Electronic journals and link resolver implementation

OpenURL link resolvers are becoming more readily available. Many libraries are considering, or are in the process of, implementing this application. A link resolver is not a 'set up once and forget about it' application. It does require commitment in its implementation and ongoing maintenance to yield the full benefit. The aim of this article is to share our experiences and considerations in the management of e-journal access in conjunction with the implementation of a link resolver. How link resolvers helped to simplify document delivery and the practical issues involved in implementation at Unilever are also discussed.

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Introduction

Unilever's laboratory at Colworth is home to over 700 scientists, technologists, legal professionals and support staff. The Colworth Information Centre provides this community with access to a wide variety of scientific, patent and popular information. As in many industrial establishments, there is a constant tension between providing a quality service and cost reductions. With a core team of three individuals providing a comprehensive information, library and training service, it is crucial that investments in new technology are carefully considered and deliver value-driven cost efficiencies. The aim of this article is to share our experiences and considerations in the management of e-journal access in conjunction with the implementation of a link resolver.

The library service moved to e-journals for a number of reasons. Firstly, to shorten the supply chain between the requester and the document supplier and to obtain articles as quickly as possible. Secondly, to better serve Unilever scientists who like the immediacy of e-access, and thirdly, to achieve cost benefits and efficiencies arising from a smaller library footprint. It was therefore decided to investigate open linking to facilitate the effective use of e-journals, accessed from existing database applications. A federated search engine as the primary access to the link resolver was also investigated but this study is not included in the scope of this article.

Link resolvers

A link resolver is an application that generates a URL that will navigate the user to a full text article. The link resolver is fed with key bibliographic information in order to generate a link. It should have the flexibility to link to a web resource at various levels: direct to the full text, a table of contents or a journal's home page. The URL may take the user direct to the publisher's web site, or perform a CrossRef (http://www.crossref.org) search to identify the Digital Object Identifier (DOI) and then link to the article via the DOI (doi.org). A link resolver can also be used to generate a web search if the target web search engine supports the submission of a search string within a URL.

The following are significant issues which need to be considered when populating a link resolver. Careful consideration of these will reduce implementation times.

- Is your institution legally entitled to link directly to an article? Check licensing agreements carefully to verify that links to the full text of an article can be made.
- Where should the link be directed? Publisher, aggregator or CrossRef? There are pros and cons for using each or every way to access e-journals, dependent on many different factors including cost, administration overhead and user requirements.

- Free with print journals, open access content and open access journals:
  free journals sound appealing but are they worth the administration overhead?
- Linking to different full text formats: if a consistent look is required when displaying a full text article, the possible formats for article presentation need to be checked.
- How is the full text provider authenticated? Depending on the technical implementation for e-journal access by the host site, access to an article via certain paths may be denied.

These factors are now examined in more detail below.

Legal issues

The e-journal licence or contract will clarify whether or not your institution has permission to link directly to the full text. It is usually necessary to link to the journal home page and then navigate down to an article. It is common practice for many databases to link directly to an article; this is because there is an agreement between database producers and publishers to display these links.

Licence contracts should be checked to establish what is permitted. Alternatively the publisher's web site is a useful resource. Permission must be sought from any publisher that either does not grant permission or whose position is unclear. Permission may be required directly from the publisher or via a subscription agent. There are a few publishers who do not permit direct linking to an article. The American Institute of Physics, for example, has adopted this policy.

Where should links be directed?

The administrative burden of the journal linking within the link resolver is eased with fewer suppliers. Every journal requires an entry to define its e-journal details. These are used to check and generate the URL. If the same method is used for creating a URL, only one or two journals need to be tested to ensure that the links are working. The following example illustrates the many ways to link to a full text article:

Links can be created from a bibliographic citation or reference. For an article published in the journal *Plant Physiology* (Print ISSN: 0032-0889, e-ISSN: 1532-2548) one can link to an e-article at different levels via alternative routes.

Bibliographic information for the article
wCLUTO**: A** web-enabled clustering toolkit
Rasmussen MD, Deshpande MS, Karypis G, Johnson J, Crow JA, Retzel EF
Plant Physiology, October 2003; 133 (2): 510–516
DOI: 10.1104/pp.103.024885

The following are examples of the citation as OpenURLs all to the same article using volume, issue and start page.

Publisher journal site links:
http://www.plantphysiol.org/cgi/content/full/133/2/510 (to HTML full text)
http://www.plantphysiol.org/cgi/reprint/133/2/510 (to PDF full text)
http://www.plantphysiol.org/cgi/content/abstract/133/2/510 (to the abstract with links displayed to either HTML or PDF full text)

Aggregator link via SwetsWise:
http://www.swetswise.com/link/access_db?issn=00320889&vol=133&iss=2&page=510&FT=1
A CrossRef 'piped' query to identify an article DOI, which can then be subsequently extracted by the Link Resolver and used to resolve to the article.
http://doi.crossref.org/servlet/query?usr=CrossRef_username&pwd=CrossRef_Password&qdata=00320889|Plant%20Physiology|Rasmussen|133|2|510|2|||
http://dx.doi.org/10.1104/pp.103.024885 (to resolve direct via DOI to where the publisher defines)

Linking to publisher web sites

There are pros and cons to linking to publishers' web sites. The pros include: the publishers' web sites are very up to date; an article is usually available via the publisher web site before it is available on an aggregator's platform; and, increasingly, publishers are making articles available as in-prints and pre-prints, ahead of printed paper publication, for example, *Nature*.

The cons include: once a subscription has been cancelled, access to an e-journal is switched off or additional platform fees are required for continued access to the back-file. (This is dependent on the terms of the contract with the e-journal supplier.)

Cross publisher changes in journal ownership can also affect access rights, and where links must be directed to gain continued access to the back-file. Furthermore, ISSN or e-ISSNs are commonly used within a link resolver as a unique key to derive a URL. It is therefore important that the link resolver can record both ISSN and e-ISSNs for a journal as these can change as the publisher or title changes over time.

Linking via CrossRef

The following diagram (Figure 1) shows the process of resolving a bibliographic citation via CrossRef.

Once again there are pros and cons to using CrossRef. A compelling reason for using CrossRef and DOIs is that the administration of link changes is undertaken by the publishers and the DOI organization; therefore, there is no administration for the library. Unilever's experience demonstrates this to be a reliable route to full text, and this is a single method adopted by many publishers to enable linking.

The downsides to using CrossRef are quite wide ranging and, of course, not every publisher is a member of CrossRef. For articles published in advance it is not always possible to identify the full bibliographic citation details of an article, e.g. volume, issue, start page and sometimes even the year. CrossRef look-ups are, therefore, not possible. In CrossRef the publishers define where the DOI links to (usually their web sites). This can affect access and presentation of an article format. If your

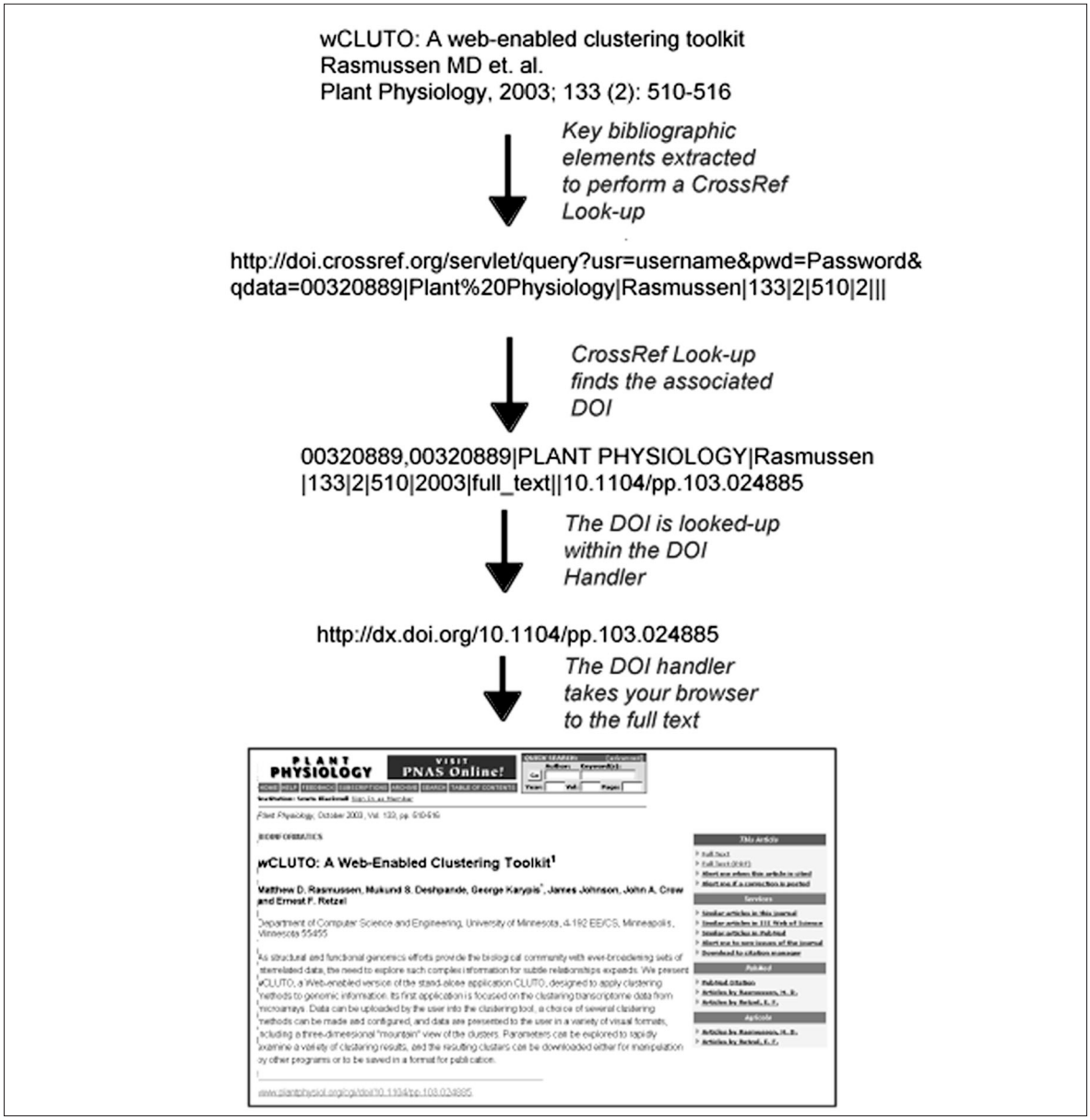

Figure 1. © American Society of Plant Biologists (ASPB)

institution is not licensed to link directly to the publisher's web site (e.g. you link via an aggregator) users will be denied access.

The type of article format is dependent on the publisher. For example, Blackwell links directly to the PDF; Elsevier links directly to an HTML article; the American Chemical Society links to an intermediary page offering HTML, PDF or supplementary data when it is available. We have found that DOIs occasionally disappear from the DOI look-up database. Once the publisher had been notified it took between one day and three weeks for the links to reappear. The 'failed DOI' look-up page is also unhelpful, requesting the user to re-submit a DOI. End users are unlikely to know that they were being routed via a DOI request and even less likely to know what DOI is.

Linking via an aggregator

The advantages of using aggregators are that they will facilitate access to licensed e-journals, removing the administration from the library. The aggregator may enable articles which do not have full bibliographic data and therefore are unavailable via CrossRef. An aggregator reduces the administrative overhead for libraries as they connect to one aggregator, not multiple journals or publishers' sites. Furthermore, some publishers deny access to paid-for back-files when a subscription is cancelled. Access can be maintained via an aggregator, since the agent is a trusted intermediary and is allowed to maintain the links on our behalf.

The disadvantages of linking via an aggregator are that this adds another layer of complexity and yet another stage where failure can occur. The speed at which the aggregator can rectify a failing link to a journal or issue can be longer than is desirable. It is a good idea to check to see if the aggregator contract has a service level agreement, or a clear process on how to rectify a suspected fault. Linking via an aggregator can be inconsistent. Our work demonstrated that occasionally with older material, the user is linked to the abstract, and has to click to view the full text. For newer articles the user is taken directly to the full text PDF.

Free with print journals, open access content and open access journals

The clear benefit for libraries in encompassing free and open access content within their collections is that they acquire additional electronic content that does not have to be paid for. However, there are a number of issues in adding such content which require careful consideration. The 'free' content requires additional work in maintaining, monitoring and administering the different rules that apply for each publisher and title, e.g. previous plus current year, current calendar year or rolling 12 months. For e-journals which are received 'free' with printed journals, if a publisher is slow to make issues available, users may never have access to some issues. In our experience, these types of links can only be updated on a six-month basis. Remember, it may be cheaper to purchase articles than to maintain these links.

Linking to different full text formats

The full text is generally available in several different formats such as HTML, HTML plus supplementary information, XML, PDF or another proprietary format. Within our library service the decision was made to take the user to the PDF whenever possible. This is a format users are familiar with and when printed looks very similar to the published print article.

Authenticate with a full text provider

The majority of publishers rely upon IP authentication for institutions. IP authentication within large organizations can be a problem where the organization is spread over multiple locations, each with different e-journal requirements and access. This is the case within Unilever. A good link resolver should be able to handle the user/password authentication without declaring the authentication details to the user. Athens authentication is an option for institutions that enable home working or have their staff and/or students widely distributed.

Discussion

Budget constraints mean that there is a continual compromise on how and where we obtain access to e-journals. In an ideal world, access to all journals via all routes – publisher web sites and aggregators – would be available. This luxury, however, is not available to us and for our

implementation it was important to decide on the best way to access each individual journal. Users will continue to obtain links to articles via alternative methods not connected to a link resolver, such as via e-mails or a link to full text embedded within a database record (e.g. PubMed Medline records). Where practicable, make as many links as possible available to an article to avoid refusal of access.

There are numerous reasons why a link can fail: the link resolver application is immature; bugs were found in the link resolver software and several versions have been installed, resolving some issues but sometimes introducing new ones. Enhanced features or functionality also required testing, and fault-finding is always a challenge! Users expect a link to an article to work first time. If the article cannot be accessed immediately, it is equivalent to a paper journal being unavailable or lost. Removing the complexity of linking from the users is key to success. Testing the links thoroughly is a good use of resource.

Users' stored links to e-articles may change with time. There are benefits of using bibliographic management applications, such as Reference Manager (v10 or above), where there is the facility to link to the link resolver. Enabling consistent instant access of full text is changing the way users evaluate and use literature. The citation and abstract are not relied upon so much when users can immediately obtain the whole article for no additional cost to them at the point of use. They can rapidly move through the body of the article, be it the conclusion, discussion or the methodology sections, then decide if the article is of interest.

Within our service, staff have taken a pragmatic policy on the inclusion of open access material. The approach is to identify and make available the journals that are indexed in the databases used by our scientists and to include only journals relevant to the science undertaken at our laboratory. It can be a full-time job trying to locate e-articles as they become available, and subsequently updating the link resolver. It may be cheaper to purchase an article or notify the users that a paper copy of the article exists than to try and keep the links up to date.

Conclusion

It is a complex and time-consuming project to successfully implement a link resolver. In Unilever we believe that it was effort well spent, since the investment has removed much of the complexity of e-journal linking and has speeded document delivery for our users. It has also reduced our document request costs.

The user is now presented with options – on one single screen – on how an article can be delivered, with additional information about the journal:

- link to the full text of the article
- link to our library catalogue
- link to the journal home page
- order the article via traditional document delivery process.

The link resolver has been integrated into our suite of information applications and resources. It provides a most useful addition to help the users to help themselves in accessing documents quickly and accurately.

There is now a choice of an intranet-based, in-house or Internet-based, third party-hosted link resolver implementation. We may well have chosen a third party internet-hosted implementation if that had been available at the time of selection. However, we would not have learnt so much about the subject nor had so much fun!

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A selection of link resolver solution suppliers

EBSCO, product name LinkSource:
http://www.ebsco.com/

Elsevier, MDL product name LitLink:
http://www.mdl.com/

Endeavor, product name LinkFinderPlus:
http://www.endinfosys.com/

Ex-Libras, product name SFX:
http://www.exlibrisgroup.com/

Fretwell Downing Informatics, product name OL2:
http://www.fdisolutions.com/

Openly Informatics, product name 1-Cate (their technology is licensed and embedded in many OLR products):
http://www.openly.com/

Ovid & SilverPlatter, product names OvidLinkSolver; SilverLinker:
http://www.ovid.com/

Serials Solutions, product name Article Linker:
http://www.serialssolutions.com/

Sirsi, product name Sirsi Resolver
http://www.sirsi.com/

Swets Information Services, product name Swets Linker:
http://www.swets.com

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