

## SEAMLESS LIBRARY SERVICES USING THE OpenURL SYNTAX



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*ABSTRACT: With the rise of the Internet, scientists expect to be able to access all library services from anywhere they can carry their laptops, and to go from database to full-text article in one session. The impact of these expectations on the traditionally separate services of a library catalog, on-site collection of printed resources, document delivery system, database searching, and current awareness will be discussed. A key component to the integration of these library services is the OpenURL syntax, which forms the basis of communication among disparate systems from a variety of vendors. A solution that has been implemented in the small special library of a non-profit research institute will be presented as an example. The library's decision to abandon use of multiple proprietary linking solutions provided by database vendors, and instead rely solely on SFX (the OpenURL resolver tool from Ex Libris) is reviewed. The extraordinary usefulness of this tool is discussed, particularly the ways in which it simplifies the researcher's access to full text, reducing the time and effort spent on this important and necessary part of their work. It relieves the researcher from having to learn the complexities and peculiarities of multiple publisher web sites, from having to fill in forms, and from having to re-enter search strategies to run new jobs in related databases. The most popular menu options in the distributed SFX product are highlighted. Additional customized options that may be offered on the SFX menu are also reviewed. Attention is paid, as well, to ways in which the tool might be made even more useful by extending its integration with even more library products, such as current awareness alerting tools. The Library Community can play an important role in making suggested improvements become reality by educating, lobbying, and encouraging their vendor partners to enhance their products and improve their inter-operability with OpenURL resolvers.*

### Introduction

On June 7, 1966, in Cape Town, South Africa, Robert F. Kennedy delivered a speech in which he said, "There is an interesting Chinese curse which says, 'May he live in interesting times...'"(North of Boston Library Exchange, Inc. (NOBLE), 2001, para. 1). The Chinese are unfamiliar with this curse which has been attributed to their culture. It is possibly related to another Chinese proverb, "It's better to be a dog in a peaceful time than be a man in a chaotic period" (NOBLE, para. 2). Regardless of the origin, like it or not, we cannot deny that we, indeed, live in interesting times. This is certainly true for librarians and library customers, trying to navigate digital electronic resources, and deal with rapid change in the world of scholarly publishing.

The rise of the Internet, with web browsers and full text scholarly journals online, has transformed the way scholars search for information and raised their expectations with regard to the ease and speed with which they can access the scholarly literature. Gone are the days when our customers were willing to print out search results or jot down references, consult the library catalog to see what is owned online or in print, then navigate to and around a publisher's website to locate the article online, or (even more inconveniently) visit the library to photocopy articles from bound journals, or fill out forms requesting that the library retrieve articles from outside sources when they

were not found online or on the library shelves. The convenience of a keyword search in Google, with increasingly available seamless links to full text articles, any time, anywhere they have their laptops, is too alluring for scholars to avoid. But, as Mary Jackson points out in her 2002 article on "The Advent of Portals," "This is eroding the use of traditional library reference and information services and could ultimately result in a set of services and resources that are less authoritative, but more convenient" (p. 36). Researchers simply making do with literature they can get conveniently, and doing without (or not discovering) other superior resources because they are inconvenient to locate, request or retrieve (a strategy called "satisficing" (Bunker, 2005)), does little to promote good science or good medicine. Mary Jackson challenges libraries to "gear up to provide a competing level of convenience while retaining the authority and quality of information delivery for which they have been traditionally known" (p. 36).

For many libraries, OpenURL technology has become the weapon of choice to provide a "competing level of convenience."

### How it works

In its most straightforward application, OpenURL technology is a way for library customers to move seamlessly from a bibliographic reference (in an online indexing and abstracting database, for example, called

the "source"), to the full text of the article, or to other services related to that article reference (called the "targets"). In between the source and the target, the library runs a "resolver" -- software that knows about the library, knows the online full text resources the library has available, knows what the library has available in print, and directs the customer to the "appropriate copy" of the article. Sometimes the appropriate copy is a licensed electronic version of the full text. If the library doesn't license online access, the appropriate copy may be a print copy in the library. If the library doesn't own the print, the appropriate copy may be one delivered to the customer via interlibrary loan or from a pay-per-view service (Walker, 2001).

For example, the customer finds an article of interest in a bibliographic database, and clicks on the OpenURL button next to the reference. The resolver identifies what services are available for that particular article or book at that particular library, and presents a menu of options. The customer chooses what the next step will be. Often, with two mouse clicks, the customer has gone from the citation in the database to the full text of the article.

As Walt Crawford (2002) says, "If that sounds as boring as most standards-related stuff, that's because you haven't tried it" (p. 99).

Other good definitions of OpenURL may be found in the literature (Crawford, 2002; Crawford, 2004, p. 13-14; Library of Congress, 2004; Walker, 2003).

### History

Prior to the availability of OpenURL technology, several online indexing products offered linking capabilities. These were burdensome for librarians to maintain, requiring that holdings be entered and updated separately for each database. Many also offered links to full text articles, but they were often proprietary and incomplete, and at best represented only a subset of full text journals that the library had to offer its customers online. At worst, a link appeared to a full text source not licensed by the library, and the customer was denied access. Nor did the proprietary linking services integrate with other library services, such as assistance with interlibrary loan requests.

OpenURL technology solves a number of these flaws. For the librarian, it means maintaining holdings information in only one central database vs. updating lists for each separate indexing and abstracting tool. For the scholar, it means a link is provided for each bibliographic citation in the indexing and abstracting tool that will always lead them, in some way, to the full text (providing a link to online full text, information that the print is available in the library, or the option to order it on interlibrary loan or perhaps from a pay-per-view service).

Early work on this technology began in 1999 at Ghent University in Belgium. Because of the behind-the-scenes "magic" of this technology, it was dubbed SFX (for Special Effects). The "magic" is very interesting, and has been described eloquently by others in any

numbers of articles (Blake, 2002; Dahl, 2004; Van de Sompel & Beit-Arie, 2001; Van de Velde, 2002; Walker, 2003).

The original OpenURL, as implemented by SFX, is called OpenURL 0.1. At the end of 2000, it was proposed to the National Information Standards Organization (NISO) as a candidate standard, known as OpenURL 1.0, or Z39.88-2004. The standard was approved on April 15, 2005. Details are at the NISO Committee website (NISO, Standards Committee AX, 2004).

In early 2000, Ghent University signed over the rights to SFX to Ex Libris. In 2000, the California Institute of Technology (Caltech) started up an SFX service and released it to their customers in 2001. That same year, our library was evaluating ILLiad, a paperless interlibrary loan system, for potential purchase in the Fall of 2001. ILLiad software was not in wide use at that time, and the only site within driving distance where we could view an implementation was at Caltech. The Caltech library staff not only showed us how they used ILLiad, but showed us how they integrated ILLiad with SFX. It was impressive, to say the least. Upon returning to San Diego, we immediately ordered both products.

Selecting SFX from Ex Libris was an easy choice. SFX was the only OpenURL tool on the market at that time. Today libraries have a number of products to choose from. An article in the October 2004 issue of *Computers In Libraries* examines 11 vendors (Ferguson & Gross).

Because we are a small academic library without our own IT department, we routinely choose to have servers for our major library systems hosted by the product vendors. For example, we use Innovative Interfaces Inc. for our library catalog. Innovative Interfaces houses our OPAC server at their facility in Emeryville, California. It is transparent to library customers where the server is located when they search our catalog. But for the library, this means the server is tended by persons who are knowledgeable about that specific software system, resulting in fewer problems and less down time. It means updates and upgrades are handled promptly. At the same time, our systems librarian has permissions on the hosted servers to customize the products as desired for our local library environment. It is the best of both worlds.

In this tradition, the library entered into contracts with both Ex Libris (for SFX) and Atlas Systems, Inc. (for ILLiad) for installation of their software on vendor hosted servers. Both systems were still relatively new in the winter of 2001/2002. During the testing phase, we learned that ILLiad would not yet integrate with SFX in a hosted server situation. As a result, we set aside our implementation of SFX for a few months while Atlas Systems modified ILLiad and worked with Ex Libris to develop that functionality. By December 2002, both products worked together in the hosted server environment. At that time, SFX had around 220 customers. The number of OpenURL installations today is closer to 1500. SFX from Ex Libris remains the most popular choice, holding about 48% of the market share.

## Implementation

Ex Libris provided two days of on-site training, guiding us through the implementation process.

**Step One** was identifying the databases that our library subscribes to that are capable of exporting bibliographic data in an OpenURL syntax. At TSRI we enabled SFX in our subscriptions to Thomson Scientific's Web of Science, PubMed, Ovid, SciFinder Scholar, and Faculty of 1000. We are not able to use SFX within the CrossRef Beilstein database, as they are not yet OpenURL compliant.

**Step Two** was identifying the individual electronic journals to which the library provides access, and the holdings available. SFX organizes journal information by publisher or by aggregator in most cases, and includes information on online availability, making the process quite easy to use. Our library had approximately 700 journals to configure in our local SFX Knowledgebase. SFX also allows the activation of thousands of free e-journal targets with just a few clicks.

**Step Three** was designing an SFX button to appear in the source databases, writing an SFX FAQ web page, and customizing the look and feel of the pop-up menu to match our local web design. Some libraries choose to give the OpenURL button that appears in their databases a local brand name (for example, FindIt@Harvard, FindText@ND, etc.). Our SFX@TSRI button retains the SFX brand name, with the idea that customers will come to recognize the technology and use it at other libraries, as well.

**Step Four** was deciding what services we wished to offer our customers (for example "Get Full Text," "Get print holdings information in the library catalog," "Request via interlibrary loan"). SFX arrives with a number of services already configured. In addition to those listed above, libraries may also include services such as "Get Abstract," "Get other articles by this author," "Get a Book Review on this title," "Get Table of Contents for this issue," "Search for related information in Google," "Read the library FAQ on this service," "Ask a Librarian," etc. We recently added two additional services on our local SFX menu: "Learn if (and where) this paper has been cited via Web of Science" and "Import this reference into End Note / Reference Manager."

A library is not limited to using only those services that are preconfigured in the SFX Knowledgebase. It is entirely possible to set up new services and new targets. A review of OpenURL menus at other institutions reveals a wide range of other services offered on SFX menus:

- Order this item from CISTI (U of Guelph)
- Save and format this citation (in MLA, APA, CBE or Chicago Style) (for embedding in a course list, for example) (New York University)
- View this journal's Impact Factor Trend Graph in Journal Citation Report (U of Iowa)

- Read a review of this book at Amazon.com (Rochester Institute of Technology)
- Additional publication information from Ulrich's (U of Iowa)
- Post this citation to your blog on Uthink (U of Minnesota)
- Find this author's email address in Yahoo People search (LANL)
- From BIOSIS, send a genome search to the NIH PubMed Genome database (LANL)
- Link to items in a local institutional repository (LANL)
- Look up this movie in the Internet Movie Database (Royal Holloway)

Other services that have been proposed are:

- Linking from a citation to an article in an encyclopedia based on subject or author (Gerrity, Lyman & Tallent, 2002, p. 240)
- Linking from a citation in Dissertation Abstracts to the full text dissertation (Gerrity et al., p. 240)
- Linking to local research guides (Gerrity et al., p. 240)
- Look for books on this subject in Books In Print (Walker, 2003, p. 95)
- Link to chat reference services (Boyd & Roe, 2005)

**Step Five** was contacting our "OpenURL aware" vendors, and asking them to display the SFX button to our campus users in their search results.

From training to launch, the entire process took less than one month. Our SFX manager spends about 2 hours per week maintaining the system, turning on and off journal titles as needed, changing holdings data, and the like. There are reports in the literature that implementing SFX created an additional workload and necessitated adding library staff (Sutherland & Green, 2004). But this has not been our experience. We save time by not maintaining holdings data in multiple proprietary database subscriptions, which offsets the time spent to maintain SFX.

Ex Libris provides excellent telephone and web-based customer support. There is an active listserv of SFX customers that exchange information and an annual Users Group meeting (called SMUG, SFX and MetaLib Users Group).

## The Benefits

Library customers love the ability to move seamlessly from discovering a reference to accessing full text. It reduces their frustration with having to learn and use multiple disconnected resources and services to accomplish the same work. But OpenURL tools go beyond just saving the researcher time and effort. Extended services on the SFX menu may lead the customer to discover other relevant and related material (e.g., articles that cite the original article of interest, or the web page of an article's author) that the customer may not have pursued on their own.

Library customers appreciate not having to fill out interlibrary loan forms. Interlibrary loan staff find that the requests arrive with fewer errors when SFX populates

the form. There was some fear initially that the convenience offered by blending ILLiad with SFX and the databases would lead to rising numbers of requests. This has not been our experience. There are reports in the literature that interlibrary loan requests increased following implementation (Frick, Duncan & Julian, 2004). Angi Faiks, at Macalester College in St. Paul, reports that their ILL numbers went down with SFX (McDonald & Van de Velde, 2004). Our interlibrary loan request levels remained unchanged.

Reports generated from SFX assist in collection development efforts. For example, we generate a list of journals where customers clicked on the SFX button (presumably because they found the article of interest), and to which the library does not subscribe, and consider these for purchase.

Ex Libris sends monthly email notifications to customers after each update to the SFX Knowledgebase. These serve as alerts to library staff regarding changes to publisher websites, or availability of new backfiles, for example.

Because SFX is easy to use, and clicking the button is intuitive for library customers, it reduces the need for library instruction (Walker, 2003, p. 94).

Libraries subscribing to SFX also receive two other useful tools from Ex Libris. The "Citation Linker" presents a form where the customer supplies details about an article, clicks on the SFX button, and is presented, as usual, with a menu of options, including links to the full text if the resolver was successful finding a match. The "OpenURL Generator" allows the user to construct a URL that can be used in courseware (such as Blackboard) or on web pages.

SFX may also be used to generate an A to Z journal title list, if a library desires.

### **What Can Be Improved**

Nearly all database vendors recognize the importance of this technology, and have made their products OpenURL compliant. If you subscribe to databases that are not yet capable of exporting data in OpenURL syntax, encourage the vendors to achieve compliance (e.g., CrossFire Beilstein from Elsevier MDL). Librarians at Cape Technikon in South Africa found that encouragement and education of vendors are an important consideration when linking to resources in countries where local vendors are unfamiliar with OpenURL technology (Becker, Proske, Crowster & Lilley, 2004).

Some database vendors allow the local OpenURL button to appear next to each citation at the first "brief title" search results page (e.g., Ovid). Others (e.g., PubMed and SciFinder Scholar) display the OpenURL link only at the second level of citation detail, which requires searchers to make an extra click before the button appears. Searchers dislike extra clicks. Encourage those vendors to display the OpenURL button at both page levels.

Most electronic journal sites are configured to allow OpenURL connections at the individual article level.

Some, however, connect only to the journal title or table-of-contents level. If your library subscribes to any of these journals, encourage the publishers to enable article level linking.

The behind-the-scenes "magic" that makes OpenURL linking work does a remarkable job. But because of the complexities of serials, there are times when it fails. For example, one way the "magic" works is by matching metadata about an article that it gets from the source (the database, for example) with data about the article in the target (the journal web site, for example). The metadata elements may follow what is called the IVIP model (ISSN, volume, issue, page). A librarian doesn't need to look hard to find unusual situations where IVIP may not work. ISSNs change, online versions of articles may not use page numbers, supplements often have unconventional pagination, issues may be combined and use unconventional numbering, etc.

Embargoes (e.g., journals that provide free access after "x" number of months) and moving walls of access dates create another challenge.

Vendors like Ex Libris that provide linking technology are constantly improving their products and creating innovative solutions to problems like these. Links are increasingly reliable. But it's complex, and therefore, it's not perfect (Bittern, 2004).

### **What's Next**

We are actively searching for a good pay-per-view service that will allow anonymous ordering of articles using the customer's personal credit card in situations when customers have an urgent need, and don't care to wait for conventional interlibrary loan. However, we want a service that will provide usage data to the library so we can track if particular titles receive high use and are candidates for purchase.

We are also researching vendors that can provide email alerts for journal Table-of-Contents, and alerts for articles by authors or topics of interest that will include the library's OpenURL links next to citations in the email alerts. IngentaConnect recently announced their capability to do this. A presentation at the June 2005 SMUG meeting discussed Harvard's integration of SFX with an alerting service powered by TDNet, Ltd.

We are considering entering OpenURLs into our OPAC records to relieve catalogers of the chore of updating linking fields (in much the same way that we ceased updating holdings in our multiple commercial database subscriptions).

Libraries that have created a local Knowledgebase for their OpenURL tool are hopeful this information may be used to help populate records in Electronic Resource Management systems, saving the installing libraries time and effort.

Librarians at Yale believe OpenURL resolvers have the potential to manage the entire bibliographic research process for faculty and students (Chudnov, Frumkin, Weintraub, Wilcox & Yee, 2004). The customer can move from discovery, access to full text, downloading into citation management software, even posting to a blog, all from within an OpenURL menu. In fact, all of these services are possible on OpenURL menus today, and will undoubtedly be developed further.

There is particular interest in learning how the technology can integrate more fully with courseware, electronic reserves, and institutional repository projects.

OpenURL technology may be used for other materials besides journals and books. It may be extended to objects in museum exhibits, or as a descriptor for people, meaning it may serve as a form of authentication in the future (Loeding, McDonald, Walker & Samuels, 2003). It may be able to understand, for example, that a searcher has rights due to his or her affiliation with a particular library, but also has rights by virtue of membership in a larger consortium (Walker, 2003, p. 98). Further, John McDonald and Eric Van de Velde (2004) noted that the OpenURL "framework is agnostic as to application domain, which means it could be applied to other industries. For example, the real estate industry could define metadata and identifiers for houses, realtors, buyers, sellers, various contracts, and more -- creating a whole new set of applications" (p. 34).

Google Scholar announced in May its institutional access service where libraries may configure Google Scholar to display their OpenURL button in search results. However, Google Scholar will do this only if requesting libraries send them local holdings data. Some libraries protest that this defeats one of the main purposes of using an OpenURL resolver, creates more work for librarians, and is a step backward. Google responds that it requires this data so that search results with available full text (which Google claims are more desirable to searchers) will display higher up in the search results list. Some librarians disagree with promoting online full text access above other library services. In some sense, it reinforces the behavior of selecting only what can be retrieved conveniently, rather than selecting content based on quality and relevance. The debate continues.

For those who do not yet have an OpenURL resolver and would like to try one, Ex Libris just announced a free service called ScholarSFX. According to the announcement on their web site, "This groundbreaking service enables libraries to create customized links based on your institution's electronic journal holdings and display these links in Google Scholar search results. Your users will then be able to link from the Google Scholar results to articles that are available through local institutional subscriptions for free on the web" (Ex Libris, 2005, para. 3). There is a sign-up form at their site.

In terms of providing a "level of convenience" that competes with Google; in terms of guiding library customers from the millions of authoritative bibliographic citations they are provided in our indexing and abstracting tools, to "the Holy Grail: the full text" (Bittern, 2004, p. 45), and avoiding the frustration of dead ends and "access denied" messages; in terms of delighting customers by saving them time and effort, and improving their opportunities to discover new and valuable content that is relevant to their work, OpenURL technology remains the weapon of choice.

I use the phrase "weapon of choice" deliberately. When you have returned home from this conference, I encourage you all to play the OpenURL NISO Committee AX Theme Song and Video (Van de Velde, n.d.). Because at the end of day, it's good to remember, as Walt Crawford (2002, p. 99) reminds us, that even OpenURL standards "can be fun!"

## References

1. Becker, D., Proske, R., Crowster, N., & Lilley, L. (2004). A first in Africa: Implementation of Metalib and SFX at the Cape Technikon Library. *Electronic Journal of Academic and Special Librarianship*, 5(1). [http://southernlibrarianship.icaap.org/content/v05n01/becker\\_d01.htm](http://southernlibrarianship.icaap.org/content/v05n01/becker_d01.htm) (Accessed June 17, 2005)
2. Bittern, D. (2004). Where's my link? A perspective on why linking is not perfect. *The Charleston Advisor*, 6(2), 45-46. <http://www.charlestonco.com/features.cfm?id=167&type=fr> (Accessed June 17, 2005)
3. Blake, M. (2002, February). *Implementation of the OpenURL and the SFX architecture in the production environment of a digital library*. Paper presented at the 11th Biennial Conference of the Victorian Association for Library Automation, Melbourne, Australia. <http://www.vala.org.au/vala2002/2002pdf/39Blake.pdf> (Accessed June 17, 2005)
4. Boyd, M., & Roe, S. (2005, May 20). *Beyond article linking: Using OpenURL in creative ways*. Paper presented at the 20th Annual NASIG Conference, Minneapolis, MN.
5. Bunker, J. (2005, May 11). *Satisficing social work students' research needs*. <http://www.west.asu.edu/jbuenke/loex/satisficing.html> (Accessed June 20, 2005)
6. Chudnov, D., Frumkin, J., Weintraub, J., Wilcox, M., & Yee, R. (2004, July). Towards library groupware with personalized link routing. *Ariadne*, 40. <http://www.ariadne.ac.uk/issue40/chudnov> (Accessed June 17, 2005)

7. Crawford, W. (2002, August). Open URL: Standards can be fun! *American Libraries*, 33(7), 99. <http://www.ala.org/ala/online/thecrawfordfiles/2002columns/Default695.htm> (Accessed June 17, 2005)
8. Crawford, W. (2004). A is for AAC: A discursive glossary. *Cites & Insights Crawford at Large*, 4(2), 1-20. <http://cites.boisestate.edu/civ4i2.pdf> (Accessed June 17, 2005)
9. Dahl, M. (2004). Building an OpenURL resolver in your own workshop. *Computers in Libraries*, 24(2), 6-8,53-56.
10. Ex Libris. (2005). *ScholarSFX*. [http://www.exlibrisgroup.com/scholar\\_sfx.htm](http://www.exlibrisgroup.com/scholar_sfx.htm) (Accessed June 17, 2005)
11. Ferguson, C. L., & Gross, J. E. (2004). Helping you buy: OpenURL link resolvers. *Computers In Libraries*, 24(9), 17-24.
12. Frick, R., Duncan, C., & Julian, G. (2004). Nuts and bolts of linking: Understanding context sensitive linking services and implementation. *NASIG Newsletter*, 19(3), 38. <http://www.nasig.org/newsletters/newsletters.2004/04sept/04sept.pdf> (Accessed June 17, 2005)
13. Gerrity, B., Lyman, T., & Tallent, E. (2002). Blurring services and resources: Boston College's implementation of MetaLib and SFX. *Reference Services Review*, 30(3), 229-241. [http://escholarship.bc.edu/library\\_pubs/2/](http://escholarship.bc.edu/library_pubs/2/) (Accessed June 17, 2005)
14. Jackson, M. E. (2002). The advent of portals. *Library Journal*, 127(15), 36-39. <http://www.libraryjournal.com/article/CA242296.html> (Accessed June 17, 2005)
15. Library of Congress. (2004, March 19). *CONSER: Cooperative Online Serials. Summit on Serials in the Digital Environment: Glossary*. <http://www.loc.gov/acq/conser/glossary.html> (Accessed June 17, 2005)
16. Loeding, D., McDonald, J., Walker, J., & Samuels, H. (2003, November). *Resource integration through Open-URL linking*. Paper presented at the 23rd Annual Charleston Conference, Charleston, SC.
17. McDonald, J., & Van de Velde, E. F. (2004). The lure of linking. *Library Journal*, 129(6), 32-34. <http://www.libraryjournal.com/article/CA405398.html> (Accessed June 17, 2005)
18. National Information Standards Organization, Standards Committee AX. (2004). *The OpenURL framework for context-sensitive services*. [http://www.niso.org/committees/committee\\_ax.html](http://www.niso.org/committees/committee_ax.html) (Accessed June 17, 2005)
19. North of Boston Library Exchange, Inc. (2001, June 12). *NOBLE reference files: May you live in interesting times*. <http://www.noblenet.org/reference/index.htm> (Accessed June 20, 2005)
20. Sutherland, A., & Green, P. (2004, February). *An OpenURL resolver (SFX) in action: The answer to a librarian's prayer or a burden for technical services?* Paper presented at the 12th Biennial Conference of the Victorian Association for Library Automation, Melbourne, Australia. <http://espace.lis.curtin.edu.au/archive/00000003/01/11SutGrn.PDF> (Accessed June 17, 2005)
21. Van de Sompel, H., & Beit-Arie, O. (2001, March). Open linking in the scholarly information environment using the OpenURL framework. *D-Lib Magazine*, 7(3). <http://www.dlib.org/dlib/march01/vandesompel/03vandesompel.html> (Accessed June 17, 2005)
22. Van de Velde, E. F. (n.d.). *NISO Committee AX: Development of an OpenURL standard*. <http://library.caltech.edu/openurl> (Accessed June 17, 2005)
23. Van de Velde, E. F. (2002, July 15). *Extended-linking services: Towards a quality web*. <http://caltechlib.library.caltech.edu/43/> (Accessed June 17, 2005)
24. Walker, J. (2001). Linking is as easy as SFX. *Record*, 103(12), Article 2. <http://www.lahq.org.uk/directory/record/r200112/article2.htm> (Accessed June 20, 2005)
25. Walker, J. (2003). OpenURL and SFX linking. *The Serials Librarian*, 45(3), 87-100. <https://www.haworthpress.com/store/ArticleAbstract.asp?sid=L7MFDJGS7W9W9J0JPECV56CENLK3AF65&ID=40965> (Accessed June 17, 2005)