





# **Turning FAIR into practice**

Sarah Jones Digital Curation Centre sarah.jones@glasgow.ac.uk Twitter: @sjDCC



Rapporteur of EC Expert Group on FAIR data Independent expert on EOSC Executive Board



Research and Innovation

Presentation reflects the views of the author and group only

## **FAIR Expert Group**



Commission



Simon Hodson, CODATA Chair of FAIR Data EG



Rūta Petrauskaité, Vytautas Magnus University



Peter Wittenburg, Max Planck Computing & Data Facility



Sarah Jones, Digital Curation Centre (DCC), Rapporteur



Daniel Mietchen, Data Science Institute, University of Virginia



Françoise Genova, Observatoire Astronomique de Strasbourg



Leif Laaksonen, CSC-IT Centre for Science



Natalie Harrower, Digital Repository of Ireland – year 2 only



Sandra Collins, National Library of Ireland – year 1 only

## **FAIR Report**





**Report and Action Plan**: Take a holistic approach to lay out what needs to be done to make FAIR a reality, **in general and for EOSC** 

## Addresses the following key areas:

- 1. Concepts for FAIR
- 2. Creating a FAIR culture
- 3. Creating a technical ecosystem for FAIR
- 4. Skills and capacity building
- 5. Incentives and metrics
- 6. Investment and sustainability

**Recommendations and Actions**: 27 clear recommendations, structured by these topics, are supported by precise actions for stakeholders.

Turning FAIR into Reality: Report and Action Plan https://doi.org/10.2777/1524







While there is much existing infrastructure to build on, the further development and extension of FAIR components is required.

These tools and services should fulfil the needs of data producers and users, and be easy to adopt.



Image CC-BY by Nicolas Raymond https://www.flickr.com/photos/80497449@N04/8691983876



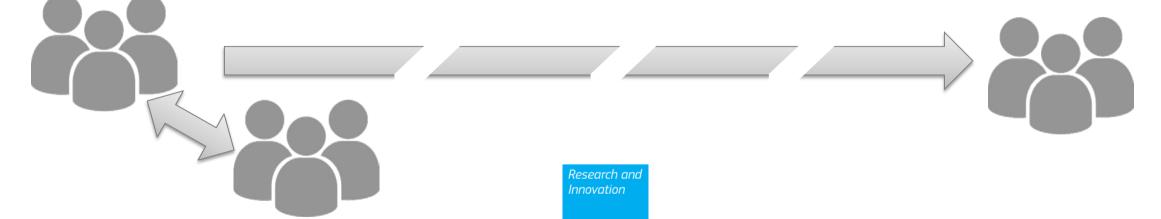


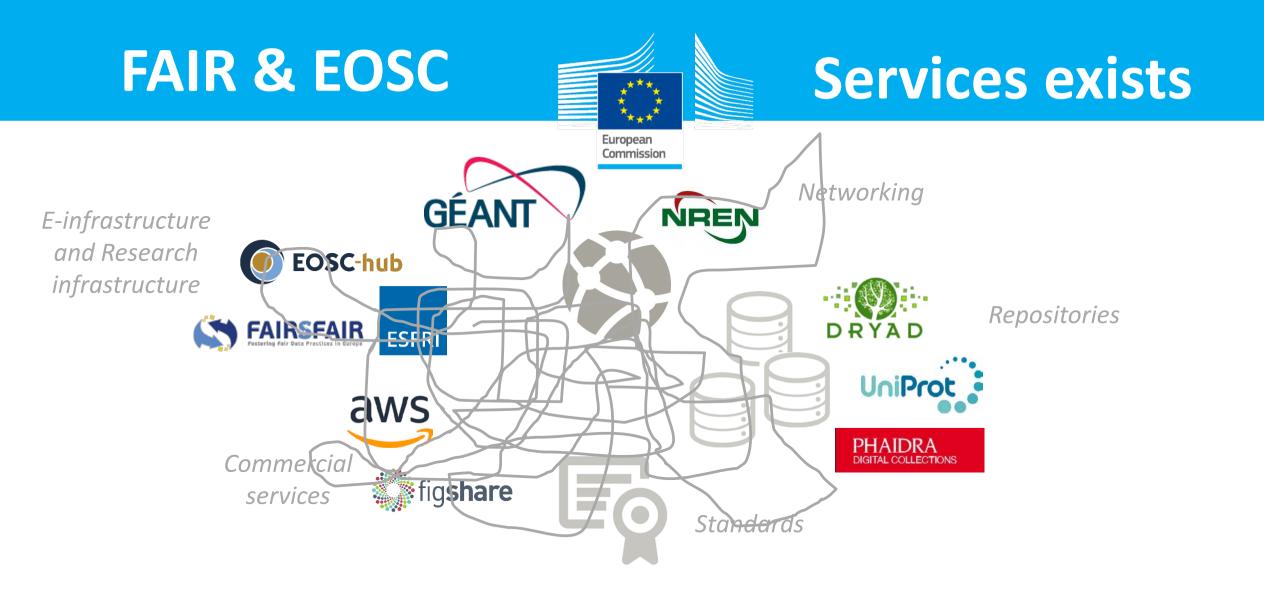


# **Sharing happens**

Research communities share data. Often peer-to-peer or easiest within disciplines or those closely related.

Data sharing agreements often disciplinary focused so it's harder to make data meaningful to completely different communities.



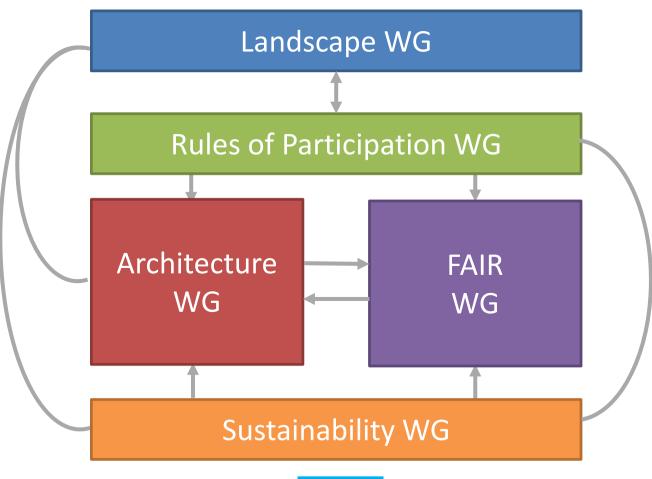


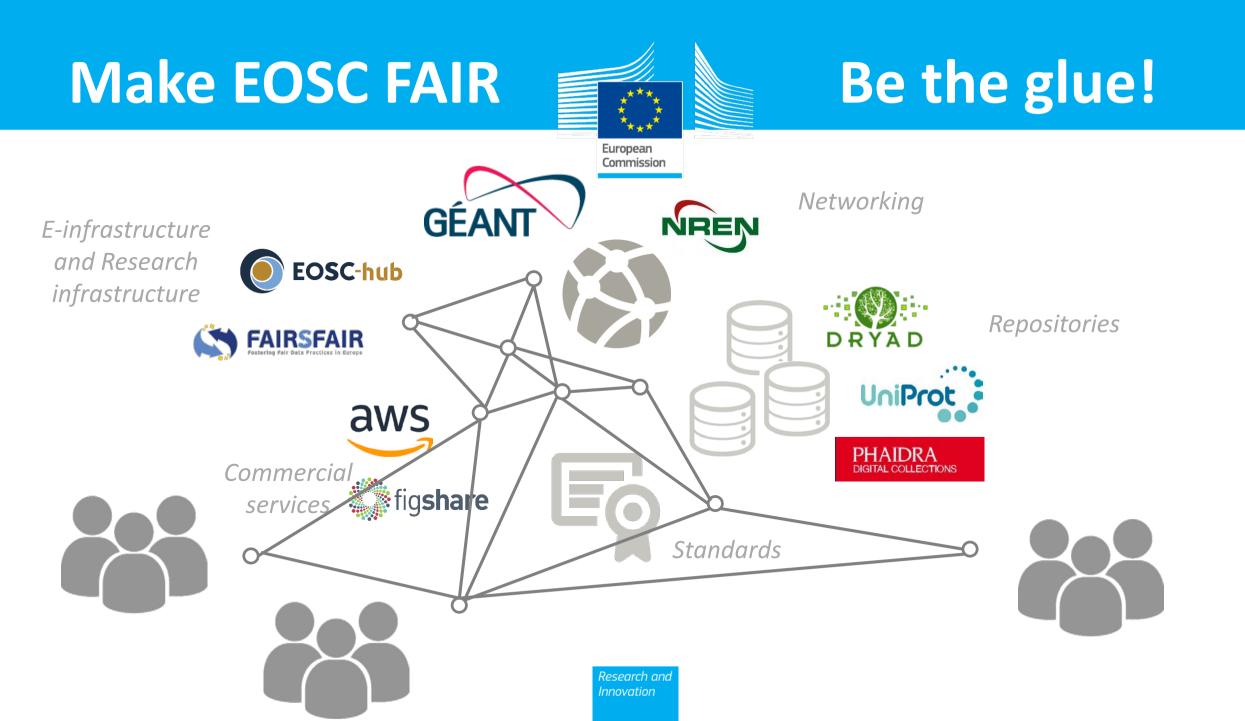
## Member state investments / disciplinary services / e-Infrastructure projects





## **Governance coming**









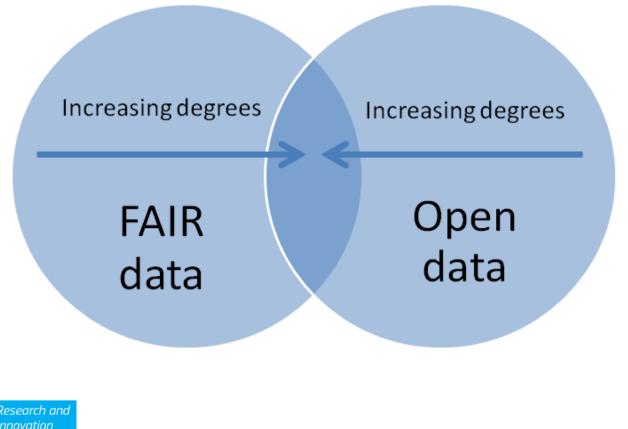
- Add value
- Be research-focused and led
- Make things easier **be** the choice!
- Promote openness in all respects



# **FAIR and Open**



- Concepts of FAIR and Open should not be conflated.
  Data can be FAIR or Open, both or neither
- The greatest potential reuse comes when data are both FAIR and Open
- Align and harmonise FAIR and Open data policy



## **FAIR Expert Group**



## Recommendations

Commission

Define	Implement			Embed and sustain	
Concepts for FAIR Implementation	FAIR culture	FAIR ecosystem	Skills for FAIR	Incentives and metrics for FAIR data and services	Investment in FAIR
Rec. 1: Define FAIR for implementation	Rec. 4: Develop interoperability frameworks	Rec. 7: Support semantic technologies	Rec. 10: Professionalise data science & stewardship roles	Rec. 12: Develop metrics for FAIR Digital Objects	Rec. 14: Provide strategic and coordinated funding
Rec. 2: implement a Model for FAIR Digital Objects	Rec. 5: Ensure data management via DMPs	Rec. 8: Facilitate automated processing	Rec. 11: Implement curriculum frameworks and training	Rec. 13: Develop metrics to certify FAIR services	Rec. 15: Provide sustainable funding
Rec. 3: Develop components of a FAIR ecosystem	Rec. 6: Recognise & reward FAIR data & stewardship	Rec. 9: Certify FAIR services	Above line = priority recommendations		
Rec. 16: Apply FAIR broadly	Rec. 18: Cost data management	Rec. 2.2: Use information held in DMPs	Below line = supporting recommendations	Rec. 25: Implement and monitor metrics	Rec. 27: Open EOSC to all providers but ensure services are FAIR
Rec. 17: Align and harmonise FAIR and Open data policy	Rec. 19: Select and prioritise FAIR digital objects	Rec. 23: Develop components to meet research needs		Rec. 26: Support data citation and next generation metrics	
	Rec. 20: Deposit in Trusted Digital Repositories	Rec. 24: Incentivise research infrastructures to support FAIR data			
	Rec. 21: incentivise reuse of FAIR outputs	Resear Innova			

# FAIR Digital Objects

European Commission

- Digital objects can include data, software, and other research resources
- Universal use of PIDs
- Use of common formats
- Data accompanied by code
- Rich metadata
- Clear licensing

#### DIGITAL OBJECT Data, code and other research outputs At its most basic level, data or code is a bitstream or binary sequence. For this to have meaning and to be FAIR, it needs to be represented

For this to have meaning and to be FAIR, it needs to be represented in standard formats and be accompanied by Persistent Identifiers (PIDs), metadata and documentation. These layers of meaning enrich the object and enable reuse.

## IDENTIFIERS

#### Persistent and unique (PIDs)

Digital Objects should be assigned a unique and persistent identifier such as a DOI or URN. This enables stable links to the object and supports citation and reuse to be tracked. Identifiers should also be applied to other related concepts such as the data authors (ORCIDs), projects (RAIDs), funders and associated research resources (RRIDs).

### STANDARDS & CODE

#### Open, documented formats

Digital Objects should be represented in common and ideally open file formats. This enables others to reuse them as the format is in widespread use and software is available to read the files. Open and well-documented formats are easier to preserve. Data also need to be accompanied by the code use to process and analyse the data.

#### METADATA

#### Contextual documentation

In order for Digital Objects to be assessable and reusable, they should be accompanied by sufficient metadata and documentation. Basic metadata will enable data discovery, but much richer information and provenance is required to understand how, why, when and by whom the objects were created. To enable the broadest reuse, they should be accompanied by a 'plurality of relevant attributes' and a clear and accessible usage license.



## FAIR ecosystem



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- Essential components of the FAIR ecosystem
- Record all components in registries
- Ideally automated workflows between them
- Ecosystem should work for humans and machines







# Investment

## Skills

Cultural and social aspects that drive the ecosystem and enact change

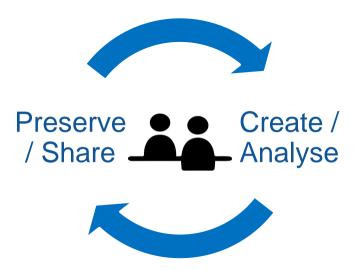
Incentives

Metrics





- Two cohorts of professionals to support FAIR data:
  - data scientists embedded in research projects
  - data stewards who will ensure the curation of FAIR data
- Coordinate, systematise and accelerate the pedagogy
- Support formal and informal learning
- Ensure researchers have foundational data skills





# Recognition



## Rewards

- Recognise the diversity of research contributions and encourage a culture change to include these in CVs, applications and activity reports
- Give credit to all roles related to data management and sharing
- Evidence of past FAIR practice should be included in assessments of research contribution
- Contribution to development and operation of certified and trusted infrastructures that support FAIR data should be recognized, rewarded and incentivised







- Provide strategic and coordinated funding to maintain the components of the FAIR ecosystem
- Ensure funding is sustainable no unfunded mandates
- Open EOSC to all providers, but ensure services are FAIR









- Underpinned by several practical and specific action points
- Action points to be linked to stakeholders and timeframes

FAIR Action Plan is directed at the EC, Member States and international level, but will also apply in context of EOSC to inform this roadmap



## **Context specific**



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# **FAIR Action Plans**

- The Expert Group has developed an overarching FAIR Action Plan
- Hope is that this will inspire the definition of more detailed FAIR Action Plans at research community and Member State level
- What are the priority actions in your area and for which stakeholders?



# Where next Italy...



- Develop a national plan
  - IOSSG (Italian Open Science Support Group)
  - Research Data Alliance Italy national node
  - OpenAIRE NOADS & EGI contact points
  - ICDI (Italian Computational and Data Infrastructure)
  - CNR (National Research Council of Italy)
- Build incentives into career progression structures
- Make strategic investments to feed into EOSC & national needs
- Leverage your position on the EOSC Governance Board







## **Questions?**



## http://tinyurl.com/FAIR-EG

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## https://doi.org/10.2777/1524