

Crossref, and Metadata as trust signals

Leveraging scholarly infrastructure
for research integrity

Evans Atoni

Technical Support Specialist, Crossref

Mauya!

Agenda

- ❑ Crossref: *Who are we?*
- ❑ Crossref Membership
- ❑ Metadata, and Integrity of the Scholarly Record

Scale of Crossref - Present

23,000 organisational members from **163** countries

- **50%** of members are based in Asia
- **35%** of members are universities or scholar-led

120 Sponsor orgs; **50** Ambassadors

174 million open metadata records with DOIs

1.3 billion DOI resolutions per month (**94%** of all DOI use)

2 billion calls to our API every month by **0000s** (?) systems ingesting and reusing this open metadata

USD \$12.5 million operating expenses in 2025

Strategic themes



Contribute to an environment where the community identifies and co-creates solutions for broad benefit



Manage Crossref openly and sustainably, modernising and making transparent all operations so that we are accountable to the communities that govern us



A sustainable source of complete, open, and global scholarly metadata and relationships



Foster a strong team—because reliable infrastructure needs committed people who contribute to and realise the vision, and thrive doing it

crossref.org/strategy

UbuntuNet
CONNECT | 2025

25
Crossref
CELEBRATING 25 YEARS

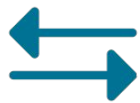
MEMBERSHIP BENEFITS



Identify and describe any research object



Add more metadata to make a difference

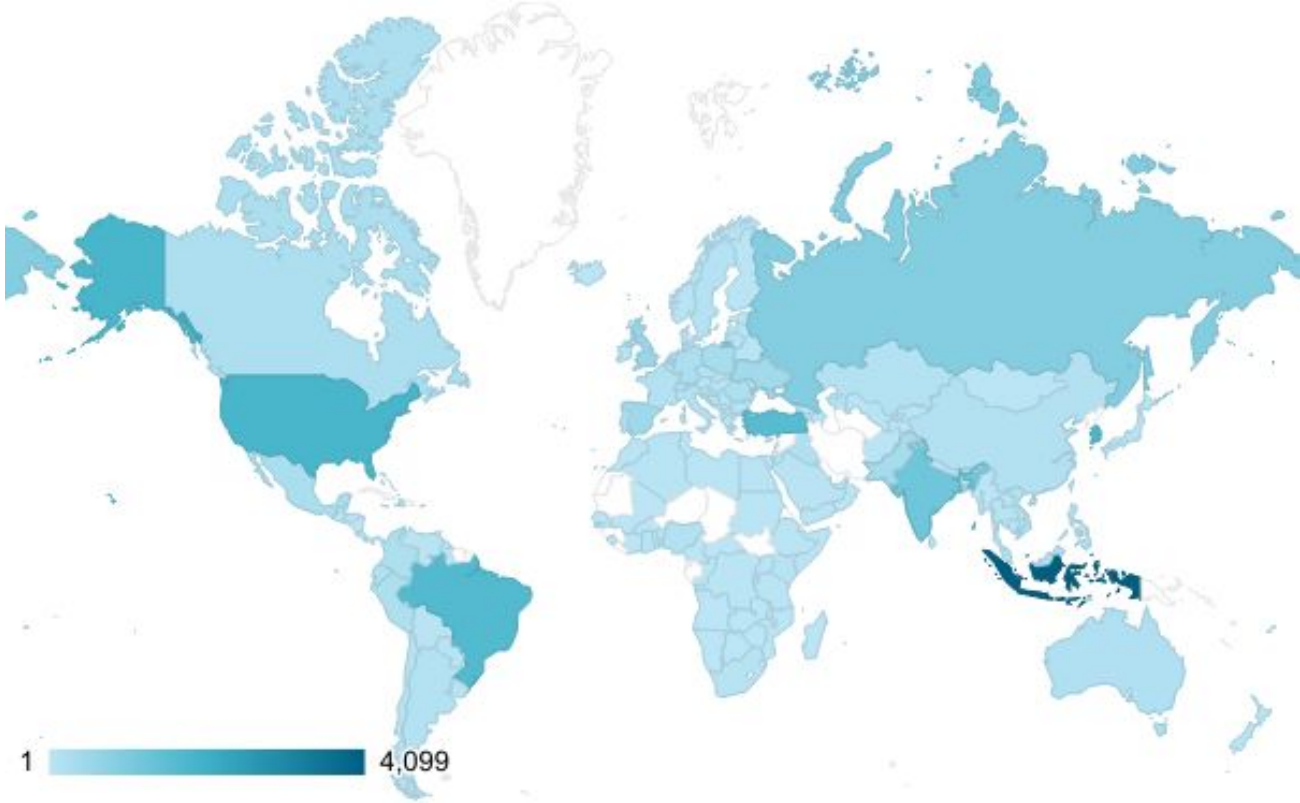


Analyse metadata to inform and understand research



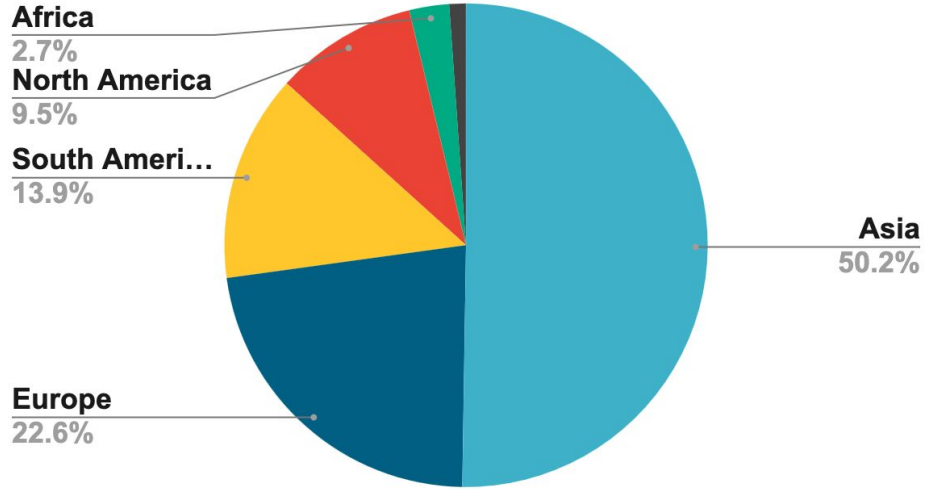
Co-create solutions to shared problems

A GLOBAL MEMBERSHIP



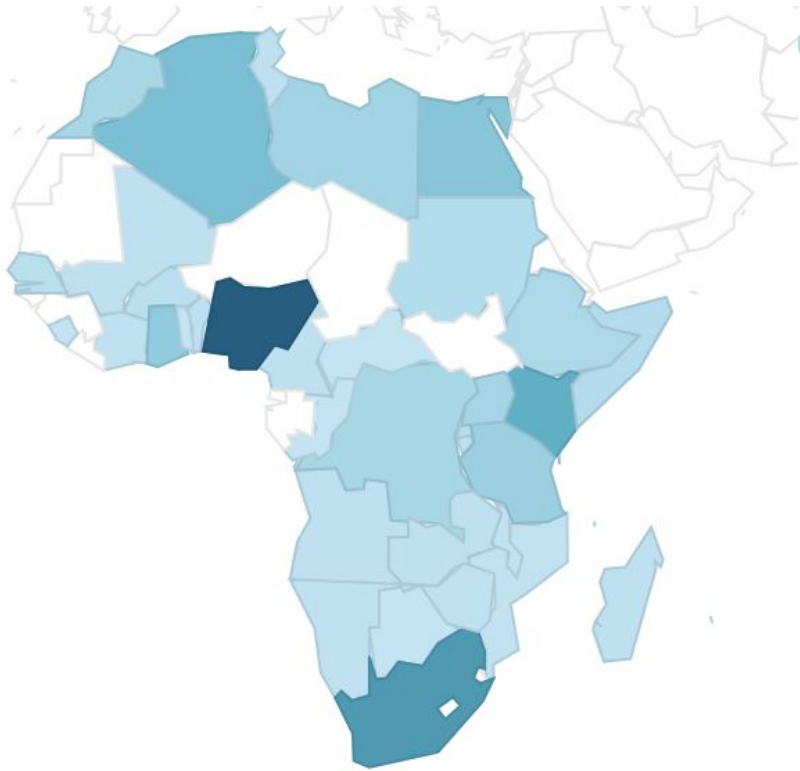
A GLOBAL MEMBERSHIP

No. Crossref members by continent



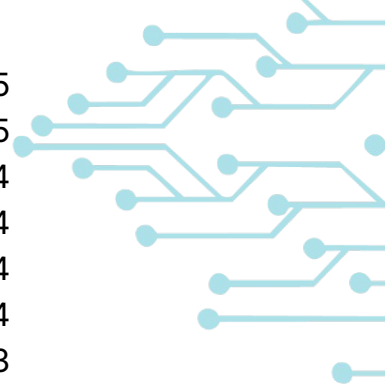
| Continent | No. members |
|---------------|-------------|
| Asia | 11,034 |
| Europe | 4,959 |
| South America | 3,043 |
| North America | 2,095 |
| Africa | 587 |
| Oceania | 244 |

AFRICAN MEMBERSHIP



AFRICAN MEMBERSHIP

| | | | |
|--------------|-----|--------------------------|---|
| Nigeria | 125 | Cameroon | 5 |
| South Africa | 79 | Zambia | 5 |
| Kenya | 62 | Mali | 4 |
| Algeria | 44 | Angola | 4 |
| Egypt | 35 | Madagascar | 4 |
| Ghana | 30 | Mauritius | 4 |
| Tanzania | 24 | Côte d'Ivoire | 3 |
| Libya | 20 | Namibia | 3 |
| Uganda | 18 | Burundi | 3 |
| Morocco | 17 | Zimbabwe | 3 |
| Congo, DR | 17 | Malawi | 2 |
| Ethiopia | 14 | Mozambique | 2 |
| Sudan | 11 | Sierra Leone | 1 |
| Somalia | 10 | Togo | 1 |
| Rwanda | 8 | Botswana | 1 |
| Senegal | 7 | Central African Republic | 1 |
| Burkina Faso | 6 | Congo | 1 |
| Benin | 5 | Comoros | 1 |
| Tunisia | 5 | Reunion | 1 |

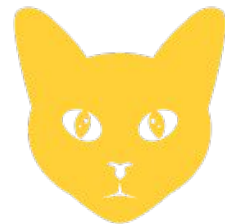


What is metadata?

Metadata is data that provides information about other data but not the content of the data itself.



WHAT KIND OF <METADATA>?



Basic: titles; dates; author names; abstracts; DOI; location URL

Full-text URLs: e.g. for text-mining and Similarity Check

Crossmark: updates, retractions, corrections, Retraction Watch data

Relationships: versions; translations; data; references; citations

Provenance: publisher/funder/steward information

Subject-specific: e.g. clinical trial info

Funding information: Funder IDs; award numbers; Grant IDs

Contributor & Affiliations: ORCID iDs and ROR IDs preferred

What does metadata do?

Research integrity

Metadata as signals of trustworthiness including provenance information

Reproducibility

Metadata as relationships between literature, data, software, protocols and more

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Assessment

Metadata can be used to analyze the outcomes of research and demonstrate compliance

Discoverability

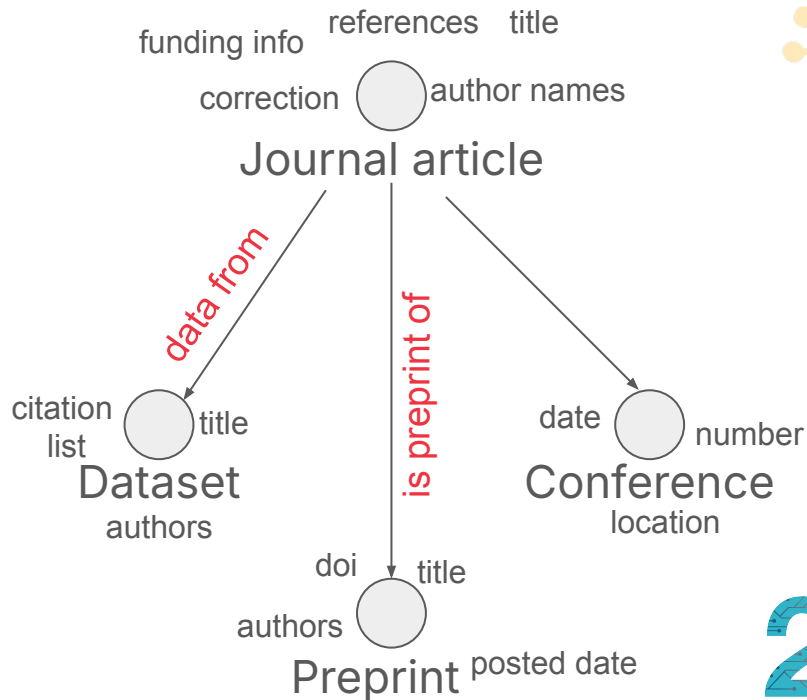
More metadata means more systems have more pathways to find your work

Metadata as part of the scholarly record

The outputs of the research and publishing process create a "scholarly record"

Each output has associated metadata

- evidence and context to help assess the integrity of the scientific and publishing process.



Metadata as trust signals

author names, ORCID iDs:

who authored the work?

what else have they authored?

affiliations: which institutes are the authors affiliated with?

dates: when was the work published?

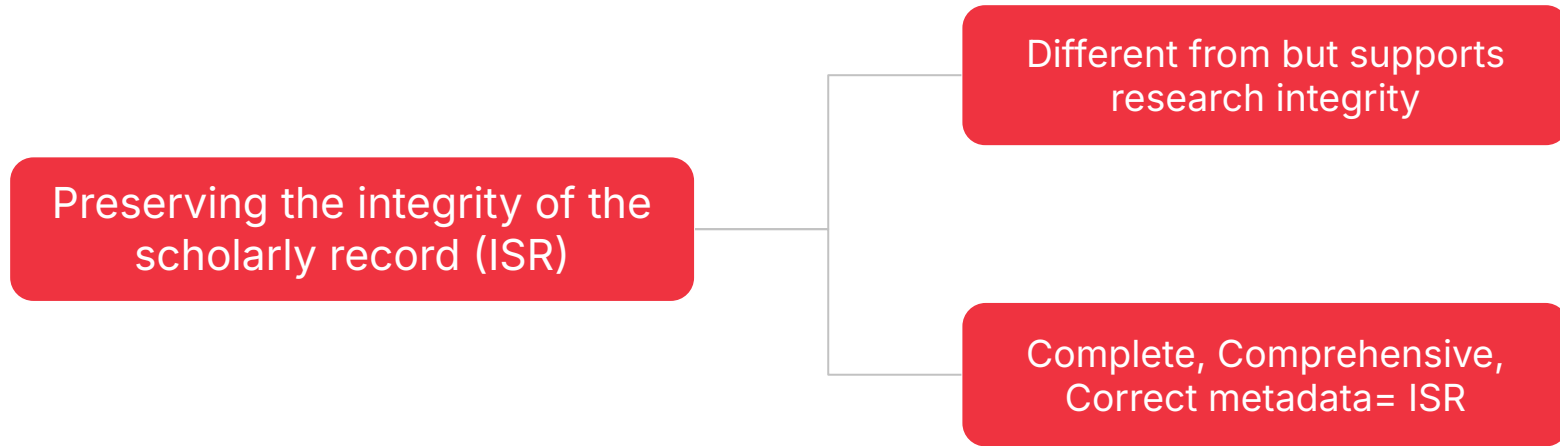
post-publication updates: was the work updated after publication?

funding information (award number, grant DOI): who funded the work?

relationships: how is a work related to a dataset to a preprint, to a software....

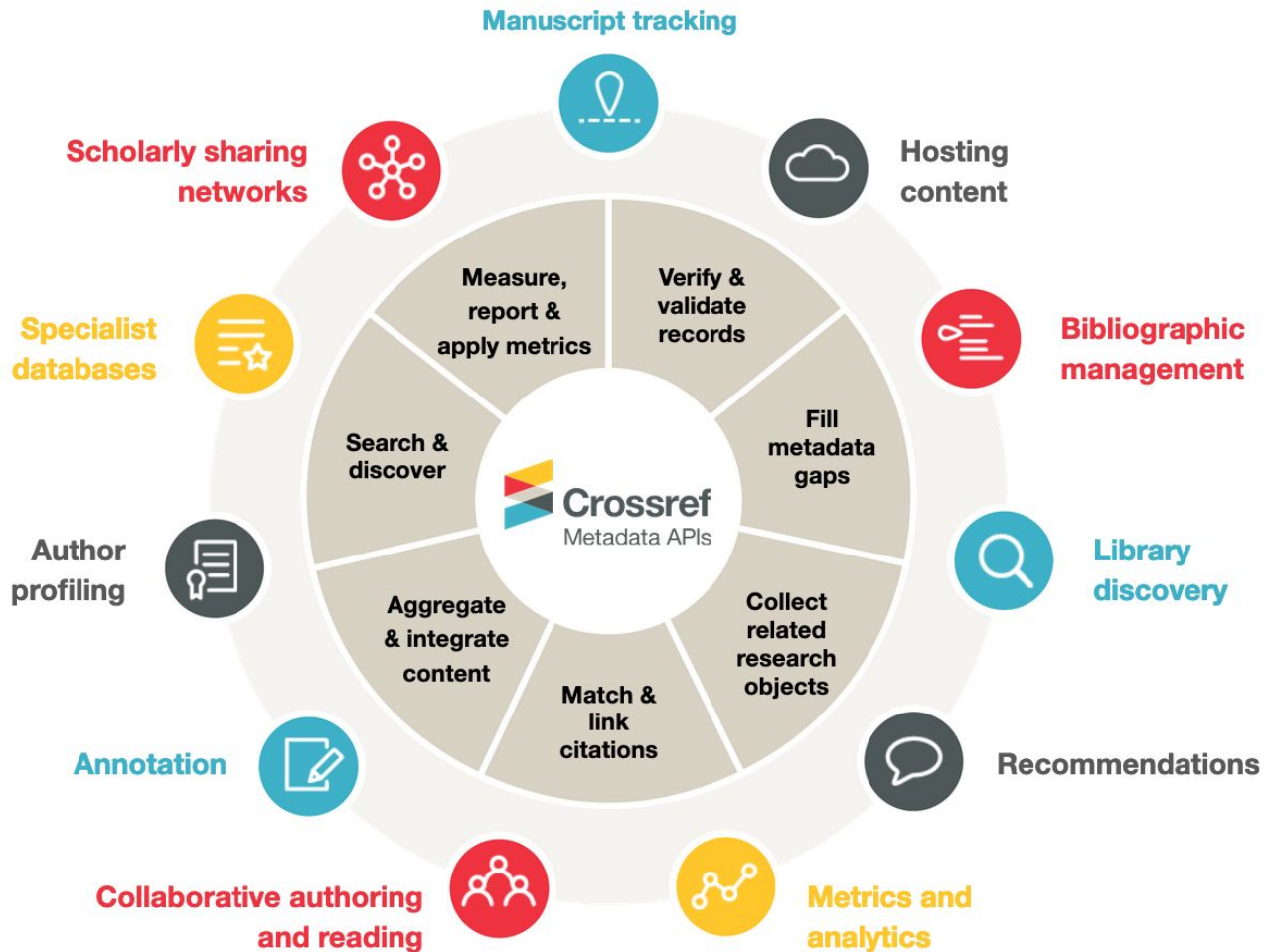


Integrity of the Scholarly Record (ISR)



Crossref provides infrastructure which enables those who produce scholarly outputs to provide metadata (effectively evidence) about how they ensure the quality of content and how the outputs fit into the scholarly record.

Who relies on Crossref?



Metadata enables connections



Metadata retrieval

The collective power of our members' metadata is available to use through a variety of tools and APIs—allowing anyone to search and reuse the metadata in sophisticated ways.

Similarity Check

A service provided by Crossref and powered by iThenticate—Similarity Check provides editors with a user-friendly tool to help detect plagiarism.

Crossmark

The Crossmark button gives readers quick and easy access to the current status of an item of content, including any corrections, retractions, or updates to that record.

Cited-by

Cited-by shows how work has been received by the wider community; displaying the number of times it has been cited, and linking to the citing content.

Metadata enables connections

<https://search.crossref.org/>

Search the metadata
of journal articles, books,
standards, datasets & more

[Search help](#)

Search funders connected to
published works with funding data

Open metadata for research integrity



Case study: Additional references in metadata

- Besançon *et al.*, 2023 compared bibliographic references between articles and references deposited by Technoscience Academy
- 5,978 additional references found in metadata of 3 journals
- Inflated citation counts for the cited references
- Crossref contacted the publisher member
- Publisher fixed the metadata to remove extra references

Open metadata at scale facilitates identification and correction of errors in the scholarly record!

What responsibility do I have as....

Authors: Include important metadata (ORCID iDs, ROR IDs) along with your submissions

Editors: Streamline journal policies, encourage and collect key metadata

Publishers: Register rich metadata for all your content items

Reviewers: Identify potential ethical issues such as plagiarism, data fabrication, or undeclared conflicts of interest.

Funders: Register your ROR funder IDs, and encourage beneficiaries to link the works.

We ALL have a part to play!!

Further Assistance?



@crossref.bsky.social



Crossref



Community Forum

<https://community.crossref.org/>



support@crossref.org

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Crossref
CELEBRATING 25 YEARS





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Thank You!