

arXiv and IR interoperability improvement plan - DRAFT

The following plan identifies a number of possible changes to support improved interoperability between arXiv and Institutional Repositories (IRs). The proposals have been identified based on input from SAB members and their delegates. A number of proposals relate to helping IRs and arXiv support various open access mandates, and thus correspondences with the requirements of US NSF, EU OpenAIRE, and UK HEFCE guidelines are also highlighted. Features have been placed in approximate order of proposed implementation based on impact and feasibility.

1. Add support for funding information

Sources: UK HEFCE mandate (Michele Ide-Smith, Danny Kingsley (Cambridge)), EU OpenAIRE compliance (Eva Isaksson (Helsinki)), US NSF mandate

The general need is to provide machine readable information about funding sources related to an article. It should be possible to describe zero or more funding sources by funder and the funder's identifier, but there is not a need to be able to describe the level or type of support. Proposal:

- Support additional metadata to specify funder and award number for zero or more funding sources.
- The funding body and possible sub-organization should use a standard, machine-readable taxonomy. We should use the FundRef registry of funders which is made openly available by CrossRef (http://www.crossref.org/fundref/fundref_registry.html).
- Include funding data in the arXiv metadata feeds (OAI-PMH and ResourceSync).
- Make funding metadata searchable both via the human search interface (<http://arxiv.org/find>) and the machine API (see <http://arxiv.org/help/api/index>).

2. Provide the ability to record the status/version of an article

Sources: UK HEFCE mandate (Michele Ide-Smith, Danny Kingsley (Cambridge))

The UK HEFCE mandate requires both indication of article status, with particular importance given to the “accepted manuscript” status in which case the “acceptance date” must be known. Support for this would require facilities for authors to (optionally) specify the manuscript status according to the NISO JAV vocabulary. Additionally the acceptance date is required for accepted status articles (JAV values AM,P,VoR,CVoR,EVoR). This introduces new UI requirements in arXiv and policies regarding whether the status and/or date can be changed without creating a new article version. There is some risk of problem authors misusing status indicators and thus questions about policing their use. Proposal:

- Develop policy for whether status metadata can be edited separately from creating a new article version.
- Support additional metadata to specify article status according to JAV vocabulary and optionally the acceptance date (granularity may be day, month or year).
- Include status data in the arXiv metadata feeds (OAI-PMH and ResourceSync).
- Make status metadata searchable both via the human search interface (<http://arxiv.org/find>) and the machine API (see <http://arxiv.org/help/api/index>).

3. Provide the ability to find articles based on author affiliation

Sources: Eva Isaksson (Helsinki), Joy Painter (CalTech), NSF mandate (author identifiers)

The general need to find, and perhaps import, articles by authors at an institution. This is currently not well supported by arXiv. There is very little affiliation information in the current arXiv metadata and search by author is string based so, even if given a list of authors to look for, results are not reliable. There are a number of possible approaches which we may follow in parallel but the key is the use of identifiers for authors and/or affiliations in arXiv. Implementation of a complete solution will be a considerable undertaking, but it would be possible to focus on author identifiers first to develop a partial solution.

3.1 Use ORCID identifiers

We have recently implemented association of arXiv accounts with ORCID iDs (2015-01, <http://arxiv.org/help/orcid>). This has been deployed in “soft start” mode and is working well. More work is required to promote the facility to encourage uptake (as of 2015-04-15 about 1800 users have associated ORCID iDs with their accounts). ORCID iDs provide the possibility of accurate search for contributors but requires that articles be tied to user accounts. This will not achieve 100% coverage because not all authors have user accounts (e.g. the submitter must but co-authors need not). Proposal:

- Promote ORCID iD association within arXiv (for example by prominently suggesting association on the user page).
- Deprecate the “arXiv author id” (http://arxiv.org/help/author_identifiers) in favor of ORCID iDs. Preserve the facility as a form of local/vanity URI but make ORCID association primary and have an ORCID form on the author id page URI.
- Improve facilities for claiming and associating articles with user accounts so that this is easier for co-authors to do so (also requires migration of old PHP code that is part of the 2015 roadmap).
- Add search by ORCID iD to the human search interface (<http://arxiv.org/find>) and the machine API (see <http://arxiv.org/help/api/index>).
- Add display of ORCID iD based links to the article splash pages in parallel with the current sting search (perhaps use the little ORCID green-circle icon/logo).
- Include ORCID iDs in the arXiv metadata feeds (OAI-PMH and ResourceSync).

3.2 Improve collection of author and affiliation data at submission time

The current article submission interface has a single data entry box labeled “Authors” which accepts author and affiliation data in various forms (see <http://arxiv.org/help/prepare#author>). Support for affiliation data is limited and such information is supplied only for a small minority of submissions. The internal metadata structures of arXiv have just a single field to store this information although in human and machine interfaces attempts are made to parse the data to separate authors and affiliations (not 100% reliable by quite good with the help of occasional manual corrections to formatting). Ideally, arXiv would have for each article a list of authors, each with name and identifier, and for each author a list of affiliations, again each with name and identifier. Building submitter and admin interfaces to enter and edit this data, and changing the internal metadata structures to support it, would entail considerable work. A danger is that an unwieldy, cumbersome or time consuming user-interface could impede or deter submission, or result in bad data. Thorough UX design and testing would be essential. Proposal:

- Study user-interfaces in other repositories and in journal systems to understand the state-of-the-art for entry of author and affiliation data.
- Develop policies for information required for arXiv submissions including: are identifiers required for all authors? must they be validated? are affiliations required for all authors? what identifiers should be used? what freedom is provided in the form of affiliation name?
- Develop user and admin interfaces to enter and edit author and affiliation data, including identifier lookup.
- Extend metadata model to support extended author and affiliation data.
- Understand migration of legacy data to new formats.
- Adjust search and browse interfaces to support improved data and facilities that leverage it.
- Adjust data export and other machine interfaces to support improved data (e.g. OAI-PMH, ResourceSync, arXiv API, RSS).

3.3 Clean historical author and affiliation data

arXiv has over a million articles with author, and sometimes affiliation, data in a simple string format. It is impractical to consider centralized manual cleanup of this data. However, once there are better structures available to store author and/or affiliation data, there could be a mix of some semi-automated cleanup and perhaps user-sourced cleanup facilities. This work could only be scoped after improvements in the metadata, submission and admin infrastructure.

4. Improve license information for arXiv articles

Sources: Eva Isaksson (Helsinki), EU OpenAIRE compliance, NSF mandate

In order to understand the conditions for reuse or possible import into a local repository the license associated with the article is required. Currently this information is available in the OAI-PMH metadata only in some metadata formats and only for articles submitted after 2004. Most of the infrastructure is already present in arXiv so changes to meet these needs would be relatively easy to implement. Proposal:

- Add license information to the article splash page (at least for CC licenses).
- Add license information to OAI-PMH for all articles.
- Add license information to OAI-PMH metadata in `oai_dc` format in `dc:rights` element.
- Consider adding license as a possible search term in arXiv API and human search.

5. Automated deposit from arXiv to IR

Sources: Joy Painter (CalTech), perhaps fits some needs expressed by Eva Isaksson (Helsinki)

Likely depends on availability of license information (already in OAI-PMH data for all new articles, section 3) and better way to find articles by author and/or affiliation (section 4). It is almost certainly best to approach “automated” as a pull from the institution running the IR with some means to find new material (e.g. OAI-PMH, API), because this avoids complex permissions issues of arXiv pushing to a remote IR.

Except for the issue of finding articles by author and/or affiliation, arXiv already provides all the infrastructure needed to develop such a deposit. The best approach would likely be a stand-alone application that polls or queries arXiv for appropriate content, has rules about licenses or agreements with individuals to allow, creates requests to extract the source and/or processed files from arXiv, has configuration for the local IR ingest interface (SWORD perhaps), and can then push directly or stage in local IR workflow. Development of such an application could be done by non-arXiv staff.

6. Communication and collaboration issues

The following issues are either not related to arXiv features, or are currently not well enough motivated or described to implement.

6.1 arXiv updates and Elsevier’s Pure system

Eva mentions the problem of not knowing about updates to arXiv articles which have been imported into local systems via Elsevier’s Pure tool and its import option. Updates from arXiv can be detected via the OAI-PMH interface (and ResourceSync data fed to SHARE) so the issue here is perhaps the need to have the Pure team understand the user need and for us to provide any help understanding arXiv updates.

6.2 Use of arXiv links in LibGuides

Eva: “Another (minor) bother is linking arXiv to our LibGuides system. I’ve had to resort to writing the links as direct HTML code to make them suit my needs. Getting a RSS feed is ok but otherwise it is pretty difficult to customize the links.” Need to follow-up to better understand this issue.

6.3 Comments from IR staff at LANL and U. Alberta

The following comments need a little unpacking to understand the use cases being imagined. Most of the facilities mentioned are supported to some degree:

- 1) A nice clean, well documented RESTful API.

What API facilities are required? OAI-PMH (<http://arxiv.org/help/oa/index>) is good for metadata harvest. It is not RESTful but it is widely used and well documented. We are experimenting with ResourceSync (used by SHARE) as a replacement for OAI-PMH harvesting which is web-centric and RESTful. The arXiv API (<http://arxiv.org/help/api/index>) is good for search and real-time access, it is also RESTful and well documented.

- 1a) U. Alberta adds request for JSON

I don’t think JSON is a very good option for the harvesting use-case, but having arXiv API data available in JSON seems like a good idea to support interactive use from within JavaScript. Use cases would help to understand priority.

- 2) A standard protocol such a SWORD would be good

arXiv supports SWORD (http://arxiv.org/help/submit_sword) though it is the 1.3 profile which is now a little dated.

- 3) Ranged date queries are a must to query repeatedly over time

Range queries are supported in both OAI-PMH (for incremental harvest), and in the arXiv API.

- 4) Metadata standards should be simple and widely used (ie. Dublin Core)

The OAI-PMH interface offers Dublin Core and provides additional formats to express more detailed information. The arXiv API uses Atom metadata with arXiv extensions.

- 5) URIs such as a DOI are a must

All arXiv articles have internal URIs. DOIs are expressed in URI form where available.

- 6) Institutional Affiliation needs to be easy to determine, this could be hard given the variety of ways authors find to enter this.

This is not currently supported and is among IR interoperability requests. See section 3 above.

- 7) If a resource has multiple files or a variety of formats, a standard such as METS would be good.

It would be good to understand the use case here. Multiple files in the source package are available as a tar file (see: <http://arxiv.org/help/unpack>). Since there is no additional metadata per-file or structure to described, it is not clear what benefit METS would offer. Currently different formats are available at different URIs and it is not clear that packaging them together would be helpful to many users.

- 8) This may be out of scope, but preservation metadata would be useful if available.

All the metadata we have is made available. We could consider storing and exposing additional fixity or digital-signature metadata to support preservation and other services built on top of arXiv.

Document history

- 2015-04-15 - First draft [Simeon]