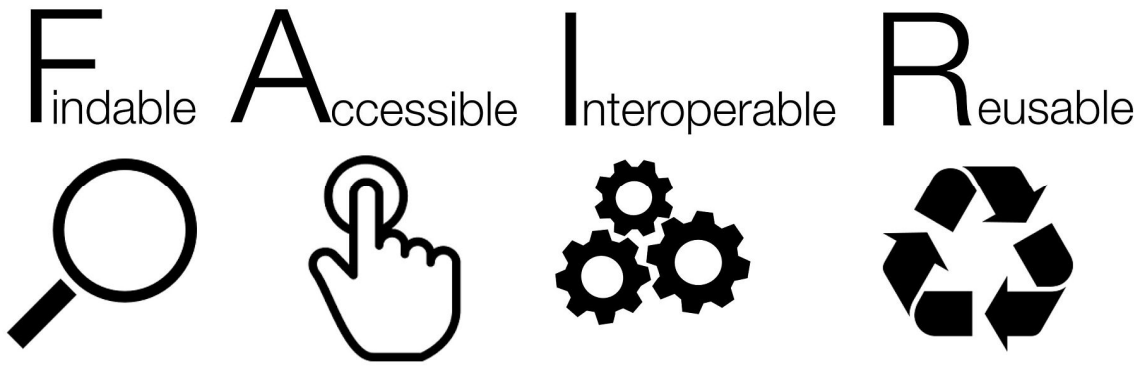
Source: https://www.dcc.ac.uk

Two main reasons for RDM in EMPIR projects

- Grant Agreement*

  ARTICLE 29 – DISSEMINATION OF RESULTS – **OPEN ACCESS** – VISIBILITY OF EMPIR FUNDING

- FAIR principles



Source: https://www.go-fair.org/fair-principles/

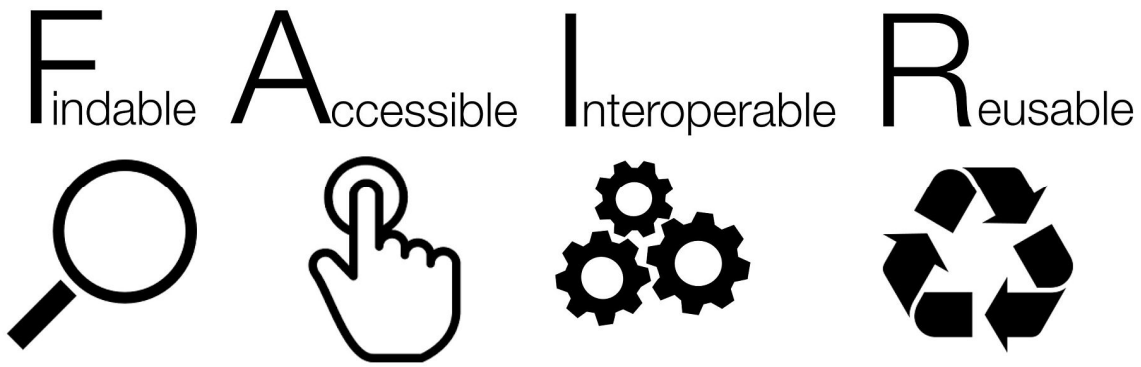
Part 2: Intro to RDM in metrology

Data Policy (Common principles on research data)

Common Principles:
https://www.ukri.org/funding/information-for-award-holders/data-policy/common-principles-on-data-policy

Guidance on best practice in the management of research data:
https://www.ukri.org/wp-content/uploads/2020/10/UKRI-221020-guidance-on-best-practice-management-of-research-data.pdf

FAIR principles



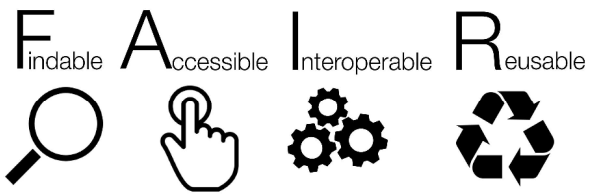
Source: https://www.go-fair.org/fair-principles/

Part 2: Intro to RDM in metrology (i.e. EMPIR)

The Go FAIR initiative

1. Make data openly available where possible
2. Have policies & plans. Preserve data of long-term value
3. Metadata for discovery / reuse. Link to data from publications
4. Be mindful of legal, ethical and commercial constraints
5. Allow limited embargoes to protect the effort of creators
6. Acknowledge sources to recognise IP and abide by T&Cs
7. Ensure cost-effective use of public funds for RDM

Source:
https://www.go-fair.org/fair-principles/
Extra sources:
GO-FAIR Initiative: https://www.go-fair.org/go-fair-initiative/
HOW TO GO FAIR: https://www.go-fair.org/how-to-go-fair/
International FAIR Symposium: https://www.go-fair.org/events/international-fair-convergence-symposium/



General approach to research

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

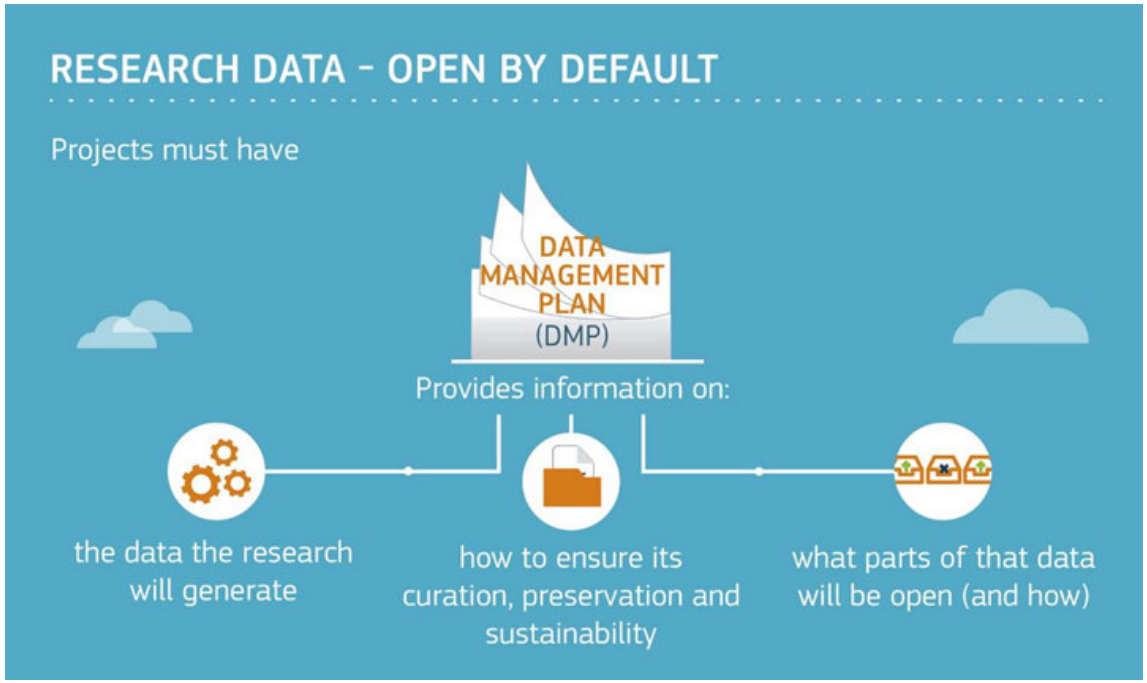
To be Interoperable:
I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
I2. (meta)data use vocabularies that follow FAIR principles
I3. (meta)data include qualified references to other (meta)data

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

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

Part 3: Intro to DMP (DCC's funder requirements)

- Brief Intro
- Existing tools
- Common themes
- Initial tips
- **Tutorial 2 Information**



Source: https://www.openaire.eu/what-is-a-data-management-plan

Intro to DMPs

A brief plan written at the start of your project to define:

- how will your data be created?
- how will it be documented?
- who will access it?
- where will it be stored?
- who will back it up?
- whether (and how) will it be shared & preserved?

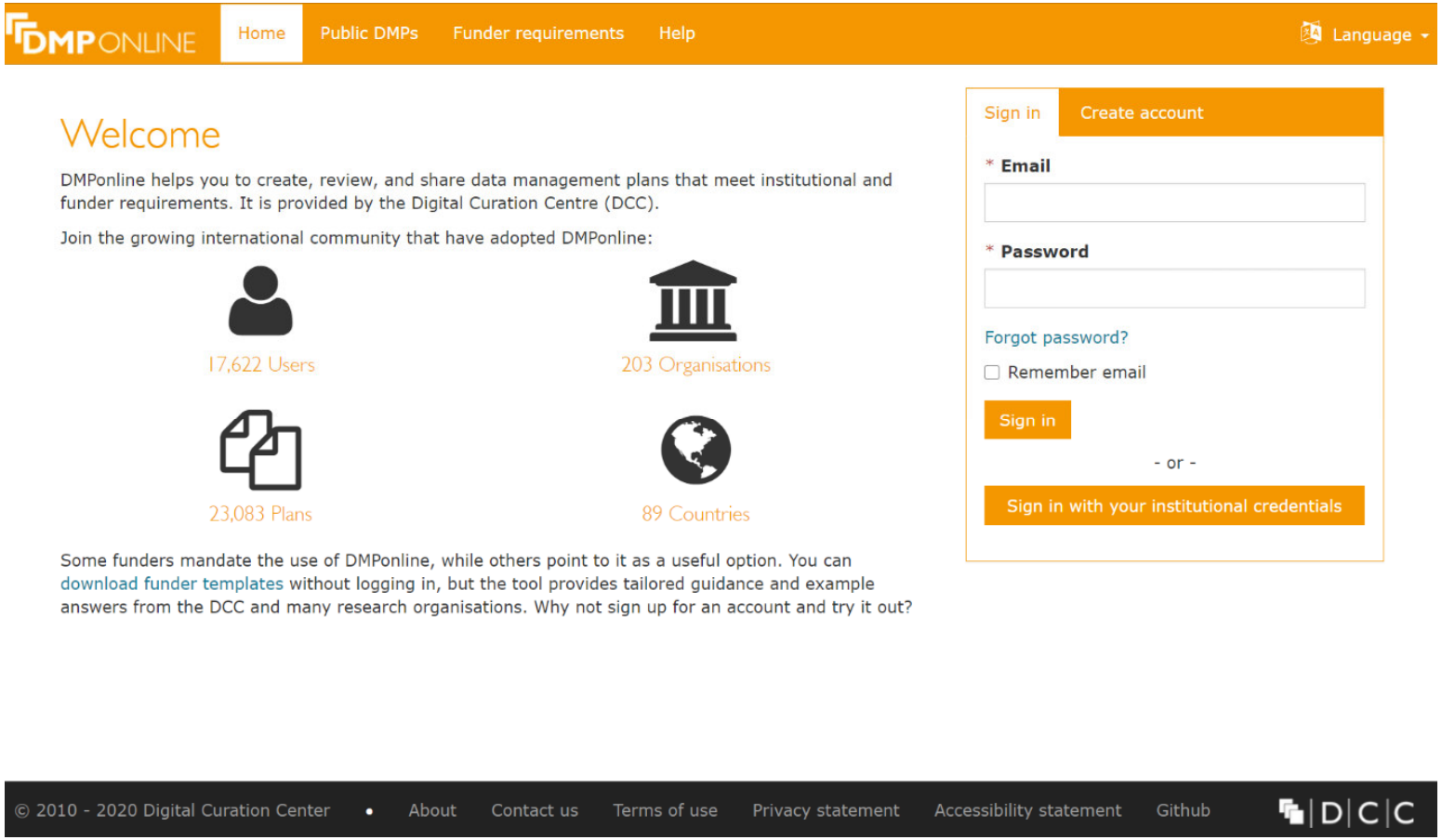
DMPs are often submitted as part of grant applications,
but are useful whenever researchers are creating data.

DMPs can **help working in a more structured way**, remind about tasks, collect together metadata / information to be reused later in the data lifecycle.

Source: Data Management Plans: https://www.dcc.ac.uk/dmps

Part 3: Intro to Data Management Plans (DMPs)

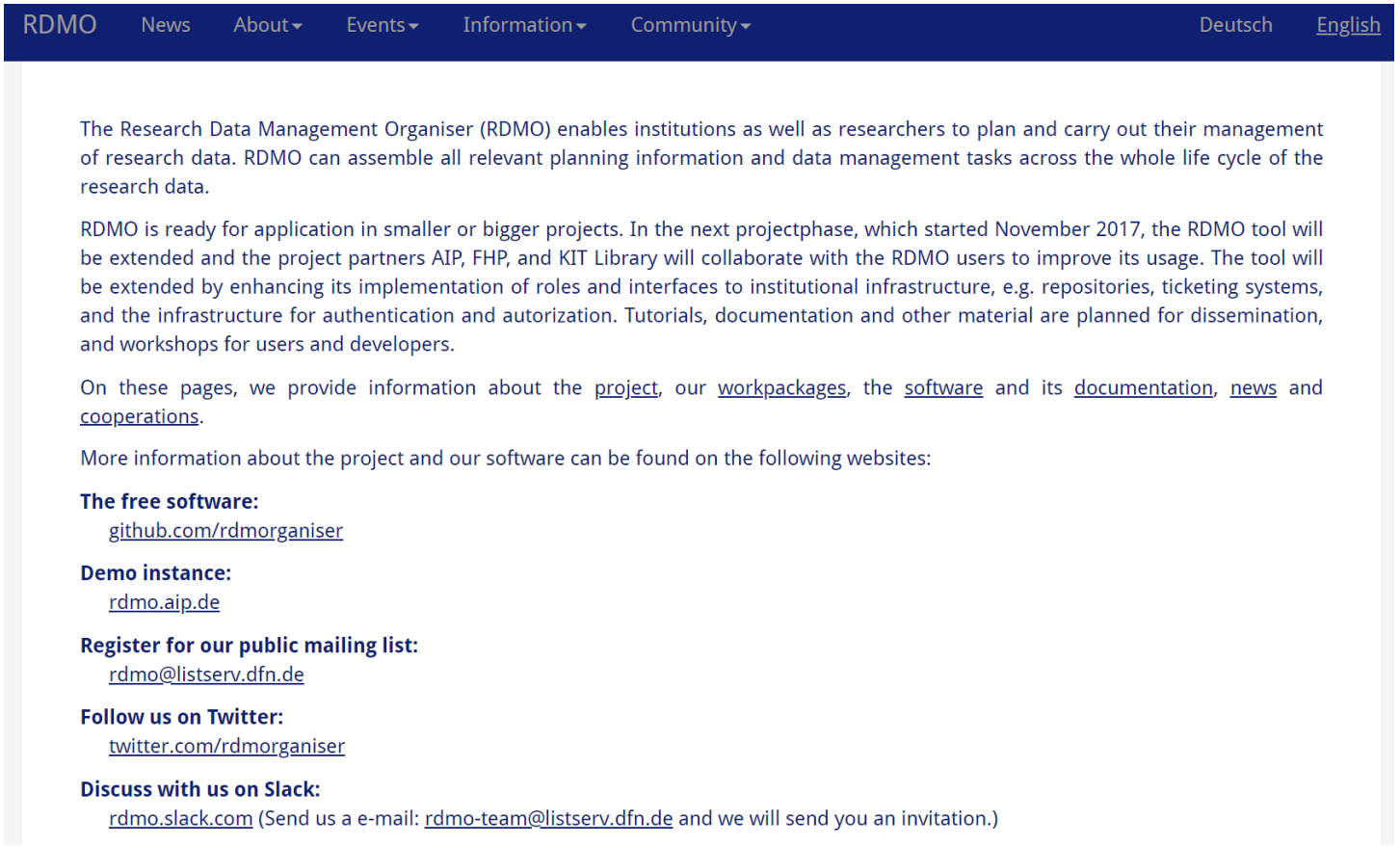
Existing tools (1)



Tool description: https://www.dcc.ac.uk/dmponline
Tool (online): https://dmponline.dcc.ac.uk/

Part 3: Intro to Data Management Plans (DMPs)

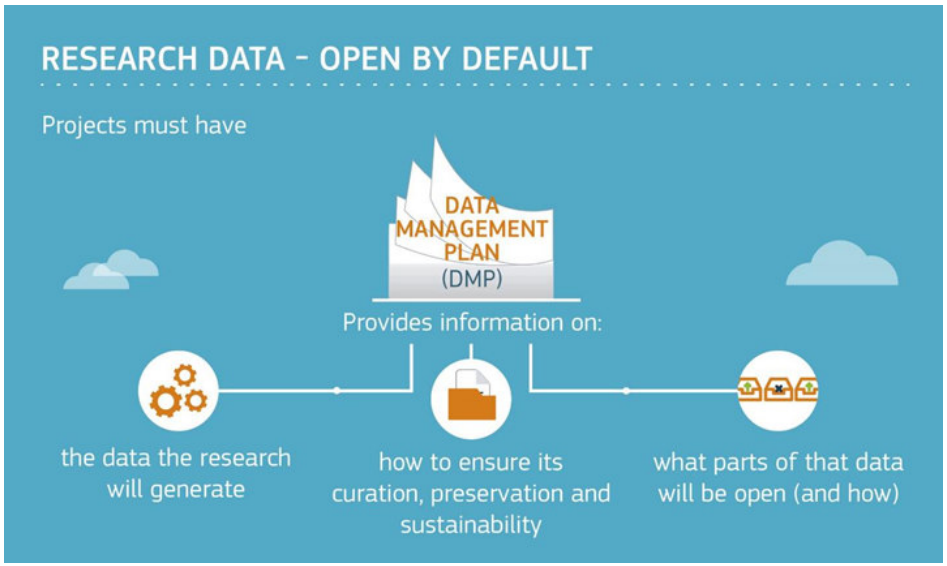
Existing tools (2)



Tool description: https://rdmorganiser.github.io/en/
Tool Documentation: https://rdmorganiser.github.io/en/documentation/

Common Themes for DMPs

1. Description of data to be collected / created (i.e. content, type, format, volume...)
2. Standards / methodologies for data collection & management
3. Ethics and Intellectual Property (highlight any restrictions on data sharing e.g. embargoes, confidentiality)
4. Plans for data sharing and access (i.e. how, when, to whom)
5. Strategy for long-term preservation.



Source: https://www.dcc.ac.uk/dmps

Part 3: Intro to Data Management Plans (DMPs)

Tips on writing DMPs:

- Keep it simple, short and specific
- Seek advice - consult and collaborate
- Base plans on available skills and support
- Make sure implementation is feasible
- Justify any resources or restrictions needed
- If possible, use a tool saving the information in machine-readable format for better reusability

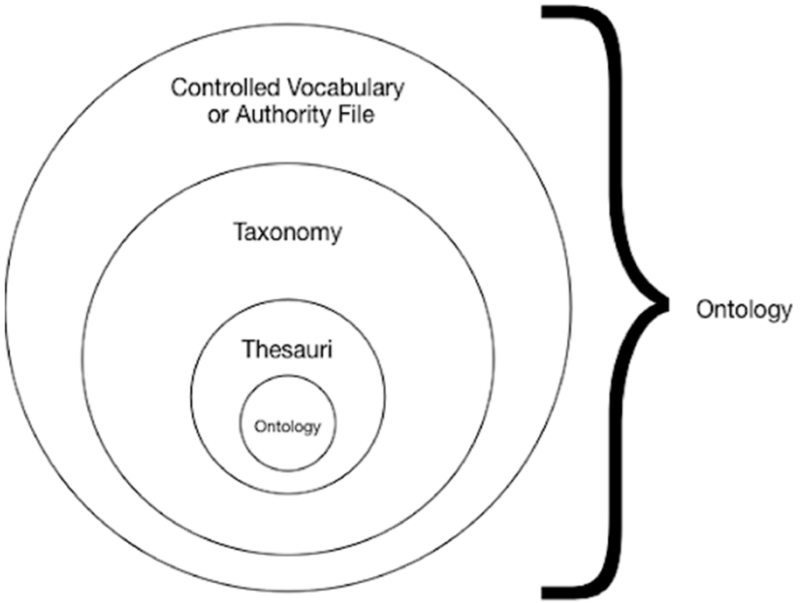
TUTORIAL 2: Preparation and implementation of data management plans (DMPs) for EMPIR projects

Monday, February 15th, 10 AM CET

Source (from DCC): www.youtube.com/watch?v=7OJtiA53-Fk

Part 4: Intro to metadata

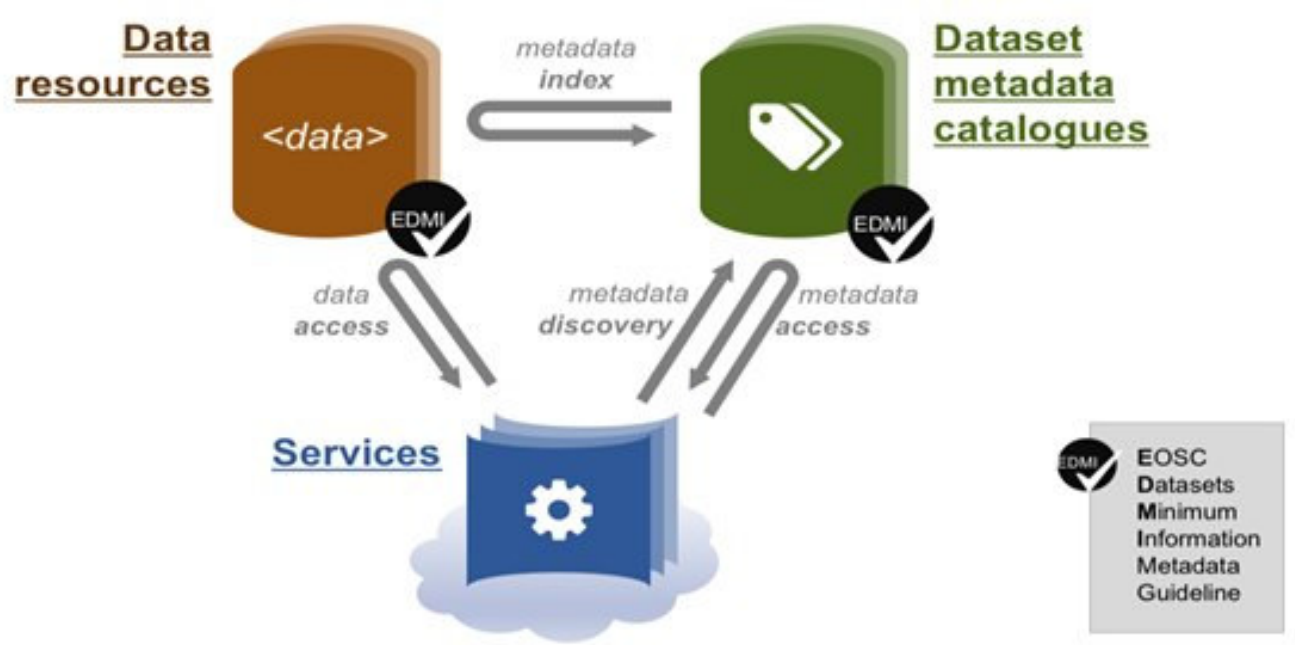
- Intro to metadata concept
- Related to FAIR
- Metadata Retrieval API
- **Information about Tutorial 3**



Source: https://dianebowen.wordpress.com/2017/03/06/controlled-vocabulary-lexicon-thesaurus-and-ontology/

Metadata ("data about data")

- "metadata" in research

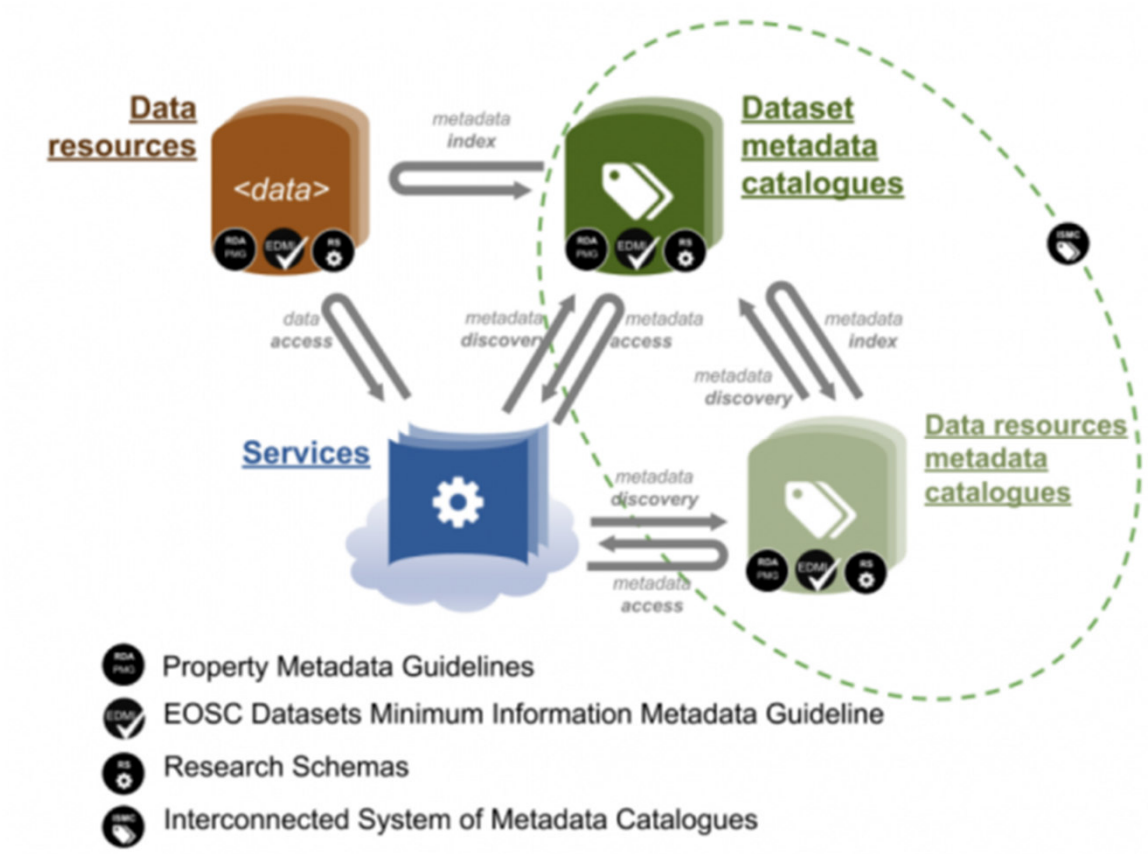


Source: https://eoscpilot.eu/metadata-catalogues-strategy

EDMI Project: https://eosc-edmi.github.io/

Metadata ("data about data")

- Related to **FAIR**

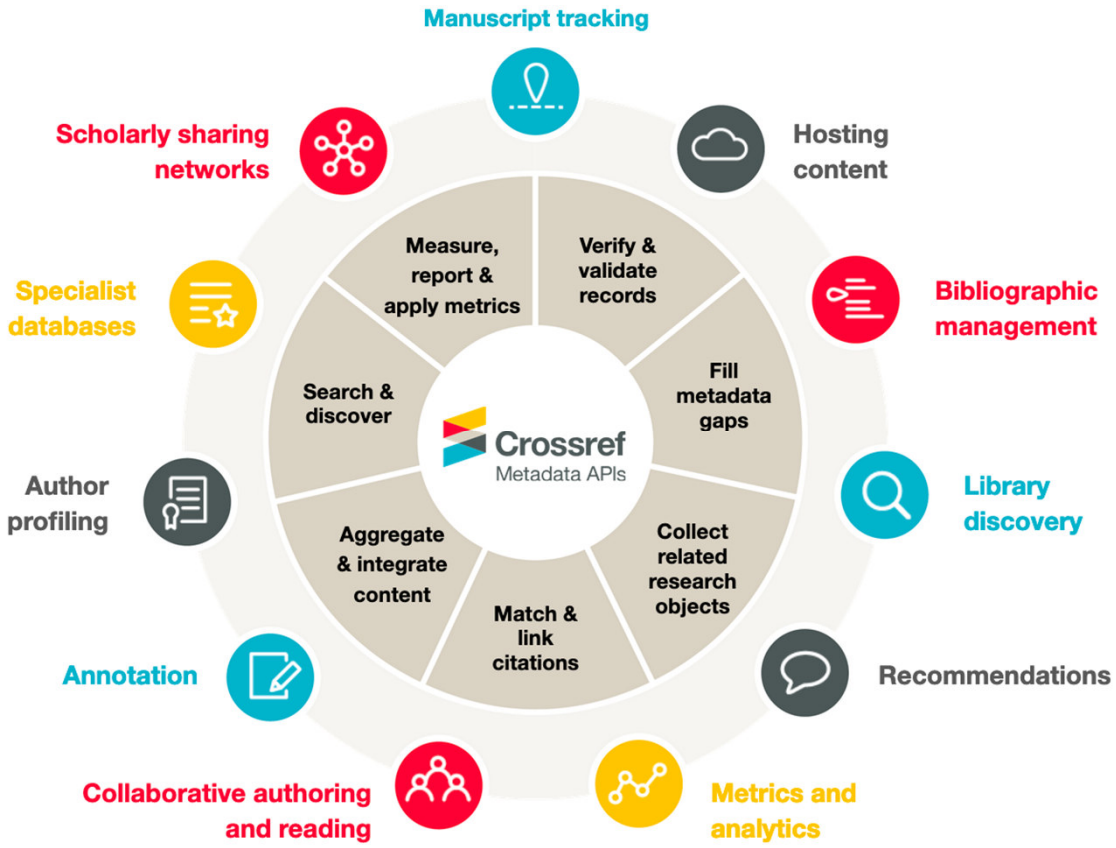


Source: https://eoscpilot.eu/news/eosc-data-interoperability-ensure-availability-scientific-data

EOSC Metadata Guidelines: https://eoscpilot.eu/edmi-metadata-guidelines

Metadata ("data about data")

- Metadata retrieval API



Source: https://www.crossref.org/services/metadata-retrieval/

Part 4: Intro to metadata

The role of METADATA and FAIR principles:
http://aims.fao.org/activity/blog/fair-principles-digital-objects-role-metadata

TUTORIAL 3: METADATA for RDM in EMPIR projects

Friday, March 11th, 2021

Source: https://hangingtogether.org/?p=5616

Part 5: Intro to RDM in EURAMET projects

- Metadata required by Grant Agreement (Article 29).
- Minimum Metadata for good practice: Compliance for FAIR.
- Towards EOSC Minimum Viable Ecosystem.

Part 5: Intro to RDM in EURAMET projects

Metadata required by Grant Agreement

ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EMPIR FUNDING

29.1 Obligation to disseminate results
Unless it goes against their legitimate interests, each beneficiary must — as soon as possible — 'disseminate' its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium)

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

A beneficiary that intends to disseminate its results must give advance notice to the other beneficiaries of — unless agreed otherwise — at least 45 days, together with sufficient information on the results it will disseminate.

Any other beneficiary may object within — unless agreed otherwise — 30 days of receiving notification, if it can show that its legitimate interests in relation to the results or background would be significantly harmed. In such cases, the dissemination may not take place unless appropriate steps are taken to safeguard these legitimate interests.

If a beneficiary intends not to protect its results, it may — under certain conditions (see Article 26.4.1) — need to formally notify EURAMET before dissemination takes place

Source: Grant Agreement (Art. 29)

Part 5: Intro to RDM in EURAMET projects

Metadata required by Grant Agreement

ARTICLE 29 — DISSEMINATION OF RESULTS — OPEN ACCESS — VISIBILITY OF EMPIR FUNDING

29.2: Open access to scientific publications

Each beneficiary must ensure open access (free of charge, online access for any user) to all peer-reviewed scientific publications relating to its results.

In particular, it must:
(a) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.
(b) ensure open access to the deposited publication — via the repository — at the latest:
(i) on publication, if an electronic version is available for free via the publisher, or
(ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.

(c) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication."

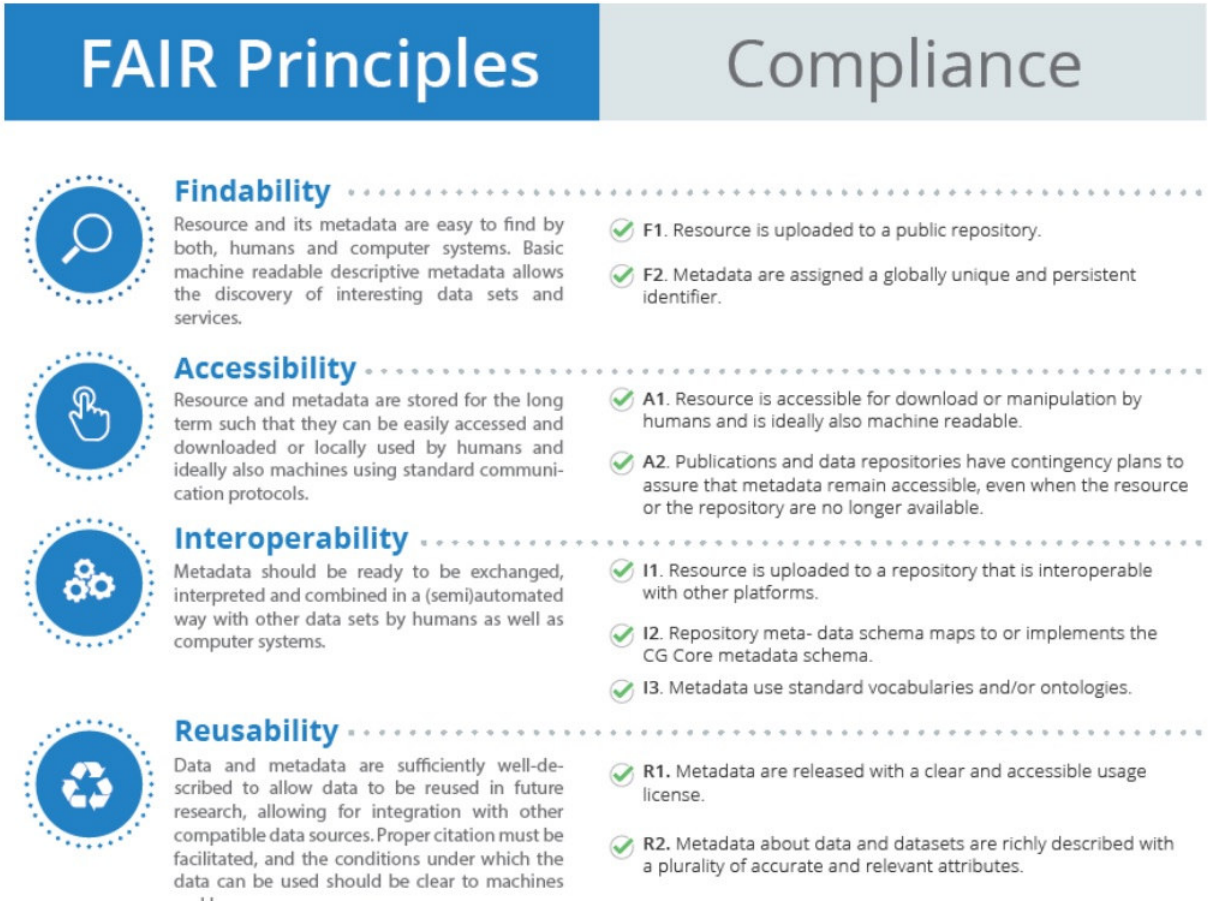
The bibliographic metadata must be in a standard format and must include all of the following:
- the terms " EMPIR" "European Union (EU)" and "Horizon 2020"
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

Source: Grant Agreement (Art. 29)

Part 5: Intro to RDM in EURAMET projects

Minimum Metadata for good practice:

Compliance for FAIR



Source: https://www.go-fair.org/fair-principles/

Part 5: Intro to RDM in EURAMET projects

Towards "**EOSC Minimum Viable Ecosystem**"

EURAMET wants EMPIR (and EMP) to be EOSC-ready

SOFTWARE DEVELOPERS/SERVICE PROVIDERS

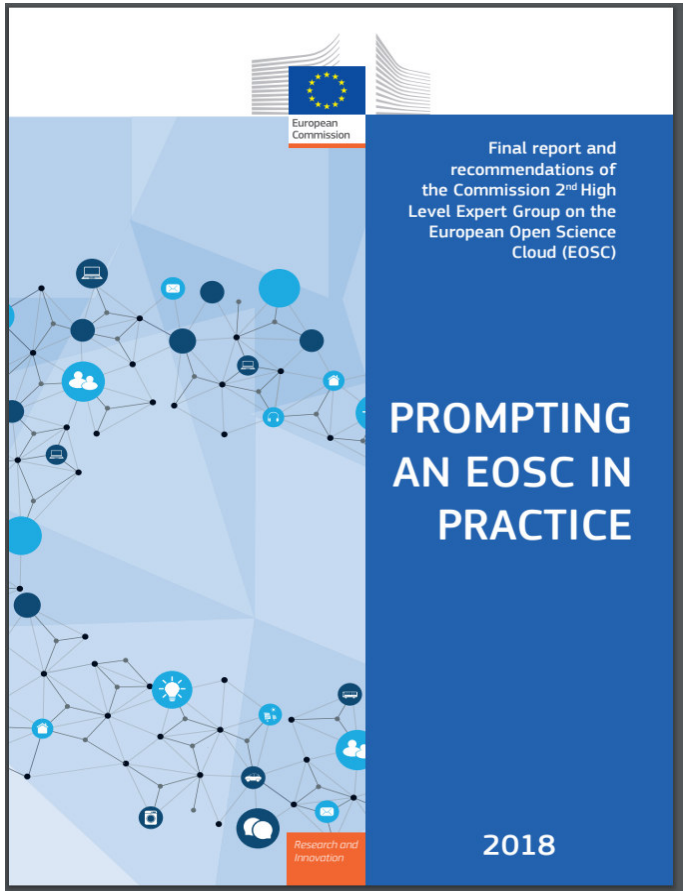
Interoperable services and open data rely on the principles of software openness. The software used in EOSC services should guarantee interoperability and comply with standards, be they de facto or by right (de Jure). Data produced and handled with EOSC software services should respect the FAIR principles; services within EOSC should be secure and comply with the European authorisation and authentication policies; as a general policy, the software elements are provided upstream to open source projects, to guarantee the required level of sustainability; to provide persistent identifiers, identification scheme and machine-readable metadata about the resources.

For this key activity to be successful in terms of engaging human talent, breakthrough ideas leading to innovation need to be awarded with the proper recognition. Putting in place transparent mechanisms to recognise successful software development, such as creating an ***'EOSC-Ready' certification for software*** products, would have a positive impact on the software development ecosystem in Europe. The successful development of an *'EOSC-Ready'* branded software product, would improve the reputation of researchers and technologists and dynamically harness the potential of European developers, across academia and industry.

Source: Prompting an EOSC in practice
https://op.europa.eu/en/publication-detail/-/publication/5253a1af-ee10-11e8-b690-01aa75ed71a1

Part 5: Intro to RDM in EURAMET projects

Towards "**EOSC Minimum Viable Ecosystem**"



Source: Prompting an EOSC in practice
https://op.europa.eu/en/publication-detail/-/publication/5253a1af-ee10-11e8-b690-01aa75ed71a1

Thank you for your attention!

NEXT TUTORIAL:

Preparation and implementation of data management plans (DMPs) for EMPIR projects

Monday, February 15th, 10 AM CET

Speaker: Giacomo Lanza (PTB)

METAS PTB NPL

Example from EMPIR projects

BiRD Project

Website: https://www.birdproject.eu/

F: https://www.birdproject.eu/papers-and-presentations/

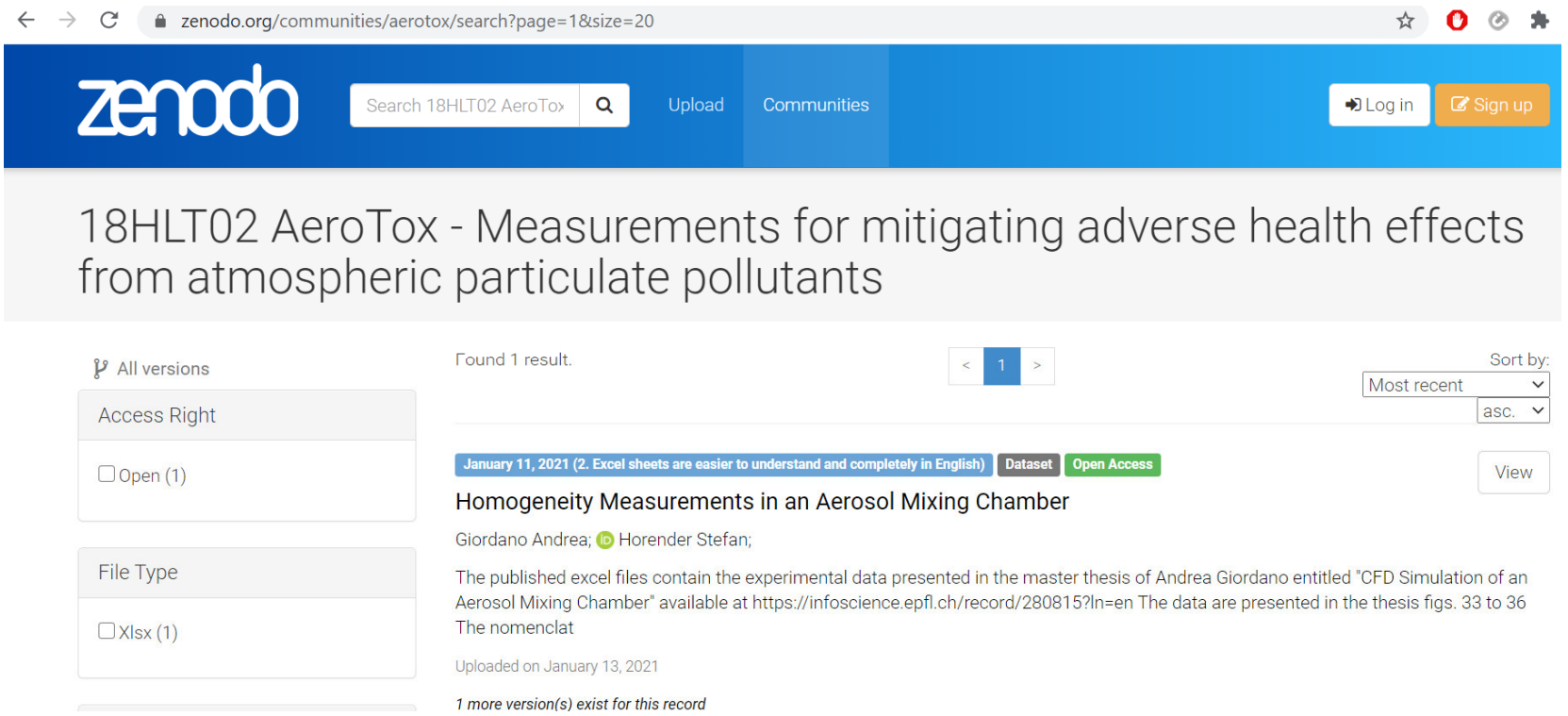
AIR: https://www.birdproject.eu/measurement-data/

https://www.birdproject.eu/references/

Results: https://www.birdproject.eu/project-results/

Example from EMPIR projects

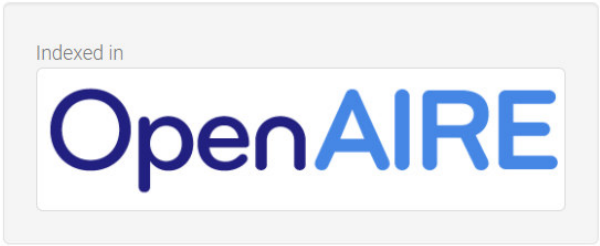
AeroTox



Community in Zenodo
https://zenodo.org/communities/aerotox/search?page=1&size=20

Example from EMPIR projects

AeroTox



https://www.openaire.eu/

Publication date:
January 11, 2021

DOI:
DOI 10.5281/zenodo.4436486

Keyword(s):
Aerosol Homogenization | CFD | Validation

Awarding University:
EPFL

Related identifiers:
Previous versions
10.5281/zenodo.4432572

Communities:
18HLT02 AeroTox - Measurements for mitigating adverse health effects from atmospheric particulate pollutants

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Community in Zenodo:
https://zenodo.org/communities/aerotox/search?page=1&size=20