Leveraging Electronic Content: Electronic Linking Initiatives at Arizona State University

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Abstract. This paper presents an overview of electronic linking initiatives at Arizona State University Libraries. It covers existing commercial solutions. These solutions include SilverLinker from SilverPlatter Information and ISILINKS from the Institute of Scientific Information. Problems, advantages, and disadvantages of these initiatives are described and explored.

1   Background

Arizona State University Libraries is a multi-campus university serving the State of Arizona, USA. ASU has a full-time enrollment of 49,000 students. The Carnegie Foundation ranks ASU as a Research I institution. The Association of Research Libraries places ASU in the top thirty of research libraries in the United States.

Like many ARL libraries, Arizona State University has embarked upon an ambitious plan to create an electronic library to serve its faculty, students, staff, and community. Over the last three years, ASU Libraries has committed over 20% of its materials budget toward licensing databases and electronic journal content.

Three components make up ASU Libraries core delivery architecture. An Innovative Interfaces Innopac system provides library cataloging. A Silver Platter Electronic Resources Library (ERL) networks key indexing/abstracting services. Journal content and other information resources are mainly outsourced from library vendors and publishers. Of these outsourced services, a key indexing/abstracting service is ISI's Web of Science. All of these services are web-based. The Innopac online catalog and the ERL networked are managed locally by the library.

ASU Libraries manages and delivers electronic resources from the library's home page. Through these pages, customers have the opportunity to access over 200 indexing/abstracting services, 2000 aggregated electronic journals, and 1500 electronic journals.

2   The Problem

Most customers, including librarians, find navigating among so many electronic resources a daunting task. Despite the web environment, built around easy navigation of digital resources, our users find themselves in an information environment rich in

electronic resources but poor in the area of linked relationships among resources, especially journal content.

To remedy this, and in doing so leverage our investment in web-based electronic resources, ASU Libraries has invested in the various linking initiatives which have entered production over the last year. We are also taking a keen interest in initiatives that are slated to go into production in the near future. These initiatives include SilverPlatter's SilverLinker product, ISI Isilinks, SFX linking, and soft linking from Ebscohost.

Currently, we have implemented SilverLinker and ISILINKS.

3   SilverLinker at ASU Libraries

ASU Libraries has provided SilverLinker links to electronic content since March 1999. Technically, the solution is simple. SilverLinker gathers stable URLs from publishers, creating a searchable database of link information.

We immediately saw the value of this move. Previously holdings information was limited to look-ups at the item level (journal title). Customers could (and still do!) query an alphabetical list of journals titles maintained as a web page. Item information is also linked in the InnoPac catalog using the MARC 856 tag. Finally, the ERL client, in its Windows and Web version, allows dynamic query of the ISSN field in the InnoPac item record.

With SilverLinker, users possessed linkage access to articles. In most SilverPlatter databases, a search query not only returns bibliographic information but also links to subscribed content. If the customer wants to access fulltext, he or she simply clicks on the SilverLinker icon. The customer is then linked to the publisher's web site.

Linking to journal content from major indexing/abstracting services was a major step forward. Up until this point librarians were seriously concerned on how to leverage the value of indexing/abstracting information and functionality with content that resided outside these services. We were also concerned with the trend of journal publishers to segregate content at their own web sites and providing clearly less power, even inferior, search interfaces.

The fact that major publishers are cooperating with SilverPlatter (and other I/A services) to provide stable URLs to their content illustrates that a business philosophy has been revised

A particular advantage of SilverLinker is our ability to manage the SilverLinker program locally. Article level linking is necessarily a new facet of serial management. As any serials librarian knows a serials collection is a constantly changing phenomena. We weed collections, we cancel subscriptions. We select new titles. These dynamics require local choice, local decisions, and local management. Any product that doesn't allow this creates a major problem.

The biggest complaint and disadvantage of SilverLinker are probably not limited to this SilverPlatter product. SilverLinker involves the customer with two web-based products. We have found that in the hand-off of one system to another there are a number of system related problems. One is performance. Our SilverPlatter server

resides in our library. The server connects directly to the campus fiber-network. This configuration enhances Internet performance on campus.

However, performance problems begin the further the user gets from our server and vary with how a customer accesses. For example, telephone access is limited to PPP modem banks that operate at very slow speeds.

This problem is exaggerated when the user is handed off from a SilverPlatter session to a session with a publisher's web site. In an instant, the customer may be a dozen or so Internet hops from the content server.

ASU does authenticate SilverPlatter users from Internet locations that do not go through the PPP modem bank. Users can access the ERL server in a peer to peer configuration. However, publisher sites vary in their ability and willingness to authenticate users who have been authenticated in SilverPlatter.

Publishers prefer proxy servers for remote authentication. For performance and management reasons, ASU Libraries has evolved a hybrid authentication system that uses referring URL. Every product on our web site has a page that provides a basic introduction to the database and ways to access the database. The customer has the choice of going through the slower modem pool or to access via ASURITE.

4   ISILINKS

ASU Libraries licensed the Web of Science early in 1968. Soon after, it became one of our more popular databases, averaging 10,000 session per month. Although the Web of Science covers arts, humanities, and the social sciences, the physical and life sciences are its major focus. ASU faculty and researchers have long had access to a local implementation of Current Contents on BRS Onsite. As the Web of Science more or less incorporated Current Contents into the Web of Science

Science, technology, and Medical publishers were among the first to create content web sites. The opportunity to bring together one of the better and more known indexing/abstracting tools and e-content was golden.

ISILINKS works very much like SilverLinker. Publishers give stable URLs to ISI who then builds a database table of valid links. These links appear in a Web of Science citation record if access is available. Some publishers have created enhanced reference links from their content. ISILINKS captures these links. So one can link back from an article to the Web of Science citation.

Unlike SilverLinker, ISI manages the linking setup. The library must inform ISI which journals to which it has electronic access. ISI has made this process quite simple with an online form submitted via email by registered contact person at the library.

At the same time, this method interferes with management at the local level. If something goes wrong with a link, the library must investigate and then communicate with ISI. And then wait for a response or a fix.

To manage effectively, the library must have a good customer support program. Feedback from customers must be verified as a problem. The problem must then be quickly and effectively communicated to ISI. If all works well, ISI fixes the problem,

and communicates the fix to the library. We then test whether or not the problem has been corrected.

This process appears simple enough. Yet it isn't so smooth. ISI doesn't like to deal with just a few problems; they prefer we batch them. However, this means delay. One bad is tantamount to many bad links. The customer who can not link from

A better situation, adopted by SilverPlatter (as well as Ebsco) is self-administration.

ISILINKS also does not support authentication methods useful to ASU Libraries. They support IP filtering or proxy servers. As noted, ASU Libraries have decided that proxy service does not meet performance requirements. Moreover, we can not manage a sufficiently robust proxy service, which would meet performance requirements.

5   What We Have Learned and other Observations

5.1   Leveraging

The basic complaint against publisher web sites lodged by librarians has been the lethargic and function-handicapped search engines provided by the publishers. System librarians can add to this complaint that publishers, new to online services, do not seem to act like online services. Customer support is rarely 24X7 and publisher web sites do not seem to take seriously the need to communicate downtimes to users.

In complete contrast, indexing/abstracting services have a long history of working as online services. Support is 24X7 and customer support is well established. Search software has evolved over the last twenty to forty years to very effective and powerful retrieval tools.

5.2   Eliminating Intermediate User Steps

Librarians and customers alike also complain about the steps required to move from a finding tool to a document location. Hosting services that aggregate electronic content have long succeeded by merging the finding tool with the actual content, e.g., Bell and Howell Proquest, Ebscohost. Linking initiatives like SilverLinker and ISILINKS emulate these aggregators by bridging powerful finding tools and content.

5.3   Maximizing the Web Model

Web use is click-conscious and click-oriented. Users expect to be linked from one piece of information to another piece or related or more useful information. Linking initiatives play into this model.

5.4   Problems with Standards

No standards exist for linking. The CrossRef initiative promises to create a system of providing linking information from publishers to a clearinghouse for such information. The Publishers International Linking Association will manage this clearinghouse (see http://www.crossref.org/).
At present, SilverLinker and ISILINKS support proprietary solutions. There is no reason for either of these products to adhere to a proprietary solution should a standardized approach be developed.

5.5   Authentication

Authentication presents a stickier problem. Most publishers adhere to IP domain restriction for academic customers. This approach is easy to implement, maintain, and offers a great degree of security. Unfortunately, it presents specific problems for linking initiatives.
On one hand, if the indexing/abstracting service and publisher are both IP authenticated, then a user accessing from a valid IP range will have no problem moving from one IP restricted service to another. He or she will be validated by the service accessed.
On the other hand, if a valid user accesses from a restricted domain, the library must take certain steps to authenticate this user. Generally speaking this involves some form of query to a database of valid users and passing to the information provider some piece of information that says this user may access a set of resources.
On the surface this appears to be a simple process. In reality, there are many obstacles. Many publishers protect their content by limiting authentication options. For large institutions publishers prefer IP restriction or issuing userid and passwords. These encryptions are changed frequently to maintain security. As a result, the library inherits a considerable management problem of determining who should receive userids and passwords, updating lost and forgotten passwords, issuing revised passwords etc.
The main problem for linking involves the continuity of authentication across what may be called authentication boundaries. A user needs to be taken from one service to another and back—as many times as required. Current authentication policies and technologies do not readily support this.

5.6   Performance Problems

Best performance over Internet bandwidth occurs in situations where the user is close to a server. Theoretically, the Internet forms an ideal distributed environment where servers may reside anywhere in the world.
In fact, the Internet does not constitute an ideal distributed environment. Servers more proximate to each other on the Internet tend to perform better as distributed servers than do servers that are located far from each other.

Linking of services encounters real problems of performance as a result of server locations and server capacities. Presently, publisher servers do appear to be scaled to perform well and efficiently for all users.

5.7   Lost in Cyberspace?

At present, over 200 information providers comprise ASU Libraries set of web services. Over 3,000 electronic journal titles are available from an array of aggregators and publishers. To provide sensible and simple navigation among these resources stands as major challenge. Linking through SilverPlatter and ISILINKS accomplishes the important task of bringing together indexing resources and content. The remaining task will be to make easier the customers understanding the various informational "worlds" they enter when they click on links.