Chapter 4

# Link-Resolver Products

Although Ex Libris's SFX was the first commercially available link resolver, the market now offers many other products, including other commercial and homegrown products as well as open-source releases. Choosing a link resolver can be a daunting task, so simply knowing the available options can be useful to those wishing to purchase, build, or adapt an open-source link resolver. This section is not meant to be comprehensive but rather includes the most popular link-resolver products and options.

## Commercial

Commercial link resolvers are available from a number of vendors, including integrated library system (ILS) vendors as well as other content providers, such as Serials Solutions, Ovid, and EBSCO. In October 2004, Grogg and Ferguson published an article in *Computers in Libraries* that offered a large-scale comparison of commercially available link resolvers, including a detailed comparison chart of features to consider when evaluating possible purchases. These features included:

- Remote or local hosting;
- Subscription or purchase;
- Title listing availability;
- Customization of the link-resolver menu of services/intermediary screen;
- Customization of extended services;
- Usage statistics;
- Citation-finder feature;
- User support group;
- Web-based administrative tools;
- Ability to "invoke" or go directly to the full text, bypassing the link-resolver menu of services/intermediary screen;
- Ability to specify/weight the order of links in the link-resolver menu;
- Ability to block links from appearing in the menu or prevent circular linking;
- Ability to add targets and sources; and
- Consortia or individual purchases.[1]

Another more qualitative feature to consider is the quality of the vendor's global knowledgebase. Because the knowledgebase powers the link resolver's ability to match the user to his or her desired information object, the knowledgebase needs to be as correct, comprehensive, and up to date as possible. This can be difficult to ascertain, but length of time the product has been on the market as well as whether or not the vendor maintains its own knowledgebase (or buys content from elsewhere) are two important factors to consider.

Also, it is important to know the scope of the knowledgebase, including whether or not the vendor tracks non-journal content (e-books and Web sites) as well as open-access materials. Additionally, if a library is currently using a stand-alone A-to-Z listing service (such as those offered by Serials Solutions, TDNet or EBSCO), another question to consider is how difficult it will be to implement a link-resolver product from another vendor—because data from the A-to-Z listing service may need to be used to populate the knowledgebase of a competitor's product. Also, if the librarian can add use restrictions as negotiated in a license to specific e-resources to the A-to-Z title list, can this be listed on the link-resolver intermediary screen too? One of the main selling points of the link-resolver product in general is that it enables the librarian to enter data at one, time-saving point, so if the library purchases different products from different

companies, the librarian needs to consider how well those products integrate with one another.

Another component to consider, which is not easy to quantify, is the support level a link-resolver vendor will provide. Often, when a link fails to resolve, it can be fairly difficult to determine where the error occurred because data is being passed among at least three entities: the source, the link resolver, and the target. In many cases, there are more than three entities, especially if there is a unique-identifier schema being used, such as DOI/CrossRef, or if the desired information object is being hosted by a third party. Libraries with limited staff time want to be able to call one company, often the link-resolver vendor, to help with any problems that occur. Libraries, therefore, need to consider how well the link-resolver vendor works with content providers and if there are political issues at stake that prevent cooperation.

Mike Hoover, in his Sept. 21, 2005, NISO Workshop presentation, "Being a Good OpenURL Source," stressed that OpenURL support is a partnership and that "effective back-channel communications between vendors is critical to continued success of both parties."[2] The link-resolver vendor needs to be able to communicate effectively with content providers, and content providers need to "create and maintain test accounts for link-resolver vendors."[3]

Certainly many of the same features need to be considered when choosing to license a preexisting homegrown product, build your own product, or adapt an open-source option. By their very natures, however, homegrown and open-source link resolvers require the library to consider them in a slightly different way, the specifics of which are discussed in the "Homegrown/Open Source" section appearing later in this chapter.

Following is a selected listing of commercially available link-resolver products, including information about when the product was introduced and how many customers are using it (at the time of writing, summer/fall 2005). The responses were compiled from interviews with link-resolver vendors.

- LinkSource from EBSCO Publishing (www.linkresolver.com): introduced in spring 2003; approximately 200 customers. LinkSource is integrated with EBSCO's A-to-Z listing product, which tracks more than 800 databases and packages. In addition to traditionally published e-journals, A-to-Z supports open access, conference proceedings, e-books, and customer-supplied print journal lists. LinkSource has been updated to support OpenURL 1.0 (SAP 1);
- SFX from Ex Libris (www.exlibrisgroup.com/sfx.htm): introduced in May 2000; 847 customers in 37 countries. All SFX-generated OpenURLs (such as target test links from within the SFXAdmin application and links from the SFX-generated A-to-Z list) are delivered in OpenURL 1.0 format. The SFX knowledgebase contains records for open access and other freely available e-journals. SFX also maintains records for e-books from multiple providers. Additionally, the SFX knowledgebase design includes capabilities for libraries to add their own entries for local types of records, such as technical reports, dissertations for locally conferred degrees, other local records, and more. Librarians can add local record numbers to SFX to create relationships between records used in SFX for linking purposes and their e-journal and catalog databases. At the time of this report's writing, SFX was exploring the RSS movement and investigating the improvement of linking for proceedings and other kinds of conference documents;
- OL2 from Fretwell-Downing (www.fdusa.com/products/olt.html): introduced in Dec. 2002; 10 customers, 7 local, 3 hosted. OL2 is not sold as a stand-alone link resolver; it is a tightly integrated component of Fretwell-Downing's metasearch product, ZPORTAL. The impact of changes in the OpenURL standard on OL2 has been minimal because Fretwell-Downing does not use OpenURL for transmission of source metadata between ZPORTAL and OL2. OL2 does use OpenURL for linking to some targets; versions 0.1 and 1.0 are supported, as required by the target site. Because OL2 is not sold as a stand-alone link resolver, its use with third-party search platforms (sources) is relatively limited. It can perform that role, however, if, for example, customers want to use OL2 as a link resolver when their patrons search resources via the native interface, in addition to searching via ZPORTAL. At the time of writing, OL2 accepted OpenURL v. 0.1 from external/third-party sources; support for OpenURL v. 1.0 is anticipated in 2006. OL2 licenses its knowledgebase data from Openly Informatics and tracks the same resources that organization tracks;
- 1Cate from Openly Informatics, Inc. (www.openly.com/1cate): introduced in June 2001; a few direct customers, mostly licenses to other companies. (Announced Jan. 3, 2006, the OCLC [Online Computer Library Center] purchased the assets of Openly Informatics, Inc. It will now be known as OCLC Openly Informatics, and founder Eric Hellman will serve as its director. For more information, visit the Openly Informatics and OCLC Frequently Asked Questions Web site at www.openly.com/company.oclcfaq.htm.) According to Eric Hellman and Director of Sales/Marketing Tim McCormick, a large part of the company's business is providing knowledgebase components to other companies, and in Oct. 2005, the latest release of the knowledgebase had 1.2 million records/objects, including e-books and non-full-text

content, such as abstracting and indexing material. Increasing e-book-like content will be a major focus for the company. Openly Informatics, through the direction of Hellman, was one of the first link-resolver vendors and continues to be at the forefront of linking innovations involving the OpenURL, including its involvement with COinS (ContextObject in Span), which is discussed in more detail in chapter VII, "Innovative Uses of the OpenURL";

- LinkSolver from Ovid Technologies, Inc. (www.linksolver.com): pilot launched in Oct. 2003, full release in Aug. 2004; 200 customers. The same linking architecture is used by more than 3,000 Ovid platform Links@Ovid customers. Because Ovid offers the Ovid-centric solution, Links@Ovid, a more complete discussion of the Ovid linking architecture is included in chapter V, "Linking without a Stand-Alone Link Resolver." Ovid maintains its own knowledgebase through its relationship with CrossRef, direct harvesting contracts with publishers that are not members of CrossRef, and direct harvesting contracts with aggregators. Ovid also tracks open-access journals and e-books as well as links to Internet-subject gateways, OAI archives, working papers, portals, drug databases, chemical structure databases, patent databases, geological surveys, taxonomy databases, reprints/rights information, continuous-education systems, images, article reviews, and more;
- Article Linker from Serials Solutions/ProQuest (www.serialssolutions.com/articlelinker.asp): introduced Mar. 2003; 325 customers, all hosted at Serials Solutions. Serials Solutions maintains its own knowledgebase, which serves more than 1,500 clients worldwide. Serials Solutions also uses a unique work-level identifier, which allows it to deliver links without an ISSN. Serials Solutions tracks more than 70,000 e-journals, including scholarly, consumer, open-access, international, and trade journals; approximately 900 full-text, e-journal aggregated databases and collections; and approximately 2,000 non-full-text resources, such as online encyclopedias, reference and image databases, Web sites, and e-book collections. Abstracting and indexing databases were added to the knowledgebase in July 2005. According to Serials Solutions, extending and enhancing this last set of non-full-text resources is a high priority in early 2006. Additionally, international resources will be an increasing focus of the company's efforts, once it has Unicode support in its database in 2006;
- SirsiDynix Resolver from SirsiDynix (www.sirsidynix.com/index.html): introduced in Jan. 2003; approximately 50 customers, with the majority choosing to have SirsiDynix host the resolver. SirsiDynix Resolver is OpenURL v. 1.0 compliant and tracks open-access material. There are currently about 40,000 e-book records in the knowledgebase; a normal installation does not expose them yet, but v. 1.6 of SirsiDynix's product will include added e-book functionality. Resolver integrates with SirsiDynix SingleSearch federated search tool, SirsiDynix Directors' Station business intelligence tool, SirsiDynix Room context-management solution, and the online catalog; and

### *Commercial Link-Resolver Products*

*LinkSource from EBSCO Publishing*
www.linkresolver.com

*SFX from Ex Libris*
www.exlibrisgroup.com/sfx.htm

*OL2 from Fretwell Downing*
www.fdusa.com/products/olt.html

*1Cate from OCLC Openly Informatics*
www.openly.com/1cate

*LinkSolver from Ovid Technologies, Inc.*
www.linksolver.com

*Article Linker from Serials Solutions/ProQuest*
www.serialssolutions.com/articlelinker.asp

*Sirsi Resolver from SirsiDynix*
www.sirsi.com/Solutions/Prodserv/Products/resolver.html

*TOUR Full Text Resolver from TDNet*
www.tdnet.com/site/page.asp?ID=458A&Parent=457

*LinkFinder*Plus *from Endeavor Information Systems*
www.endinfosys.com/prods/linkfinderplus.htm

*VLink from Geac Library Solutions*
www.library.geac.com/page/vlink_LIB.html

*WebBridge from Innovative Interfaces, Inc.*
www.iii.com/mill/digital.shtml#webbridge

- TOUR Full Text Resolver from TDNet (www.tdnet.com/site/page.asp?ID=458A&Parent=457): introduced in Oct. 2003, 30 U.S. customers; 200+ international customers. TOUR currently supports OpenURL v. 1.0. TOUR's most unique feature is the ability to incorporate a Table of Contents collection into the resolver's knowledgebase. TOUR currently only tracks full-text journal content in the

TOUResolver knowledgebase; however, customers have the ability to set up custom target links to other resources via the online administrator function.

Other link-resolver products include LinkFinder*Plus* from Endeavor Information Systems, (www.endinfosys.com/prods/linkfinderplus.htm), which was released in June 2001; VLink from Geac Library Solutions (www.library.geac.com/page/vlink_LIB.html), which was released in 2002; and WebBridge from Innovative Interfaces, Inc., (www.iii.com/mill/digital.shtml#webbridge), which was released in 2002. All link resolvers function essentially the same way: they interpret the metadata in the OpenURL and present the links of appropriate copies to the users. Many of the value-added features, however, vary widely from vendor to vendor.

## Homegrown/Open Source

Homegrown/open-source link-resolver products are not as common as those available from vendors, but building a resolver may be an attractive option, particularly for those libraries with tight budgets and the staff who have technical expertise. Mark Dahl's 2004 article, "Building an OpenURL Resolver in Your Own Workshop," describes the process he went through and he notes in his introduction that he initially "hesitated about trying to design an OpenURL resolver myself. But the seductively simple nature of the OpenURL standard ultimately compelled me to take a crack at creating one on my own."[4] Several other single institutions have developed link-resolver products, including the Simon Frasier University, the University of North Carolina at Greensboro, and the University of Illinois at Urbana-Champaign.

Additionally, several consortia have created link-resolver products. These include OLinks from OhioLINK and Gold Rush from the Colorado Alliance of Research Libraries. At the time the consortia products mentioned above were developed, in the late 1990s and early part of this century, commercial link-resolver products may not have had the necessary features to support the consortia environment. For example, by their nature, consortia share resources and must be able to identify "user affiliations with both the consortium and individual institutions"; however, since the first generation of commercial link-resolver products were introduced, many have mastered issues such as multiple affiliation and are now used by consortia.[5] For instance, the California Digital Library uses SFX.[6] Additionally, the early-generation link-resolver products, particularly SFX, were viewed as prohibitively expensive, especially for consortia serving many institutions. OhioLINK, for example, has eighty-five member libraries, and when OLinks was developed, the state of Ohio was facing a budget crunch.[7]

After talking with developers at consortia and single institutions, two common themes emerged. First, many of the homegrown solutions already had some sort of knowledgebase in existence when the first-generation link-resolver products (particularly SFX) were introduced, so paying a vendor to track e-journal data seemed unnecessary. Second, these organizations had individuals on staff with the technical expertise and institutional support to tackle the OpenURL and create the necessary technical infrastructure to make the links work; therefore, it made more sense at the time to develop a homegrown solution because two of the key components were in place: the knowledgebase and the technology. Following is a brief examination of some unique features of several homegrown solutions, both for consortia and individual institutions.

### OhioLINK

According to OhioLINK's assistant director of library systems (client/server apps) Thomas Dowling, OLinks was released in the fall of 2001 after the first discussions of the appropriate copy problem at Harvard in the fall of 2000. OhioLINK locally loads and provides its members with centralized access to approximately six thousand e-journal titles; the consortium also provides centralized access to electronic-research databases and e-books, some of which are also locally loaded. OhioLINK, thus, has a high degree of control and knowledge about its shared collection, and therefore, has a basis for a knowledgebase already in place. As Dowling noted, "constructing the knowledgebase was a non-issue for us and when you get beyond that and just look at what the software needs to do, it wasn't that difficult so we went ahead and created it ourselves."[8]

*OhioLINK*
www.ohiolink.edu

Dowling also astutely noted that if an institution's e-collection is not extremely large, it certainly is not black magic to create a knowledgebase of one's own. The OhioLINK member institutions (the state library of Ohio and virtually every college and university library system in the state) can choose to participate in OLinks for no extra charge, and they can also choose whether or not to have link resolution beyond those resources to which the consortium centrally subscribes.

If member institutions would like to include their local holdings (which includes most of the larger universities and a fair number of the smaller private colleges), they can do so by sending updates to Dowling in Excel spreadsheets. Dowling then converts this into a format that he can import into the MySQL database that underlies the link resolver. Dowling noted that, ideally, the process would

be entirely self-service, but at the present time, there is no administrative module allowing libraries to update their local holdings. For non-OhioLINK content, a librarian or staff member at each site has the responsibility of determining the linking syntax for a certain site; however, Dowling has created "tools that enable member libraries that subscribe to the same resources to cooperatively share their holdings information with one another," as well as share other relevant information, such as the linking syntax.[9] For example, once an institution figures out the linking syntax for the University of Chicago Press, then the consortium makes that linking syntax available to anyone else who wants to include e-journals from this publisher.

When asked how much customization is available to member libraries that would like to create links to extended services, Dowling commented that at a simple level, there is very little customization, but he also added that, frankly, there has been little interest from member libraries to add links to extended services. OLinks does have a facility—which no one has taken advantage of—to write a custom display template that essentially would allow a library to link, based on information that was in the original OpenURL, v. 0.1, to any extended service it wishes. In terms of the effect of v. 1.0, Dowling stated OhioLink does have a v. 1.0-compliant version of OLinks. Additionally, because the consortium also locally loads some databases, the consortium has switched these locally hosted databases to send OpenURL v. 1.0 links.[10]

## Simon Frasier University

Simon Frasier University (SFU) was at the forefront of linking initiatives, having had a system, called "GODOT," since the early 1990s; GODOT took citations from databases and performed Z39.50 searches of local library catalogs, both at SFU and in British Columbia, Canada, to find print holdings. This early iteration of GODOT also allowed patrons to place ILL requests if that item was not held locally.

SFU then began working with the Jointly Administered Knowledge Environment (JAKE) system from Yale University. JAKE was a publicly available knowledgebase that allowed librarians to discover in which databases journals were indexed and/or digitized in full text. SFU took the JAKE database and ran a copy of it at SFU, made some modifications, and started updating the data. SFU also input back-end hooks from GODOT into JAKE, so GODOT was using JAKE as a knowledgebase for link resolution.

As it became clear that JAKE was not sufficient as a knowledgebase, systems consultant Todd Holbrook wrote CUFTS and developed the CUFTS knowledgebase. CUFTS can function as a basic stand-alone link resolver for full text, handling both v. 0.1 and 1.0 OpenURLs, but it does not perform the Z39.50 searching that GODOT performs.

CUFTS and GODOT are only two of the components of the SFU suite of electronic tools, called "reSearcher" (http://software.lib.sfu.ca). reSearcher components are:

- CUFTS: Open-Source Serials Management;
- GODOT: Open-Source Link Resolving;
- dbWiz: Open-Source Federated Searching; and
- Citation Manager: Open-Source Bibliographic Management.[11]

According to the reSearcher Web site, it was "developed with the support of the Council of Prairie and Pacific University Libraries (COPPUL) and the British Columbia Electronic Library Network (ELN)."[12] This relationship with the consortia makes SFU a unique case, in that reSearcher is a homegrown system built at a single institution with the support of local and regional consortia. According to SFU's associate university librarian for processing and systems G.W. Brian Owen, SFU would develop the products and then the resources would be made available to the consortia members if they wished to use them.

*SFU reSearcher*
http://researcher.sfu.ca

SFU offers the reSearcher suite of tools to libraries in three basic ways. As Kevin Stranack, SFU's systems and geography/Latin American studies librarian, explained, there are three ways libraries can adapt reSearcher for their own uses. First, there is the fully hosted option, in which SFU runs the software and libraries can become a "client." This first option is the existing model being used with libraries in Western Canada, wherein SFU centrally hosts the knowledgebase and the software for a fee. Secondly, libraries can use the software as open source, set up a system independently, and subscribe to the knowledgebase for an annual fee. Finally, the libraries could be completely independent, adapting the software and an empty knowledgebase that they would then populate with their data. In the third option, the knowledgebase would be delivered with only some open-access content but no commercial title lists. As Owen explained, the software code powering reSearcher's components is open source, but the data in the knowledgebase is content, and therefore, is not truly open source.

CUFTS was initially available in 2002, but SFU has stated the entire reSearcher suite has been in steady development. SFU noted they hope to have a v. 2.0 release for reSearcher in late 2005 or early 2006, including making it available for open-source download of GODOT and dbWiz, which were not previously available for download via the SFU Web site. Finally, SFU offers free

brief MARC records for the data it tracks in the CUFTS knowledgebase, cufts2marc.[13] A wealth of information about all the SFU resources is available at the Web site, http://researcher.sfu.ca.

## University of North Carolina at Greensboro

The University of North Carolina at Greensboro (UNCG) decided to build its link-resolver product, Journal Finder (http://journalfinder.uncg.edu/demo), because no commercially available link resolver was available at the time. According to UNCG's assistant director of the Jackson Library/head of information technologies and information resources Tim Bucknall, Journal Finder was released in August 2001, which means the developers at UNCG did not see SFX in action while building their own homegrown solution, so they did not use it as a model. Like the other homegrown systems heretofore discussed, UNCG already had an e-journal list, and this became the seed for the Journal Finder knowledgebase. UNCG then added its print holdings to the knowledgebase in order to facilitate more accurate linking to print.

The developers have also added an administrative module to Journal Finder, which allows for easier maintenance, statistics, overlap analysis, and other administrative queries, such as the no-hits log. The no-hits log allows UNCG and Journal Finder customers to see what searchers *aren't* finding—which is information that can be used to improve searching algorithms, make collection-development decisions, and more. Echoing other homegrown developers, Bucknall commented that the technology behind the link resolver is more intellectually challenging, but the maintenance of the knowledgebase represents many more hours of tedium.

Currently, UNCG licenses its product and is working with twenty-nine customers. Bucknall noted that, with the exception of one customer, all are using Journal Finder as a hosted solution, meaning UNCG hosts the link server for the customer. The global knowledgebase underlying Journal Finder only contains those items to which UNCG subscribes, plus approximately 6,000 open-access titles, i.e., what is centrally maintained at UNCG. If a customer, however, subscribes to materials not tracked in the centralized Journal Finder knowledgebase, the UNCG staff contacts the content provider and loads the titles into the knowledgebase; the customer is then responsible for the maintenance of those non-UNCG titles. Customers can also submit their print holdings to UNCG staff via a spreadsheet and thus have their print holdings included in their instances of the knowledgebase. When asked how Journal Finder has changed with the release of OpenURL v. 1.0, Bucknall said that very little has changed. UNCG staff members regularly examine their linking syntaxes and closely evaluate how they build their OpenURL links to ensure they continue to function properly. UNCG is currently considering building electronic-management functionality into Journal Finder and continues to pursue innovative developments, such as dynamically built links from its OPAC to book reviews.[14]

*UNCG Journal Finder*
http://journalfinder.uncg.edu/demo

## University of Illinois at Urbana-Champaign

The University of Illinois at Urbana-Champaign (UIUC) originally created its own link-resolver product but has since decided to migrate to SFX through its state consortium, the Illinois Library Computer Systems Organization (ILCSO, www.ilcso.uiuc.edu), which has approximately sixty-eight institutions sharing the same Voyager system. According to UIUC's head of library systems John Weible, ILCSO did a request for proposal (RFP) about one-and-one-half years ago to receive bids for link resolvers, metasearch systems, and digital-object repository-management systems for the whole consortium. As a result of the RFP, ILCSO chose SFX for link resolution, and as a member, UIUC is able to have SFX almost completely free. This was a large incentive to use SFX—as opposed to the continued development and implementation of a homegrown system.

*Illinois Library Computer Systems Organization (ILCSO)*
www.ilcso.uiuc.edu

*LIB-OPENURL-DEV-L E-Discussion List Archives*
http://listserv.uiuc.edu/wa.cgi?S1=lib-openurl-dev-l&X=-

Due to the timing of the ILCSO purchase, the homegrown system at UIUC was never actually put into production use for patrons; however, the pieces were in place to create the homegrown link resolver (in particular, the knowledgebase component). Since 1999, UIUC has had an in-house e-journal database system; it is currently in its third generation. UIUC licenses TDNet's database of e-journal information so, although UIUC does not use the TDNet software, it loads the TDNet data into its in-house system weekly. UIUC also includes its own data about e-resources that TDNet does not track. With the consortia purchase of SFX, UIUC uses SFX as its link-resolver product. The ILCSO central staff runs one SFX server with dozens of instances for member institutions, but because UIUC

is so large, it chose to house its own SFX server and manage it independently.

John Weible created an electronic-discussion list (LIB-OPENURL-DEV-L**)** for those institutions building their own resolvers in order to communicate with one another about successes and failures. Weible indicated the list is virtually dormant now, but the archives are available for searching (http://listserv.uiuc.edu/wa.cgi?S1=lib-openurl-dev-l&X=-).[15]

## Other Link-Resolver Options

Other notable homegrown solutions include Gold Rush, created by the Colorado Alliance of Research Libraries.[16] Additionally, in August 2005, CrossRef deployed a freely available OpenURL resolver. This OpenURL resolver "allows users to enter an OpenURL as one way to be directed to publications from the hundreds of publishers and societies that participate in CrossRef by registering Digital Object Identifiers (DOIs) for their content."[17] It is OpenURL v. 1.0 compliant and accepts URLs for either v. 0.1 or 1.0; furthermore, it supports the SAP1 and is available at www.crossref.org/02publishers/openurl_info.html.

*Colorado Alliance of Research Libraries: Gold Rush Info. Page*
http://grweb.coalliance.org

*"CrossRef Deploys Free OpenURL Resolver" Press Release*
www.crossref.org/01company/pr/press081505.htm

*Welcome to CrossRef's OpenURL Resolver*
www.crossref.org/02publishers/openurl_info.html

## Notes

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2. Mike Hoover, "Being a Good OpenURL Source" (see chap. 3, n. 43).
3. Ibid.
4. Mark Dahl, "Building an OpenURL Resolver in Your Own Workshop," *Computers in Libraries* 24, no.2 (February 2004): 6.
5. Grogg and Ferguson, "Places Linking Will Go!", 52–53 (see chap. 3, n. 22).
6. California Digital Library, Projects, Programs & Services, "UC-eLinks," Inside CDL: Providing Access to the Working Documents of the California Digital Library," www.cdlib.org/inside/projects/uc-elinks/ (accessed December 8, 2005).
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13. G. W. Brian Owen, Todd Holbrook, and Kevin Stranack, telephone interview with author, October 13, 2005.
14. Tim Bucknall, telephone interview with the author, October 17, 2005.
15. John Weible, telephone interview with the author, October 10, 2005.
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17. crossref.org, "CrossRef Deploys Free OpenURL Resolver," (August 16, 2005), www.crossref.org/01company/pr/press081505.htm (accessed December 8, 2005).