Modelling research output expressions : metadata schema modelling of publication lifecycles & scholarly entities

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Overview

1. Briefly explore the metadata application profile landscape of open scholarly repositories
2. Prior attempts to model expressions, relations, etc. of scholarly works
3. Growth of the persistent identifier graph (PID graph)
4. How the Rioxx: Research Output Metadata Schema (v3.0) is responding to a PID-centric and relational data reality
    - Brief exploration of Rioxx itself
5. Community reflection that the Rioxx experience, and reality, is prompting

Repository metadata context

- OOTB, repositories remain *very* good at making (scholarly) content discoverable
- OAI-PMH still a principal machine interface to repository content, despite alternatives (e.g. ResourceSync)
- History - my favourite subject - and the folly of 'simple' Dublin Core...
- Metadata profiles central to improved interoperability and semantics
- Harvesting, aggregation, discovery and... compliance

Profile examples...

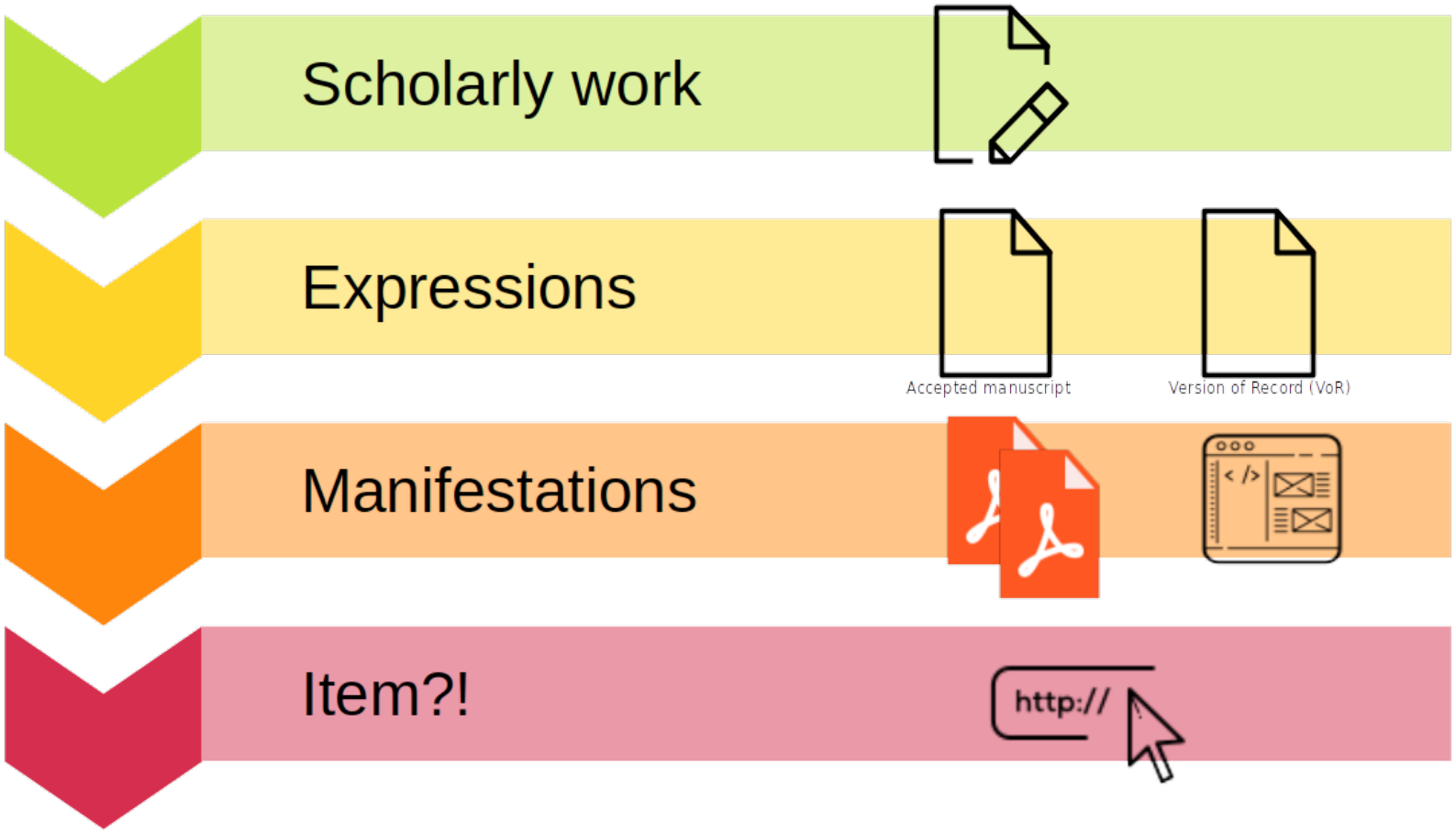
Prominent repository metadata applications profiles include:

- OpenAIRE (literature repositories)
- OpenAIRE (data archives)
- OpenAIRE (software)
- UKETD 2017 (EThOS)
- Scholarly Works Applications Profile (SWAP) - dead but not forgotten!
- Rioxx v2.0, more on this too!

In 2013

The good old days... 😄

...when publication lifecycles and scholarly entities were (*relatively*) simple...


Scholarly work
Expressions
Accepted manuscript
Version of Record (VoR)
Manifestations
Item?!
http://

SWAP circa 2008

SWAP: Scholarly Works Application Profile [1]

- Clear motivation; supported by Jisc
- Recognized importance of relations between entities, esp. funding
- Used FRBR! Yay!

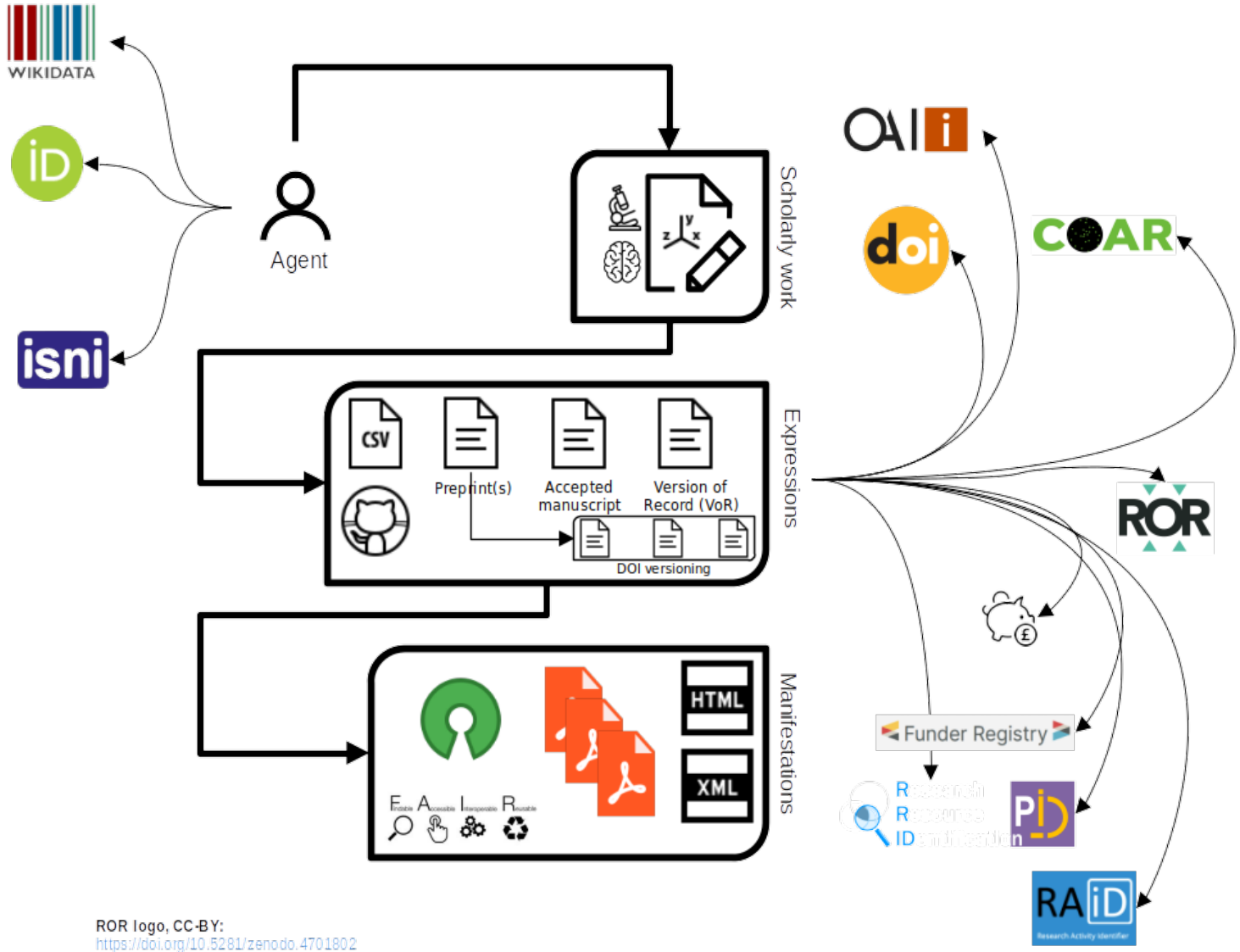
But never adopted by repositories

- Ahead of its time in 2008...?
- Difficult to implement within repository software
- Too esoteric for those working with scholarly digital content [2]
- Useful conceptual exercise but did not address machine discovery satisfactorily

2023

The future envisaged by SWAP is now the present, sort of...

...but this future is actually more *complex*...

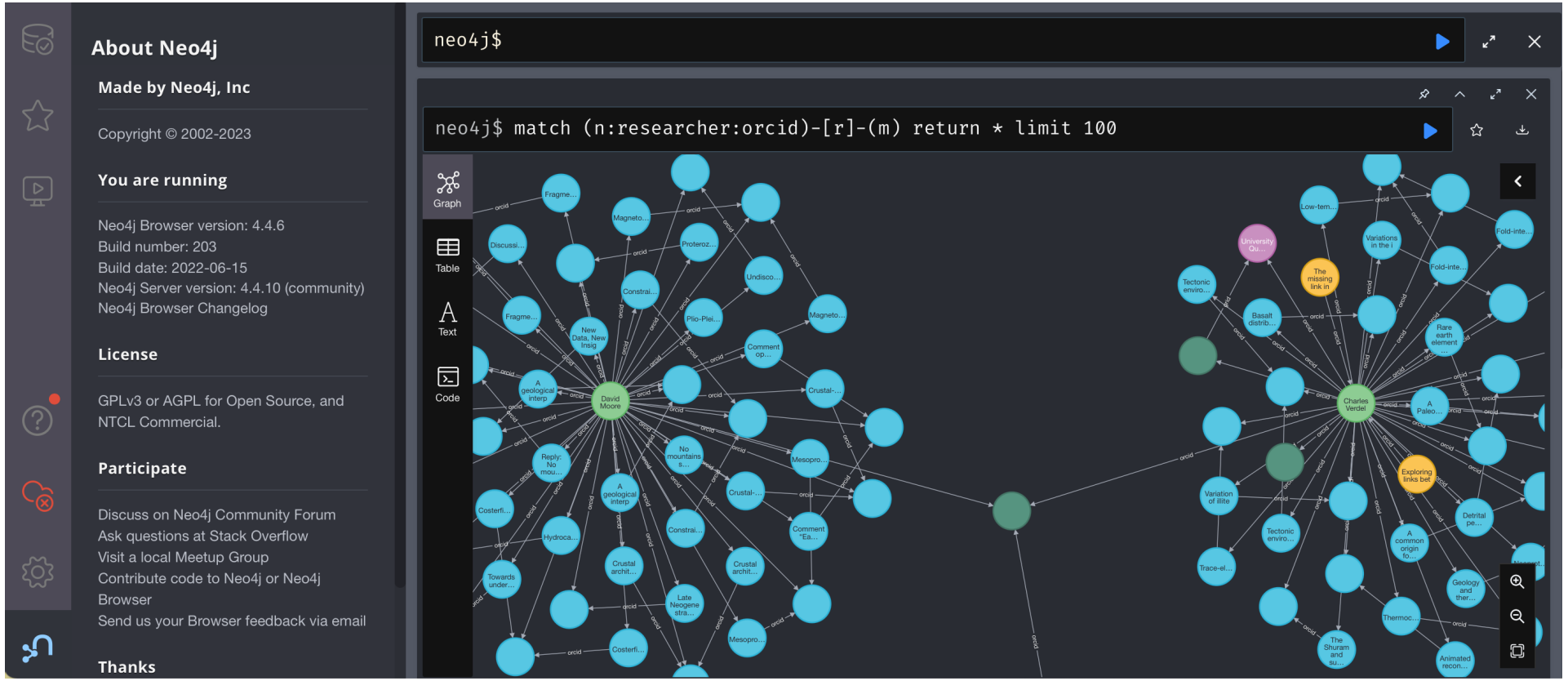


ROR logo, CC-BY:
https://doi.org/10.5281/zenodo.4701802

Trends in scholarly publication inescapable...

1. Need to respond to complexity while ensuring discovery advantages
    i. *Provenance & contextualization*
2. Enshrined in open research requirements of funders (Plan S, UKRI, G7)
3. *Reproducibility, verification, replication* -- scholarly record & the "reproducibility crisis"
    i. Growth of rights retention strategy (RRS), FAIR data, data management planning (DMPs)
4. Supporting the burgeoning 'PID graph'
5. Scholarly works as (unofficial) multi-part or multi-object outputs

TIB – Leibniz Information Centre for Science and Technology - PID Service (CC-BY)



Exploring the graph with Neo4j...

Rioxx

Rioxx: Research Output Metadata Schema

- Version 2.0 widely adopted since 2016; Dublin Core with extensions
- Discovery improvements, esp. in harvesting and aggregation [2] -- file location links critical [3]
  - Repositories default support of Dublin Core spectacularly ineffective for OAI-PMH harvesting of digital content
  - *Full-text harvesting request average for single resource using Dublin Core:*
  - **Digital Commons** (13K!!), **DSpace** (1.5K!) [3]
  - **EPrints** = 8. Better but 7 too many! [3]

Rioxx v3.0

Version 3.0

- Improves modelling of scholarly entities & relations
  - Borrows conceptual thinking from FRBR (as per Library Reference Model) (but not SWAP!)
- Capitalizes on discovery potential
- Better supports productive contribution to PID graph
- 'PID-ification '-- greater URI referencing & semantics
- Alignment with Signposting and ResourceSync
- Retains some semblance of 'traditional' notions of publication `:thinking:`

v3.0: Vocabularies, semantics, & PID types

(Beyond structure) language independent semantics conveyed by SKOS:

- COAR Resource Type Vocabulary
- COAR Access Rights Vocabulary
- COAR Version Type Vocabulary

Resource Type Label: '**observational data (English)**', '**gözlemsel veri (Türkçe)**', etc.

`http://purl.org/coar/resource_type/FF4C-28RK`

Broader concept: '**dataset**'

`http://purl.org/coar/resource_type/c_ddb1`

...

Referral to entities by URIs widely supported but anticipated PID types include:

- **Creators/Contributors**: *ORCID,* ISNI, VIAF, WikiData
- **Organizations**: ISNI, VIAF, WikiData - *ROR*, *FundRef*
- **Research activity**: *RAiD*

Optimum use of PIDs for reference and relational associations between related works and expressions to enrich PID graph and support discovery / contextualization

- (Can create issues with 'authority of assertion' - see tomorrow!)

Example snippets...

```
<rioxxterms:contributor>
    <rioxxterms:name>Bhopal, Kalwant</rioxxterms:name>
        <rioxxterms:id>https://orcid.org/0000-0003-3017-6595</rioxxterms:id>
        <rioxxterms:id>https://isni.org/isni/0000000038079210</rioxxterms:id>
        <rioxxterms:id>https://www.wikidata.org/wiki/Q61998297</rioxxterms:id>
</rioxxterms:contributor>
```

...

```
<rioxxterms:file
        coar_type="https://purl.org/coar/resource_type/c_6501"
        coar_version="https://purl.org/coar/version/c_ab4af688f83e57aa"
        deposit_date="2023-03-28"
        resource_exposed_date="2023-03-28"
        cite_as="https://doi.org/10.17868/strath.00084907"
        access_rights="https://purl.org/coar/access_right/c_abf2"
        license_ref="https://creativecommons.org/licenses/by/4.0/"
        format="application/pdf">
            https://strathprints.strath.ac.uk/84907/7/Jiang_etal_...on.pdf
</rioxxterms:file>
```

...

Introduction of `rioxxterms:relation`:

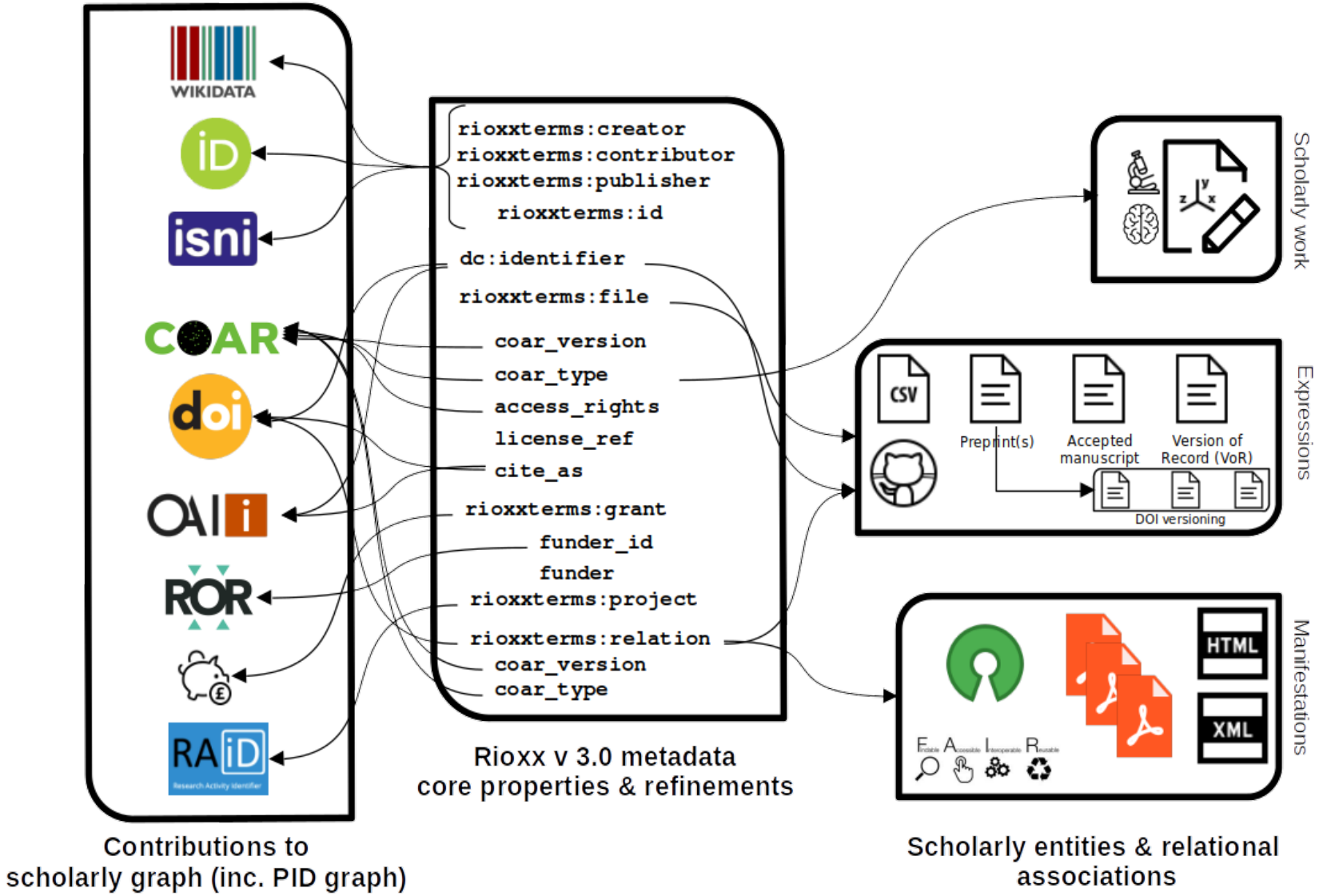
```
<!--Relation to VoR-->
<rioxxterms:relation coar_type="https://purl.org/coar/resource_type/c_6501"
    coar_version="https://purl.org/coar/version/c_970fb48d4fbd8a85">
            https://doi.org/10.1109/TGRS.2023.3262412
</rioxxterms:relation>

<!--...to research dataset(s) - simulation data-->
<rioxxterms:relation coar_type="http://purl.org/coar/resource_type/W2XT-701">
            https://doi.org/10.15778/RESIF.MT
</rioxxterms:relation>

<!--...to research data(s) - observational data-->
<rioxxterms:relation coar_type="http://purl.org/coar/resource_type/FF4C-28RK">
            https://doi.org/10.5880/fidgeo.2021.032
</rioxxterms:relation>
```

Some fuller but simple examples…

Example 1, example 2, example 3



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But, questions for the community?

Are 'traditional' notions of publication holding back the community when it comes to resource description in a more URI-centric and relationally dependent resource environment?

Possibly...

Attachment to outdated notions of publication? 🤔

Attachment to seeing things through the prism of the 'published version' (Version of Record - VoR)

- Distorts purer / richer metadata modelling of publication lifecyles and scholarly entities
    - Including Rioxx v 3.0
- Prism reinforces the primacy of publishers and dysfunction in scholarly publishing
- Reality is increasingly fluid and relational

Lack of technical understanding of URIs, PIDs, and relational linking? 🤔

The revenge of Linked Data and the Semantic Web...?

- Improved understanding of web technology necessary
- URIs, PIDs, relational linking and the role of distributed metadata
- Working for the benefit of machines as well as humans

Rioxx v 3.0

- Version 3.0, 2nd draft available
- Long road -- changes always to implement!
- Advocate for adoption - technical but also socio-technical
- JSON-LD serialization of Rioxx forthcoming

Thanks for listening!

Questions?!

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References

[1] J. Allinson, ‘Describing Scholarly Works with Dublin Core: A Functional Approach’, *Library Trends*, 57 (2), pp. 221–243, 2008. Accessed Jul. 18, 2023.

[2] E. O’Neill and M. Žumer, ‘FRBR: Application of the Model to Textual Documents’, Libr. Resources Tech. Serv., 62 (4), Art. no. 4, Oct. 2018. Available: https://doi.org/10.5860/lrts.62n4.176

[2] P. Knoth and B. Notay, 'UKRI OA policy requirements for repositories and how to meet them', presented at the *Jisc Workshop, 2021*. Accessed: Jul. 18, 2023.

[3] P. Knoth, M. Cancellieri, M. Klein, 'Comparing the performance of OAI-PMH with ResourceSync', *The 14th International Conference on Open Repositories (OR2019)* June 2019. Universität Hamburg, Hamburg. Accessed: Jul. 18, 2023.

Questions

Thanks for listening!