Portfolio **MONITOR**

Brief presentation of the five OpenAIRE services that allow funders, institutions and research communities to monitor their research results and particularly their open science practices.

OpenAIRE Research Graph, Claudio Atzori (CNR-ISTI)

Service: **MONITOR Dashboard**, Ioanna Grypari (Athena RC)

Service: **Scholexplorer**, Sandro La Bruzzo (CNR-ISTI)

Service: **OpenCitations**, Silvio Peroni (University of Bologna)

Service: **OpenAPC**, Jochen Schirrwagen (University of Bielefeld)

Service: **UsageCounts**, Dimitris Pierrakos (Athena RC)

Claudio Atzori
Institute for Information Science and Technologies "Alessandro Faedo" – National Research Council (ISTI-CNR)

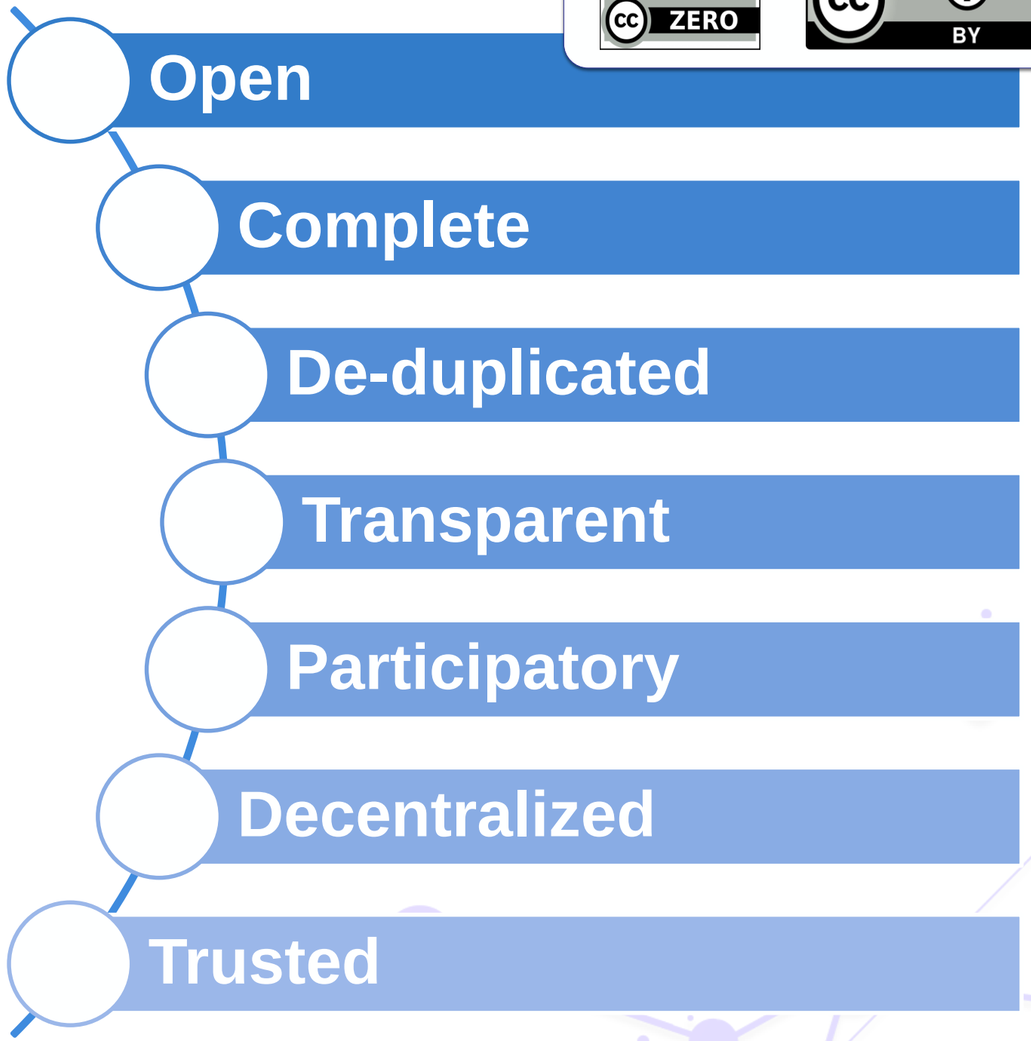
OpenAIRE ResearchGraph

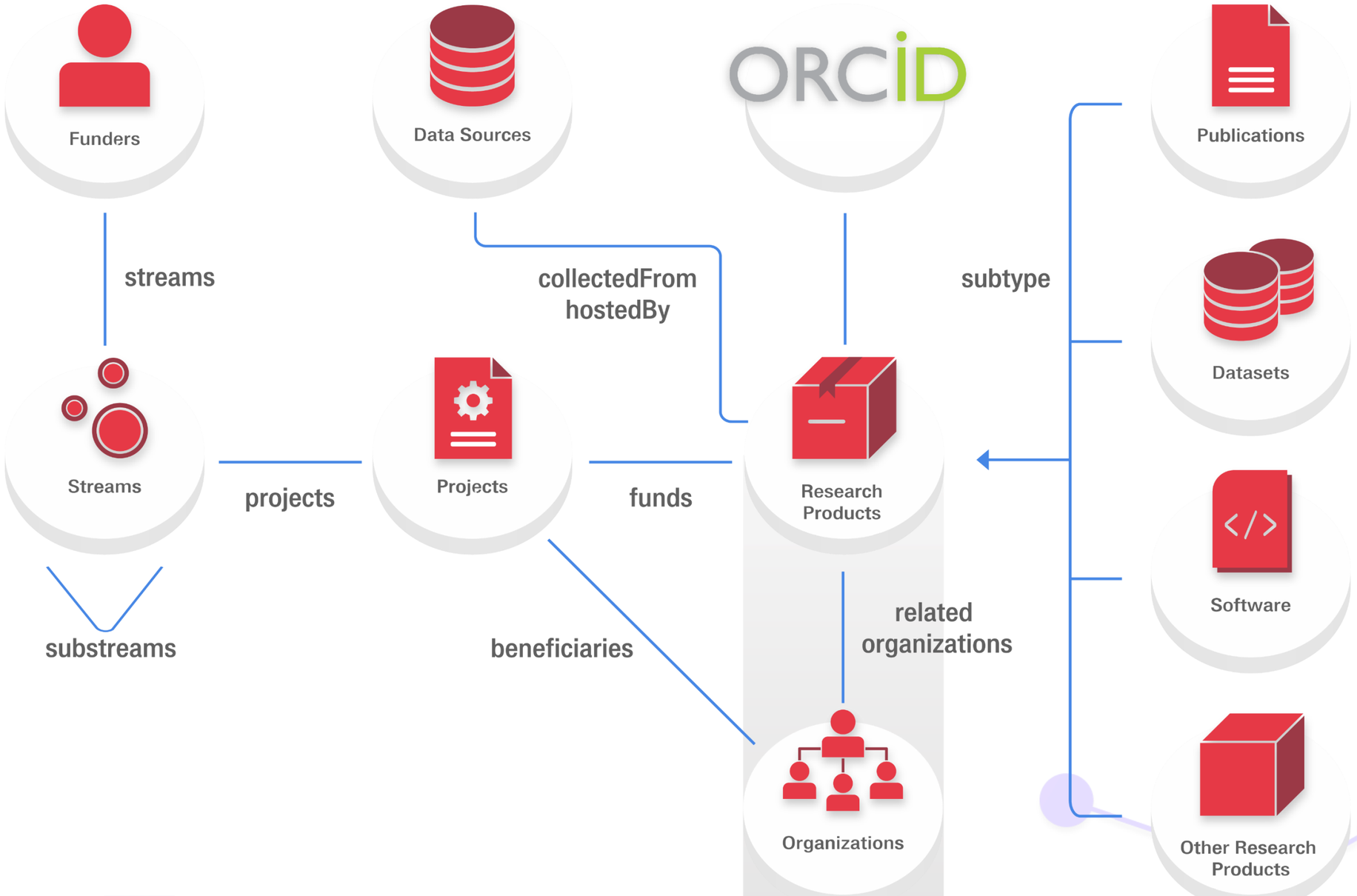
Putting research into context, making the connections

Overview of the OpenAIRE Research Graph

OpenAIRE ResearchGraph

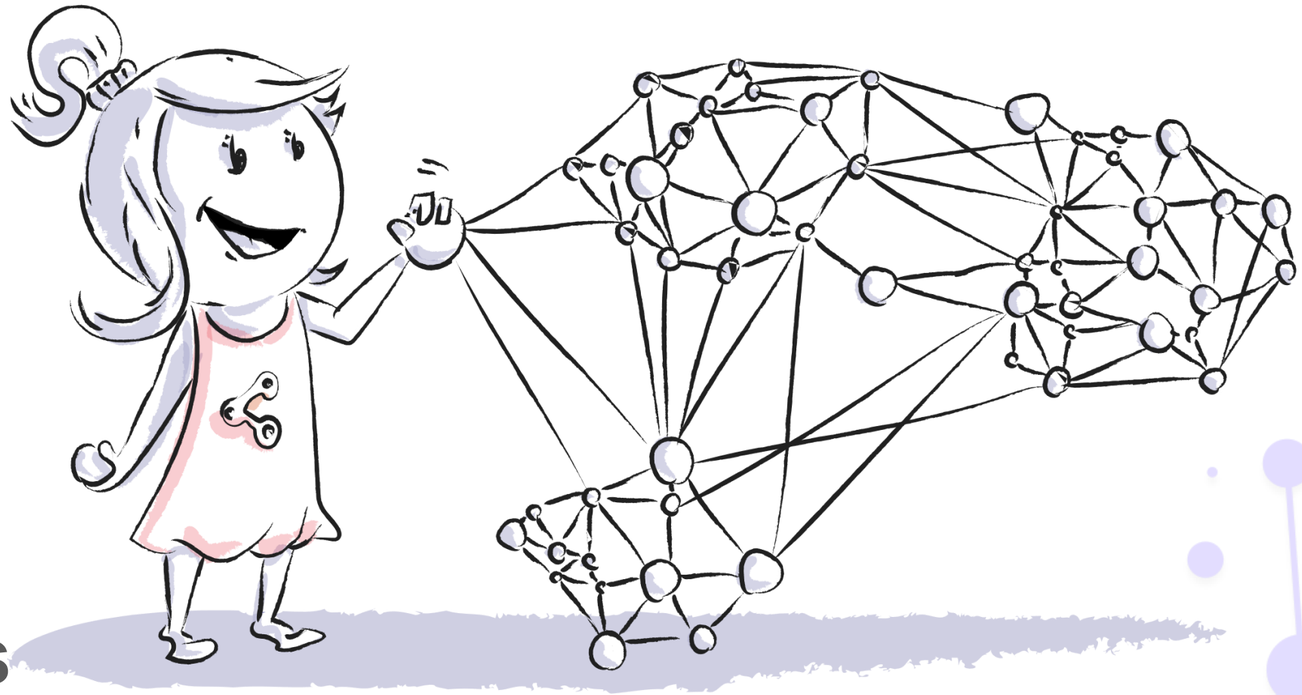
"A collection of metadata describing **objects** in the research lifecycle and **relationships** among them"




Funders
Data Sources
ORCID
Publications
streams
collectedFrom
hostedBy
subtype
Datasets
Streams
projects
Projects
funds
Research
Products
Software
substreams
beneficiaries
related
organizations
Organizations
Other Research
Products

OpenAIRE Research Graph in numbers

- **23** funders
- **78k** content providers
- **3Mi** projects
- **123Mi** publications
- **216k** software
- **14Mi** research data
- **8Mi** other research products



Why to use OpenAIRE Research Graph

Reproduciblity and transparency require tracking of all outcomes of science and related ”context”

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

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

OpenAIRE Research Graph by whom

The OpenAIRE Research Graph is used by:

- content providers, publishers, funders, institutions, research infrastructures, policy makers, industry, researchers, data scientists

How to use OpenAIRE Research Graph

Programmatic access to the Graph

- through **api.openaire.eu**
- as data dumps on **Zenodo**
  - Funded products
  - RI & RC related products
  - COVID-19 related products
  - Scholix links from ScholExplorer
  - Linked Open Data
  - Complete Graph (incl. products, data sources, organizations, projects)

OpenAIRE | DEVELOP

The OpenAIRE APIs allow developers to access the metadata information space of OpenAIRE programmatically.

If you have any question, please open a ticket to the OpenAIRE Helpdesk.

New!

Broker

Documentation

Swagger

Bulk access

OpenAIRE Research Graph Dumps

OAI-PMH

Bulk access to projects

Selective access

Publications

Research data

Software

Other Research Products

Projects

Linked Open Data

Documentation

OpenAIRE LOD Ontology

OpenAIRE RDF dump

SPARQL endpoint

November 19, 2020

Dataset Open Access

OpenAIRE Research Graph Dump

Manghi, Paolo; Atzori, Claudio; Bardi, Alessia; Baglioni, Miriam; Schirrwagen, Jochen; Dimitropoulos, Harry; La Bruzzo, Sandro; Foufoulas, Ioannis; Löhden, Aenne; Bäcker, Amelie; Mannocci, Andrea; Horst, Marek; Jacewicz, Przemyslaw; Czerniak, Andreas; Kiatropoulou, Katerina; Kokogiannaki, Argiro; De Bonis, Michele; Artini, Michele; Ottonello, Enrico; Lempesis, Antonis; Ioannidis, Alexandros; Manola, Natalia; Principe, Pedro

The OpenAIRE Research Graph is exported as several dumps, so you can download the parts you are interested into.

publication_[part].tar: metadata records about research literature (includes types of publications listed here)
dataset.tar: metadata records about research data (includes the subtypes listed here)
software.tar: metadata records about research software (includes the subtypes listed here)
otherresearchproduct.tar: metadata records about research products that cannot be classified as research literature, data or software (includes types of products listed here)
organization.tar: metadata records about organizations involved in the research life-cycle, such as universities, research organizations, funders., datasource.tar: metadata records about providers whose content is available in the OpenAIRE Research Graph. They includes institutional and thematic repositories, journals, aggregators, funders' databases.
project.tar: metadata records about projects funded by a given funder.
relation_[part].tar: metadata records about relations between entities in the graph.
communities_infrastructures.tar: metadata records about research communities and research infrastructures

Each file is a tar archive containing gz files, each with one json per line. Each json is compliant to the schema available at 10.5281/zenodo.4238939. Learn more about the OpenAIRE Research Graph at https://graph.openaire.eu.

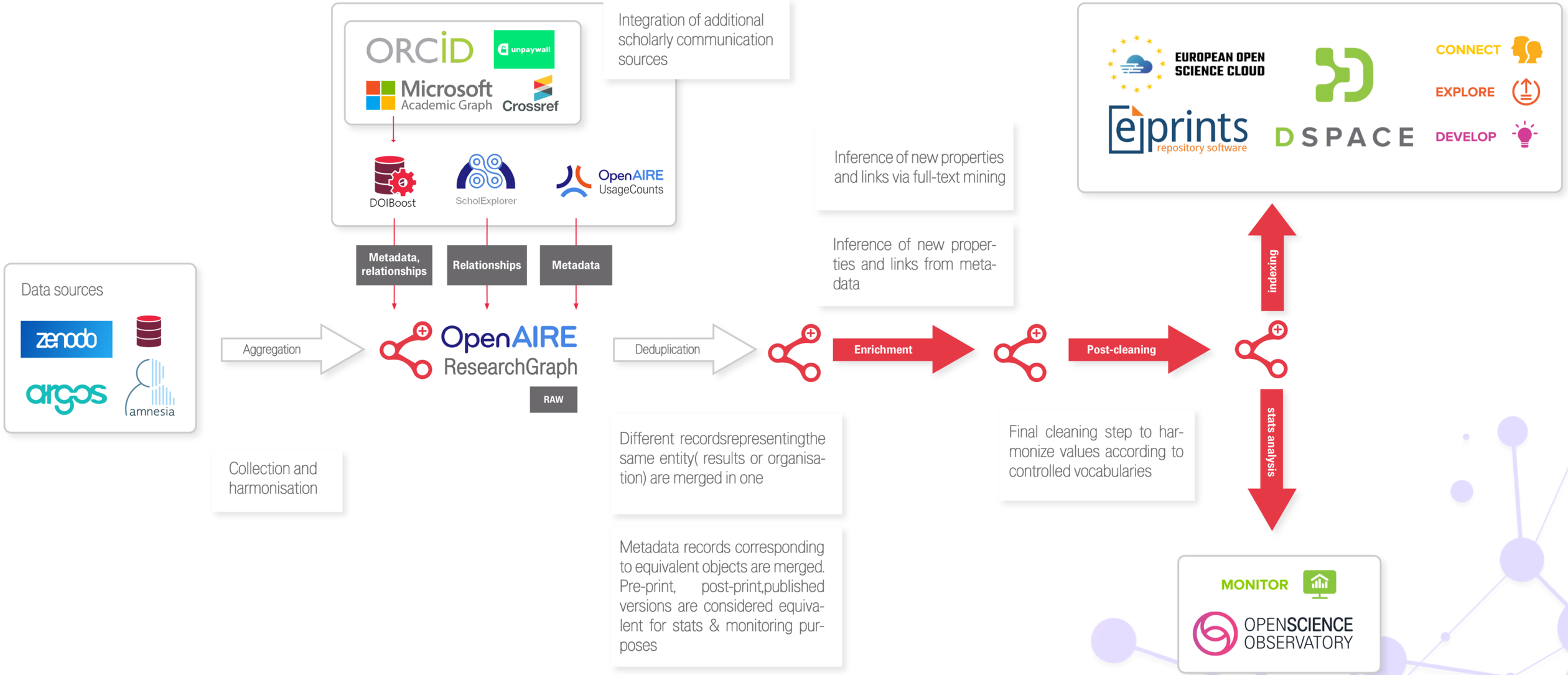
Files (121.4 GB)

Name	Size	
communities_infrastructures.tar md5:294ef84da91511c6752495d2b3e47728	8.7 kB	Download
dataset_1.tar md5:f8902b342331699d8af7bb85980404d0	8.7 GB	Download

Indexed in OpenAIRE

Publication date:
November 19, 2020
DOI:
DOI 10.5281/zenodo.4279381
Keyword(s):
Open Science Scholarly Communication Information Science
Grants:
European Commission:
- OpenAIRE-Advance - OpenAIRE Advancing Open Scholarship (777541)
- BE OPEN - European forum and oBsErvatory for OPEN science in transport (824323)
- RISIS 2 - European Research Infrastructure for Science, technology and Innovation policy Studies 2 (824091)

Positioning in EOSC & OpenAIRE Ecosystem


ORCID
unpaywall
Microsoft Academic Graph
Crossref
DOIBoost
ScholExplorer
OpenAIRE UsageCounts
Integration of additional scholarly communication sources
Metadata, relationships
Relationships
Metadata
Data sources
zenodo
argos
amnesia
Aggregation
OpenAIRE ResearchGraph
RAW
Collection and harmonisation
Deduplication
Different recordsrepresentingthe 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
Post-cleaning
Final cleaning step to harmonize values according to controlled vocabularies
indexing
stats analysis
EUROPEAN OPEN SCIENCE CLOUD
CONNECT
EXPLORE
DEVELOP
eprints repository software
DSPACE
MONITOR
OPENSCIENCE OBSERVATORY

USAGE ANALYTICS

Make your content count

provide.openaire.eu

OpenAIRE | MONITOR

Simplify research tracking & monitoring

monitor.openaire.eu

ScholeXplorer

Interlinking data and publications

scholexplorer.openaire.eu

OA BROKER

Routing information across content providers

provide.openaire.eu

OpenAIRE | CONNECT

Build an Open Research Gateway for your community

connect.openaire.eu

OpenAIRE ResearchGraph

amnesia

Anonymize your datasets

amnesia.openaire.eu

zenodo

a catch-all-repository

www.zenodo.org

argos

Plan and follow your data

openaire.eu/argos

OpenAIRE | EXPLORE

Discover and share research

explore.openaire.eu

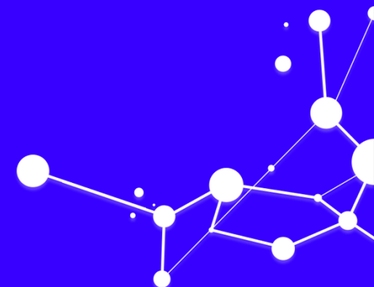
OpenAIRE | DEVELOP

APIs to access the OpenAIRE Research Graph

develop.openaire.eu

OpenAIRE | NEXUS

Take away



Takeaway

The OpenAIRE Research Graph is

- an **open metadata** collection of interlinked **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
- find more @ **https://graph.openaire.eu**

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#OpenAIRE-Nexus

THANK YOU

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OpenAIRE

Ioanna Grypari
ATHENA Research Center

MONITOR

Tailor-made monitoring and impact assessment of research activities

Overview of OpenAIRE MONITOR

A monitoring tool where stakeholders can

- **create** their own customizable monitoring dashboard
  - to **track** research activities (e.g. projects) and their **impact (across multiple dimensions)**, or
- **view** the (public) dashboards of other stakeholders

monitoring **policy-making** **story-telling**

reporting **analysis**

Why to use OpenAIRE MONITOR

A highly **customizable**, **user-friendly** monitoring tool that allows you to

- select **well-documented, timely, reliable** indicators based on the OpenAIRE ResearchGraph
  - with **downloadable** data and visualizations
- invite **team-members** to view or edit your dashboard
- separate
  - **private indicators** for internal monitoring
  - **public indicators** for external stakeholders
- browse, download and compare indicators of **other stakeholders**

stakeholders

funders

policy-makers

research administrators

institutions

How to use OpenAIRE MONITOR

0. Starting from the OpenAIRE RESEARCH GRAPH

1. Provide us some information

2. We get the ball rolling

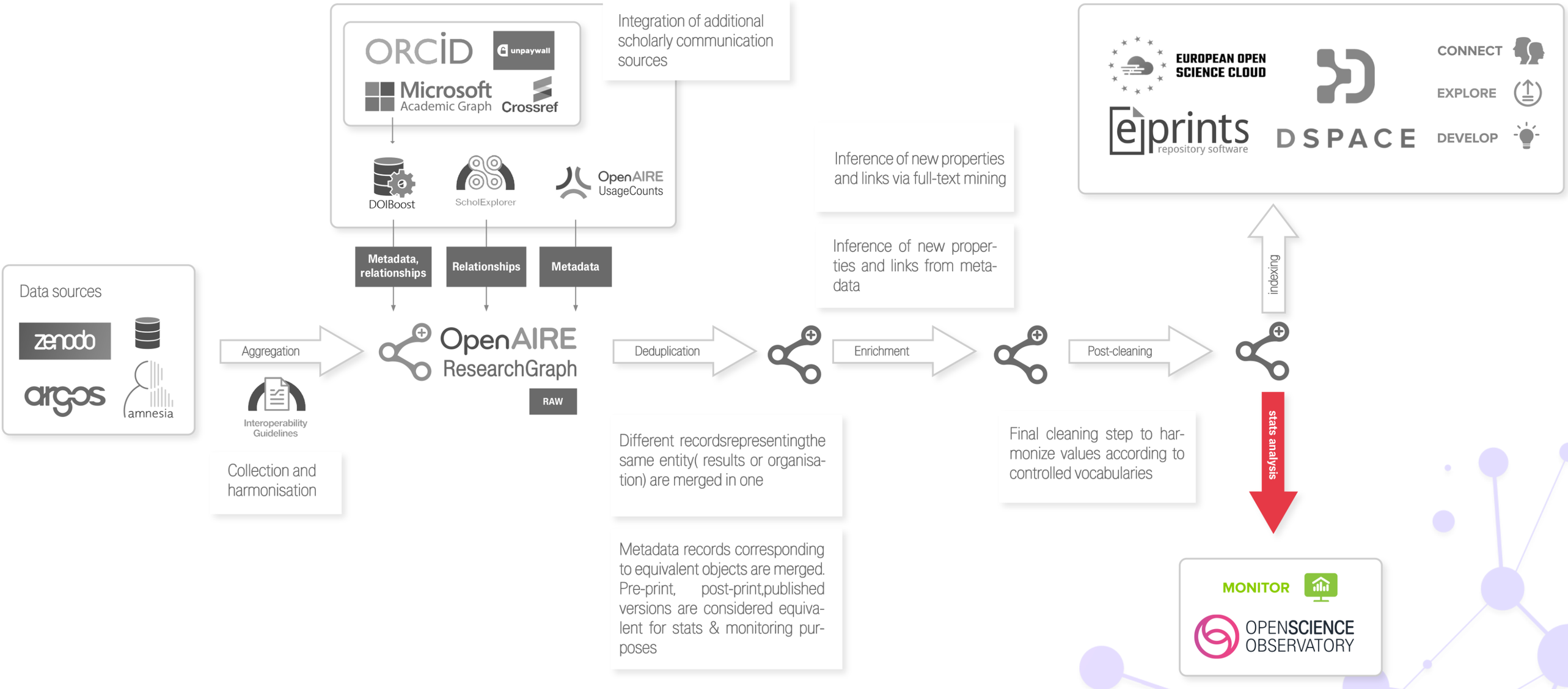
3. You validate

4. You set up your portal

5. You track, monitor, report

Visit: monitor.openaire.eu

Positioning in EOSC & OpenAIRE Ecosystem



Source: graph.openaire.eu

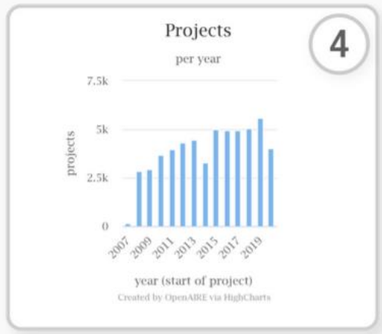
STARTING from existing research-related data sources

we

and

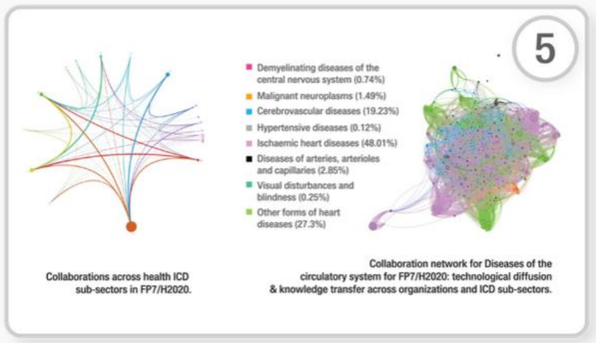
build an open, global and trusted Research graph

on which



we perform **STATISTICAL ANALYSIS** and produce Open Science Indicators

and

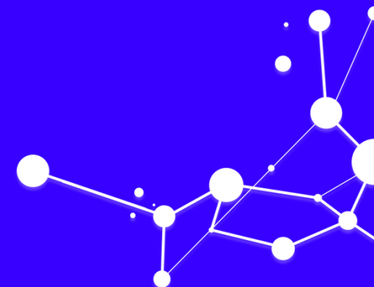


furthermore **NETWORK ANALYSIS** producing Collaboration Indicators

We

Often combine with external data (patents, social, company) and perform **IMPACT ANALYSIS** to produce Innovation Indicators

Take away



Takeaway

OpenAIRE MONITOR

A tailor-made monitoring dashboard, for impact assessment of research activities

monitor.openaire.eu

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"Alessandro Faedo" – National Research Council (ISTI-CNR)

ScholeXplorer
The Data Literature Interlinking Service

The Data Literature Interlinking Service

What is Scholexplorer

- A service that provides access to a graph of **links** between datasets and literature objects
- Link metadata is harvested from scholarly communication data sources, to be **resolved**, **harmonised**, and **de-duplicated**
- Links are exported using the standard **Scholix.org**
- The service is accessible via Rest API, **free at the point of use**

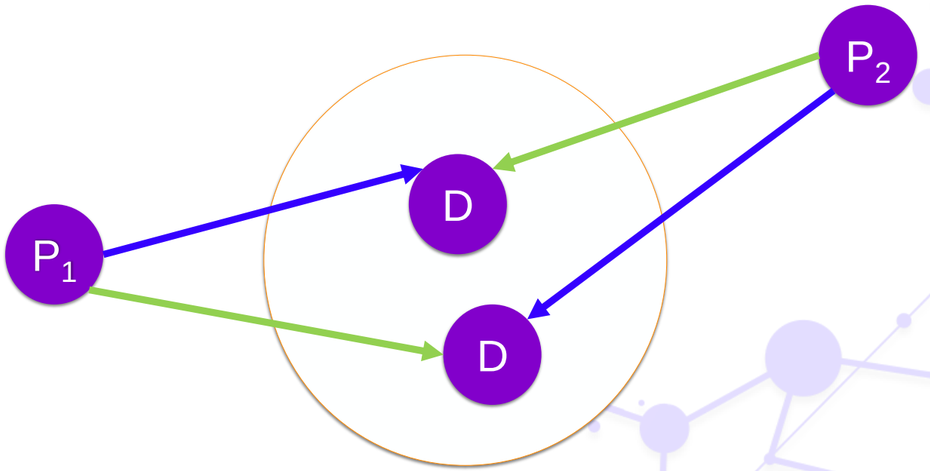
Why use Scholexplorer

Problem: Linking Research Data with the Literature is of great value, yet current solutions are not realizing the potential

- Many non-interoperable sources (publishers, data centers, repositories, infrastructure providers, …)
- Heterogeneity of practices, for example:
  - Different PID systems (DOI, accession numbers)
  - Different ways of referencing data (formal citations, in-text references, etc.)
  - Different moments of citing data (at publication, post publication, etc.)

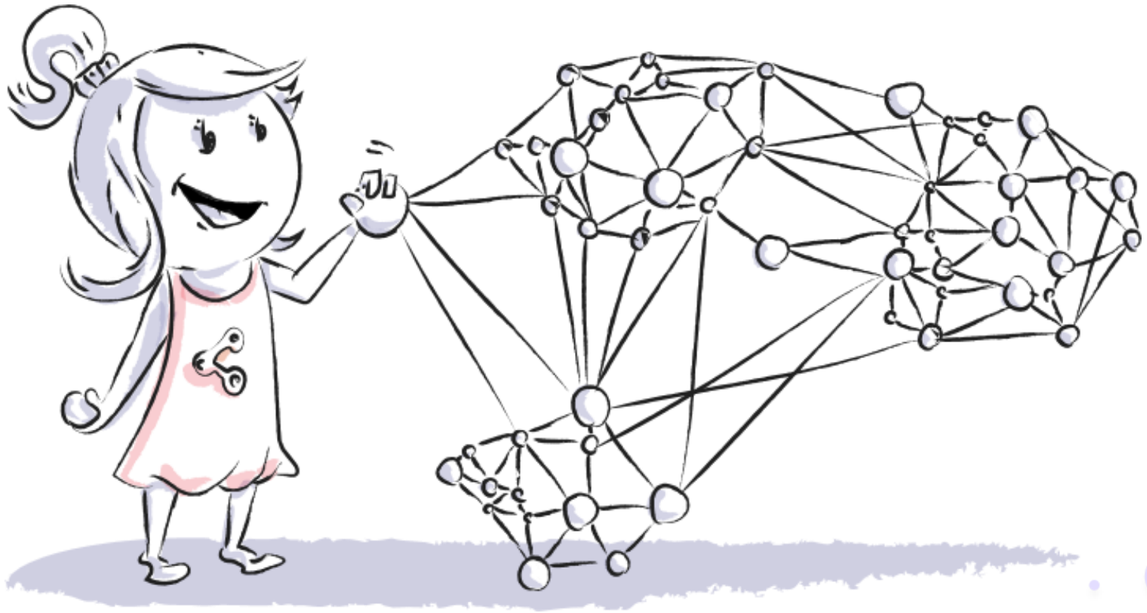
Who is it for

- **Scholarly Communication Data sources to**
  - Share links with any consumer
  - Link their objects to others by induction (i.e., via links made available by other data sources)
- **Clients (3rd services) to resolve on the fly PIDs to identify related research products, counting on**
  - Resolution persistent identifier in extracted links
  - De-duplication of objects



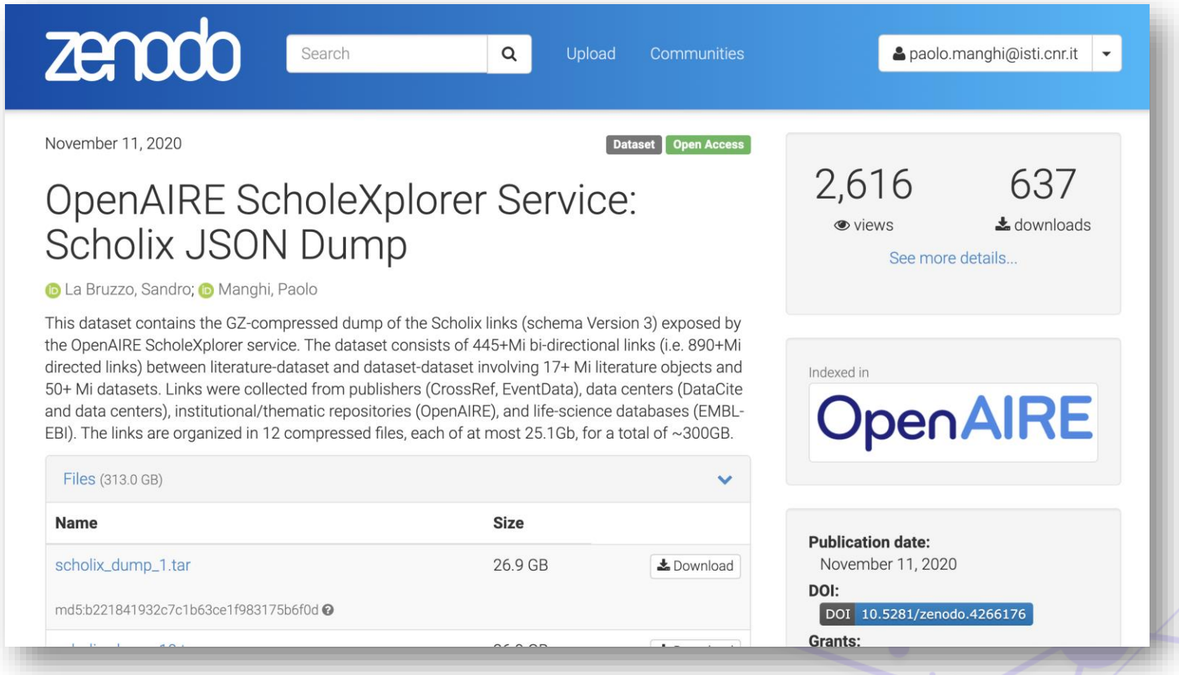
Some numbers

- **22** Data sources
- **55M** Datasets
- **37M** Publications
- **900M** Scholix relationships



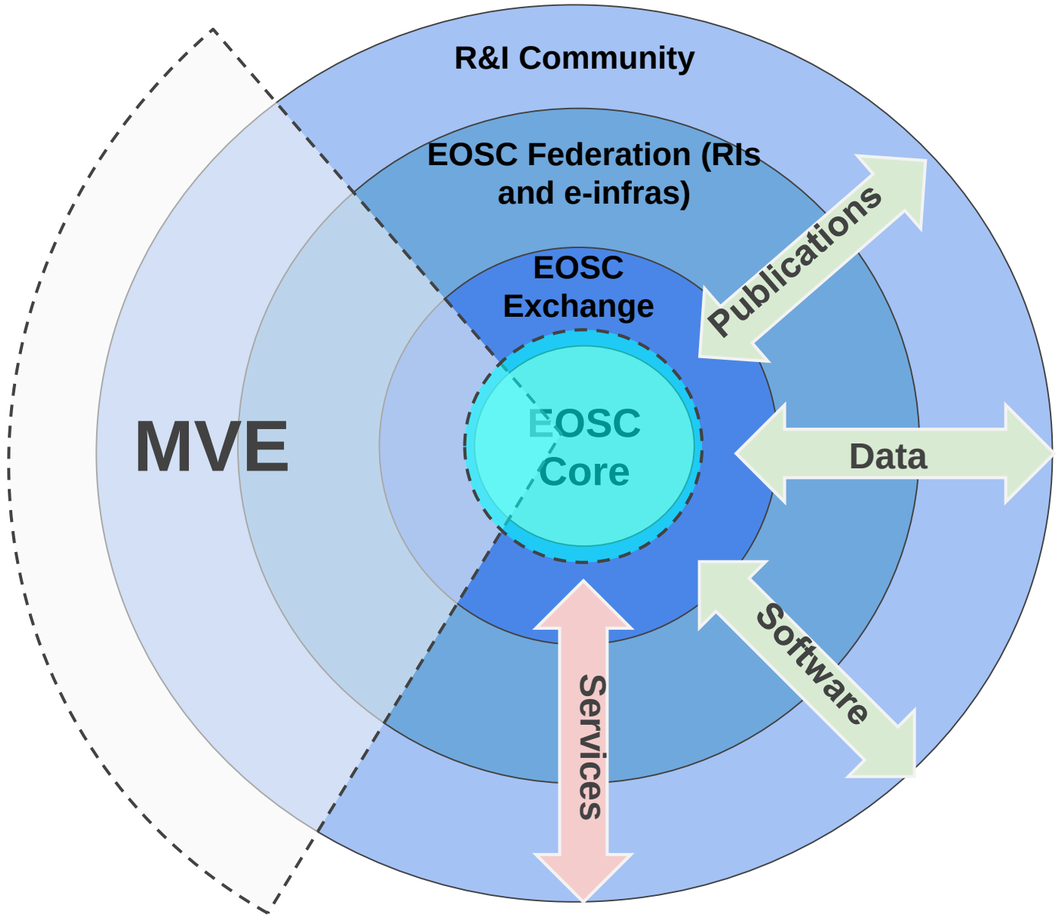
How to use Scholexplorer

- Through api.scholexplorer.openaire.eu
  - 10M requests per day
- As data **dumps** on Zenodo



Positioning in EOSC & OpenAIRE Ecosystem

“Horizontal” services in EOSC-Exchange



EOSC-Core resource catalogue

OpenAIRE ResearchGraph

Scholexplorer

Interlinking data and publications

scholexplorer.openaire.eu

Exchange: scholarly comm service

OpenAIRE NEXUS

Takeaway

- Interoperability via Scholix framework
- An **open metadata** collection of links between datasets and literature objects and datasets and datasets object
  - Beyond DOIs

- **More information @ http://scholexplorer.openaire.eu**

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#OpenAIRE-Nexus

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OpenAIRE

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University of Bologna

OpenCitations

Providing access to scholarly bibliographic and citation data

Overview of OpenCitations

- **OpenCitations** (http://opencitations.net) **is an infrastructure organization dedicated to the publication of open bibliographic and citation data using Semantic Web (Linked Data) technologies**
- **It offers free and open Web-based services** (REST APIs, SPARQL endpoints, visual interfaces) **to gather global scholarly citation data, that can be also downloaded in bulk in several formats**
- **In 2020, there were more than 23,100,000 requests to the REST API** (average: ~ **1,925,000 accesses per month**)

Why to use OpenCitations by whom

- It enables more **transparent** and **reproducible** national and international research evaluation exercises, **saves thousands euros** to **institutions** for commercial access to their own scholarly data, and **reuse citation data for any purpose** (CC0 waiver)
- Adds value to EOSC users by enabling the development of tools to monitor research and to improve the discoverability of research products
- OpenCitations exposes its citations in several format and currently contains more than **759 million citations** (growing)
- Aiming at helping authors, researchers, students, institutional administrators, librarians, funders, research managers, data repositories, publishers

How to use OpenCitations

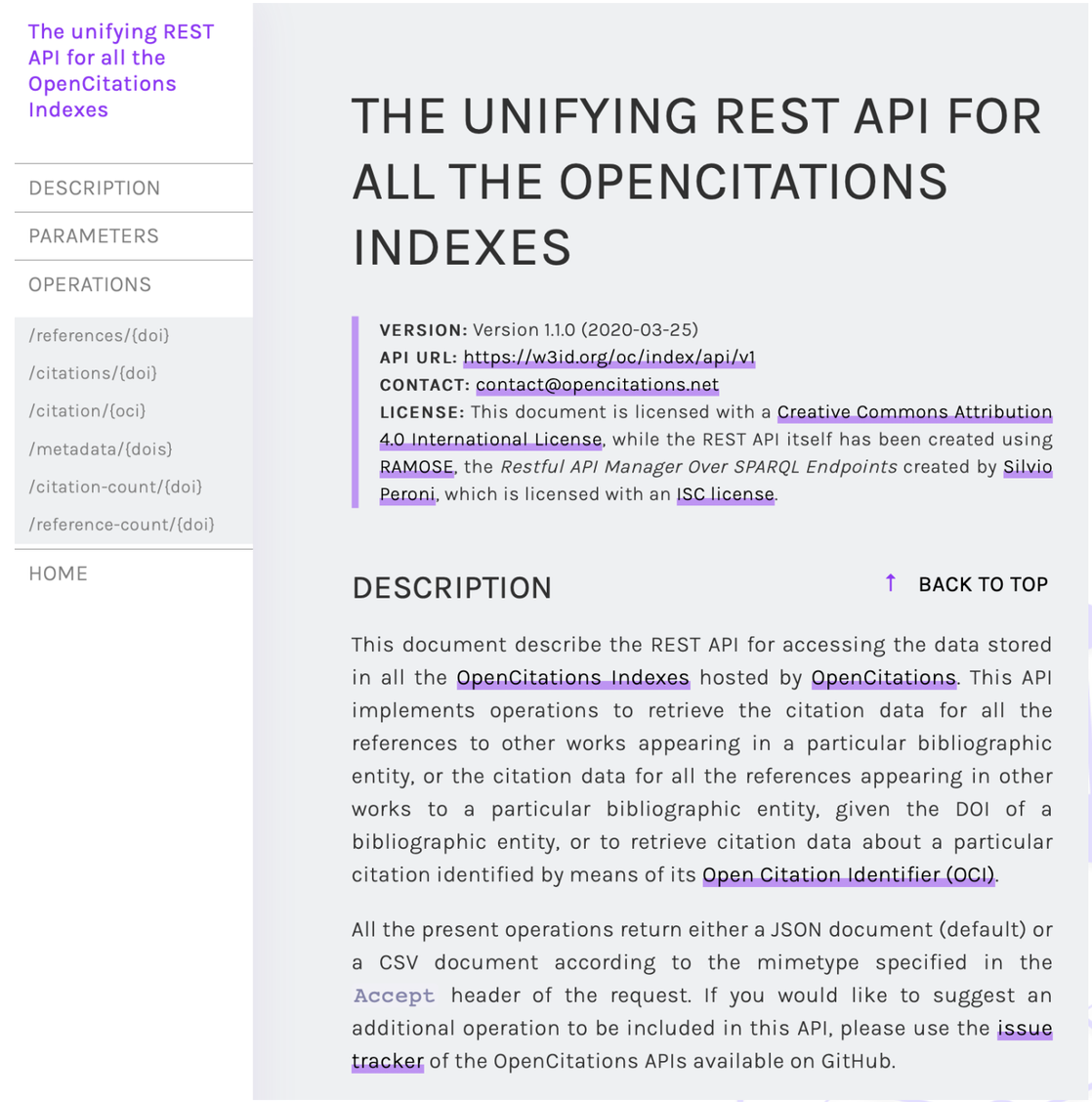
- **Querying the data** (http://opencitations.net/querying)
  - REST APIs (e.g. http://opencitations.net/index/api/v1)
  - SPARQL endpoints (e.g. http://opencitations.net/index/sparql)
  - Search and browse interfaces (e.g. http://opencitations.net/index/search)
- **Download dumps** (http://opencitations.net/download) available in CSV, RDF, and Scholix

How to use the REST APIs

Example:

get all the **citations received**
by the article identified
by the
DOI «10.1162/qss_a_00023» and
sort them starting from
the **most recent one**

http://opencitations.net/index/api/v1/citations/10.1162/qss_a_00023?sort=desc(creation)



How to use the SPARQL endpoints

Example:

get all the **DOIs** that
are **co-cited** with
the article identified by the
DOI «10.1162/qss_a_00023»

OpenCitations Indexes SPARQL endpoint

```
1  PREFIX cito: <http://purl.org/spar/cito/>
2  SELECT DISTINCT ?cocited WHERE {
3    <http://dx.doi.org/10.1162/qss_a_00023> ^cito:hasCitedEntity/cito:hasCitingEntity ?citing .
4    ?citing ^cito:hasCitingEntity/cito:hasCitedEntity ?cocited .
5    FILTER (?cocited != <http://dx.doi.org/10.1162/qss_a_00023>)
6  }
```

Raw Response | Table | Pivot Table | Google Chart

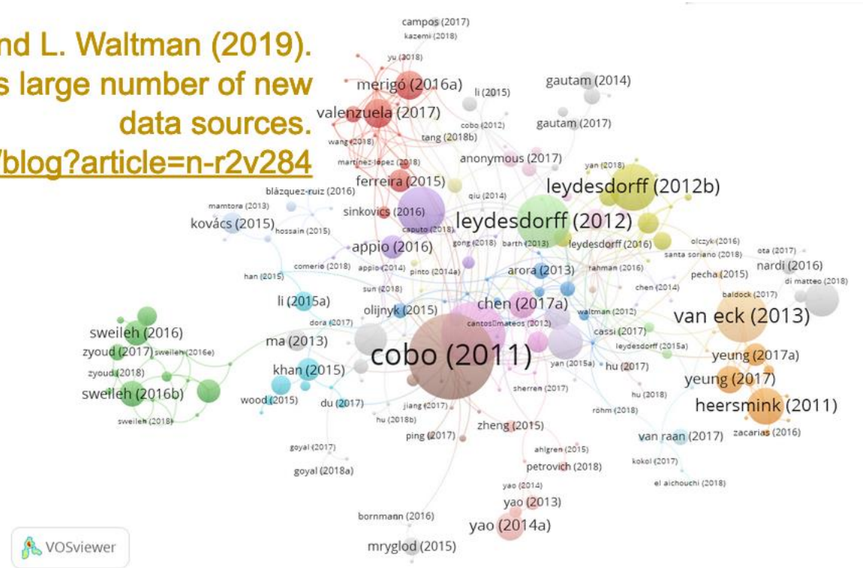
Show 50 entries

	cocited
1	http://dx.doi.org/10.1007/978-3-030-01379-0_9
2	http://dx.doi.org/10.1007/978-3-030-30796-7_8
3	http://dx.doi.org/10.1007/978-3-319-54627-8_5
4	http://dx.doi.org/10.1007/978-3-540-24750-0_13
5	http://dx.doi.org/10.1007/s11192-019-03217-6
6	http://dx.doi.org/10.1038/sdata.2016.18

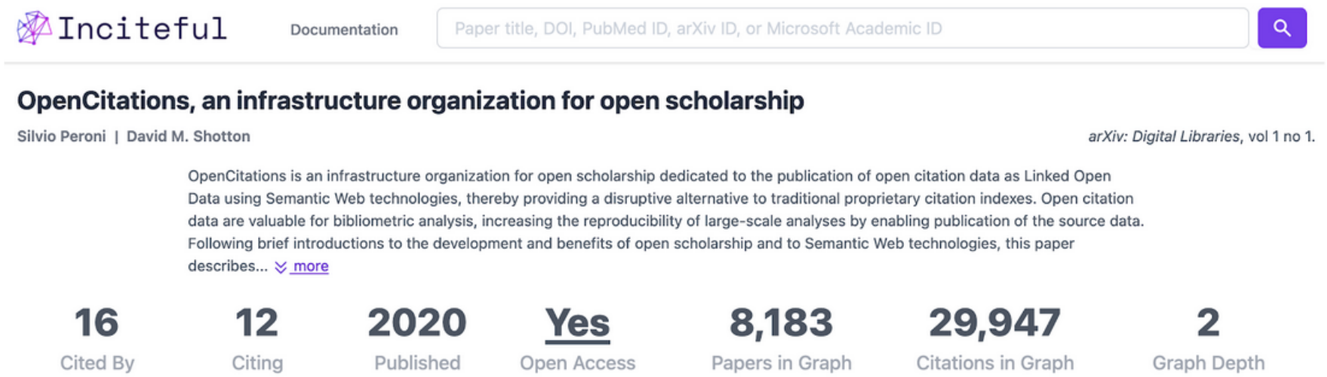
How it is used

Article https://doi.org/10.1162/qss_a_00023 visualised with the Open Access Helper plugin (https://www.oahelper.org/)

N. van Eck and L. Waltman (2019). VOSviewer supports large number of new data sources. https://www.cwts.nl/blog?article=n-r2v284



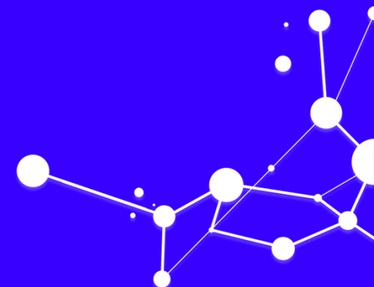
https://inciteful.xyz/



Positioning in EOSC & OpenAIRE Ecosystem

MONITOR

Take away



Takeaway

- OpenCitations publishes **global scholarly open citation data** that can be reused for any purpose (CC0 waiver)
- **REST APIs**, **SPARQL** endpoints, and **dumps** are available to gather such citation data
- So far, OpenCitations hosts more than **759 million citations** data – more to come

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OpenAIRE

Andreas Czerniak, Jochen Schirrwagen
Bielefeld University

Making the costs of Open Access publishing transparent

Overview of OpenAPC

- OpenAPC (https://openapc.net) is an initiative and infrastructure that **collects**, **aggregates** and **publishes APC** and other **cost data** on **open access publishing** from participating institutions since 2014.
- It allows **web-based visualizations** (treemaps) and an API for **Online Analytical Processing** (OLAP cubes); the service is free to use; the datasets are made available under the Open Database License
- Today **282 organisations worldwide** contribute with their cost data, covering **118,842 articles** with an aggregated sum of **232m €** (APC dataset)

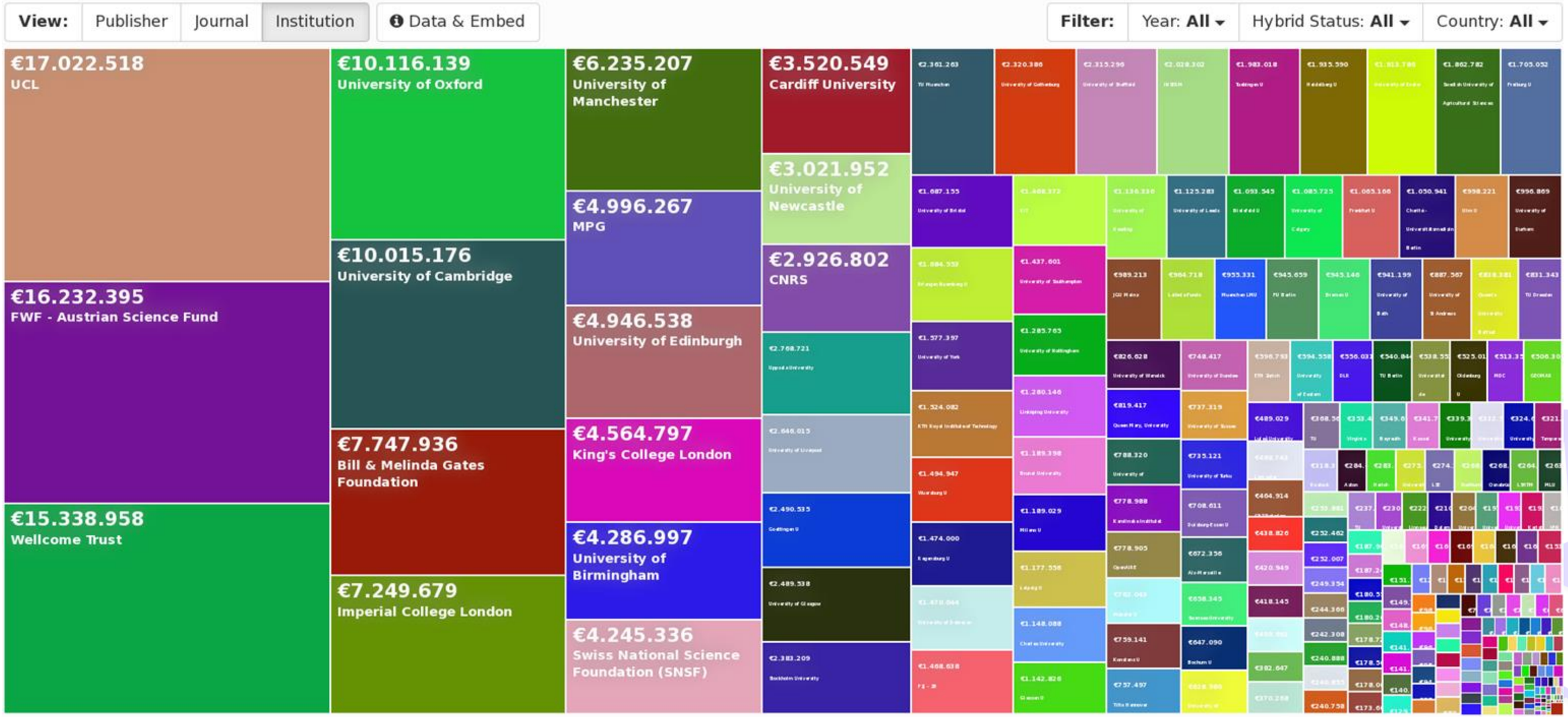
Why to use OpenAPC by Who

- It aims at **transparency**, **comparability** and **tracking** of cost developments in the field of Open Access publishing
- It complies with current recommendations for **cost transparency** in an **Open Access based scholarly publication system**,e.g., https://doi.org/10.2777/836532, Plan S
- It releases datasets on APCs, BPCs, transformative agreements
- It is aimed for **libraries**, **funding agencies**, **researchers**, **developers** to keep track and provide access to the Open Access record of (European) expenditure for publishing fees and cost data from transformative agreements

How to use OpenAPC

- **It is accessible through**
  - web user interface using **Treemaps,** https://treemaps.openapc.net/
  - **OLAP-Server REST-API**, https://olap.openapc.net/
  - released **datasets** on **Github**, https://github.com/OpenAPC/openapc-de/

Example: Treemap to browse and inspect the APC dataset

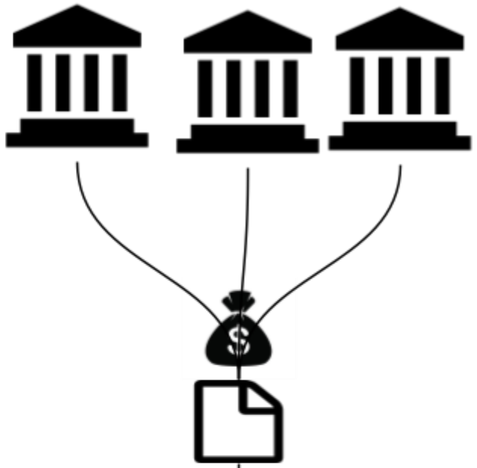


Example: Querying the OLAP Server

Example: APC expenditures in the period 2014 to 2016:
https://olap.openapc.net/cube/openapc/aggregate?cut=period:2014-2016

- **OLAP** Server - based on cubes, a Python framework for reporting and analytical applications
- **A cube in OpenAPC** represents data from participating institutions or all aggregated data
- **Operations,** e.g. list entries, aggregate functions, drilldowns, cuts

Positioning in EOSC & OpenAIRE Ecosystem



participating institutions (libraries, consortia)

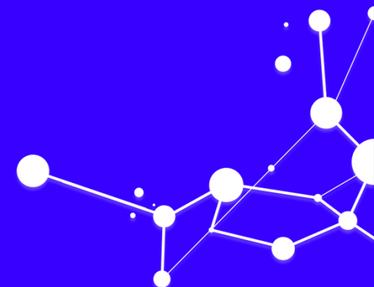
cost data delivery

aggregation, curation, enrichment

OpenAIRE ResearchGraph

MONITOR

Take away



Takeaway

- OpenAPC is a contribution to a transparent and reproducible monitoring of fee-based open access publishing across institutions and nations
- It regularly releases datasets
  - on fees paid for open access articles and monographs
  - cost data stemming from transformative agreements with publishers
- Today the APC dataset covers **>118k articles**, **fees of > 232m €**, **data** contributed from **282 institutions**

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#OpenAIRE-Nexus

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OpenAIRE

Dimitris Pierrakos
ATHENA Research Center

OpenAIRE UsageCounts

The Usage Statistics Service of OpenAIRE Research Graph

Overview of Usage Counts

- Collects usage data or usage statistics reports for OpenAIRE Research Graph products and from OpenAIRE distributed network of repositories using open standards and protocols
- Generates reliable, consolidated and comparable usage metrics, compatible with the COUNTER Code of Practice standard.
- Worldwide Indicators (February 2021):
  - ~200 Content Providers
  - ~100M Views
  - ~380M Downloads

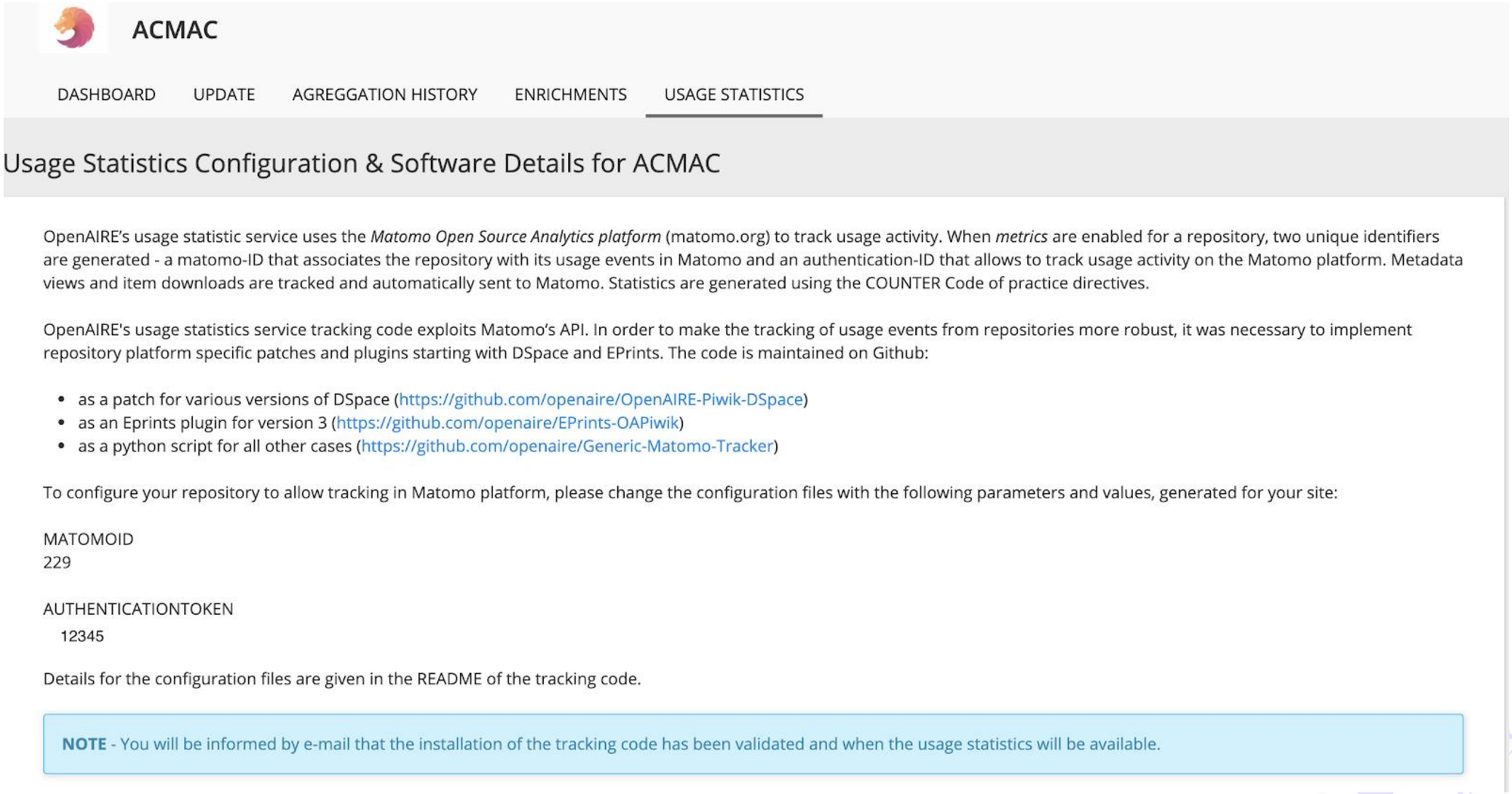
Why to use Usage Counts by Who

- A measure of scholar impact.
- Indicators that complements other (traditional and alternative) bibliometric indicators to provide a comprehensive and recent view of the impact of academic resources.
- Stakeholders: Authors, Institutions, OS platforms, Funders, etc.
  - “Which funder has the biggest engagement in Europe?”
  - “Provide me the evolution of the popularity of the publications/data of a project within the last 5 years.”
- Metadata de-duplication enables accumulation of usage for same research outputs
- Standardization needed.

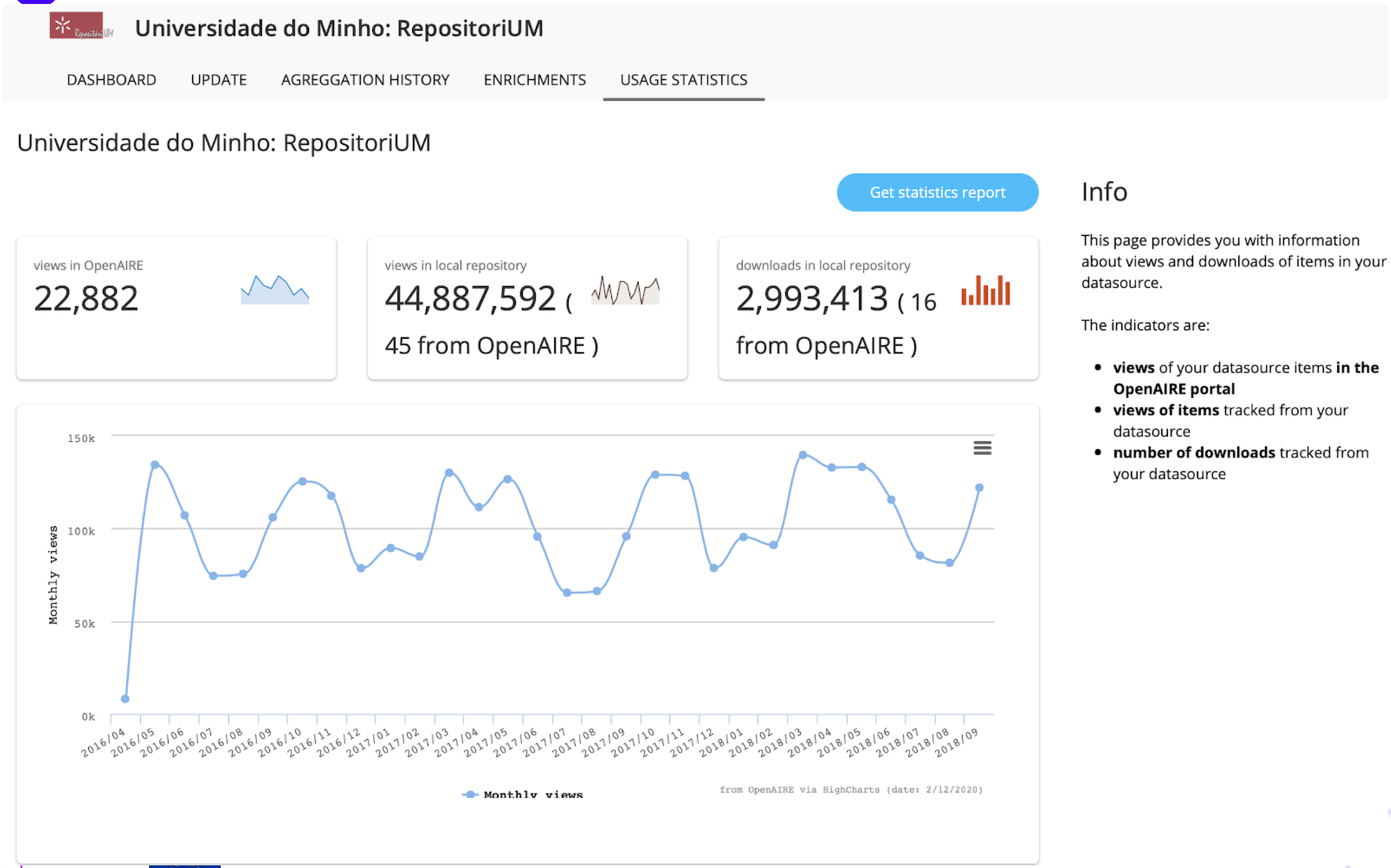
How to use Usage Counts

- **Register via Provide:**
  - provide.openaire.eu
- **View Usage Statistics in Provide and/or Explore**
  - provide.openaire.eu
  - explore.openaire.eu
- **Get COUNTER Reports via a SUSHI-Lite API**
  - https://usagecounts.openaire.eu/resources#apis

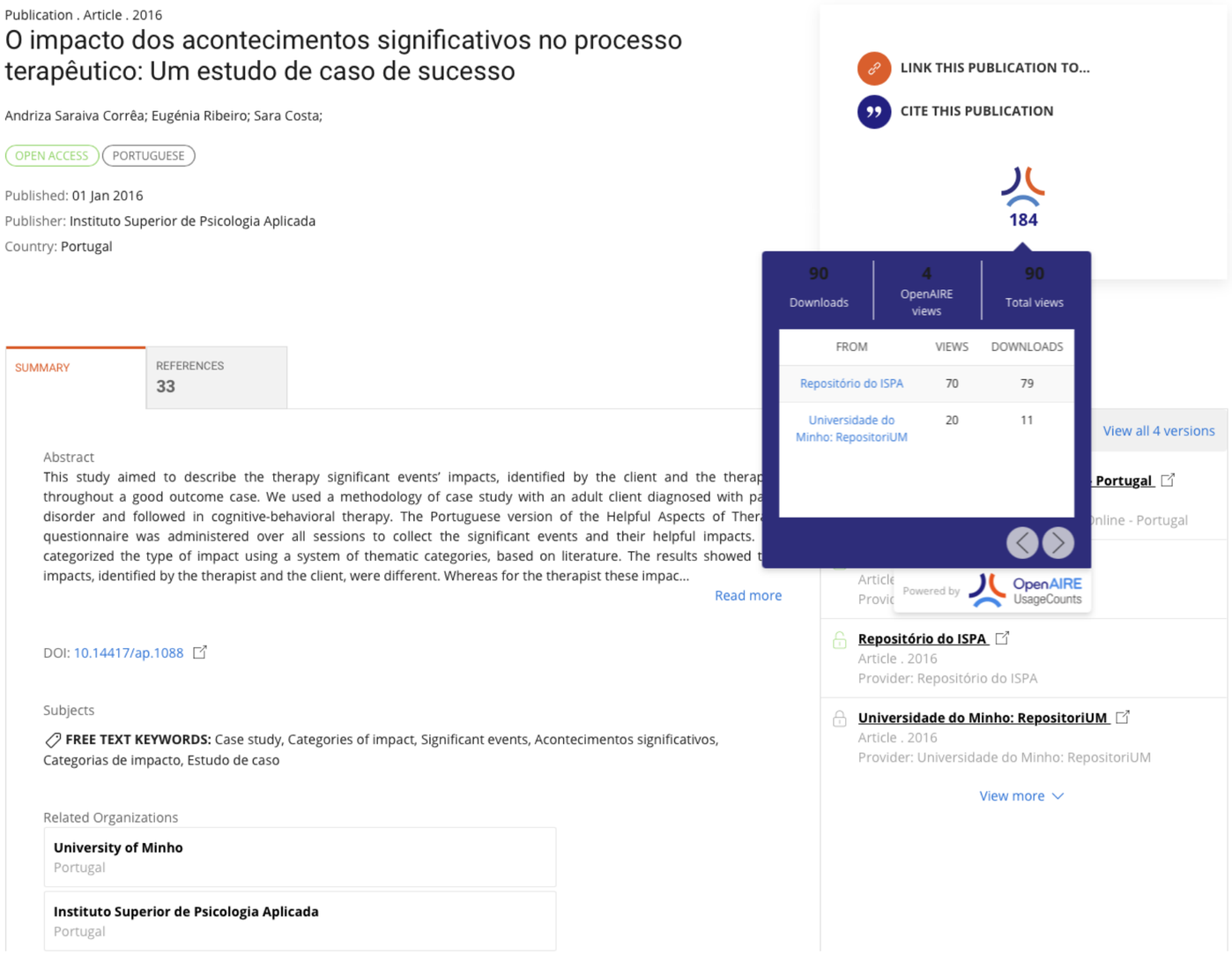
Registration via Provide



Usage Statistics in Provide



Usage Statistics in Explore



COUNTER Reports


```
- {
    - ItemIdentifier: [
        - {
            Type: "OpenAIRE",
            Value: "opendoar____::8e98d81f8217304975ccb23337bb5761"
          },
        - {
            Type: "OpenDOAR",
            Value: "307"
          },
        - {
            Type: "URL",
            Value: "https://repositorium.sdum.uminho.pt/"
          }
      ],
      ItemPlatform: "Universidade do Minho: RepositoriUM",
      ItemDataType: "Platform",
    - ItemPerformance: [
        - {
          - Period: {
              Begin: "2017-01-01",
              End: "2017-01-31"
            },
          - Instance: [
            - {
                MetricType: "ft_total",
                Count: "22087"
              },
            - {
                MetricType: "abstract",
                Count: "51685"
              }
            ],
            Category: "Requests"
        },
```

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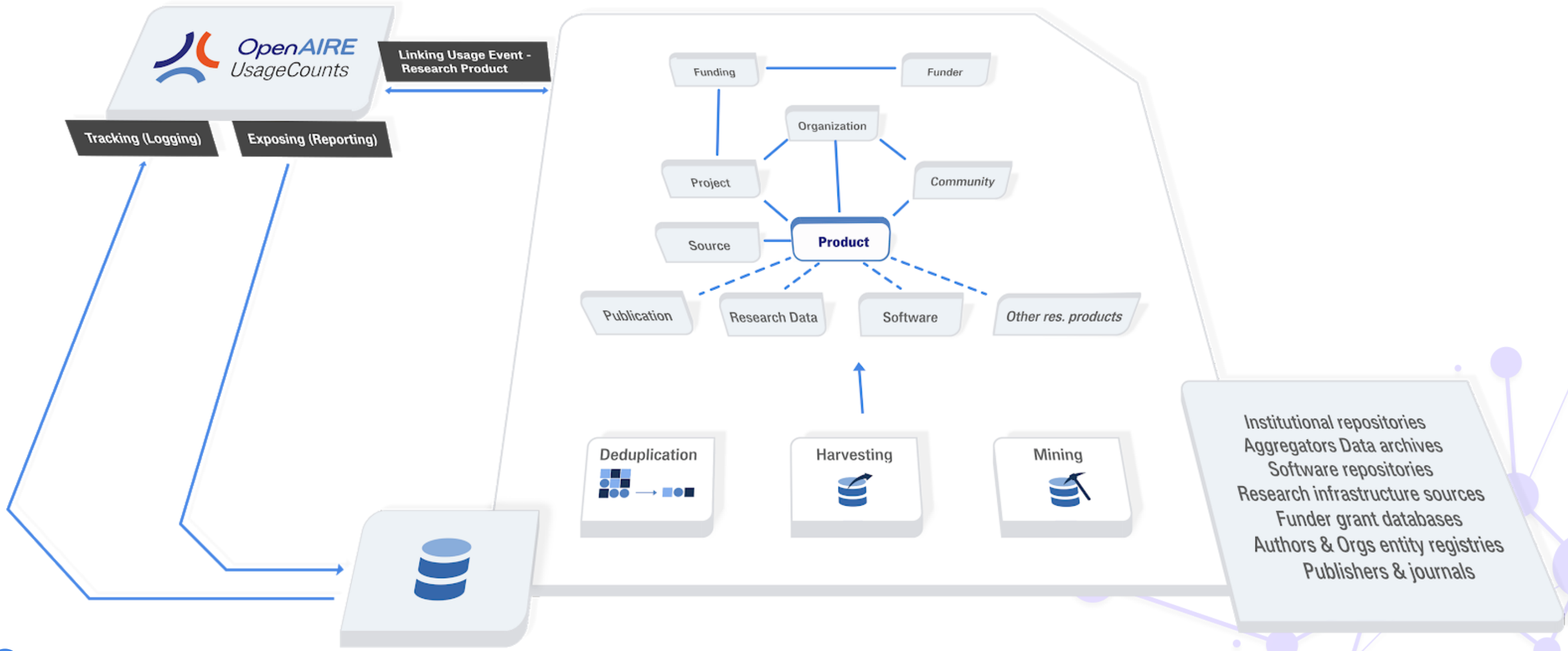
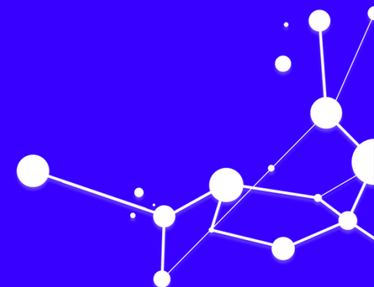
- Report: {
    @Created: "2017-09-06 08:00:21+0000",
    @Version: "4",
    @Name: "IR1:4",
  - Vendor: {
    - Contact: {
        Contact: "OpenAIRE Helpdesk",
        E-mail: "helpdesk@openaire.eu"
      },
      Name: "OpenAIRE"
    },
  - Customer: {
      ID: "anonymous",
    - ReportItems: [
      - {
        - ItemIdentifier: [
          - {
              Type: "OpenAIRE",
              Value: "dedup_wf_001::0233282d03f7f027b5c08890501849ef"
            },
          - {
              Type: "URLs",
              Value: "http://hdl.handle.net/1822/7975 ;http://hdl.handle.net/1822/7463 ;http://europepmc.org/articles/PMC2268319 ;"
            },
          - {
              Type: "OAI",
              Value: "oai:europepmc.org:1834183"
            }
          ],
          ItemPublisher: "American Society for Microbiology",
          ItemPlatform: "Universidade do Minho: RepositoriUM",
          ItemDataType: "Article",
          ItemName: "Adaptive evolution of a lactose-consuming Saccharomyces cerevisiae recombinant",
        - ItemPerformance: [
          - {
            - Period: {
                Begin: "2017-01-01",
                End: "2017-01-31"
              },
            - Instance: [
              - {
                  MetricType: "ft_total",
                  Count: "1"
                },
              - {
                  MetricType: "abstract",
                  Count: "4"
                }
              ],
              Category: "Requests"
            },
```

Positioning in EOSC & OpenAIRE Ecosystem

Usage Counts in OpenAIRE infrastructure



Take away



Takeaway

- Usage Counts provides standards for usage statistics exchange for almost all type of content providers and platforms.
- Complies to COUNTER Code of Practice for reliable and comparable reports.
- Follows GDPR guidelines.
- Offers global coverage.
- Supports analysis via APIs and visualizations.

@openaire_eu

#OpenAIRE-Nexus

THANK YOU

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