Introduction

In July 2002, a report of the Special Committee on the Future of Law Libraries in the Digital Age was released, entitled Beyond the Boundaries. This special AALL committee had been charged “to consider the implications of electronic publishing for the future of law libraries and to prepare a report examining the issues and outlining different scenarios or models to describe the law library of the future.” [p. 1] That report examined sixteen different scenarios involving academic, private, and government law libraries. The committee then made seven recommendations to the AALL Executive Board [p. 64-65]. Recommendation number five stated that “AALL establish a committee to develop standards for cataloging of electronic resources and the development of intranets to ensure consistent and permanent access.” [p. 65] When the board met in Orlando, Florida in July 2002, it approved a motion to “appoint a new Special Committee on Cataloging Records to work with the vendor community to examine and make recommendations that would facilitate provision of better records for cataloging of electronic resources and the development of intranets, thus ensuring consistent and permanent access…” [p. 138]

In October of 2002, the Special Committee on Cataloging and Intranet Access to Electronic Resources was formed, including law librarians from a variety of settings. The committee began its work in January 2003 and met together informally at the Seattle
conference in July 2003. The members read articles, compiled bibliographies, posted comments and opinions, and talked to vendors. We eventually identified several main points of discussion that we now use to form the basic structure of our report.

1. Statement of the problem

The rapid and major structural changes to law libraries and law librarianship due to the move to electronic publishing are well known and experienced by all of us in this profession. The charge to the Special Committee on the Future of Law Libraries in the Digital Age was to develop scenarios detailing how this move could affect law libraries. This of course led to the issue of access to these electronic publications. The issue of access is as old as libraries: a library may have the exact book, document, or serial that a patron needs, but if the cataloging or indexing is non-existent or incorrect, that item is essentially worthless. The same applies to electronic resources: a library may have purchased the rights to a database of electronic resources, or created one in its local system, but if the cataloging or indexing is non-existent or gives incorrect information, those electronic resources are useless. Also, just as with physical items such as books and journals, electronic resources have maintenance issues. While the maintenance issues with physical items concern processing, adding call numbers, shelving, and preserving, the maintenance issues with electronic resources involve software to display it, hardware to look at it, and just being able to find it.

As the Special Committee on Cataloging and Intranet Access to Electronic Resources sees it, this is the problem. Our charge from the AALL Executive Board stated that law librarians are “constantly challenged to provide easy and comprehensive
access to electronic resources that are critical to legal research and analysis…” and that the “traditional access via the online catalog and access via Intranets and knowledge management portals each face the challenge of providing consistent and permanent access to legal information and other electronic resources.” This is the crux of the problem—how do law libraries and law librarians in law firms or corporations, in the academic environment, and in various governmental settings provide superior and consistent access to electronic publications and resources?

2. What we found in our research

In our examination of the issues and the research and development, we have concluded that the most promising solution lies in the emergence of link resolving applications that use OpenURL and Digital Object Identifier (DOI) technology. CrossRef (www.crossref.org) and SFX (www.sfxit.com) are leaders in the development and implementation of this technology. CrossRef is a not-for-profit network whose membership of libraries and publishers works to support standardized linking of resources through the use of OpenURL and DOI technology. SFX is a link resolver tool developed by Ex Libris. For a further discussion of OpenURL and DOI technologies, please see the appendices to this report.

A number of library-related organizations are also deeply involved in seeking a resolution to the issue of access to electronic resources and are looking with great interest at OpenURL and DOI technology. These organizations include ALA, the Library of Congress, OCLC, and IFLA. This interest by leaders in the library community further
encourages our committee to believe that link resolvers using the OpenURL and DOI standards are our best hope for solving the access problem.

As link resolvers continue to develop and become a solution to the problem of managing access to electronic resources, law researchers will derive the greatest benefit if providers of electronic legal information comply with standards that support such software. This includes the library system vendors such as Innovative Interfaces, Inc.; the abstracting and indexing database vendors such as The Gale Group; full text vendors such as Hein, West, and LexisNexis; and any other legal information providers who make their products available electronically, such as Aspen Publishers. The greatest reluctance to comply might come from those vendors who invest heavily in proprietary search systems (e.g., Westlaw) and may not wish to spend additional resources making the adjustments to their metadata that is needed for OpenURL/DOI compatibility. Others, like Hein, already exhibit interest in making their data OpenURL compliant.

3. Actions we recommend for AALL

Our primary recommendation is that AALL should encourage providers of electronic legal information to comply with the emerging standards of the link resolving application. This would include making their data OpenURL compliant and establishing DOIs that will facilitate link resolvers to work properly. The standards are increasingly stable, and user expectations are present for these services. Maintenance issues would be simplified, eliminating the need for checking URLs. Vendors and suppliers would benefit from such compliance because it would help them remain competitive, and provide them with a selling point to current and potential customers.
Our second recommendation is that AALL should designate a committee (preferably a subcommittee of CRIV or a designated committee comprised of members from the Computing Services SIS, Online Bibliographic Services SIS, and Technical Services SIS) to continue to monitor the progress of this technology. We believe that this group should also be charged with identifying the target vendors and developing a means for communicating expectations to them. Our committee further recommends that this oversight unit be encouraged to compile and post a list of the information providers that do comply. This would aid law libraries in their purchasing decisions, and give the information providers an incentive to comply.

Finally, we recommend that AALL use the Legal Publishers List maintained on the CRIV website (www.aallnet.org/committee/criv/resources/tools/list/index.htm) as the basis for the distribution of this report and AALL’s recommendations. Others who should receive the report and recommendations include library system vendors and other providers of databases that are used by law libraries. If the board accepts our recommendation that an AALL unit continue to monitor this technology, we believe that this unit should continue to identify vendors who should receive the report and recommendations.

Respectfully submitted—
Michael Maben, Chair
Hope Breeze
Janet McKinney
George Prager
Karen Selden
Eloise Vondruska
Nina Platt, Board Liaison
Appendix A


DOI

Acronym:

DOI

What it stands for:

Digital Object Identifier

What is its purpose?

The spec links customers with publishers/content suppliers, facilitating digital rights management, supply chain management, and electronic commerce.

Most commonly, publishers employ the system to sell digital content—journal articles, books, chapters of books, etc. Publishers can also use it to facilitate linking to excerpts, as for promotional purposes.

The International DOI Foundation defines DOI as an entire system for "persistent identification and interoperable exchange of intellectual property (IP) on digital networks." In other words, DOI is used to identify ownership and track the use of IP in cyberspace. DOI has been called "the bar code for intellectual property." The system has three components: identifier, directory, and database.

The identifier has two parts—a prefix, which identifies the entity that is registering the DOI, and a suffix, which identifies an individual item. A pre-existing identifier (like an ISBN) can be part of the suffix.

The directory, which functions as an intermediary between the user and the publisher, links DOI numbers with the servers on which the actual content is held. A publisher may change servers or transfer ownership of the copyright to another entity, but the DOI number will always remain linked to the content itself.

The database, maintained by the publisher, contains information about the materials and copyright holders. When a user clicks on a DOI link, he or she is taken to the publisher's repository and either views the content directly (if a subscription is in place) or perhaps sees a screen offering different ways to purchase the content.

The "plumbing" underneath DOI is called Handle System technology (http://www.handle.net). This is "a comprehensive system for assigning, managing, and resolving persistent identifiers" ("handles") for Internet resources, which can also be used
as Uniform Resources Names (URNs). The Handle System, written in Java, can be freely downloaded for research and educational purposes (http://www.handle.net/java_version.html). For those who want to test drive the system, or those who prefer not to run these services on their own, the Corporation for National Research Initiatives (http://www.cnri.reston.va.us) operates a Public Local Handle Service (http://hs9.cnri.reston.va.us/CNRIHS/index.html). CNRI operates the DOI system and provides technical support as a contractor to the IDF.

Groups behind it:

International DOI Foundation (IDF) (http://www.doi.org)

The Association of American Publishers (http://www.publishers.org), in conjunction with the Corporation for National Research Initiatives (http://www.cnri.reston.va.us), originally developed the system.

Registration of DOIs is accomplished via Registration Agencies (http://www.doi.org/registration_agencies.html), which may specialize in certain types of IP. Registration fees are set by the individual agencies. Once registered, a DOI can be used freely. The IDF itself grants DOI prefixes freely to organizations wishing to use them for limited research/education/experimentation projects (as opposed to commercial purposes).

Does it replace or update a previous standard?

DOI works with another standard. An OpenURL—a method for sending metadata associated with a digital object—can contain a DOI as an attribute. Embedding a DOI in an OpenURL can convey the correct copyright/licensing information that allows a user to access the desired content.

What stage of development is it at?

In August 2003, the 10-millionth DOI was assigned via CrossRef (http://www.crossref.org), which IDF identifies as "the first and still largest assigner of DOIs." This is what the DOI for that article looks like:

DOI:10.1007/s00348-003-0647-4. Here is the Web link: http://dx.doi.org/10.1007/s00348-003-0647-4.

Pros & Cons:

**Pros:** DOI links look and work like standard hyperlinks, and they can easily be cut and pasted. Also, DOI links are persistent. A DOI functions as a standard machine-readable number, allowing for cross-system communication. Once registered, DOIs can be used freely by anyone and are easily modified without requiring re-registration. DOIs can incorporate existing ID information, such as ISBNs, SKUs, etc. A publisher can add
unique DOIs to different parts of a resource—e.g., chapters in a book—so that a customer can easily purchase only what is wanted or needed. An extensive list of benefits can be found in the DOI Handbook (http://www.doi.org/handbook_2000/intro.html).

**Cons:** It costs money to affiliate with a registration agency and register items. In addition, the spec is oriented toward publishers rather than the library community. Furthermore, DOIs are not yet common in Web URLs; the standard is obscure to most outside of the information professions. Some feel the system is overly complex and wonder if publishers are capable of maintaining DOI databases.

**Additional comments:**

The IDF offers a page of links (http://www.doi.org/demos.html) to some demos of DOI in action. Content Directions, Inc., a DOI registration agency, also offers some examples from its customers (http://doi.contentdirections.com/doi_examples.cgi). Other references:

*Automating the Digital Supply Chain: Just DOI It* (2001)
http://www.contentdirections.com/materials/SIIA-AutomatingSupplyChain.htm

http://www.cmswatch.com/Features/TopicWatch/FeaturedTopic/?feature_id=66

http://www.dlib.org/dlib/june03/paskin/06paskin.html


**OpenURL**

**Acronym:**

OpenURL

**What it stands for:**

Open Uniform Resource Locator

**What is its purpose?**

An OpenURL is a URL that links a citation to extended services that are independent of the information provider where the citation originates. These extended services may
include an article's full text, biographical information about the author of an article, a search in a library catalog for a journal or book represented by the citation, a Web search, etc.

By far, the most popular use of OpenURLs is to link article citations in an abstracting-and-indexing database to the full text of the articles at a publisher or full-text aggregator Web site.

The structure of an OpenURL is composed of two parts: First, the base URL is the service component or "resolver." This is typically the hostname of a library-controlled server (or resolver) that processes the data in the rest of the OpenURL. OpenURL resolvers depend on a knowledgebase of sources that is used to find appropriate links for citations sent to the resolver. In most cases, the knowledgebase contains electronic journals that a library subscribes to and the URL syntaxes needed to directly link to articles within them.

Several library software vendors, including Ex Libris, Innovative Interfaces, Endeavor Information Systems, and Serials Solutions, sell OpenURL resolvers. Some libraries have designed and built OpenURL resolvers in-house.

The rest of the OpenURL is called the "descriptor," and consists of a defined set of variables tacked on to the URL in HTTP GET method fashion. The descriptor can contain the source of the OpenURL (e.g., the database that created the OpenURL—OCLC FirstSearch, EBSCOhost, etc.), and metadata about the article (or other information object) that the OpenURL describes. In the case of a journal article, this would include the journal name, its ISSN, the volume and issue numbers, the author's name, the title of the article, etc.

An example of an OpenURL follows:

**Group behind it:**

NISO Committee AX ([http://library.caltech.edu/openurl](http://library.caltech.edu/openurl))

**Does it replace or update a previous standard?**

No, it is a new standard.

**What stage of development is it at?**

It is currently a draft NISO standard and is in use by many information providers and library software vendors. NISO Committee AX is currently pursuing its adoption as a NISO standard.

**Additional comments:**
Most abstracting-and-indexing database providers are offering outbound OpenURL links from their Web interfaces. These links are intended to point to a library's local OpenURL resolver. Only a few such vendors (EBSCO, to name one) offer the ability to link to a full-text article via an inbound OpenURL.

Many electronic journal providers require a Digital Object Identifier (DOI) in order to link directly to the full text of a specific article. A nonprofit organization called CrossRef ([http://www.crossref.org](http://www.crossref.org)) provides free DOI look-up services. To link directly to the full text of an article at a publisher's Web site, an OpenURL resolver might need to send the citation data out to CrossRef via an OpenURL, receive a DOI back, and then link to the article at the publisher's Web site with the DOI.

OpenURLs could eventually have applications outside the scholarly publishing world. At some point, online book retailers might allow you to point OpenURLs at their Web sites to check on the price and availability of a book, CD, or DVD.

It's also easy to conceptualize OpenURL-like standards for entities other than citations for articles or books. People, places, and consumer products come to mind. For example, consumer products could have an "OpenURL" definition that might include product name, vendor, year released, model number, etc. If you were looking for a specific shoe by brand and size, your personal resolver could check prices and availability at a number of online stores that were compliant with the standard. Here are sites you might want to check:

*OpenURL Committee's Web site: [http://library.caltech.edu/openurl](http://library.caltech.edu/openurl)*

*The OpenURL Framework for Context-Sensitive Services: Standards Committee AX; National Information Standards Organization (2003)*
[http://www.niso.org/committees/committee_ax.html](http://www.niso.org/committees/committee_ax.html)

*OpenURL format specification: [http://www.sfxit.com/OpenURL/openurl.html](http://www.sfxit.com/OpenURL/openurl.html)*

Appendix B
CrossRef website (www.crossref.org):

OpenURL and CrossRef

In order for information providers to equip their products for optimal integration with library linking systems, they are being asked to implement the OpenURL. This has caused some confusion concerning primary and secondary publishers who use the CrossRef/DOI system for cross-publisher links to full-text, because of the mistaken perception that the OpenURL and the DOI are competing technologies. They are not.

CrossRef and the DOI provide persistent identification of scholarly content and centralized linking to the full text and other resources designated by the publisher. The OpenURL enables library-controlled links to a multiplicity of resources related to a citation and is designed for localized linking. The OpenURL is in fact enhanced by interaction with the DOI system, as explained below.

Some basic definitions

- The OpenURL is a mechanism for transporting metadata and identifiers describing a publication, for the purpose of context-sensitive linking. The OpenURL standard is currently on the path to NISO accreditation. (For more information on the OpenURL, see http://library.caltech.edu/openurl.)
- A link resolver is a system for linking within an institutional context that can interpret incoming OpenURLs, take the local holdings and access privileges of that institution (usually a library) into account, and display links to appropriate resources. A link resolver allows the library to provide a range of library-configured links and services, including links to the full-text, a local catalogue to check print holdings, document delivery or ILL services, databases, search engines, etc.
- CrossRef is a system for the persistent identification of scholarly content and cross-publisher citation linking to the full-text and related resources using the DOI. CrossRef DOIs link to publisher response pages, which include the full bibliographic citation and abstract, as well as full-text access (for authenticated users or at no charge, as determined by the publisher). The publisher response page often includes other linking options, such as pay-per-view access, journal table of contents and homepage, and associated resources. CrossRef is a collaborative membership network, and not a product for purchase.
- DOI stands for Digital Object Identifier and is an open standard. A DOI is an alphanumeric name that identifies digital content, such as a book or journal article. The DOI is paired with the object's electronic address, or URL, in an updateable central directory, and is published in place of the URL in order to avoid broken links while allowing the content to move as needed. DOIs are distributed by publishers and by CrossRef, and there is no end-user charge associated with their use. As an identifier, the DOI can be incorporated into many
Why libraries need local link resolvers

DOIs point to the authoritative version of content on the publisher's website and to publisher-designated resources. Yet for the user working in an institutional context, it is often useful to be directed to other resources. For example, the institution may not subscribe to the e-journal itself but may still be able to offer the user access to the desired article through an aggregated database or through print holdings. In addition, the library may wish to provide a range of linking options beyond what is available at the publisher's website.

How the DOI and OpenURL work together

The DOI and the OpenURL work together in several ways. First, the DOI directory itself - where link resolution occurs in the CrossRef system - is OpenURL-enabled. This means that it can recognize a user with access to a local resolver. When such a user clicks on a DOI, the CrossRef system does two key things: (1) it redirects that DOI back to the user's local resolver, and (2) it allows the DOI to be used as a key to pull metadata out of the CrossRef database, metadata that is needed to create the OpenURL targeting the local link resolver. As a result, the institutional user clicking on a DOI is directed to appropriate resources. By using the CrossRef DOI system to identify their content, publishers in effect make their products OpenURL aware.

Secondly, since DOIs greatly streamline linking and data management processes for publishers, more publishers are beginning to require that the DOI be used as the primary linking mechanism to full text. Link resolvers can use the CrossRef system to retrieve the DOI, if the DOI is not already available from the source (i.e., citing) document.
The value of persistent links

Static URLs are not a persistent linking mechanism. If a URL is published as a link and the content it points to is moved, then that link will no longer function. DOIs address this problem. For instance, the publisher may need to migrate content from one production system to another (pre-print to post-print), or content may move from one publisher to another if a journal, or the publisher itself, changes hands. In these cases the publisher simply updates the DOI directory; the DOI itself never changes, which means that all the links to that content that have already been propagated still function. An OpenURL link that contains a DOI is similarly persistent.

Among the range of linking options they might display, local link resolvers frequently contain links to full-text at the publisher's website, as when the library subscribes to the e-journal in question or otherwise wishes to provide its patrons with access to publisher services and access options. While OpenURLs without DOIs can function persistently if the relevant metadata is updated within the institution's link resolver, this process is
greatly streamlined via access to the CrossRef system. CrossRef provides a single source for linking reliably to hundreds of publishers without the need to track varied metadata-based linking schemes. Therefore, link resolvers benefit from using the DOI wherever linking to publisher-designated resources is appropriate.

Appendix C
SFX website (www.sfxit.com):

**SFX Awarded Best New Product!**
SFX has been given The Charleston Advisor's "Best New Product" Award for Electronic Service to Libraries, as nominated by Users. For more information, visit the TCA Website.

SFX is a unique and revolutionary tool for navigation and discovery, delivering powerful linking services in the scholarly information environment. With SFX, libraries can define rules that allow SFX to dynamically create links that fully integrate their information resources regardless of who hosts them -- the library itself or external information providers. The user is presented with context-sensitive links that are dynamically configured on the basis of the institution's e-collections. Such resources could include:

- full-text repositories;
- abstracting, indexing, and citation databases;
- online library catalogs;
- citations appearing in research articles, e-print systems, and other Web resources.

SFX permits context-sensitive linking between these web-based resources; whereby the target of a link depends on the digital library collection of the institution to which the user who requested the link is affiliated. No more "dead" links whereby the user clicks on a link to navigate to a new information space but finds that they do not have rights of access to the resource to which they have linked and are therefore blocked from access.

SFX allows the librarian to define the library's electronic collection, including both licensed and freely available resources; and to determine the manner in which the component resources can be linked to best suit the library's users.

Many information providers have already enabled SFX linking for their resources whether these are hosted by the provider themselves or locally by the institution. The number of adopters is growing rapidly. See a list of these. SFX linking uses an emerging protocol for interoperability between information resources and service components that allows for localization in an open linking framework -- the OpenURL. SFX complements existing important linking initiatives such as CrossRef.

SFXIT™ to see how SFX can meet the research needs of your users.