



**Alessia Bardi**

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Italian National Research Council (CNR)

# The OpenAIRE Research Graph and the Research Community Dashboard

# Outline

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OpenAIRE in a nutshell

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The OpenAIRE Research Graph

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Research Community  
Dashboard: building Open  
Research gateway for research  
communities

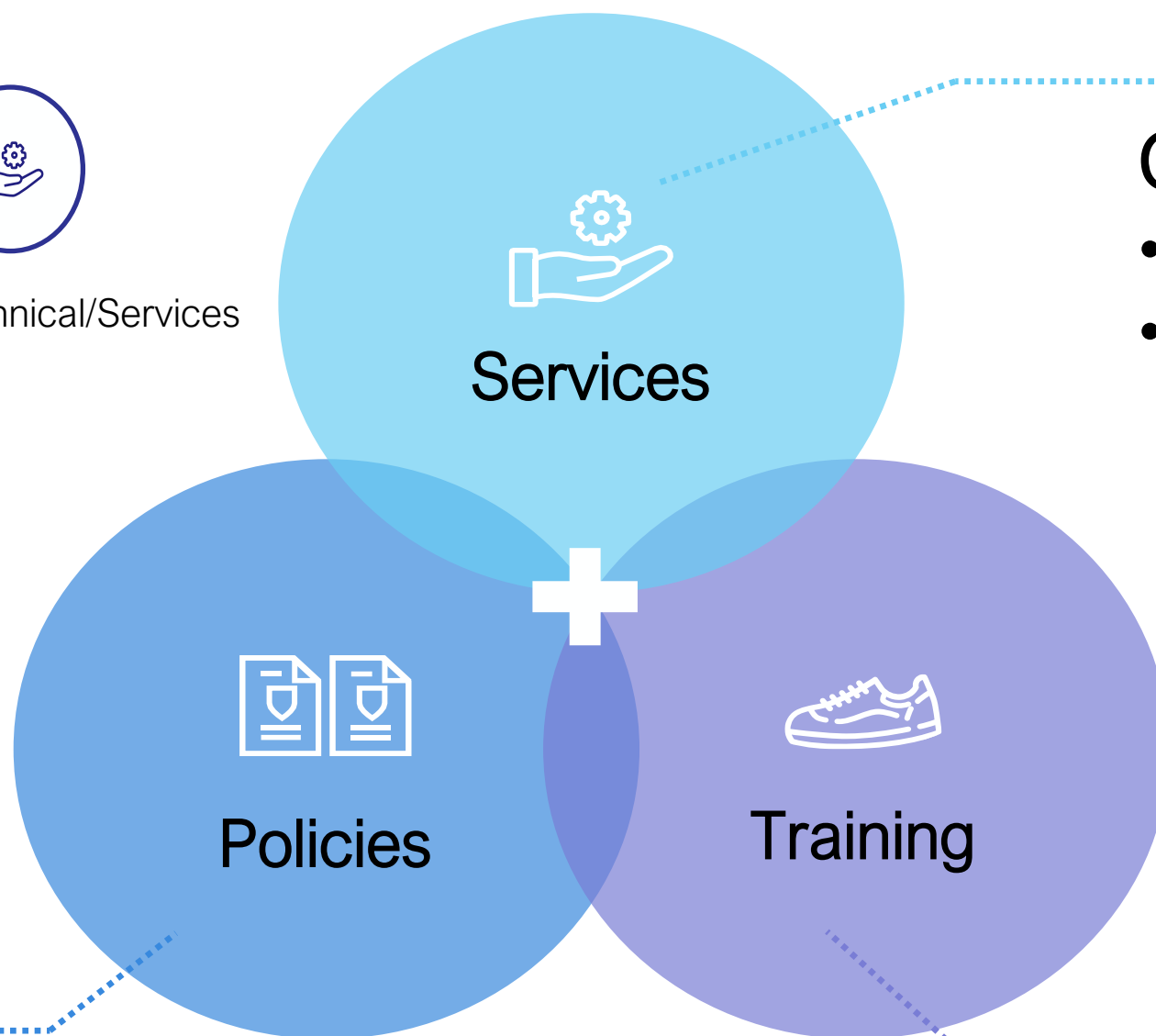
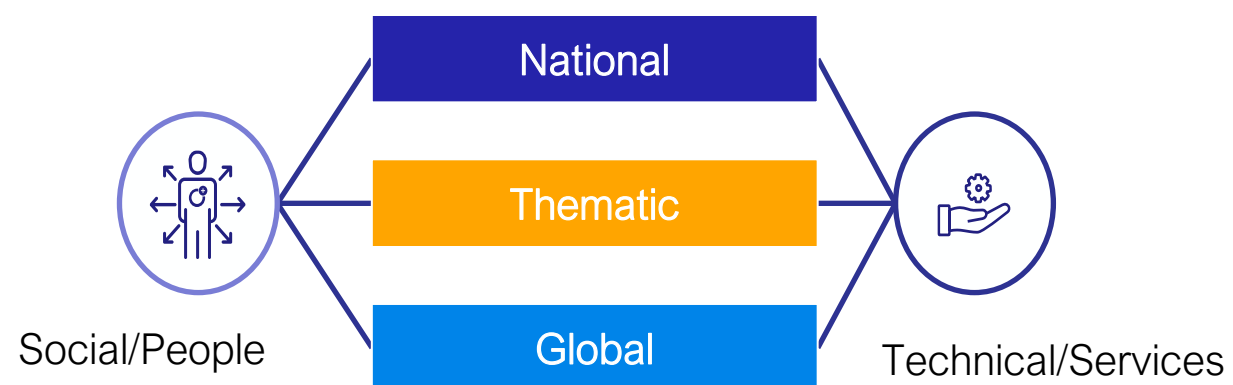
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The COVID-19 gateway



# OpenAIRE in a nutshell

# OpenAIRE AMKE: three pillars of action



## Connecting

- *Establishing infrastructure*
- *Added value Open Science services*

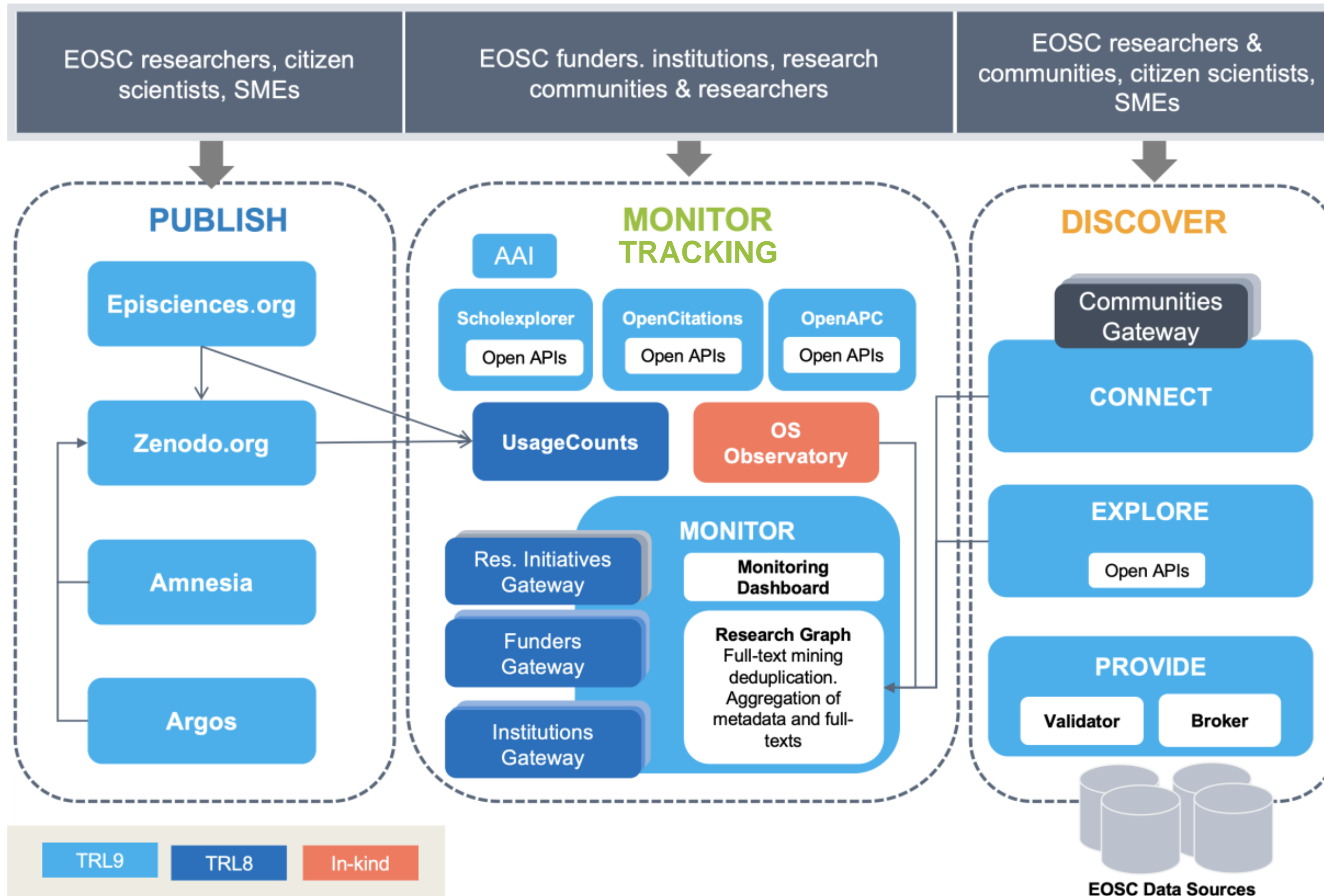
## Aligning

- *Standard*
- *Guidelines*
- *Practices*
- *Workflows*

## Empowering:

- *Open Science*
- *Open Access*
- *Policies*
- *Services*

# OpenAIRE Services





## Tracking Open Science

Reproducibility and transparency require tracking of all outcomes of science and related "context": collecting and enabling sharing of info



## Monitoring Open Science

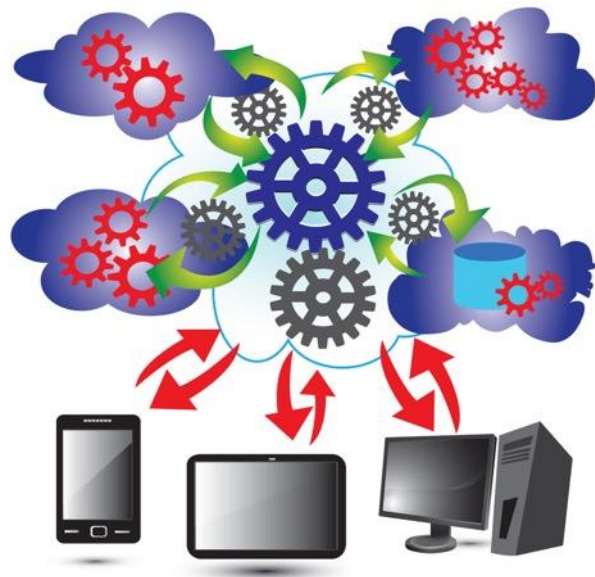
Monitoring impact, and "open scienceness" of science should be a transparent, reproducible process for all, inclusive of research "context"



## Discovery Open Science

Discovery of reproducible science outcomes must find new ways, driven by "scientific intentions" that go beyond the "find articles related to a research topic".

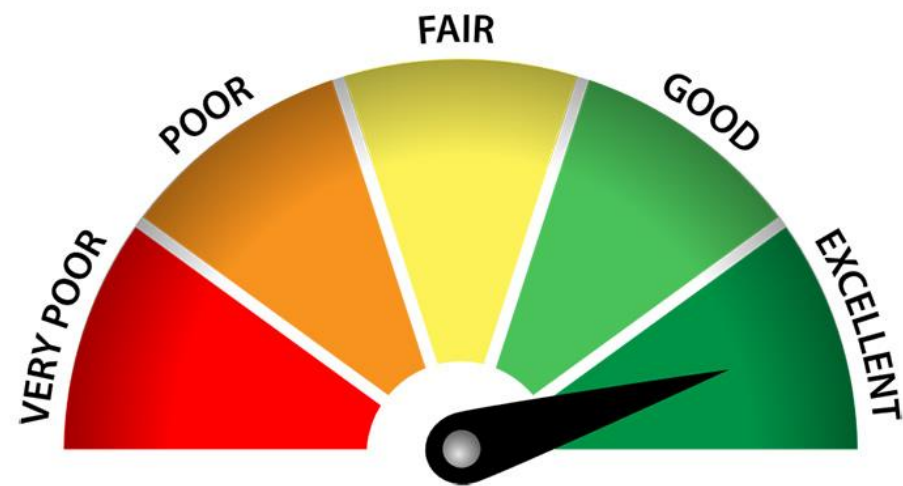
# Challenges



## Heterogeneity

Standards, crosswalks,  
community and cross-  
community view

[guidelines.openaire.eu](https://guidelines.openaire.eu)



## Quality and accuracy

Trust and stability of the  
data: researchers and  
operators in the loop

PROVIDE (validation,  
brokering), user feedback,  
PIDs



## Completeness

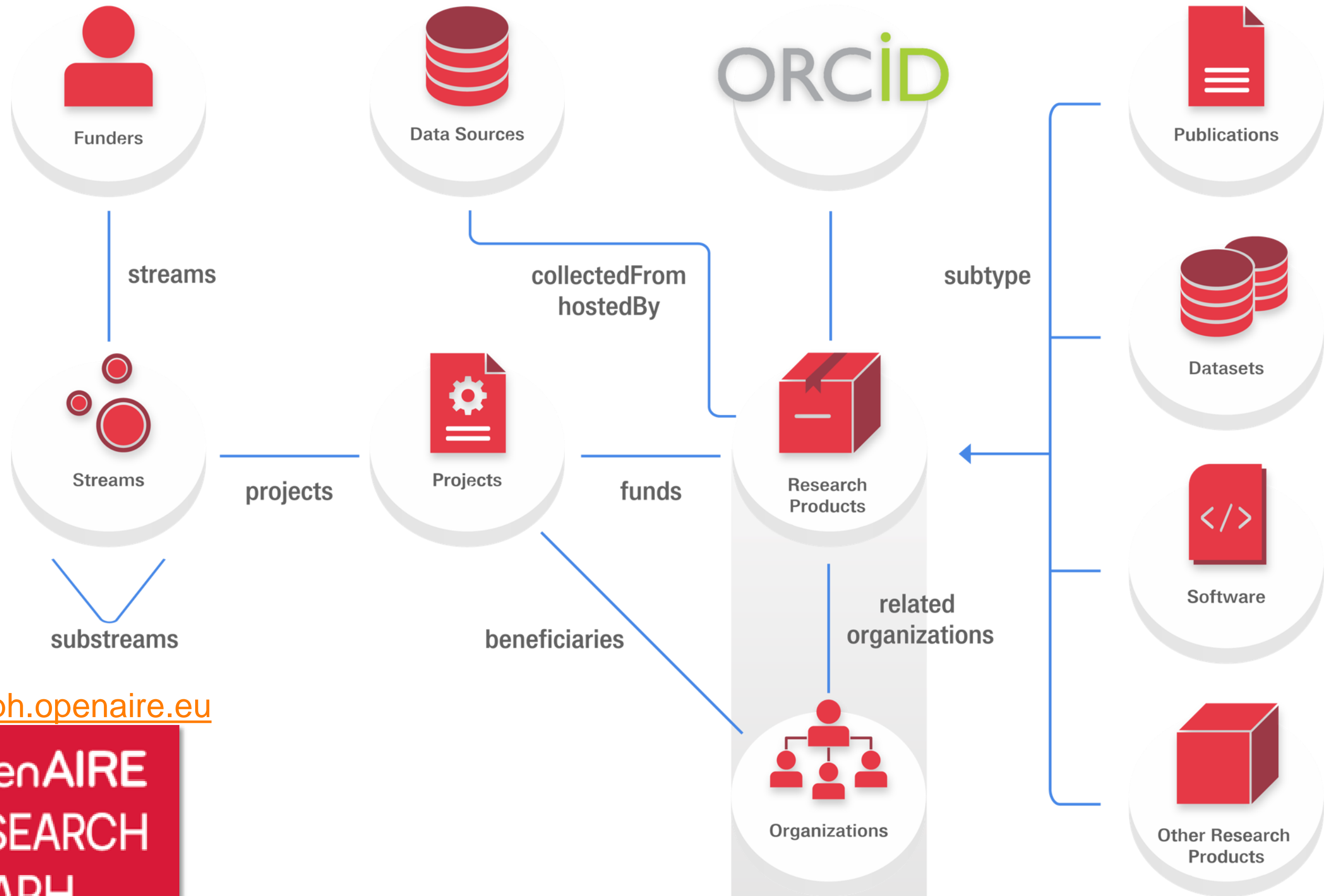
Practices, sharing of  
technology and data  
(Knowledge Graphs)

Open Science publishing  
workflows, RDA OSG  
interoperability



# The OpenAIRE Research Graph



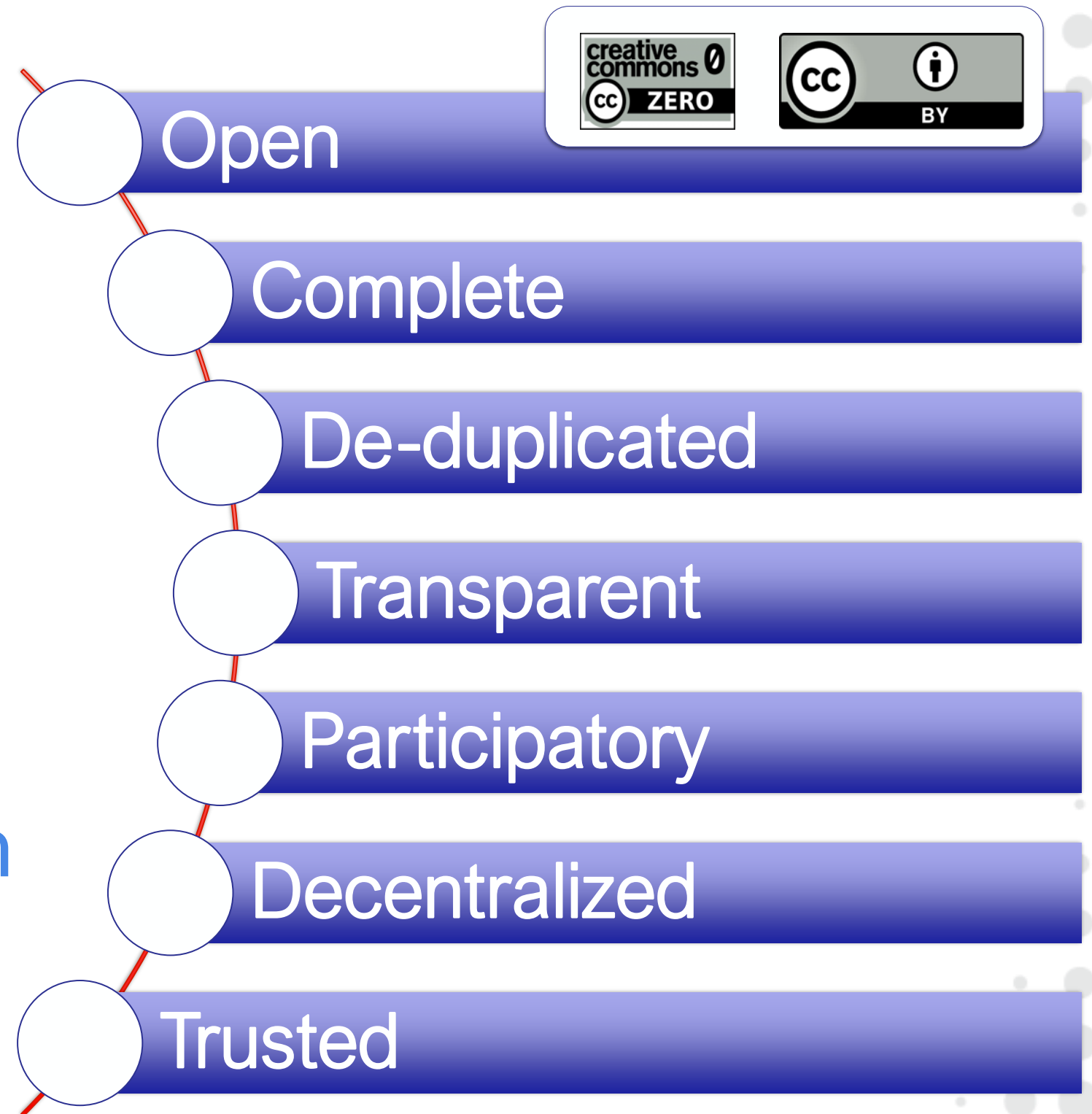


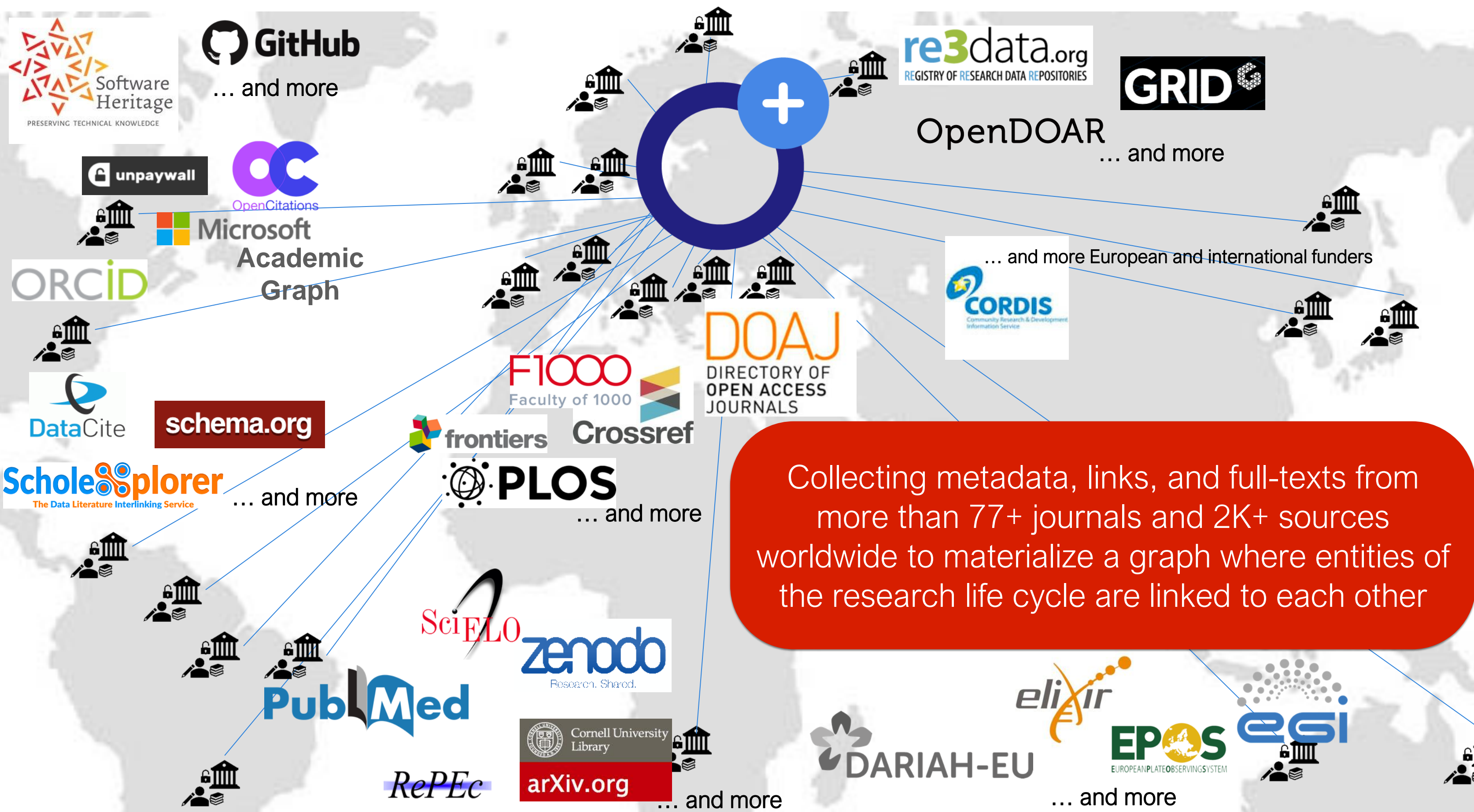
Learn more at [graph.openaire.eu](http://graph.openaire.eu)





Providing an **open metadata** research graph of interlinked **scientific products**, with **Open Access** information, linked to **funding information** and **research communities**





**GitHub**  
... and more

**Software Heritage**  
PRESERVING TECHNICAL KNOWLEDGE

**re3data.org**  
REGISTRY OF RESEARCH DATA REPOSITORIES

**GRID**

**OpenDOAR**  
... and more

**unpaywall**

**OpenCitations**

**Microsoft Academic Graph**

**ORCID**

... and more European and international funders  
**CORDIS**  
Community Research & Development Information Service

**DOAJ**  
DIRECTORY OF OPEN ACCESS JOURNALS

**F1000**  
Faculty of 1000

**frontiers** **Crossref**

**DataCite**

**schema.org**

**ScholarXplorer**  
The Data Literature Interlinking Service  
... and more

**PLOS**  
... and more

Collecting metadata, links, and full-texts from more than 77+ journals and 2K+ sources worldwide to materialize a graph where entities of the research life cycle are linked to each other

**SciELO** **zenodo**  
Research. Shared.

**PubMed**

**arXiv.org**  
... and more

**RePEc**

**DARIAH-EU**

**elixir**

**EPOS**  
EUROPEAN PLATE OBSERVING SYSTEM

**eESI**

... and more

# PIDs in OpenAIRE

## Authors

ORCID



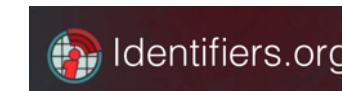
## Organisations

GRID

ROR



## Products



## Funders/Projects



and other funders

## Data sources

re3data.org OpenDOAR

DOAJ + journal lists from publishers

## Services (forthcoming...)



EUROPEAN OPEN SCIENCE CLOUD

...Clusters and RIs service catalogues



Funder database

## Scientific and Technological Research Council of Turkey

Türkiye Bilimsel ve Teknolojik Araştırma Kurumu

Web page: <http://www.tubitak.gov.tr/tr>

RESEARCH OUTCOMES (56,125,230)

PROJECTS (2,849,154)

CONTENT PROVIDERS (79,243)

ORGANIZATIONS (922)

SUMMARY

Filters

X TR

Results per page:  
10

Country (5)

Clear

- TR (922)
- EU (637)
- GB (6)
- CH (5)
- US (1)

922 ORGANIZATIONS, PAGE 1 OF 93

Organization  
Istanbul University

Country: Turkey

Project: EC | SPIOMET4HEALTH (899671), EC | COCONET (287844), EC | ODYSSEA (727277), EC LIQUEFACT (700748), EC | UP-GRADE BS-SCENE (226592), EC | ENVIGUARD (614057), EC | Cities (787248), EC | VERIFY (776810),...

Organization  
İYTE

Turkey in OpenAIRE

Project . 2006 - 2009

Fiber Optik Tabanlı DNA Biyosensörlerinin Çevre Kirliliği ve Biyoteröre Karşı Uygulamalar

Funder: TUBITAK Project Code: 106M255

# OpenAIRE Research Graph: the supply chain

**Figures (Jan 2019-today):**

- Direct data sources +2400
- Products +360Mi
- Harvested/mined links 236Mi +
- Full-texts 14.Mi+

Data sources

Aggregation

Collection and harmonisation

Integration of additional scholarly communication sources

Metadata, relationships Relationships Metadata

Deduplication

Different records representing the same entity (results or organisation) are merged in one

Metadata records corresponding to equivalent objects are merged. Pre-print, post-print, published versions are considered equivalent for stats & monitoring purposes

Inference of new properties and links via full-text mining

Inference of new properties and links from metadata

Enrichment

**Figures (Apr 2021):**

- Data sources 94K+
- Publications 123Mi
- Datasets 14Mi +
- Software 200K
- Others 8Mi
- Funders 23
- Projects 2.8Mi
- Organizations 276K

**Figures (2020):**

- 1,7Mi/y API hits
- 650K/y user visits

covid19.openaire.eu

EC Participant Portal


indexing

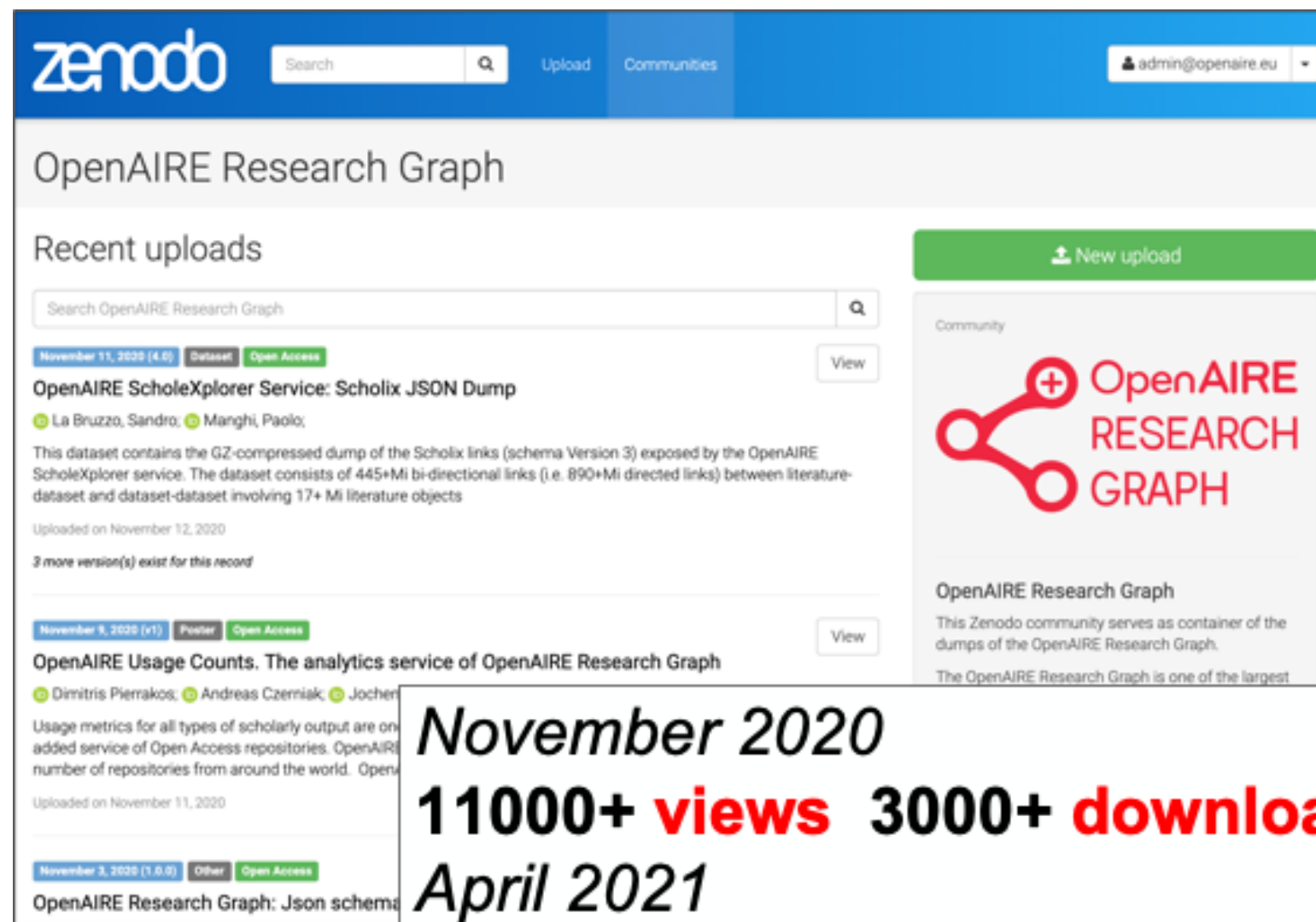
stats analysis

MONITOR

Supporting third-  
parties at building  
added-value  
services

# OpenAIRE Research Graph: Dumps

- OpenAIRE Research Graph
- OpenAIRE COVID-19
- OpenAIRE communities
- DOIBoost
- Scholexplorer 
- **Coming soon:**  
OpenAIRE RDF PID Graph

zenodo Search Upload Communities admin@openaire.eu

## OpenAIRE Research Graph

Recent uploads

Search OpenAIRE Research Graph

November 11, 2020 (4.0) Dataset Open Access View

**OpenAIRE ScholExplorer Service: Scholix JSON Dump**

La Bruzzo, Sandro, Manghi, Paolo

This dataset contains the GZ-compressed dump of the Scholix links (schema Version 3) exposed by the OpenAIRE ScholExplorer service. The dataset consists of 445+Mi bi-directional links (i.e. 890+Mi directed links) between literature-dataset and dataset-dataset involving 17+ Mi literature objects

Uploaded on November 12, 2020

3 more version(s) exist for this record

November 9, 2020 (v1) Preprint Open Access View

**OpenAIRE Usage Counts. The analytics service of OpenAIRE Research Graph**

Dimitris Pierrakos, Andreas Czerniak, Jochen

Usage metrics for all types of scholarly output are one added service of Open Access repositories. OpenAIRE number of repositories from around the world. Open

Uploaded on November 11, 2020

November 3, 2020 (1.0.0) Other Open Access

OpenAIRE Research Graph: Json schema

Community

**OpenAIRE RESEARCH GRAPH**

OpenAIRE Research Graph

This Zenodo community serves as container of the dumps of the OpenAIRE Research Graph.

The OpenAIRE Research Graph is one of the largest

November 2020

**11000+ views 3000+ downloads**

April 2021

**14700+ views 6100+ downloads**

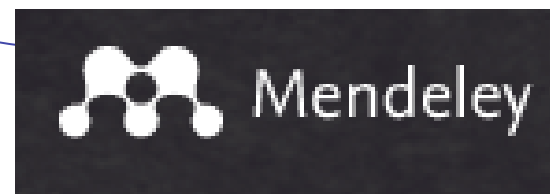
<https://zenodo.org/communities/openaire-research-graph>



# APIs integration with third-party services



The Graph as EOSC Resource Catalogue

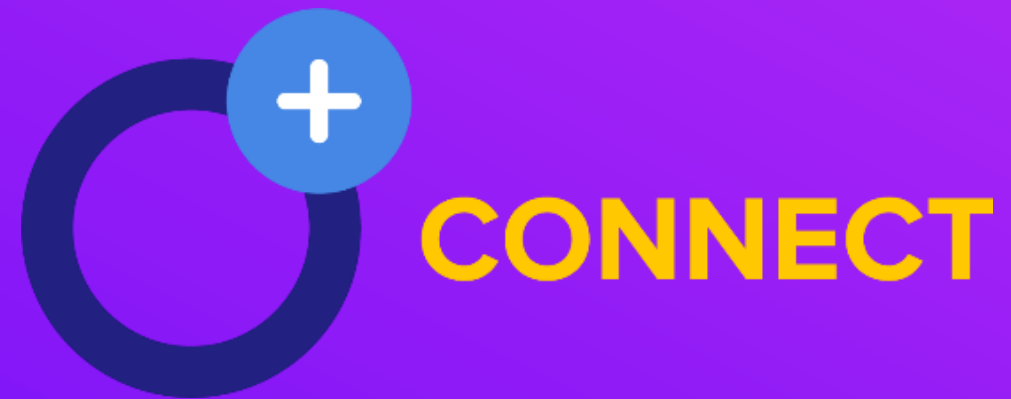


# Takeaway

The OpenAIRE Research Graph is

- An **open metadata** collection of interlinked cross-discipline **scientific products**, with **Open Access information**, linked to **funding information**, **research communities**, and more ...
- The ground on top of which different services in the OpenAIRE portfolio are built
- A resource that can be used to power third-party services

Find more @ <https://graph.openaire.eu>



# Build an Open Research Gateway for your community

OpenAIRE | CONNECT

Build an Open Research Gateway for your community



[connect.openaire.eu](https://connect.openaire.eu)

# Overview of the OpenAIRE Research Community Dashboard

- Delivers **on-demand** Open Research **Gateways** for **research communities**
  - Each gateway offers a “community view” of the OpenAIRE Research Graph and tools to support the implementation of Open Science publishing practices
- **Web portal, community content available via OpenAIRE API and dumps published on Zenodo**
- **Currently serving 11 communities and 9 infrastructures** (some gateways are public, some are private or under configuration)

# An Open Science Toolkit

Scientists of a research community can explore all research products and entities relative to their community in one place

Portal customizable to community needs

Discovery Gateway

Bridging of RIs and OS publishing

Community Customization

Collaborative curation

Statistics and monitoring


# Integrating third-party services

Publication . Article . 2017

## Feature Selection with the R Package MXM: Discovering Statistically Equivalent Feature Subsets

OPEN ACCESS

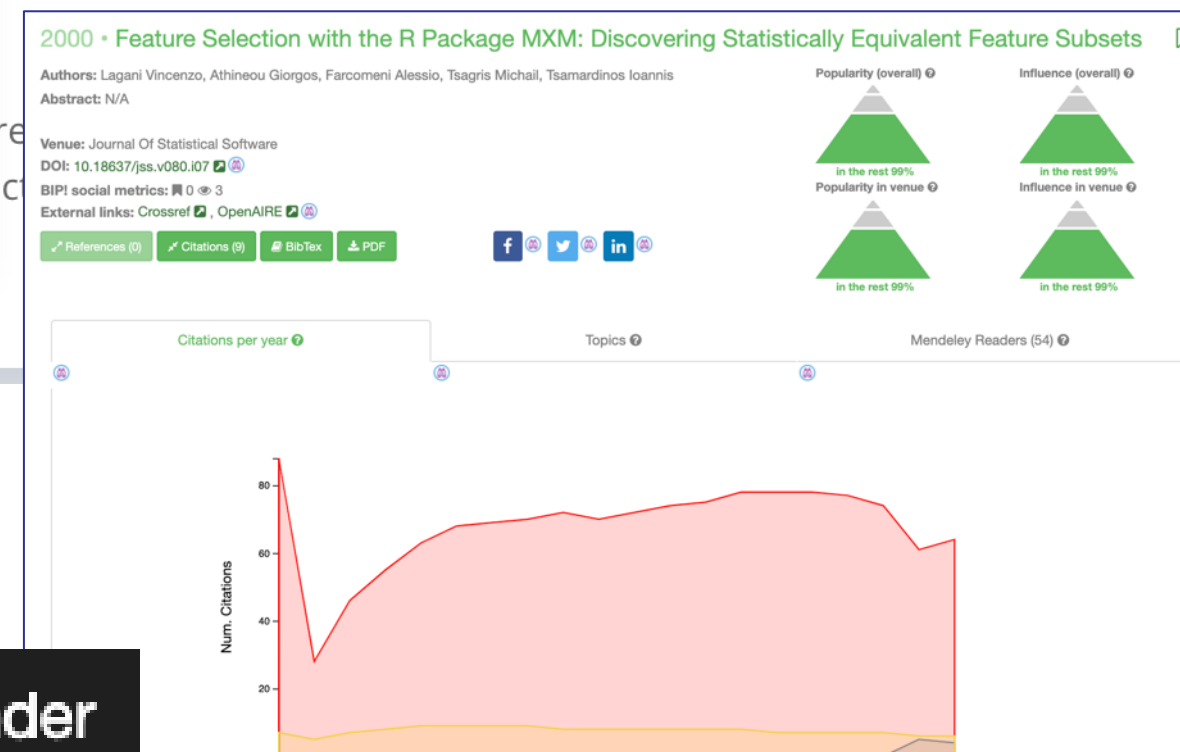
Authors: Michail Tsagris; Vincenzo Lagani; Giorgos Athineou; Alessio Farcomeni; Ioannis Tsamardinos;

 Substantial popularity In top 1%

Popularity: Citation-based measure reflecting the current impact.

[View more details](#)

 Substantial popularity  Average influence



**BIP! Finder**

Integrating impact metrics from BIP!Finder

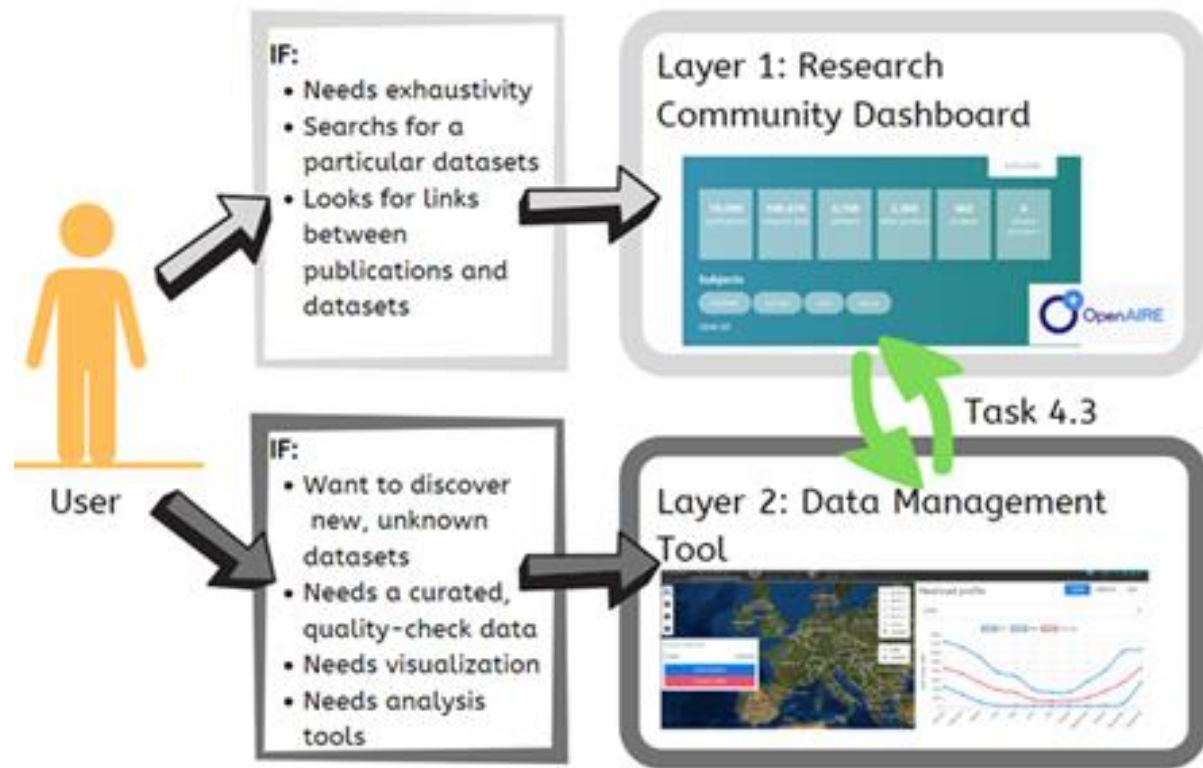
<https://bip.imis.athena-innovation.gr/>



# ENER MAPS

# Remote actionability of datasets

EC H2020 project on Energy research



**Preview**

Summary: PUBLICATIONS 310,771 | RESEARCH DATA 1,072 | SOFTWARE 23 | OTHER RESEARCH 2,366 | **FEATURED DATASETS 6**

**List of datasets available in the Data management Tool**

**Featured Datasets**

**Publication . Report . 2019**  
**Fossil CO2 and GHG emissions of all world countries**  
 OPEN ACCESS | ENGLISH  
 Authors: CRIPPA MONICA; VIGNATI ELISABETTA; OREGGIONI GABRIEL; GUIZZARDI DIEGO; MUNTEAN MARILENA; SCHAAF EDWIN; LO VULLO ELEONORA; SOLAZZO EFISIO; MONFORTI-FERRARIO FABIO; OLIVIER JOS;  
 Publisher: Publications Office of the European Union  
 JRC.C.5-Air and Climate

**Software . Undefined**  
 [no title available]  
 OPEN SOURCE  
 DOI: 10.5281/zenodo.4289229, 10.5281/zenodo.3935766, 10.5281/zenodo.3862722 ...  
 View all 7 Identifiers

**Publication . Report . 2019**  
**Fossil CO2 and GHG emissions of all world countries**  
 CRIPPA MONICA; VIGNATI ELISABETTA; OREGGIONI GABRIEL; GUIZZARDI DIEGO; MUNTEAN MARILENA; SCHAAF EDWIN; LO VULLO ELEONORA; SOLAZZO EFISIO; MONFORTI-FERRARIO FABIO; OLIVIER JOS;  
 OPEN ACCESS | ENGLISH  
 Published: 01 Jan 2019  
 Publisher: Publications Office of the European Union

LINK THIS PUBLICATION TO...  
 CITE THIS PUBLICATION  
 ADD ANNOTATION

**Details Preview**  
 Click to view it in the Enermaps Data Management Tool

**ENERMAPS TOOL**

Visit Enermaps Tool

Work in progress



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Portal customizable to community needs

Research community managers can fine-tune the criteria to include products of the OpenAIRE Research Graph in the Community Gateway

Discovery Gateway

Bridging of RIs and OS publishing

Community Customization

Collaborative curation

Statistics and monitoring



# Community Gateway configuration: identifying products among those in the OpenAIRE Research Graph



Gateway curators

**Keywords**

Discipline-specific subject terms to be found in the metadata

**Projects**

From the 22 funders integrated in OpenAIRE

**Data sources**

E.g. thematic repositories, archives and journals

**Zenodo communities**

With research products relevant for the field

**Organizations**

Organizations in the field: we look for them in the affiliations



Researchers

**Link**

Link products in OpenAIRE, Crossref, Datacite, ORCID to the community, also in bulk

**Propagation**

If a community result is supplemented by another research product, then the latter is also added in the community gateway

**Full-text mining**

Links to projects  
Affiliations  
Document classification  
...



OpenAIRE algorithms

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Discovery Gateway

Bridging of RIs and OS publishing

Support services of research infrastructures (RIs) at depositing research products in Zenodo and make them available via the community gateway.

Community Customization

Collaborative curation

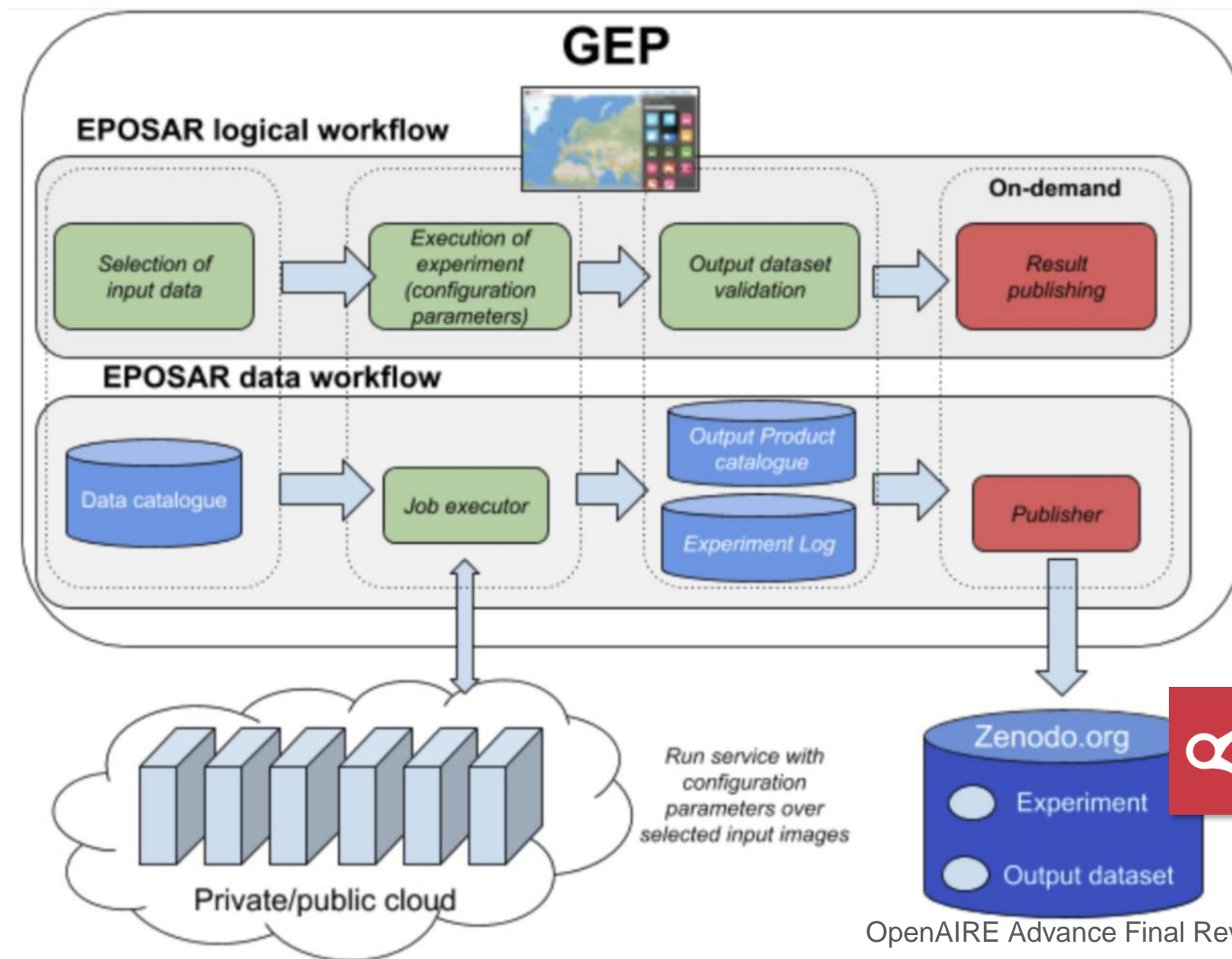
Researchers can add/remove products or links to the graph to improve its quality and send feedbacks

Statistics and monitoring

# Open Science publishing workflows

- EPOS Research Infrastructure

- Reproducibility
- Transparency
- Seamless publishing



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Discovery Gateway

Bridging of RIs and OS publishing

Support services of research infrastructures (RIs) at depositing research products in Zenodo and make them available via the community gateway.

Provide up-to-date information to RI repositories

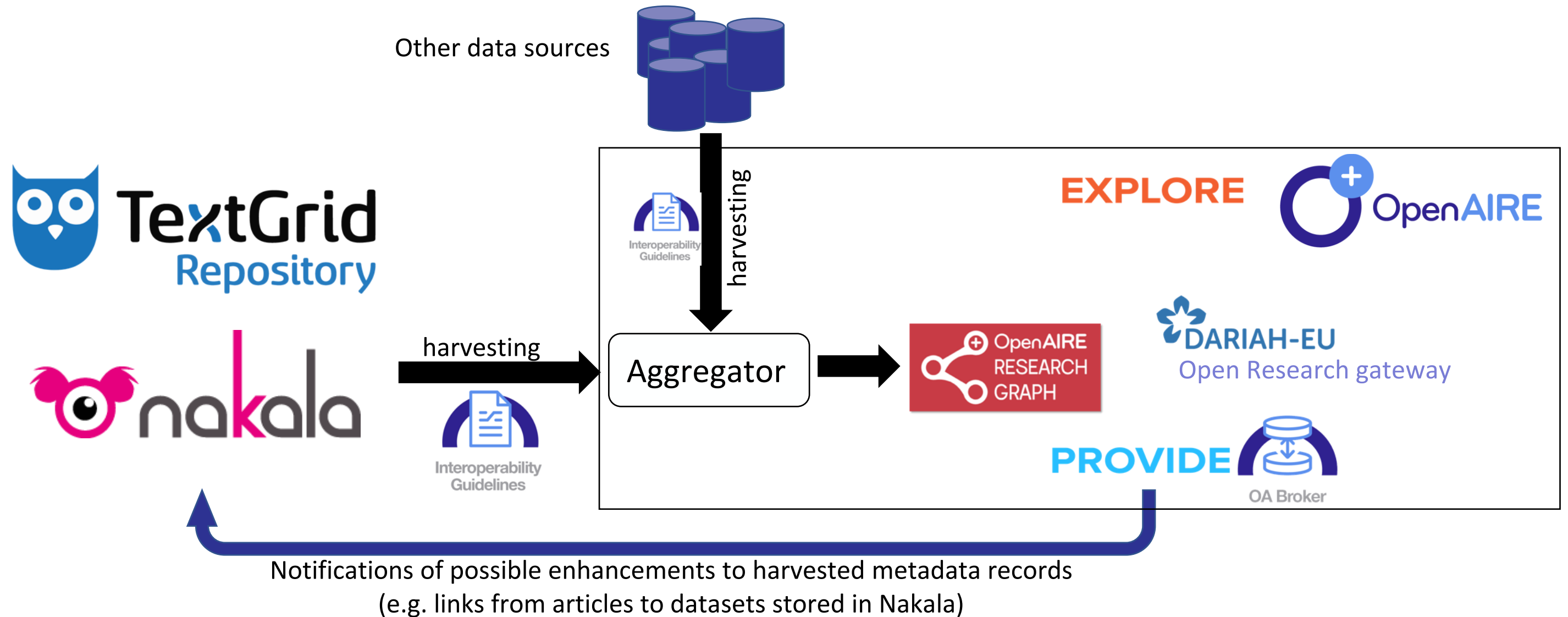
Community Customization

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Researchers can add/remove products or links to the graph to improve its quality and send feedbacks

Statistics and monitoring

# Thematic service notifications



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Researchers can add/remove products or links to the graph to improve its quality and send feedbacks

Statistics and monitoring

Reporting to funders, development of Open Science scientific reward strategies, quality measures

# Build a Gateway for your Community.

Turn Open Science into Practice.  
It takes your open and linked research outcomes.  
A service customized to your needs.

LEARN HOW

<https://connect.openaire.eu>



## Transport Research

Creation Date: 14-10-2019

Welcome to the Open Research Gateway for Transport Research. This gateway is part of the TOPOS Observatory (<https://www.topos-observatory.eu>). The ...



## Agricultural and Food Sciences

Creation Date: 01-03-2018

The scope of this community is to provide access to publications, research data, projects and software that are related to agricultural and food sc...



## Assessing the socio-economic impact of digitalisation in rural areas

Creation Date: 15-07-2020

The scope of this community is to provide access to publications, research data, projects and software for assessing the socio-economic impact of d...



## European Marine Science

Creation Date: 01-03-2018

This community was initially defined to include a very broad range of topics, with the intention to generate a number of more focused and sustainab...



## Fisheries and Aquaculture Management

Creation Date: 01-03-2018

Conservation of marine resources for sustainable development. The Fisheries and Aquaculture community focus on resources (document, data, codes..) ...



## Neuroinformatics

Creation Date: 01-03-2018

The neuroinformatics dashboard gathers research outputs from the 'neuroinformatics' community at large including the fields of: neuroscience, neuro...



## Sustainable Development Solutions Network - Greece

Creation Date: 01-03-2018

The UN Sustainable Development Solutions Network (SDSN) has been operating since 2012 under the auspices of the UN Secretary-General. SDSN mobilize...

# LIVE DEMO



## Corona Virus Disease

Creation Date: 16-03-2020

This portal provides access to publications, research data, projects and software that may be relevant to the Corona Virus Disease (COVID-19). The ...



## Digital Humanities and Cultural Heritage

Creation Date: 01-03-2018

This community gathers research results, data, scientific publications and projects related to the domain of Digital Humanities. This broad definit...



## DARIAH EU

Creation Date: 01-03-2018

The Digital Research Infrastructure for the Arts and Humanities (DARIAH) aims to enhance and support digitally-enabled research and teaching across...



## The Greek National Node of the ESFRI European RI ELIXIR

Creation Date: 01-03-2018

ELIXIR-GR enhances the potential of the Greek bioinformatics community to offer open, easily accessible and state -of- the- art services to the Gre...

# OpenAIRE for COVID-19

Activities to help researchers combat the epidemic and understand its aftermath.

[FIND OUT MORE](#)



# Our efforts

Open Science, as an underlying factor has been proved as the only and essential way forward to share immediately the results for all.

OpenAIRE, in collaboration with the EC, will provide services to help in the sharing, discovery, navigation and collaboration of the global research community.

## Zenodo COVID-19 Community

Together with CERN we have created a specific Community to collect all research results that could be relevant for the scientific community worldwide working on the Coronavirus Disease (COVID-19) and SARS-CoV-2.

*This community is currently curated by the OpenAIRE team.*

[READ MORE →](#)

## OpenAIRE COVID-19 Gateway

OpenAIRE currently develops a service to serve as a single point of entry for research results (publications-data-software) and other useful resources for the Coronavirus Disease (COVID-19) and SARS-CoV-2. It will be linked to Zenodo COVID-19 community as well as many other EU and global initiatives and will address different scientific domains.

*The COVID-19 Gateway is now live*

[READ MORE →](#)

## RDA COVID-19 Fast track Working Group

This Working Group will define detailed guidelines on data sharing and re-use under the present COVID-19 circumstances to help researchers follow best practices to maximize the efficiency of their work. The guidelines will focus on the management of data originating from different data sources and the development of a system for data sharing in public health emergencies that supports scientific research.

*OpenAIRE contributes by helping to deliver guidelines for data sharing*

[READ MORE →](#)



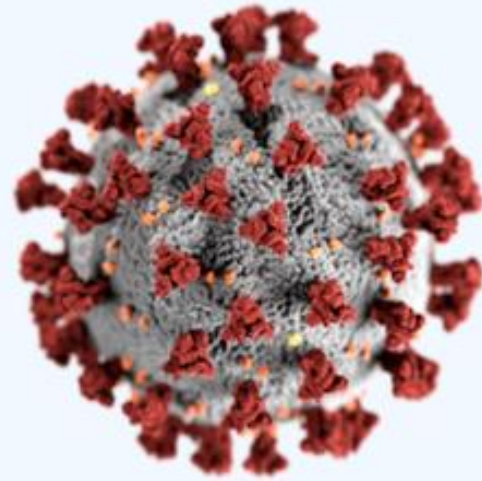
Support fast publishing of **new** research (all types of research products: software, data, publications, etc)



Support **discovery** of existing research (e.g. research products, activities, projects)



Support **data management**: fast should not mean bad!



## Coronavirus Disease Research Community - COVID-19

Browse

New upload

This community collects research outputs that may be relevant to the Coronavirus Disease (COVID-19) or the SARS-CoV-2. Scientists are encouraged to upload their outcome in this collection to facilitate sharing and discovery of information. Although Open Access articles and datasets are...

**Curated by:** Covid19\_Team\_OpenAIRE

<https://zenodo.org/communities/covid-19>

## Coronavirus Disease Research Community - COVID-19

Featured

This community collects research outputs that may be relevant to the Coronavirus Disease (COVID-19) or the SARS-CoV-2. Scientists are encouraged to upload their outcome in this collection to facilitate sharing and discovery of information. Although Open Access articles and datasets are recommended, also closed and restricted access material are accepted. All types of research outputs can be included in this Community (Publication, Poster, Presentation, Dataset, Image, Video/Audio, Software, Lesson, Other).

## Coronavirus Disease Research Community - COVID-19

All versions

Found 984 results.

< 1 2 3 4 5 6 7 8 9 >

Sort by:

Most recent  
asc.

Access Right

- Open (964)
- Restricted (11)
- Closed (9)

File Type

- Pdf (399)
- Zip (300)
- Xlsx (72)
- Csv (53)
- Gz (28)
- Docx (25)
- Png (25)
- Txt (24)
- (22)
- Tar (22)

October 15, 2020 (12-10-20) Software Open Access

### roblanf/sarscov2phylo: 12-10-20

roblanf, Richard Mansfield;

Citation and reuse Please cite this release as: Lanfear, Rob (2020). A global phylogeny of SARS-CoV-2 sequences from GISAID. Zenodo DOI: 10.5281/zenodo.3958883 You can visit that DOI here: If you publish papers that use this tree you must still follow the GISAID data sharing and attribution rules

Uploaded on October 15, 2020

32 more version(s) exist for this record

View

September 29, 2020 (v1) Dataset Open Access

### The scale and dynamics of COVID-19 epidemics across Europe

Dye, Christopher;

The number of COVID-19 deaths reported from European countries has varied more than 100-fold. In terms of coronavirus transmission, the relatively low death rates in some countries could be due to low intrinsic (e.g. low population density) or imposed contact rates (e.g. non-pharmaceutical intervent

Uploaded on October 14, 2020

View

September 30, 2020 (1) Journal article Open Access

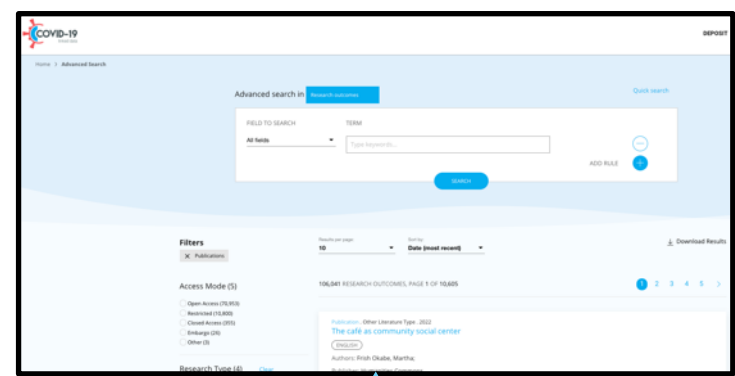
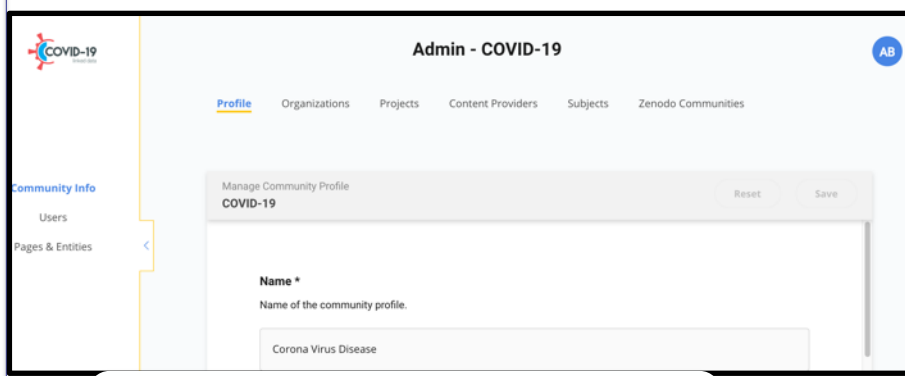
### Home Exercise-associated Accidents During COVID-19 Isolation. A Case Report

View

Research Community Dashboard



Community Gateway



Gateway configuration



Identify research products related to COVID-19

6,818 views | 577 downloads

<https://doi.org/10.5281/zenodo.3980490>

381 views | 178 downloads

<https://doi.org/10.5281/zenodo.4439644>



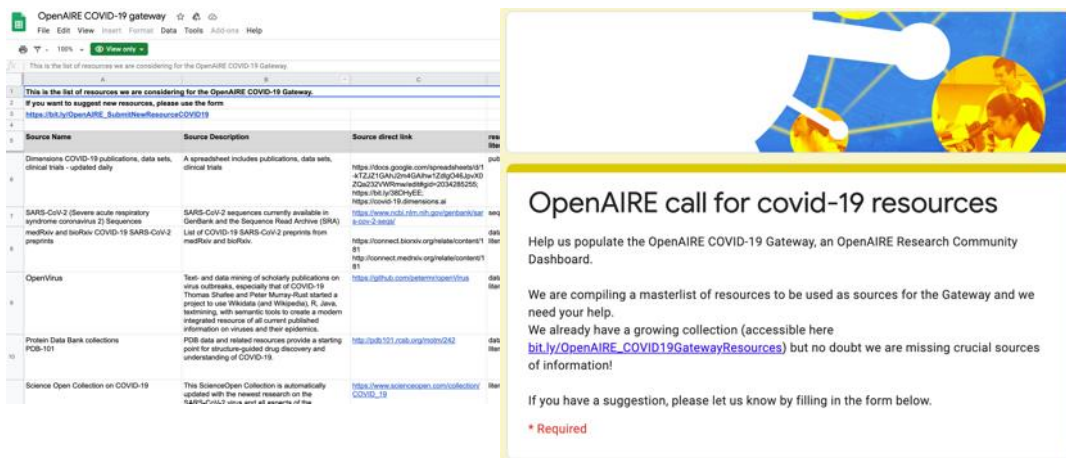
# Our approach

Involve domain experts

Set up of different processes to identify research outcomes

Single entry point

- Call for experts among researchers, librarians, research managers
- Creation of **public list of "data sources"**, updated thanks to **community suggestions via a dedicated form**



The image shows a screenshot of the OpenAIRE COVID-19 Gateway resources list on the left, with columns for Source Name, Source Description, and Source direct link. On the right is a form titled "OpenAIRE call for covid-19 resources" with the following text:

**OpenAIRE call for covid-19 resources**

Help us populate the OpenAIRE COVID-19 Gateway, an OpenAIRE Research Community Dashboard.

We are compiling a masterlist of resources to be used as sources for the Gateway and we need your help.

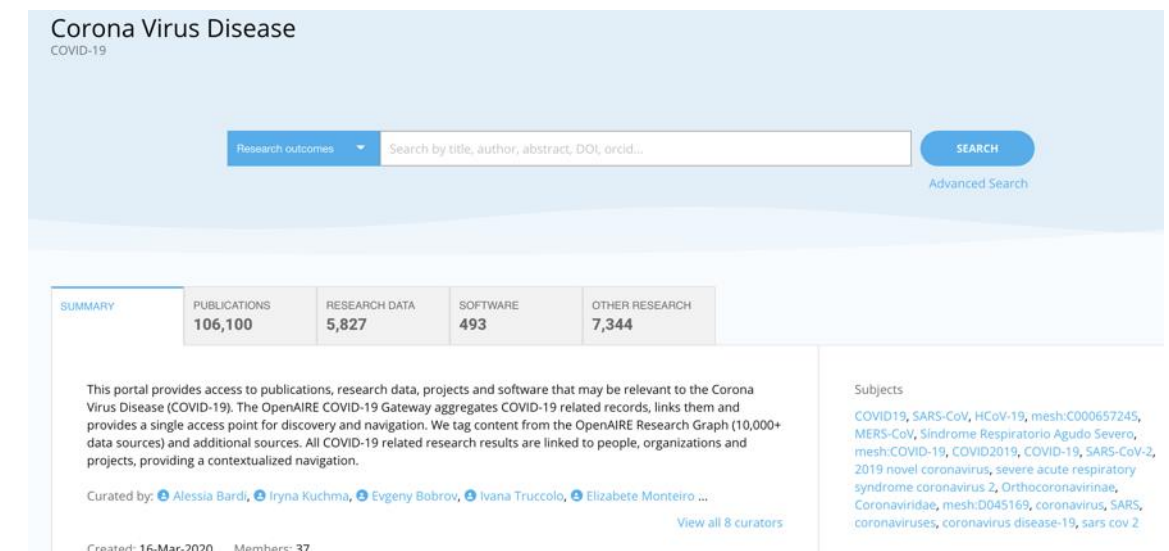
We already have a growing collection (accessible here [bit.ly/OpenAIRE\\_COVID19GatewayResources](https://bit.ly/OpenAIRE_COVID19GatewayResources)) but no doubt we are missing crucial sources of information!

If you have a suggestion, please let us know by filling in the form below.

\* Required

- Extensive set of keywords (free text and from subject classification schemes)
- Full-text mining
- Analysis of the OpenAIRE Research Graph and exploiting the links between publications, datasets, and funding projects
- Manual addition of research outcomes (with a DOI)

<https://covid-19.openaire.eu/>



The image shows the OpenAIRE COVID-19 Gateway interface. At the top, it says "Corona Virus Disease COVID-19". Below that is a search bar with a dropdown menu for "Research outcomes" and a search button. The search bar contains the text "Search by title, author, abstract, DOI, orcid...". Below the search bar is a table with the following data:

SUMMARY	PUBLICATIONS	RESEARCH DATA	SOFTWARE	OTHER RESEARCH
	106,100	5,827	493	7,344

Below the table is a description of the portal: "This portal provides access to publications, research data, projects and software that may be relevant to the Corona Virus Disease (COVID-19). The OpenAIRE COVID-19 Gateway aggregates COVID-19 related records, links them and provides a single access point for discovery and navigation. We tag content from the OpenAIRE Research Graph (10,000+ data sources) and additional sources. All COVID-19 related research results are linked to people, organizations and projects, providing a contextualized navigation."

Curated by: Alessia Bardi, Iryna Kuchma, Evgeny Bobrov, Ivana Truccolo, Elizabete Monteiro ...

View all 8 curators

Created: 16-Mar-2020 Members: 37

Subjects: COVID-19, SARS-CoV, HCoV-19, mesh:C000657245, NERS-CoV, Síndrome Respiratorio Agudo Severo, mesh:COVID-19, COVID2019, COVID-19, SARS-CoV-2, 2019 novel coronavirus, severe acute respiratory syndrome coronavirus 2, Orthocoronavirinae, Coronaviridae, mesh:D045169, coronavirus, SARS, coronaviruses, coronavirus disease-19, sars cov 2

# Useful links

- Everything about OpenAIRE for COVID-19: <https://www.openaire.eu/openaire-activities-for-covid-19>
- The COVID-19 Zenodo community: <https://zenodo.org/communities/covid-19>
- Everything about the OpenAIRE Research Graph <https://graph.openaire.eu>

LET'S DEMO!

The OpenAIRE COVID-19 Gateway:  
<https://covid-19.openaire.eu>

# Thank you!

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