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Common practices in transnational research, ICT case and challenges

Why do we need Open Science?

The researcher perspective

How does Science work today?

Scientific Journals: Paywall

Why do we spend **public money** to close the research results behind limited access **subscriptions scientific journals**?

Research Evaluation

Based on bibliometric indexes
number of citations
Impact Factor
H-index…
It’s all about **Journals**!

What are we missing?

… a great part of researchers work

Negative results

Data

Algorithms

Processes

Software

Methodologies

Educational Resources

Peer-review

Grey Literature

Project proposals

Leadeship skills

Product development

…

Why do Researchers need Open Science?

The Stick and the Carrot of Open Science

Requirements

- Compliance with policies (funder, institutional)
- Journal publishers requirements
- Demonstrate responsible practice (improve integrity and vallidation of results)

Benefits

- Keep research safe and secure (through the deposit in a trustworthy repository)
- Increase research efficiency
- Make research outputs more visible
- Enable collaboration (within or outside a specific discipline)

Current Open Science Practices in the ICT Domain

Software management tools

- GitHub is a development platform
- Based on collaborative environment (community)
- Allows to share software and collaborative develop projects, improve, request reviews, test, and share

CI/CD

Secure development

Code review

Apps

Hosting

Project management

Team management

GitHub is how people build software

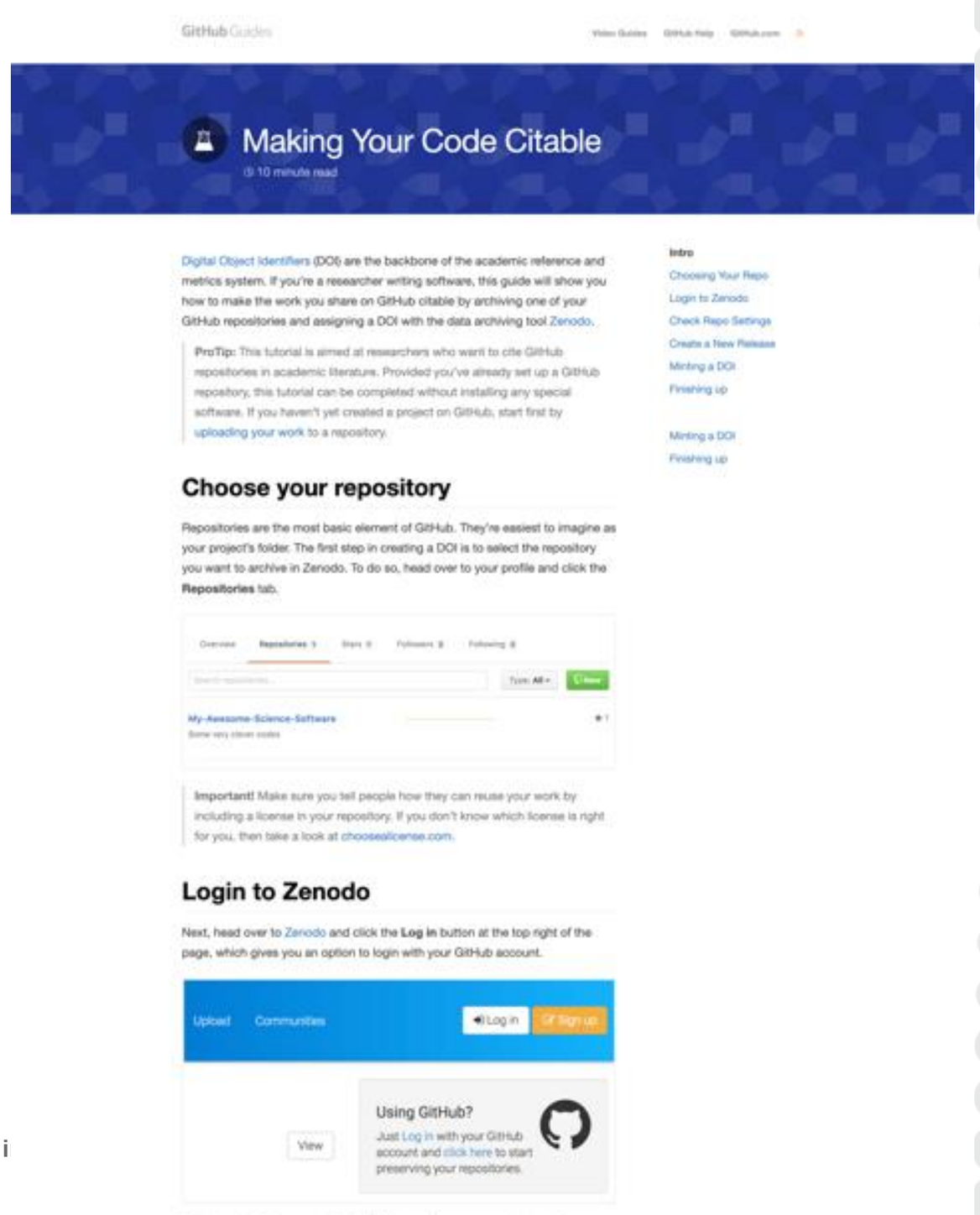
We're supporting a community where more than 40 million* people learn, share, and work together to build software.

With Github you do not publish your software!

What is missing?

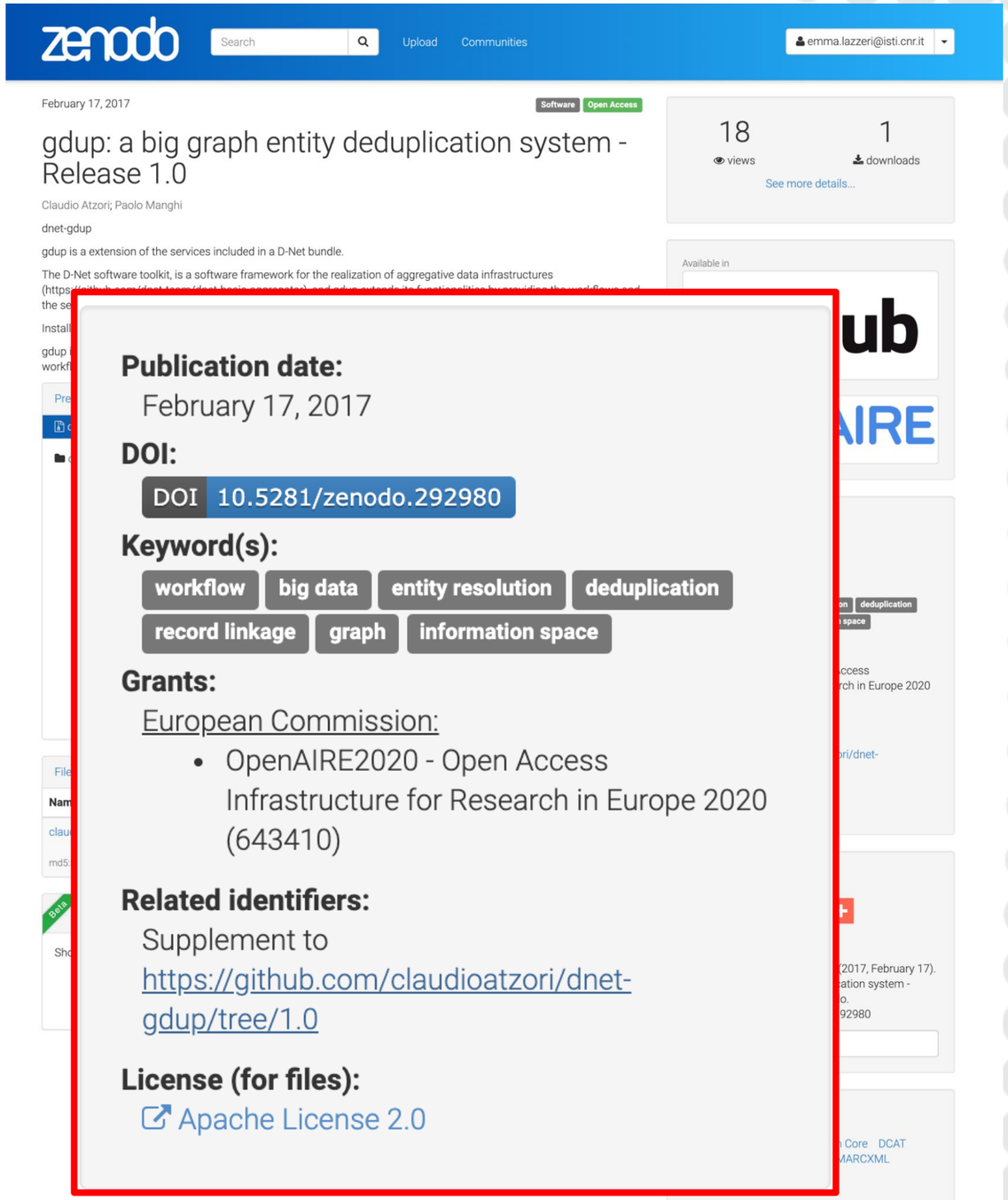
GitHub does not allow to

- Publish your software (in the academic sense),
- Preserve your software,
- Make your software findable,
- Give attribution,
- Make your software citable.



Zenodo

- Zenodo is a **catch all repository** developed thanks to a collaboration with CERN and OpenAIRE
- Zenodo provides free **DOI** to make the software **citable** and give credit to the developers/contributors
- By making the software citable, you make it **findable**
- Additional researchers can then use the same software for **different purposes**, leading to **credit** for the developers
- Citation of specific software used is necessary for **reproducibility**, although not sufficient.



What Else?

Software Heritage

An international initiative to preserve software

Software Heritage

THE GREAT LIBRARY OF SOURCE CODE

Software Papers

- Software papers are written to **describe** software and are based on the same principles of Data Papers
- The DOI attached to the article makes it **citable**
- **However the software itself should be cited on the same basis as any other research product**
- If a software paper exists and it contains results (performance, validation, etc.) that are important to the work, then the software paper should also be cited (in addition to the software).

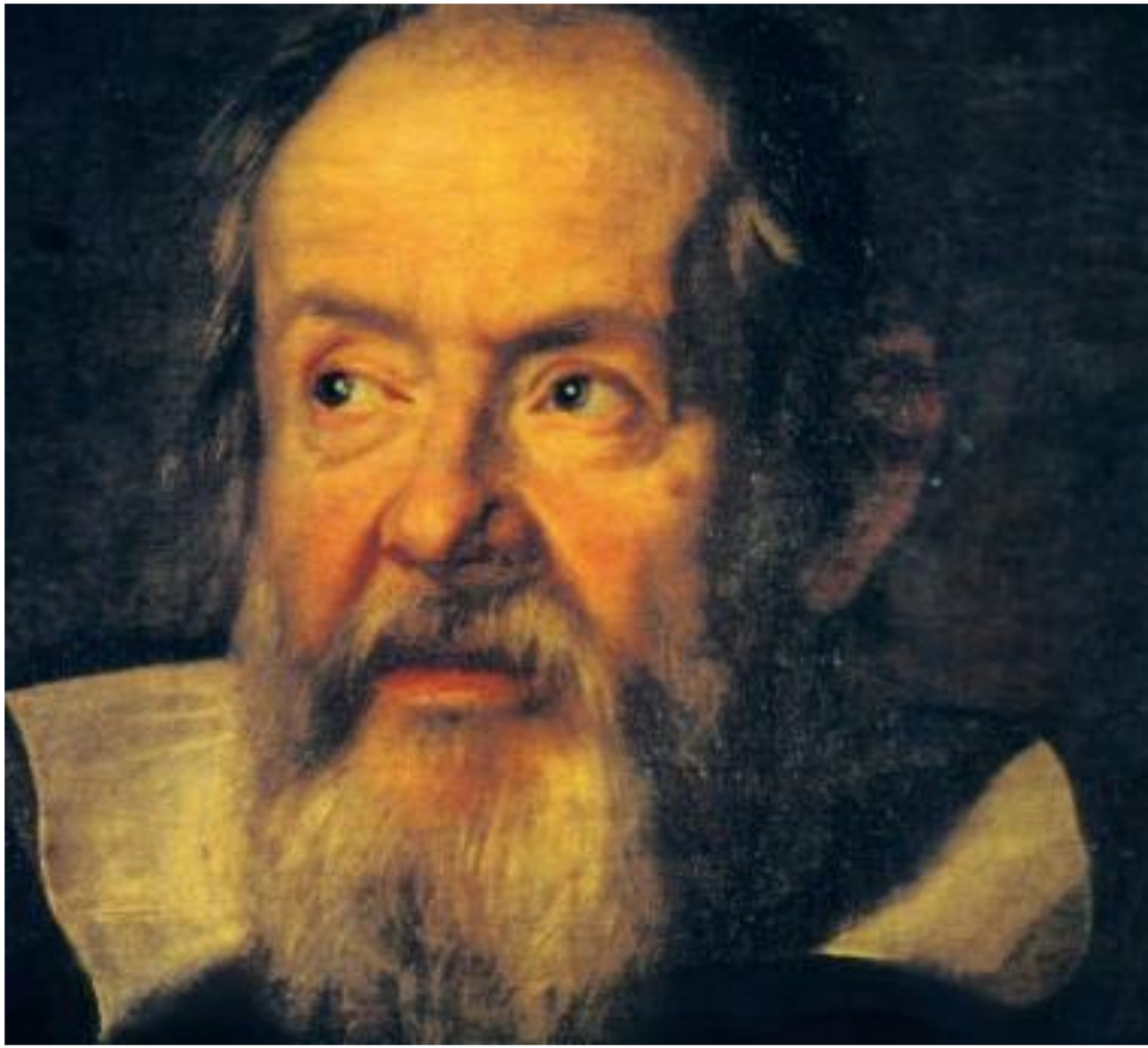
Software Reproducibility

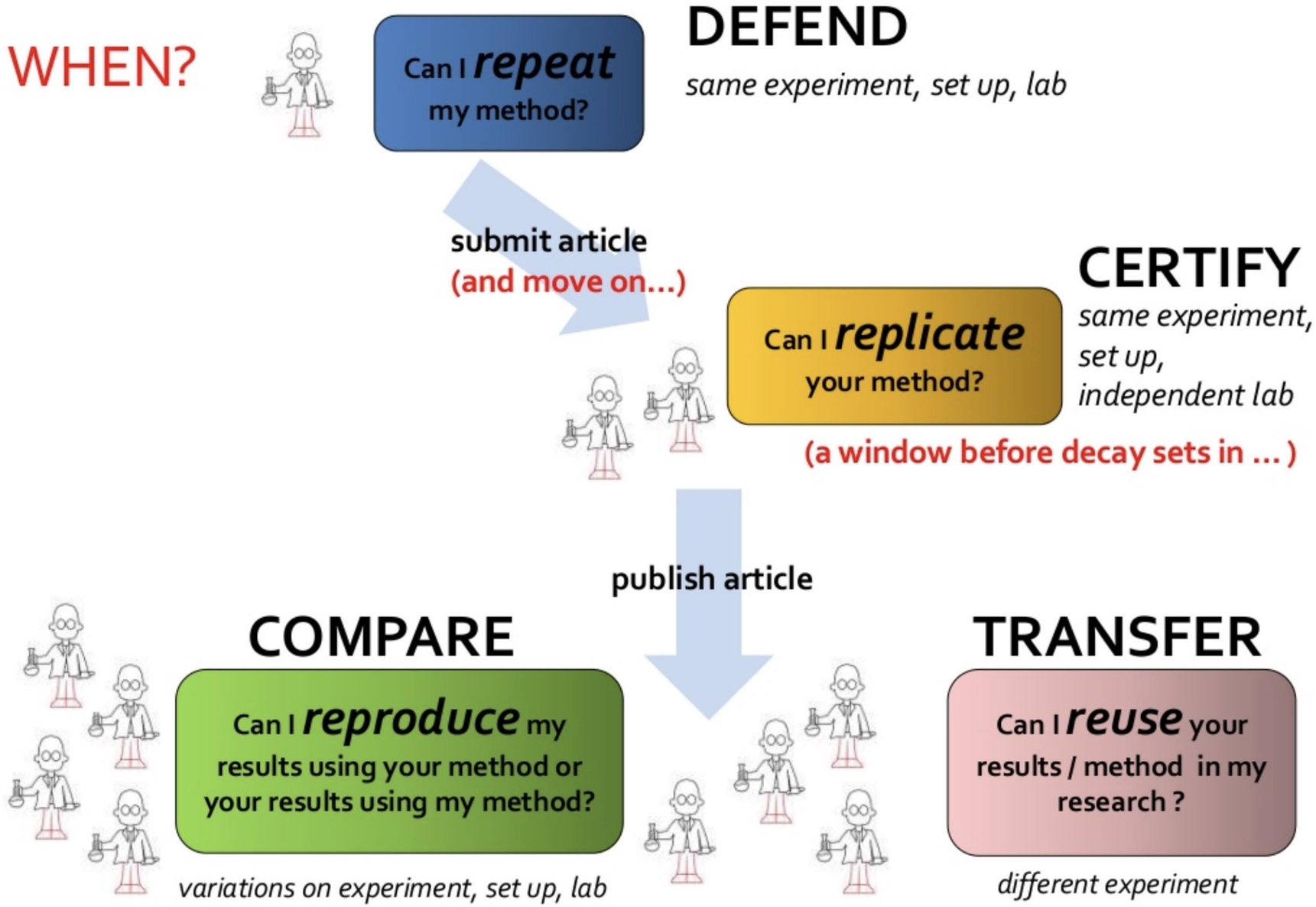
An experiment is reproducible until another laboratory tries to repeat it

Alexander Kohn

Reproducibility

Is (**still**) a principle of the Scientific Method!





* Adapted from Mesirov, J. Accessible Reproducible Research *Science* 327(5964), 415-416 (2010)

Slide by Prof. **Carol Goble**, "Reproducibility and Scientific Research: why, what, where, when, who, how"
https://www.slideshare.net/carolegoble/open-sciencemcrgoble2015/20

Ian Holmes
@ianholmes

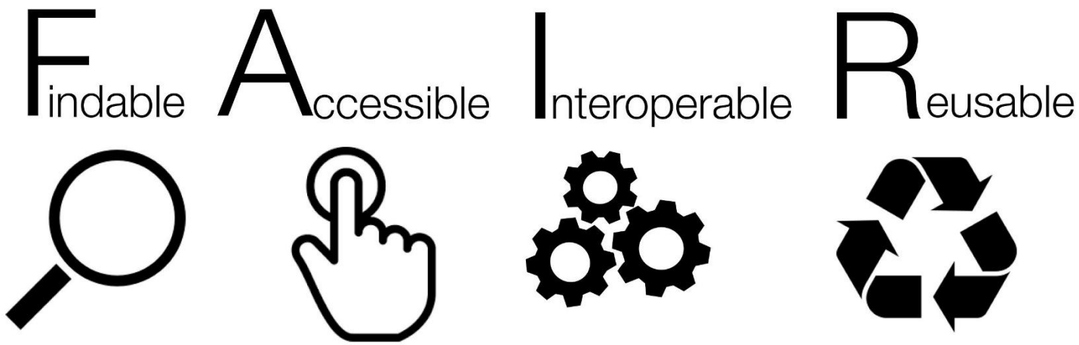
You can download our code from the URL supplied. Good luck downloading the only postdoc who can get it to run, though #overlyhonestmethods

Traduci il Tweet
5:52 PM · 8 gen 2013 · Twitter for iPhone

344 Retweet **141** Mi piace

Make software FAIR

- ORCID to identify the authors/contributors
- Develop in a structured – and collaboratory/open – way (GitHub)
- Deposit and preserve in a trustworthy repository: get a DOI! (Zenodo)
- Choose a clear license
- Deposit a (updated) README file with your code
- Use versioning
- Link to other research objects (articles, data, …)



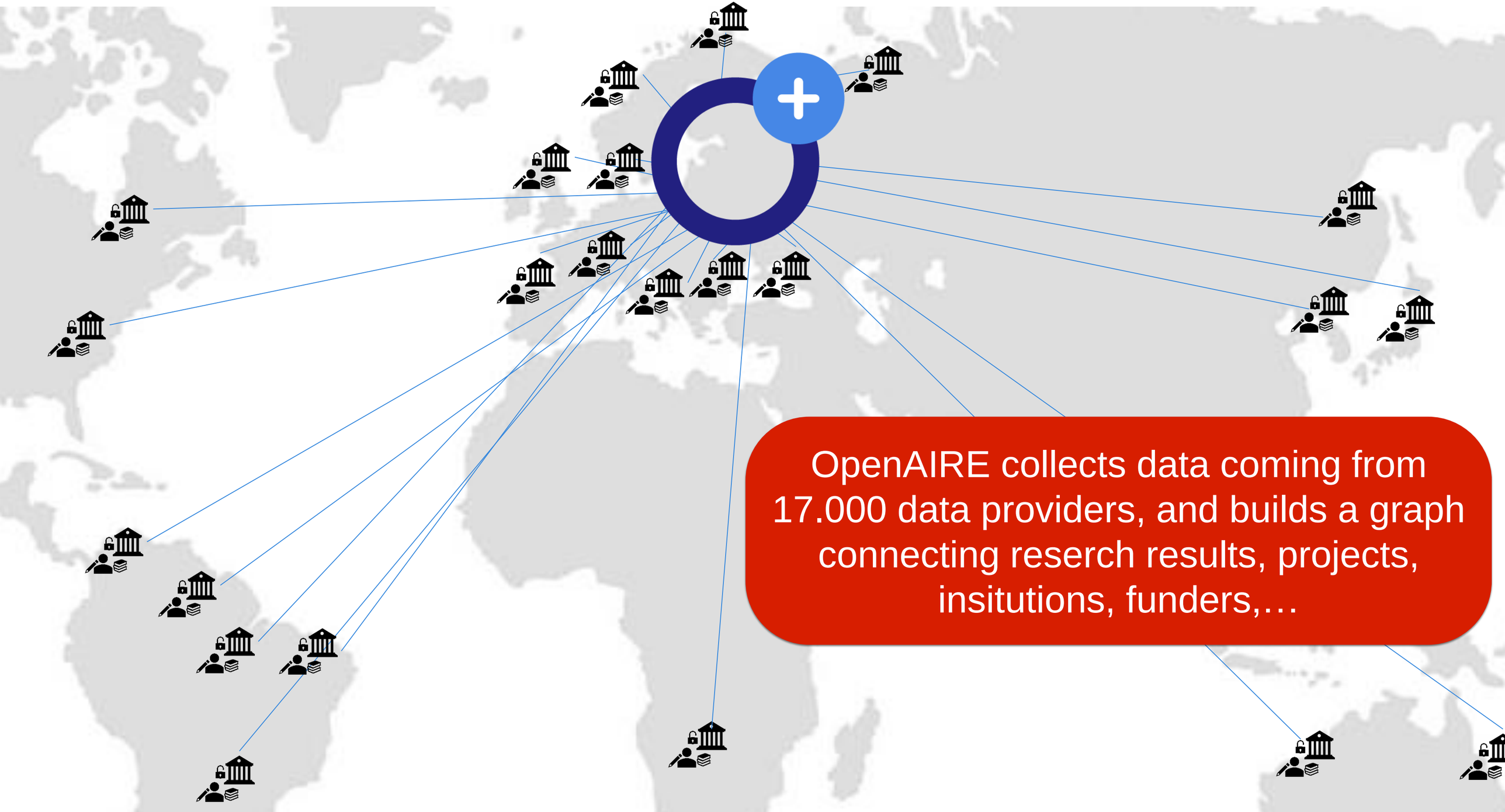
A step into the Future

A new research evaluation is coming…

- Based on Open Science and all the **FAIR objects** researchers produce
- Based on the **reuse** that (other) researchers will make of the FAIR products
- Based on the **links** research objects enable
- Researchers (and Funders) need to **prepare** for this

*Make your research **FAIR today***
if you wish to be evaluated tomorrow

OpenAIRE
Open Access infrastructure for OA in Europe
Funded by the EC since 2009

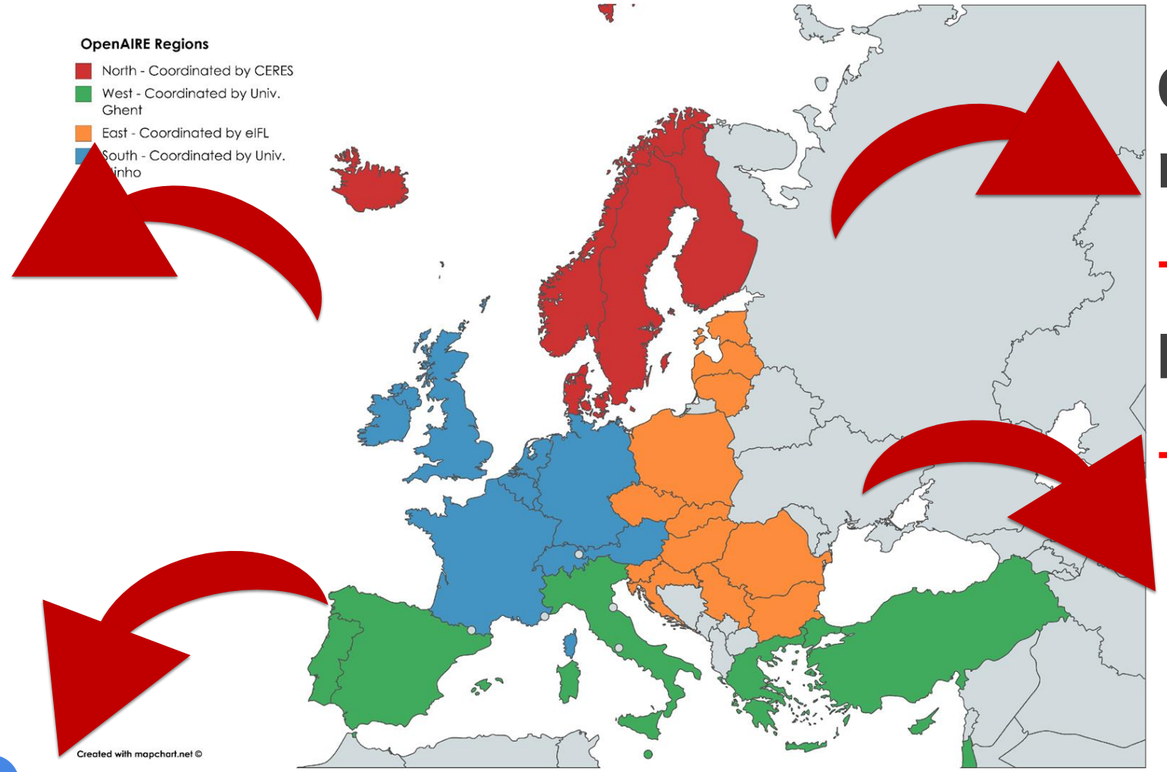

OpenAIRE collects data coming from 17.000 data providers, and builds a graph connecting reserch results, projects, insitutions, funders,…

Content Providers 17.000
Publications 40.000.000
Projects 3.000.000
Datasets 10.000.000
Software 230.000
Funders 21

National Open Access Desks (NOADs)

Facts

- Research is global, support is local
- Diversity in culture & maturity of national/local infras
- Not one size fits all in OA and open science



Our pan-European network

⇢ 34 countries

Key national organizations

⇢ 4 area coordinators

Moving to OS

Linked to infras around the world

OpenAIRE

European Commission

CC BY

Courtesy of Natalia Manola, OpenAIRE

How OpenAIRE can help

- Provide **templates** for RFO policy
- Provide **support** to the researchers
- **Train the trainers** programme for Institutions and Funders
- **Monitoring** compliance: dedicated funder service
- Dedicated **services** for researchers to

Deposit and Preserve

Link

Anonymise

Actionable DMP

zenodo

ScholeXplorer
The Data Literature Interlinking Service

amnesia

ARGOS

OpenAIRE

European Commission

My take away messages for a funder policy

- If it is an obligation, make it **easy** and **clear**
- **Guide** your researchers
- **Train and inform** your researcher: make them like Open Science
- **Monitor** the compliance and **sanction** when neccessary
- **Build on** succesful stories and **learn from** unsuccesful ones
- **Embed** Open Science in your evaluation and review process
- **Align** as much as possible with existing policies to avoid confusion and duplication of efforts

Thank you!

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