Data Curation: Technical Challenges Facing Repositories

Brianna Marshall

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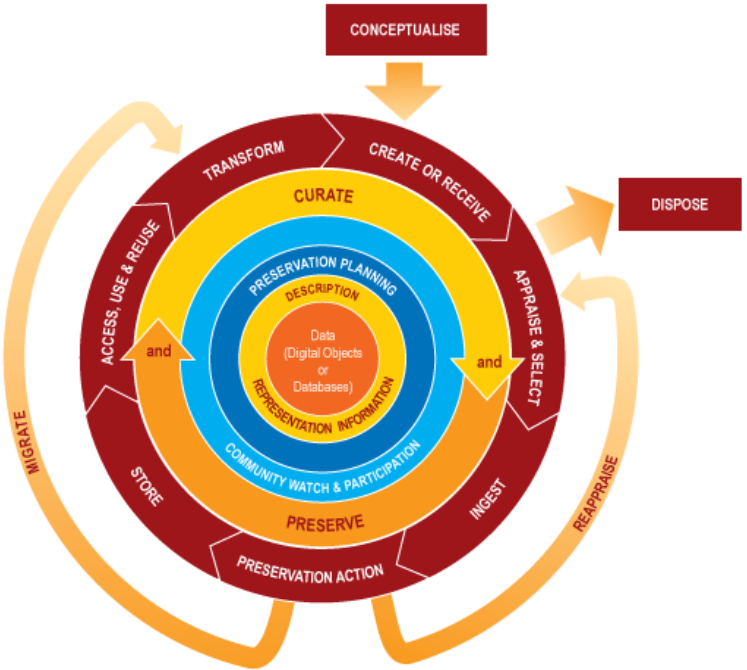
Defining digital curation

“Maintaining and adding value to a trusted body of digital information for current and future use; specifically... the active management and appraisal of data over the life-cycle of scholarly and scientific materials.”

-Digital Curation Centre

DCC Curation Lifecycle Model

1. Create or receive
2. Appraise and select
3. Ingest
4. Preservation action
5. Store
6. Access, use, and reuse
7. Transform



Broad data curation challenges

- Data are heterogeneous
  - Formats
  - Size
  - Complexity
  - Fixity

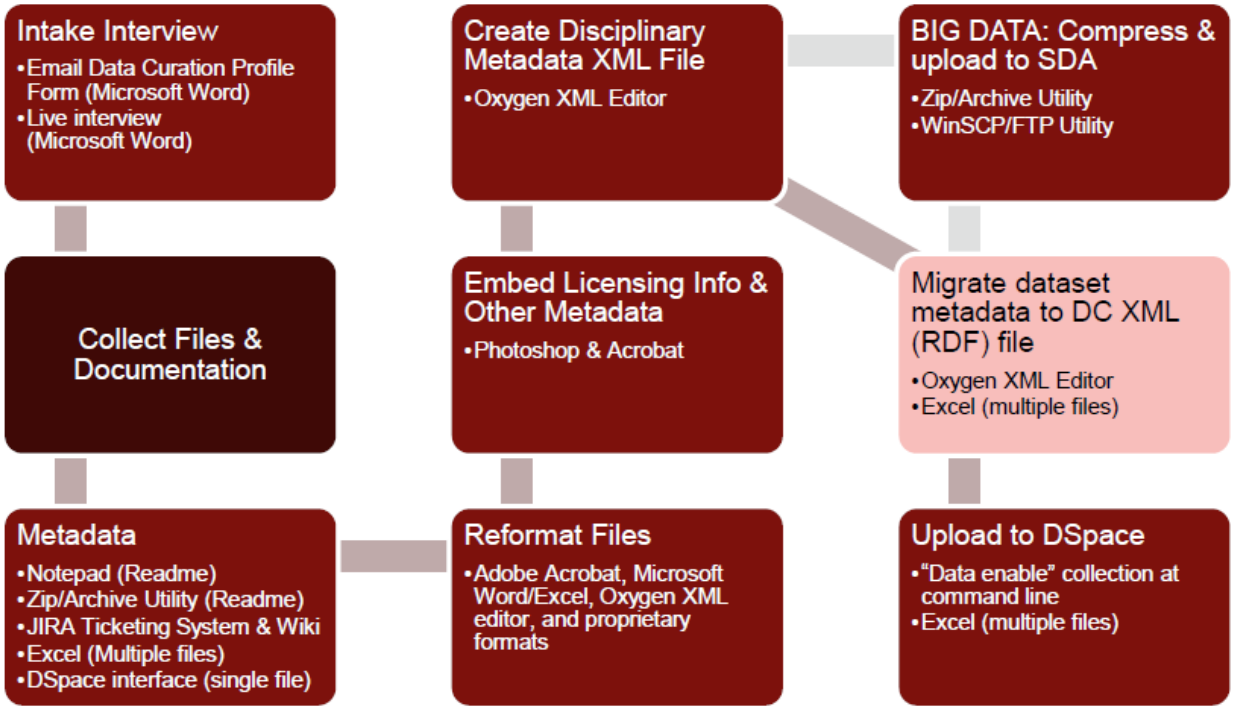
Broad data curation challenges

- For most IR platforms, data is an afterthought
  - Created initially for electronic theses and dissertations (ETDs), other publications
  - Not intended for active data collection

The real problem

So much of the active data curation that takes place is *outside* the repository.

Example workflow (IU)

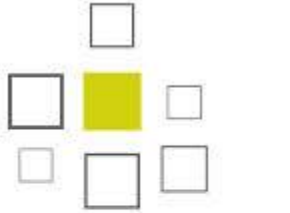


Konkiel, Snajdr, Marshall; LITA 2013

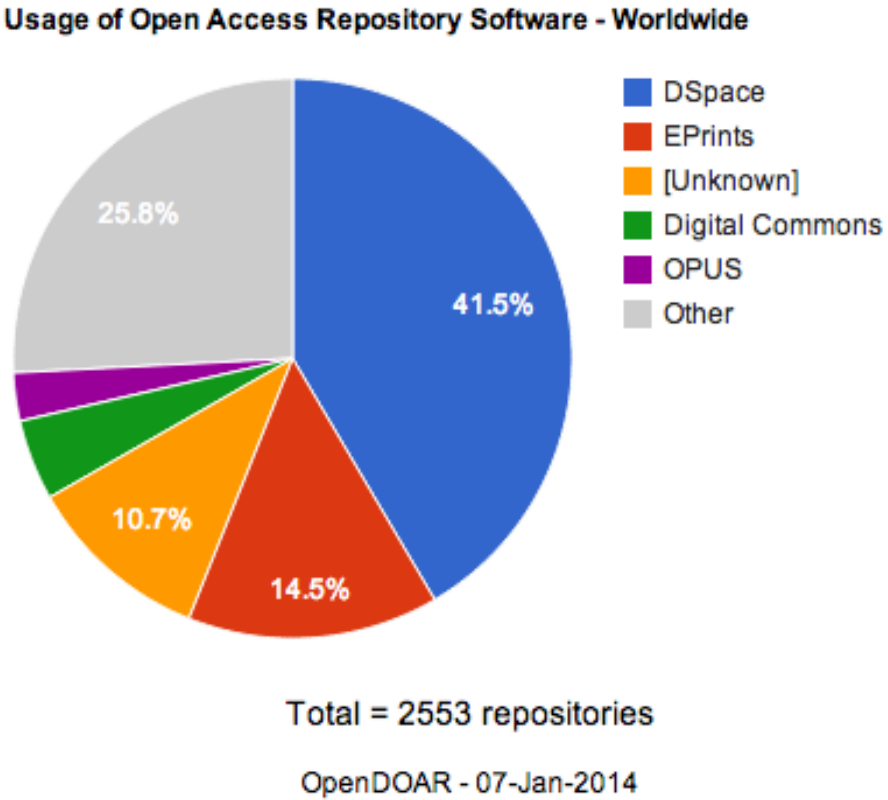
Worth pondering...

- Should we build additional technical functionality into a repository?
- Or just create better workflows between repositories and data curation tools?
  - Electronic lab notebooks
  - Data Curation Profiles Toolkit
  - DMPTool

Existing repository platforms



D SPACE



http://www.opendoar.org/

What are repositories doing well?

- Storage & access
- Indexing items for search engine discoverability
- Authentication / authorization
- Time-based access control (embargoes)

Researchers need more, though

- Persistent identifiers
  - For datasets
  - For data creators (disambiguation)
- Metadata
- Altmetrics
- Improved data ingest

Persistent identifiers

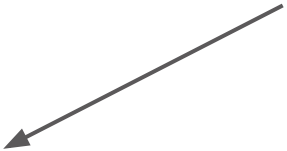
- DOIs
  - Growing push to cite datasets (DataCite)
  - Data sharing proven to increase citations (Piowawar & Vision, 2013)
  - DSpace 4.0 now offers DOIs in addition to handles

Author identifiers (disambiguation)

Metadata

- Currently, Dublin Core is default
- Why not the DataCite metadata schema?

ID	Property
6	Subject (with scheme attribute)
7	Contributor (with type attribute)
8	Date (with type attribute)
9	Language
10	ResourceType
11	AlternateIdentifier (with type attribute)
12	RelatedIdentifier (with type and relation type attributes)
13	Size
14	Format
15	Version
16	Rights
17	Description (with type attribute)



AlternateIdentifier

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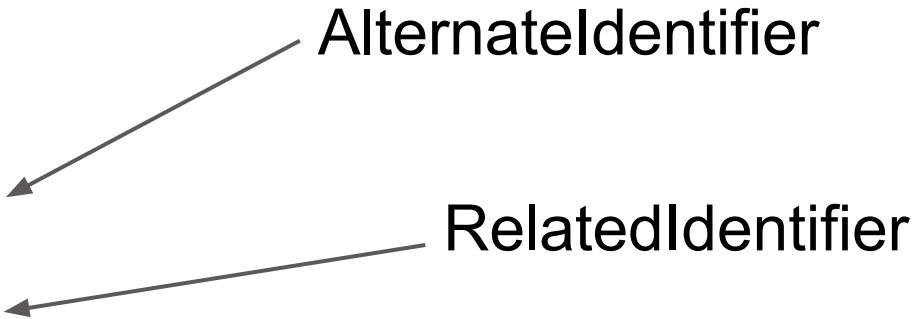

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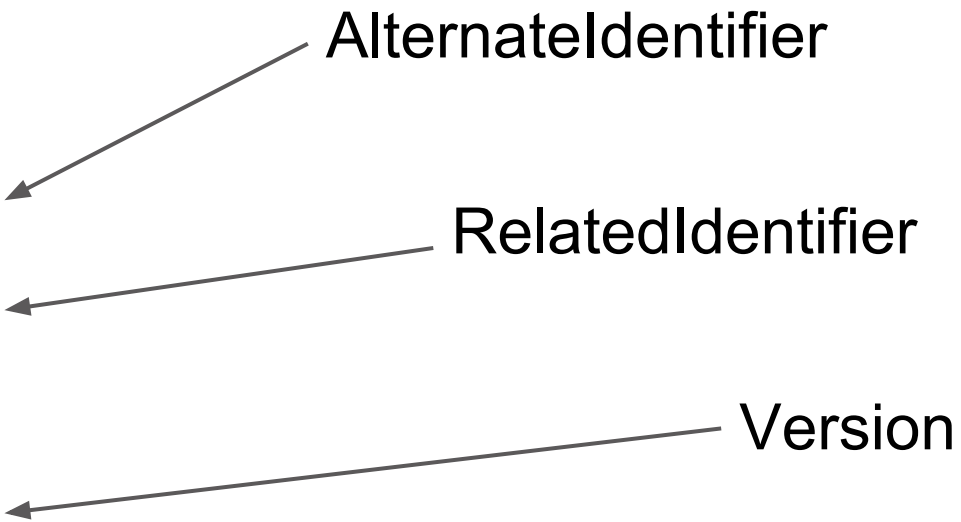

ImpactStory.

Tracks:

- Scholarly impact
- Bookmarking
- Blog mentions
- Popular impact
- News outlet mentions

(Konkiel, 2013)

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Science Policy

Data reuse and the open data citation advantage

Heather A. Piwowar [1,2], Todd J. Vision [1,2,3]

PubMed ID: 24109559

Note that a PrePrint of this article also exists.

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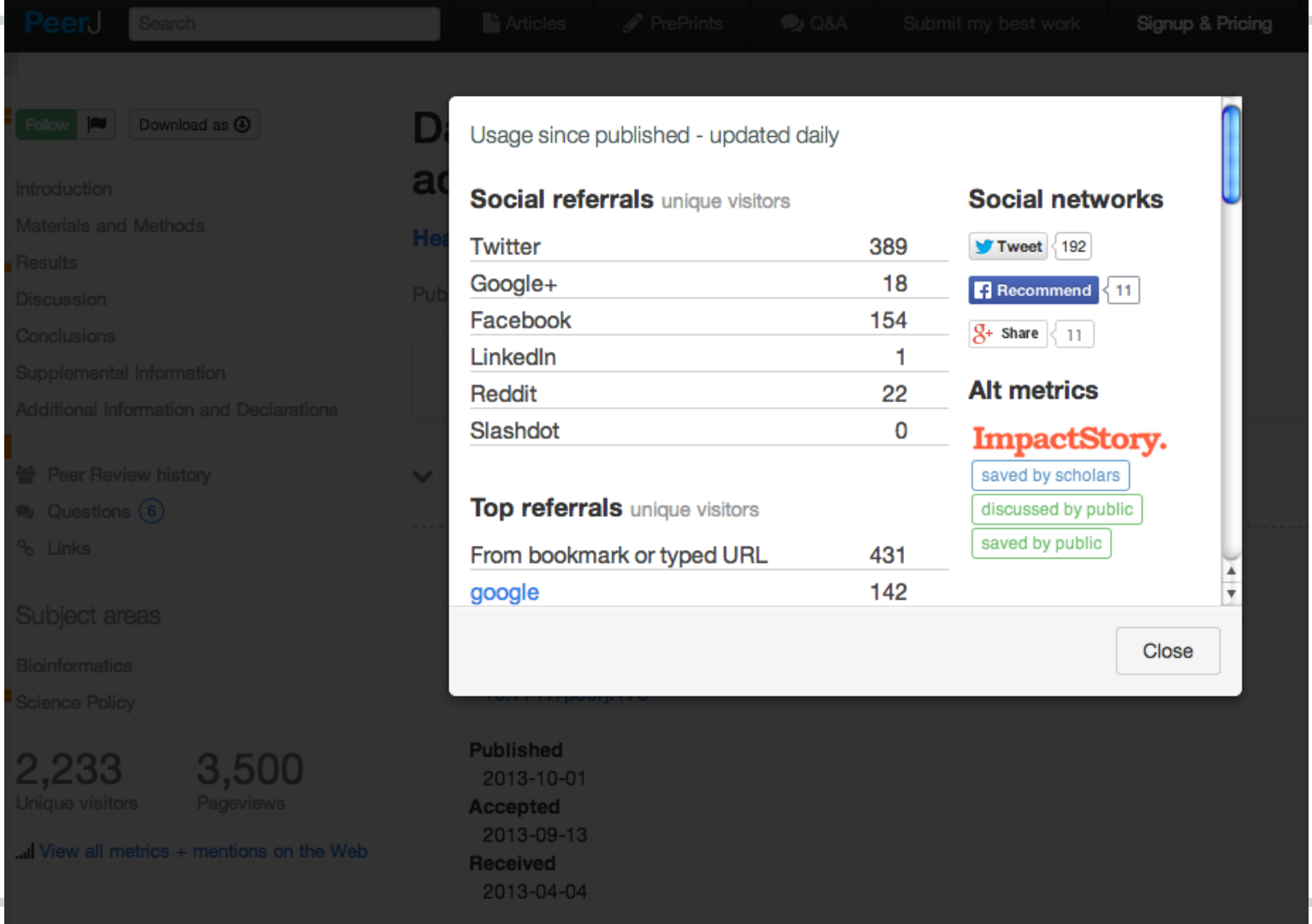
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3,500
Pageviews
View all metrics + mentions on the Web
Usage since published - updated daily
Social referrals unique visitors
Twitter 389
Google+ 18
Facebook 154
LinkedIn 1
Reddit 22
Slashdot 0
Top referrals unique visitors
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google 142
Social networks
Tweet 192
Recommend 11
Share 11
Alt metrics
ImpactStory.
saved by scholars
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Data ingest

- Current workflows are clunky and inconvenient
  - Command line or manual ingest
  - Batch ingest usually undertaken by institution
- Could benefit from integrations with researchers' local hard drive

So how did we get here?

- Dealing with the data deluge is new, overwhelming - no easy answers
- Institutions become “locked in” to the quirks of their particular repository system
- Takes developer time, either to adapt others’ code or create from scratch

New data curation models

- Hydra
  - ScholarSphere (Penn State)
  - Curate/Shared IR collaboration
    - "A Next Generation IR solution with emphasis on flexibility and responsiveness to emerging needs. Of particular priority will be the ability to accept and manage highly complex objects and **research data**." (https://wiki.duraspace.org/display/hydra/Shared+IR+project)
    - SHARE (SHared Access Research Ecosystem)
- Separate repositories for digital content
  - Purdue University
  - IUPUI
- Partnerships with external data repositories (Dryad)

Final thoughts

- Repositories are a crucial aspect of data curation, but they can’t do it all
- Current IRs enable storage and access… less so other aspects of data curation
- Overall, repository functionality must continue to adapt and anticipate researchers’ needs
- There is no one perfect solution (yet)

Resources

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Piwowar, H., and Vision, T. (2013). “Data reuse and the open data citation advantage.” *PeerJ*1:e175 http://dx.doi.org/10.7717/peerj.175

Thank you!

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