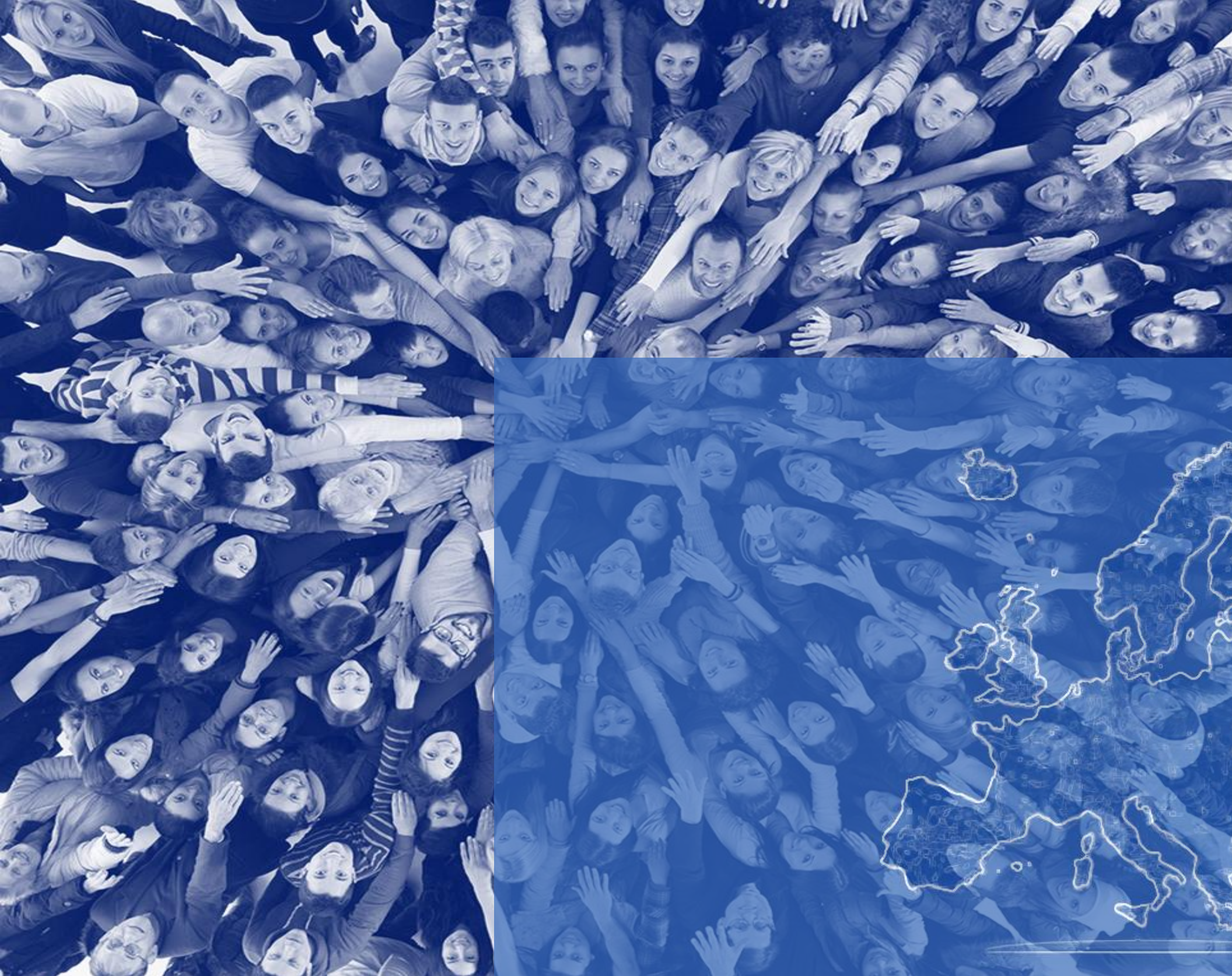




# OpenAIRE Graph as an Open Research Information Backbone for CRIS interoperability and responsible evaluation

Angeliki Tzouganatou · **Pedro Principe** · Natalia Manola ·  
Zenía Xenou · Stefania Amodeo · Leonidas Pispiringas ·  
Giulia Malaguarnera Paolo Manghi · Andre Vieira

OpenAIRE AMKE

## OUTLINE

# From CRIS fragmentation to responsible evaluation

---

## 01 Why this matters now

CRIS fragmentation meets the Barcelona Declaration and CoARA reform agendas.

## 02 The OpenAIRE Graph as a shared backbone

An open layer that connects CRIS, repositories, journals and aggregators across Europe.

## 03 Architecture, workflow, governance

CERIF-XML over OAI-PMH, provenance, open APIs, and the PROVIDE gateway for CRIS managers.

## 04 MyResearchFolio in practice

A researcher-centric service that puts open infrastructure to work for responsible assessment.

# OpenAIRE AMKE

## *European Scholarly Communication Infrastructure*

**56<sub>(+4)</sub>**  
members

**36**  
countries

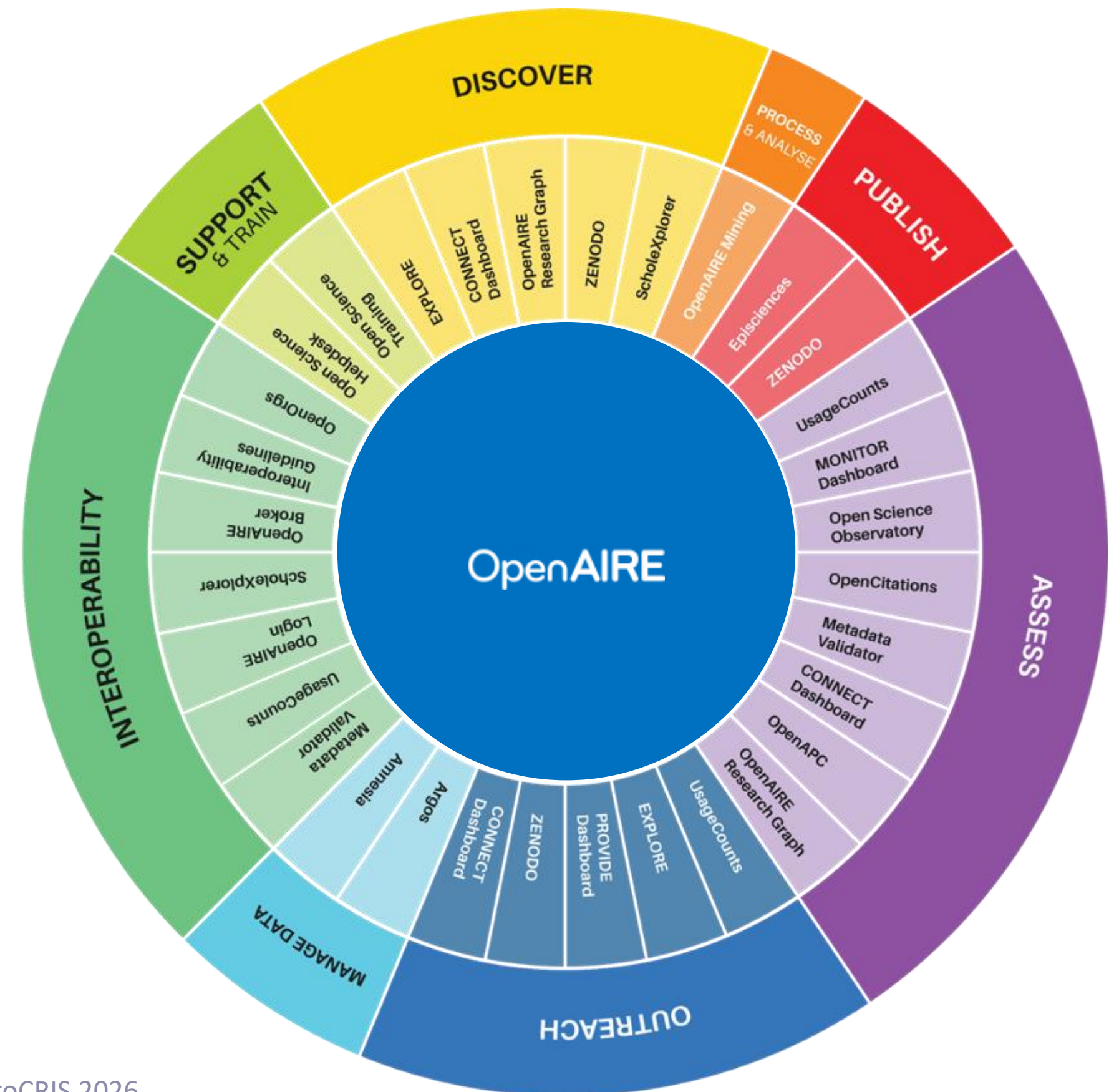
- Non-profit organisation, established **Oct 2018**
- **Federated.** Bringing together **human capital** and advanced **ICT services**
  - A **network of experts** from major national organisations (National Open Access Desks) in operation since 2009
  - A **catalogue** of scholarly communication services



Global Collaborations: Latin America, Canada, Japan, Korea, China,...

# Services in the core of OpenAIRE

- **Researchers** – discover, plan, anonymize, publish
- **Providers** – interoperate, enrich metadata
- **Research & Funding Performing organizations** – track, assess, monitor research & open science
- **Policy makers & public agencies** – assess R&I investments



## THE STARTING POINT

# CRIS at the centre, and at a crossroads

Current Research Information Systems sit at the core of **institutional reporting, funder workflows, and research evaluation**.

Yet despite long-standing investments and relevant progress, research information remains **fragmented across heterogeneous systems**, inconsistently structured, and often mediated through proprietary analytics layers.

This fragmentation becomes consequential the moment institutions are asked to make their evaluation evidence **transparent, open, auditable, and reusable** across stakeholders.

### WHERE CRIS SIT TODAY

National reporting · Funder workflows · Research assessment

### THE RECURRING PROBLEM

Heterogeneous data models. Inconsistent semantics.  
Closed analytic layers.

### WHAT EVALUATION NOW REQUIRES

Transparency. Auditability. Reuse across contexts.

# 01

## PART ONE

# Open infrastructure as a prerequisite for trustworthy evaluation.

Two reform agendas — Barcelona Declaration and CoARA — converge on the same infrastructural requirement.

Barcelona Declaration

CoARA

OI4RRA Working Group

# Two frameworks converge on the same requirement

## BARCELONA DECLARATION

Research information used for decision-making should be open, transparent, and auditable.

Those being assessed must be able to **access the evidence** considered in their evaluation — reducing systemic dependence on closed infrastructures and opaque methodologies.

Openness

Transparency

Auditability

## COARA · OI4RRA WG

Evaluation systems should be context-sensitive, supported by trustworthy evidence infrastructures.

The OI4RRA Working Group translates the reform agenda into **infrastructure requirements** — principles, characteristics, and a checklist for what it means, technically and institutionally, to be fit for Responsible Research Assessment.

Plural evaluation

Community governance

Ethical foundations

# Open Infrastructures for Responsible Research Assessment: Principles and Framework

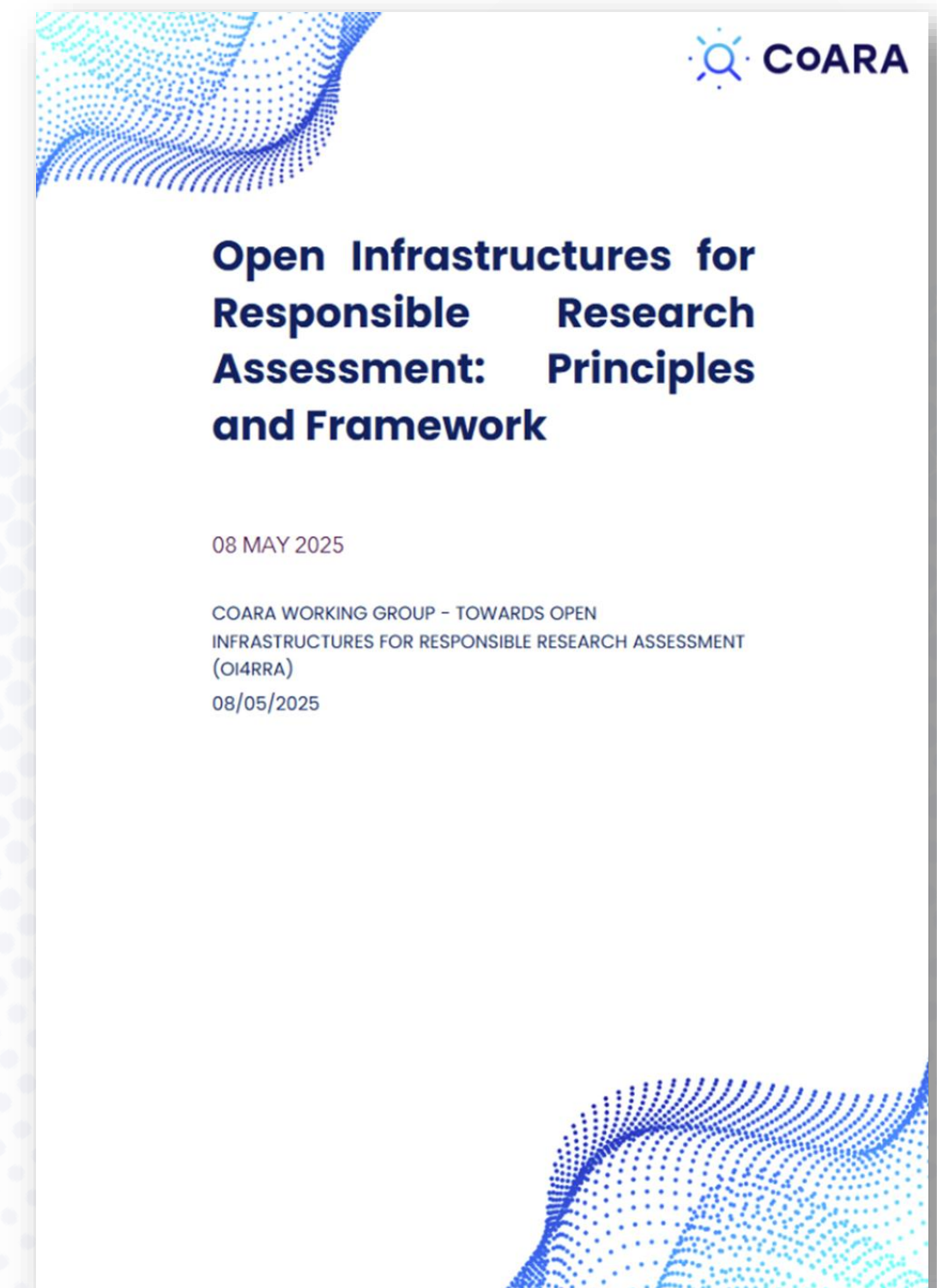


Sets the foundation for the principles behind OIs principles in RRA, specifically outlining:

- The **critical role of Open Infrastructures** in ensuring transparent, equitable, and responsible assessment.
- The **essential characteristics** that Open Infrastructures must possess to **support RRA**.



<https://zenodo.org/records/15487403>



# Four dimensions for trustworthy infrastructures

---

**01**

## Technical robustness

Engineering quality, security, scalability, and resilience of the infrastructure stack.

**02**

## Operational capacity

Day-to-day reliability, sustainability practices, and capacity to deliver services over time.

**03**

## Community-centred governance

Open governance structures, transparent decision-making, accountability to stakeholders.

**04**

## Ethical & inclusive foundations

Fairness across disciplines, languages, and career stages; safeguards against misuse.

Source: OI4RRA WG · *Open Infrastructure Checklist for Responsible Research Assessment* — [zenodo.org/records/15487403](https://zenodo.org/records/15487403)

# 02

PART TWO

## The OpenAIRE Graph as a shared backbone.

A common, open layer aggregating institutional and national CRIS landscapes alongside repositories, journals, and aggregators...

Architecture

Provenance

Open APIs

# OpenAIRE Graph & OpenAIRE Provide

Functional services to build a co-designed scholarly Communication Ecosystem

400M

**Research Records**

Processed every month



1

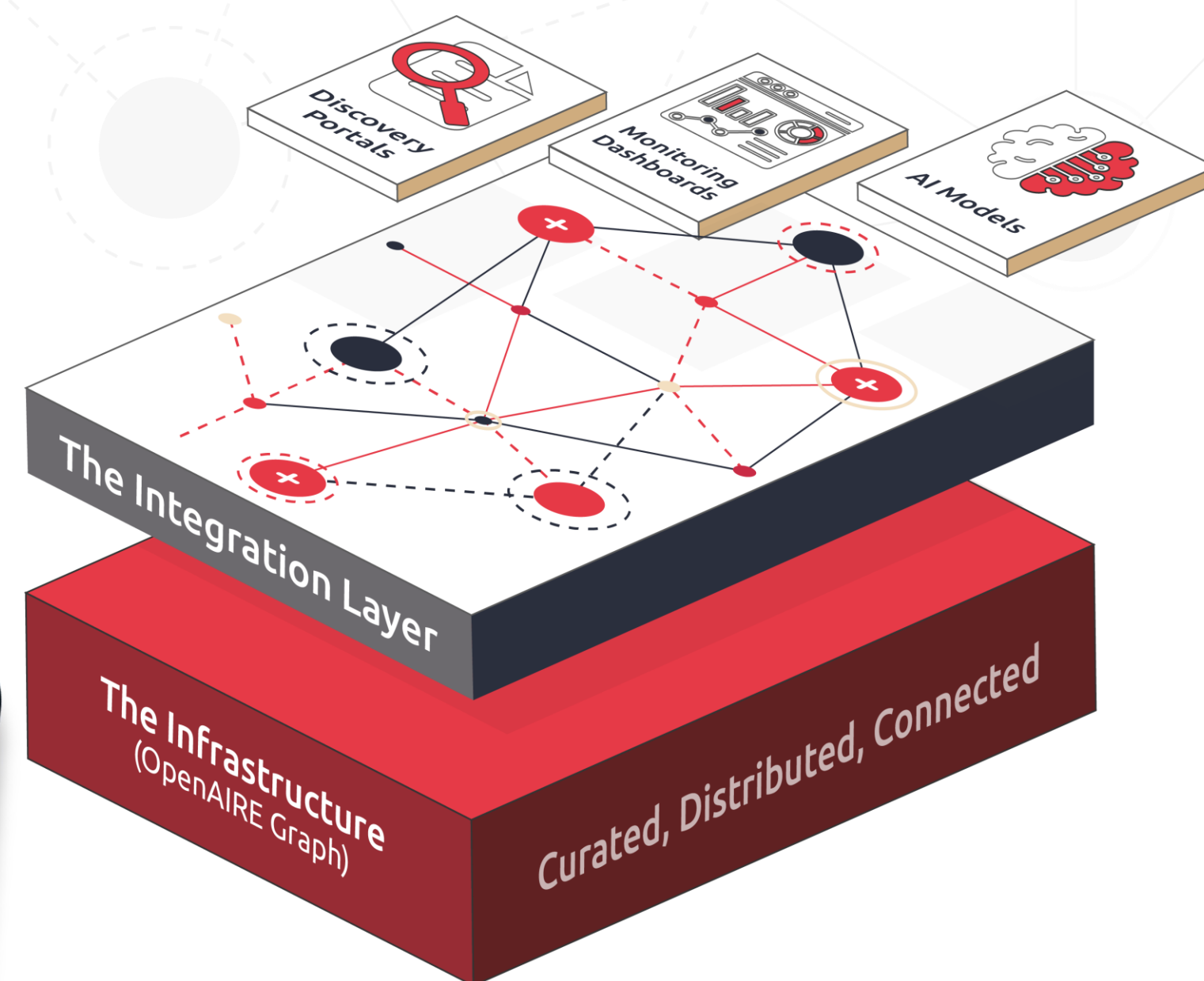
**Open Mission**

Making research intelligence openly accessible to all

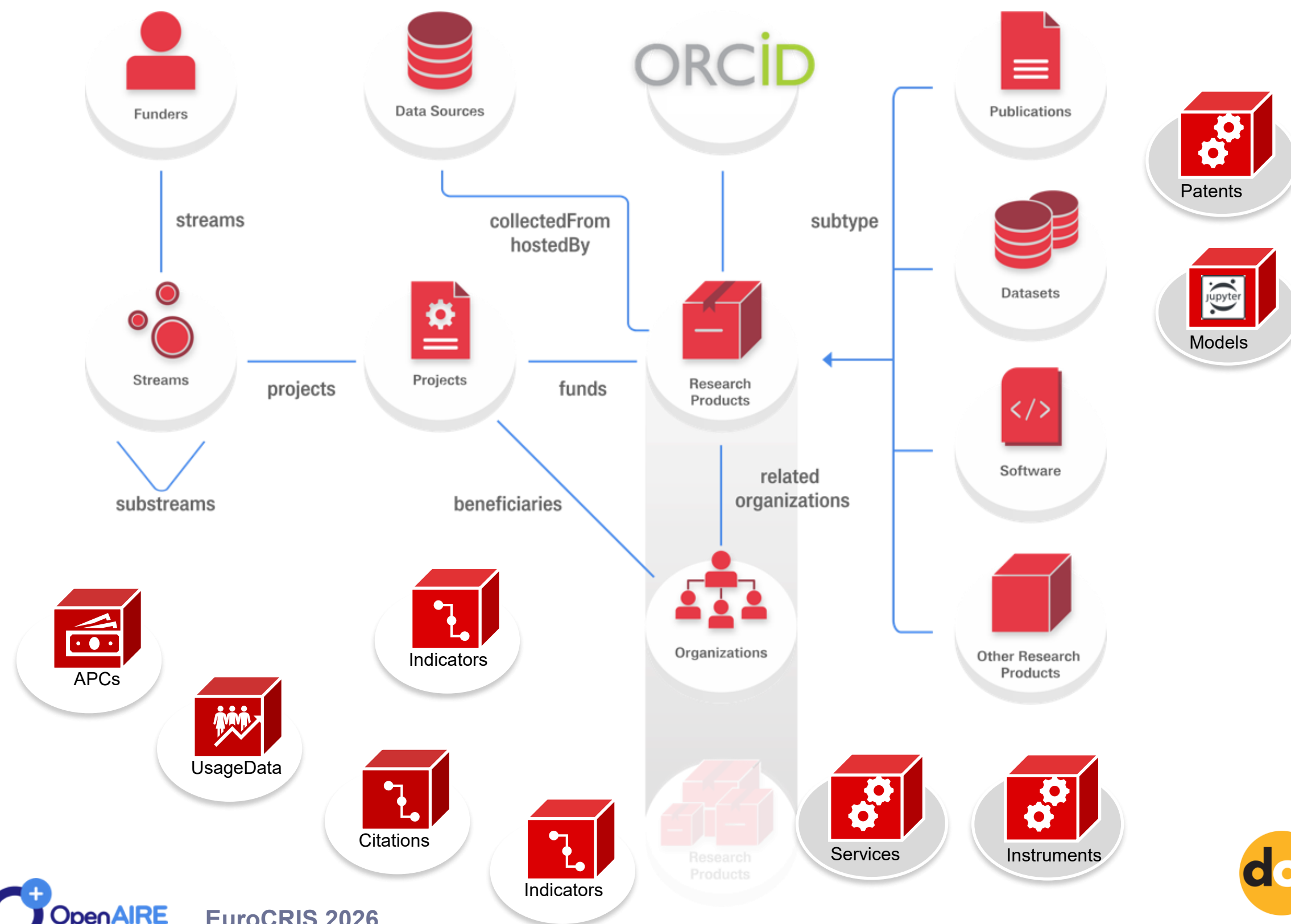
100K+

**Trusted Sources**

Repositories, journals, CRIS systems, and data archives



# 360-Degree View of Research

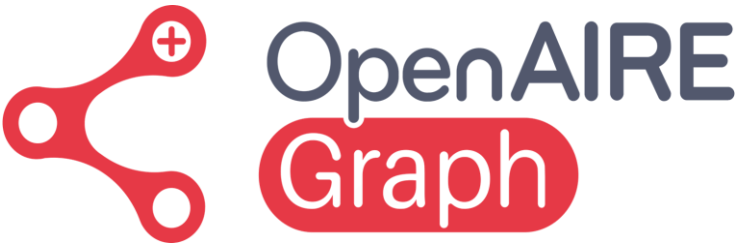


- Based on **Open Science principles**: open software, open data, open APIs
- **Open metadata collection** interlinking Projects/Grants, Publications, Data, Software, Organizations, Funding
- **Beyond publications** to include data, software, clinical trials, patents, etc.
- **Global & cross-disciplinary** coverage
- Enriched by **AI-processes** - citation, reproducibility, FOS, SDGs, domain terms/ontologies

# OpenAIRE **Graph** (150K) Data Sources



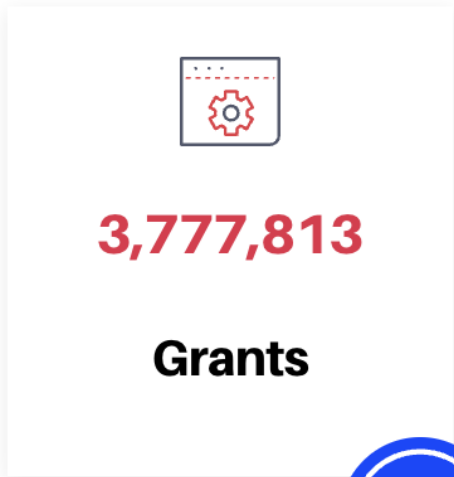
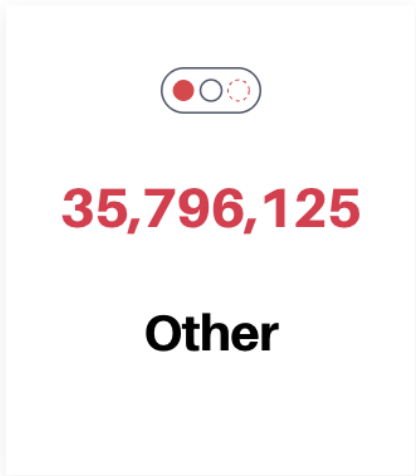
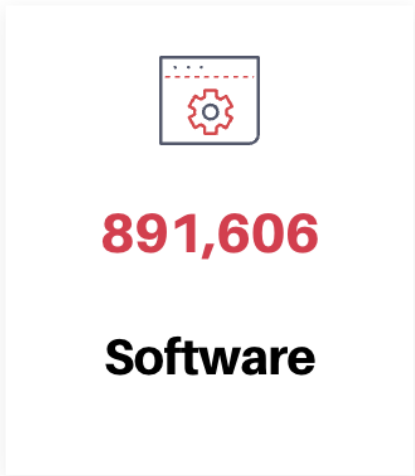
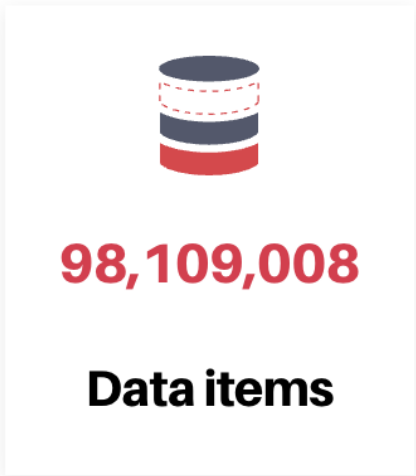
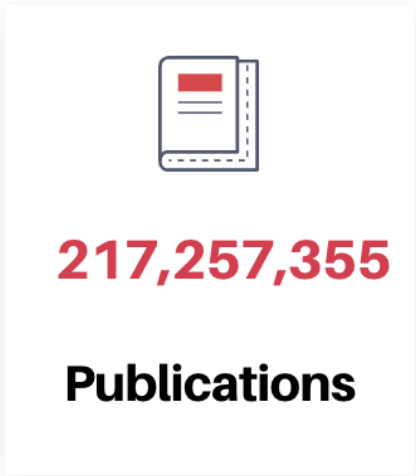
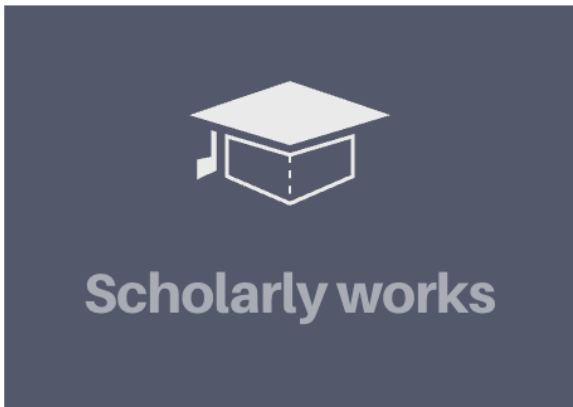
# A comprehensive, open dataset of research information



>3.5bi citation relationships

- pub-pub
- pub-data
- pub-software
- data-data
- ....

## Latest Statistics



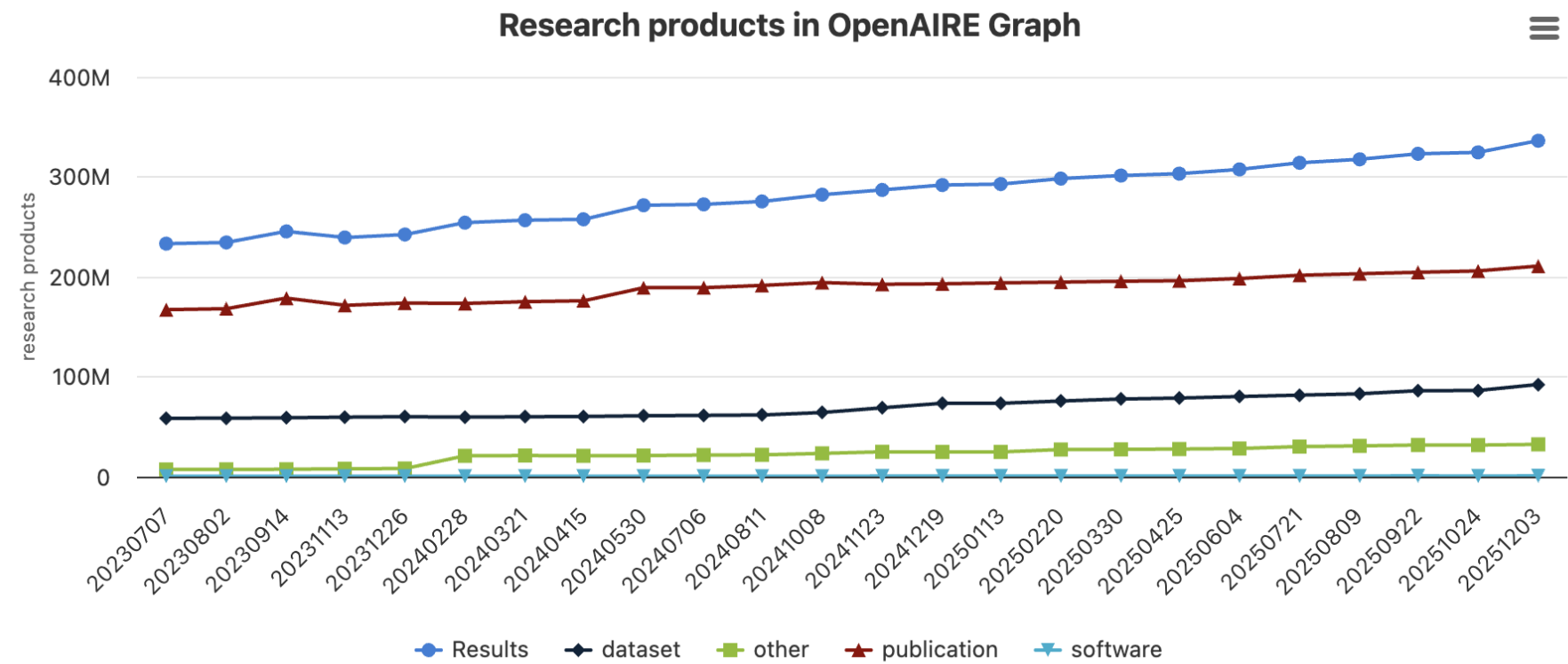
**352.1 M** Research Products

PUBLICATIONS. DATA. SOFTWARE. +

Enriched. Deduplicated. Connected.

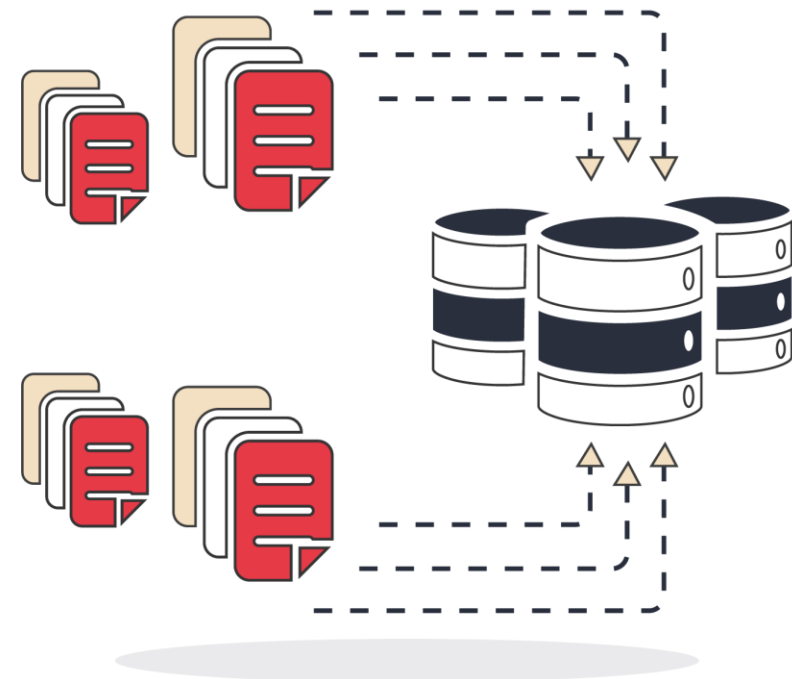
**Dive Deeper** →

## Growth over time



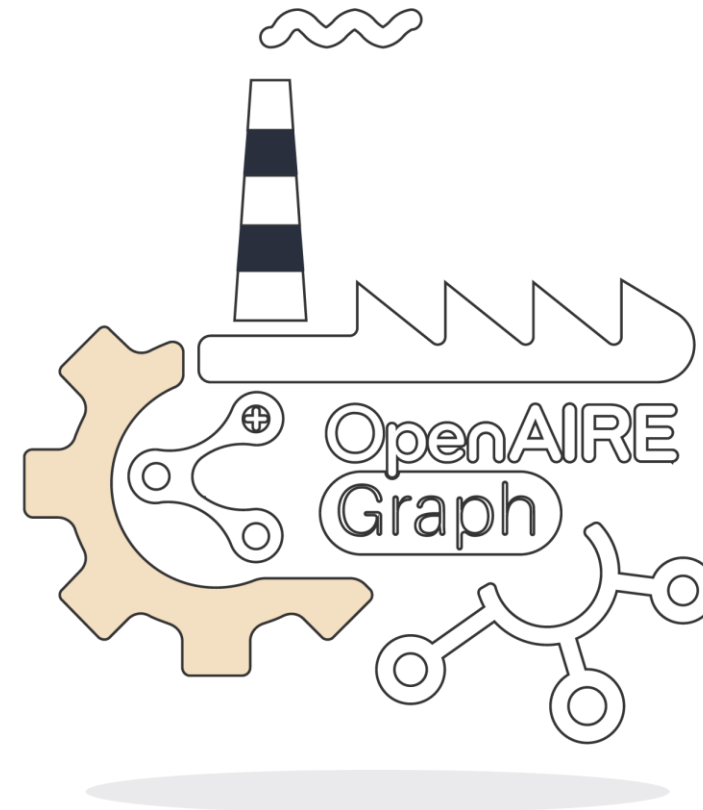
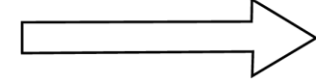
Created by OpenAIRE via HighCharts

# The Lifecycle



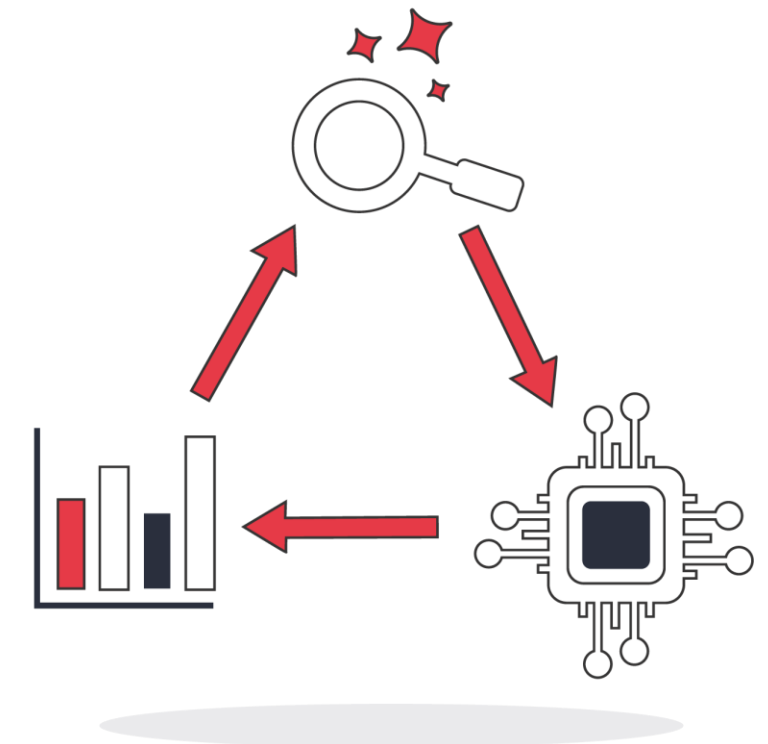
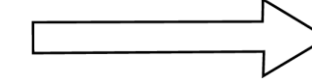
## Provide

Repositories, CRIS,  
National sources



## The Graph

Deduplication, Provenance  
tracking, Affiliation  
resolution

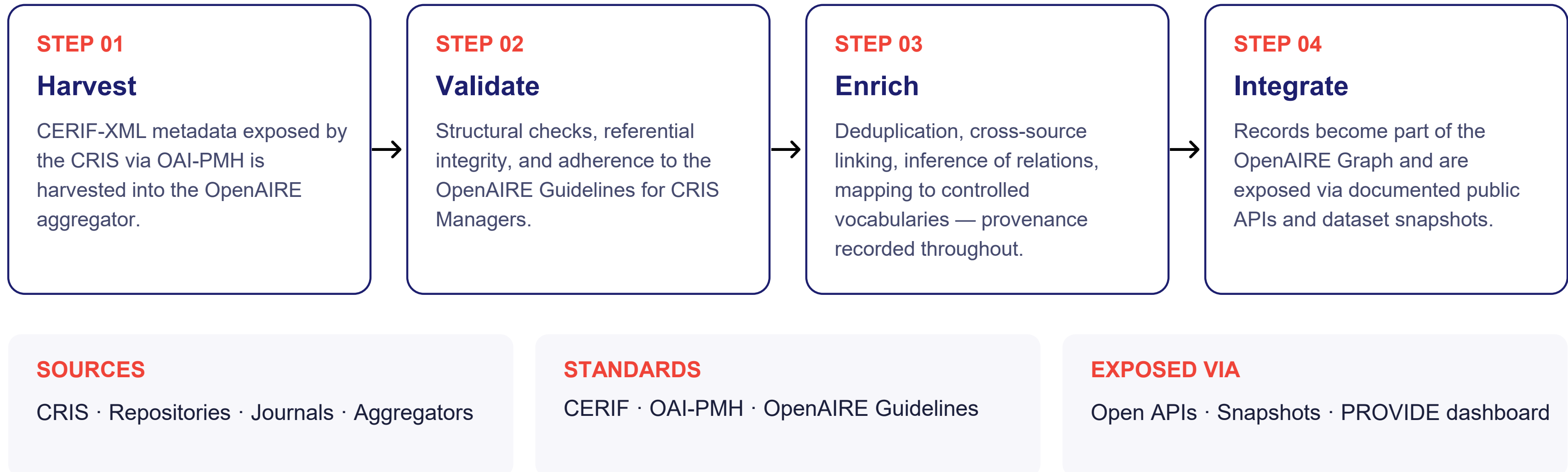


## Reuse

Discovery, Monitoring,  
Assessment, EOSC,  
AI-ready datasets

## WORKFLOW

# CRIS → Graph: harvest, validate, enrich, integrate



## TECHNICAL DETAIL

# Keeping CERIF relationships intact over a record-based protocol

## WHAT THE GUIDELINES SPECIFY

All referenced entities and linking objects are explicitly represented within the provided dataset.

Identifier consistency is enforced so relationships can be reconstructed downstream.

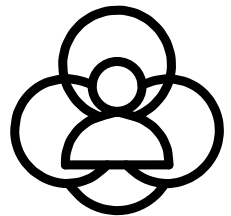
CERIF-XML is exposed via OAI-PMH as **sets of records**, with completeness expectations.

Validation, harmonisation, and integration happen in the aggregation workflow.

**OpenAIRE Guidelines for CRIS Managers** — structural and exposure requirements for interoperable CERIF-XML dissemination across heterogeneous CRIS deployments.

# Getting into the Graph: OpenAIRE PROVIDE

**PROVIDE: a single entry point for CRIS managers**



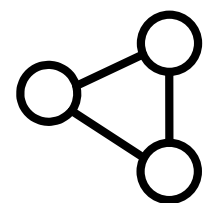
## Onboarding service for content providers

Supports institutional and data repositories, data archives and journals, aggregators and CRIS systems.



## Rigorous validation process

Checks metadata against the **OpenAIRE Guidelines** to ensure it is **complete and interoperable**.



## FAIR compliance

Guideline compliance enables consistent metadata across services and improves **machine-actionability** in line with **FAIR principles**.



# Open APIs and provenance turn the Graph into auditable evidence

## DOCUMENTED ACCESS

### Public APIs & data snapshots

Entity-specific endpoints support retrieval and query-based access — enabling reproducible data access for institutional processes.

## PROVENANCE SIGNALS

### Harvested, inferred, or user-linked

Every record carries provenance documenting how information was obtained — together with an associated trust signal.

## AUDITABILITY

### Inspect & reproduce evidence

Third parties can inspect, contest, and reproduce evidence extraction — a governance-relevant capability, not just a technical one.

Asserted vs. inferred information is made explicit. Uncertainty is communicated, not hidden — aligning the Graph with the Barcelona Declaration's auditability rationale and OI4RRA's call for community-governed infrastructures.

# Identifiers and semantics as baseline safeguards

---

In evaluation settings, ambiguity and misattribution can **materially affect outcomes**. Interoperability must therefore prioritise persistent identifiers and semantic alignment.

The Barcelona Declaration highlights persistent identifiers as a prerequisite for linking information from different sources. The OpenAIRE Graph implements this through its persons, organisations, products, and projects entities — each with explicit identifier mapping.

**DOI**

Research products

**ORCID**

Persons

**ROR**

Organisations

**PMID**

Citations

**Grant IDs**

Projects & funding

**Vocab.**

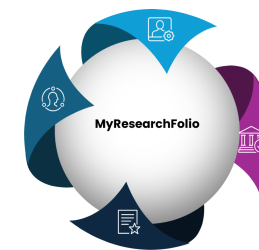
Controlled terms

# 03

## PART THREE

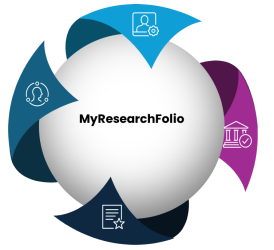
# From principles to practice: MyResearchFolio.

A researcher-centric service layered on the OpenAIRE Graph, designed to support Open Science–aware Responsible Research Assessment.



## APPLIED CASE

# An evaluation-facing layer on the OpenAIRE Graph



MyResearchFolio lets researchers **showcase their work and career advancements beyond narrow publication metrics** , adding a qualitative perspective to their contributions.

It supports researchers and evaluators in making informed assessments related to career progression and project funding decisions — while preserving a principled separation between **evidence provision** and **evaluative judgement**.

Open research info

Narrative CV

ORCID sync

RRA-aligned

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



# MyResearchFolio as a pathway from principles to implementation

## HOLISTIC

Provide a comprehensive view of a researcher's capabilities, skills, impact

## EXTENSIVE IN SCOPE

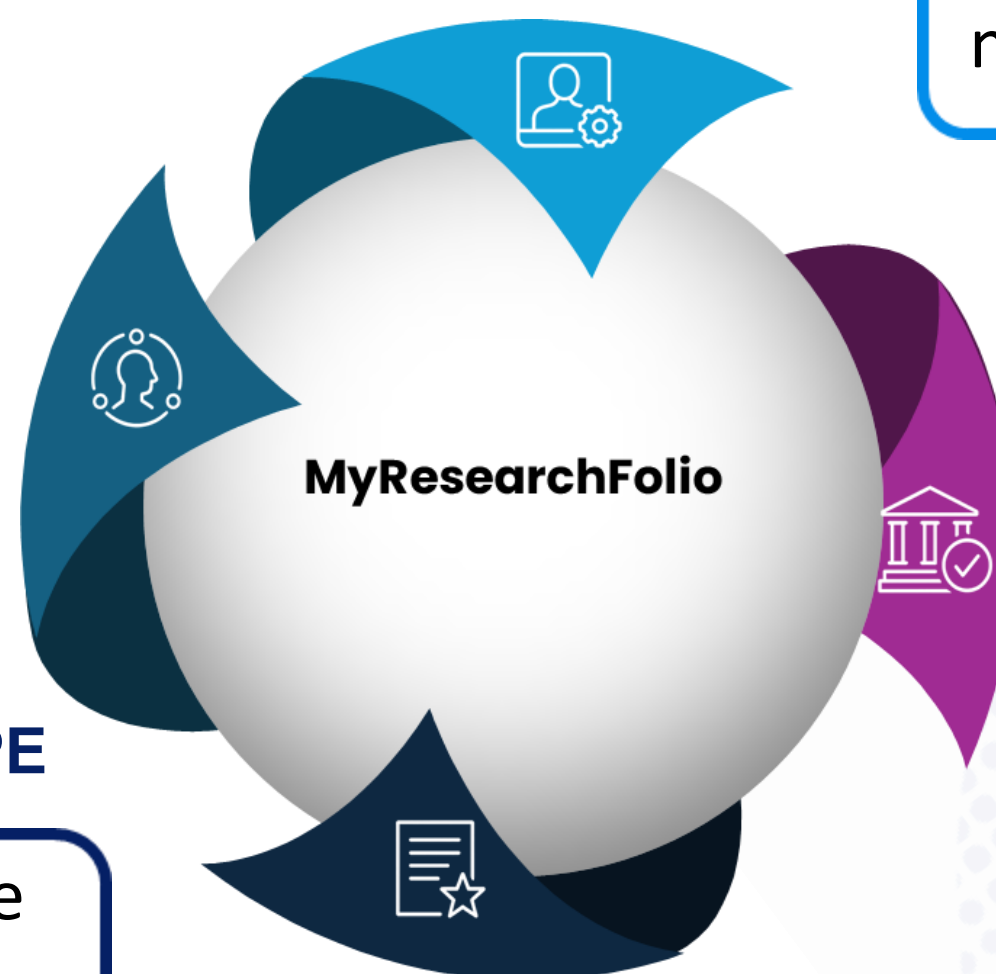
Capture a researcher's full range of contributions, not just traditional publication metrics

## CUSTOMIZABLE

Flexible to accommodate diverse needs and contexts

## ALIGNED WITH REFORMS

Support the implementation of Open Science and responsible research assessment



<

Education & Teaching

Research Outputs

Projects

Network

Awards

Activities

Innovation

Impact

Map

Open Science

>

Societal

Economical

All Societal Impact

Collaboration and engagement with the public

Technological advancements

Uptake in citizen science

Uptake in education

Promote diversity, equity, and Inclusion

Volunteering

Contribution to policies!

Contribution to SDGs

Societal Impact

+ Add New Category

Collaboration and engagement with the public

Public consultations

Public awareness campaigns

Public reports & press releases

Uptake in citizen science

Environmental / Climate conservation

Public health & Epidemiology

Cultural Heritage & Archaeology

Resource Conservation & Management

Technological advancements

AI & Machine learning

Data Science & Analytics

Green & Sustainable Tech

Engineering & Manufacturing

Healthcare & Biotech

Uptake in education

Conducted workshops and training sessions

Design of educational programs

Creation of educational materials

E-learning adoption

0.3

0.1

0.6

0.4

# Transferable takeaways for the CRIS community

---

- 01** **CRIS interoperability and RRA converge.**  
Both agendas require open, interoperable, auditable research information — the same underlying infrastructure.
- 03** **Provenance enables contestation and trust.**  
Treat provenance and inspectability as first-class capabilities, not optional metadata.

- 02** **Interoperability is technical and governance-dependent.**  
Especially regarding vocabularies, sustainability, and community oversight.
- 04** **Support plural, context-sensitive evaluation.**  
Rather than single-score benchmarking — demonstrate value through applied layers like MyResearchFolio.

THANK YOU

# Thank you.

---

We welcome questions, collaborations, and CRIS managers interested in connecting their content to the OpenAIRE Graph.

Please contact us at  
[pedro.principe@usdb.uminho.pt](mailto:pedro.principe@usdb.uminho.pt)  
[\*\*angeliki.Tzouganatou@openaire.eu\*\*](mailto:angeliki.Tzouganatou@openaire.eu)  
[natalia.manola@openaire.eu](mailto:natalia.manola@openaire.eu)