Accessing LOCKSS Content Through OPACS and Link Resolvers

Philip Gust

Stanford University LOCKSS Program

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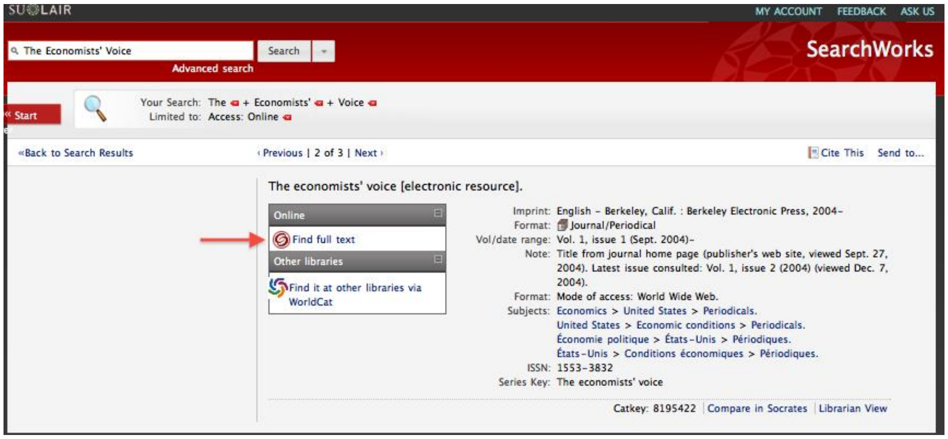
Introduction

The LOCKSS (*Lots of Copies Keep Stuff Safe*) digital preservation infrastructure gives libraries control over on-line content they have purchased, by ensuring that the content is preserved locally in case they lose access to it from the publisher. Local ownership is critical to long-term preservation. It separates payment from access, and insulates libraries from future price increases for preservation and access to content they already own. LOCKSS enables libraries to build and preserve real digital collections, with guaranteed perpetual availability, in the same way that they do with print media. This includes subscription and open access materials, e-journals, books, and a wide range of other web delivered content.

Beyond preservation, LOCKSS plays another role: making preserved content available to users when it is not available from the publisher. This is important when the publisher discontinues the publication, the library discontinues its subscription to the publication, or access to it though the publisher is temporarily interrupted because of a breakdown in IT infrastructure. In these situations, LOCKSS is like an "uninterruptable power supply" for preserved content.

To fulfill this role, a library's local LOCKSS box must be integrated into the library IT infrastructure, and make preserved content available through the same user interfaces that libraries normally provide. The most common user interface in a library is the Online Public Access Catalog (OPAC). When a user locates a title in the catalog that is available on-line, the displayed record includes a link to access the title:

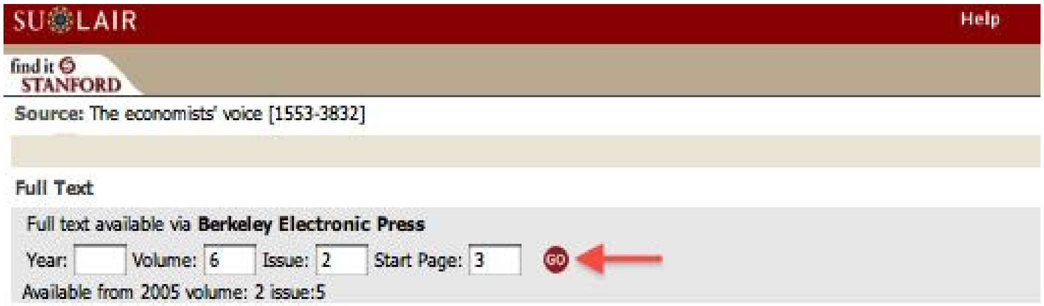


The economists' voice [electronic resource].

Imprint: English - Berkeley, Calif. : Berkeley Electronic Press, 2004-
Format: Journal/Periodical
Vol/date range: Vol. 1, issue 1 (Sept. 2004)-
Note: Title from journal home page (publisher's web site, viewed Sept. 27, 2004). Latest issue consulted: Vol. 1, issue 2 (2004) (viewed Dec. 7, 2004).
Format: Mode of access: World Wide Web.
Subjects: Economics > United States > Periodicals.
United States > Economic conditions > Periodicals.
Économie politique > États-Unis > Périodiques.
États-Unis > Conditions économiques > Périodiques.
ISSN: 1553-3832
Series Key: The economists' voice

Catkey: 8195422 | Compare in Socrates | Librarian View

The link provides a way to request content from one or more *target* content suppliers. The form that is displayed for a specific target enables the user to request an article using its bibliographic information:



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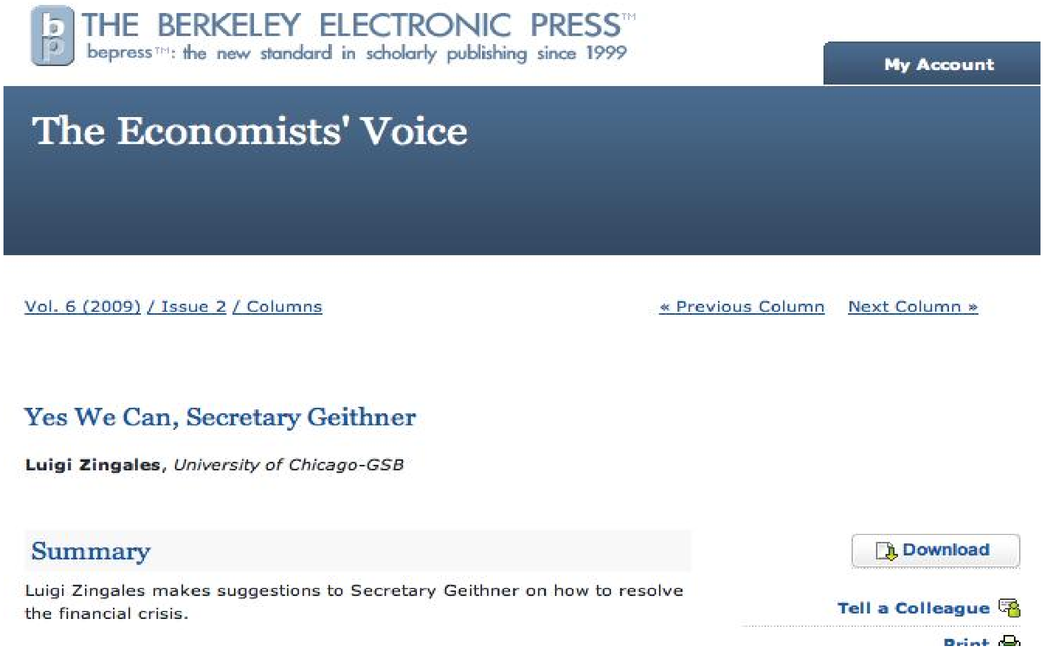
In this example, the target is the publisher, who returns a landing page where a PDF rendition of the article can be downloaded.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The Economists' Voice

Yes We Can, Secretary Geithner

Luigi Zingales, *University of Chicago-GSB*

Summary

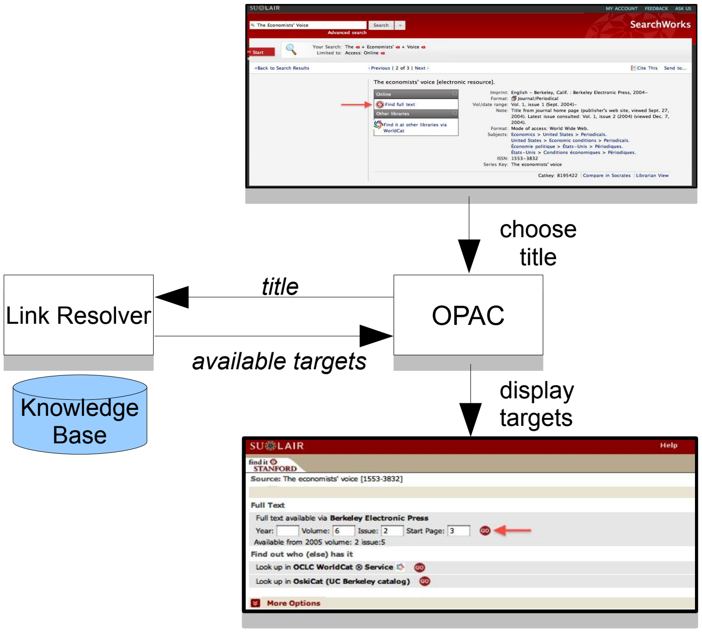
Luigi Zingales makes suggestions to Secretary Geithner on how to resolve the financial crisis.

Link Resolvers to the Rescue

Context-sensitive linking, accessing on-line content based on bibliographic data, is a complex process. Rather than requiring each OPAC to implement this functionality, the library community developed a technology, known as a *link resolver (*or *link server*), that OPAC vendors can integrate with their systems. A link resolver transforms a request in terms of its bibliographic data into a Uniform Resource Locator (URL) "link" to the content at a target. The publisher is the only target in this example. If the title were also available from other targets, such as *Web of Science* or *Google Scholar*, the OPAC would display a line for each, and the link resolver could provide the URL to the content at any of them.

How they work

To accomplish this, the link resolver maintains a *knowledge base* of titles that are available from each target. Entries in the knowledge base include title ISSN or ISBN, the range of volumes available from the target, and a target-specific method for transforming bibliographic information into a content URL. When an OPAC displays a title, it retrieves a list of available targets from the link resolver.



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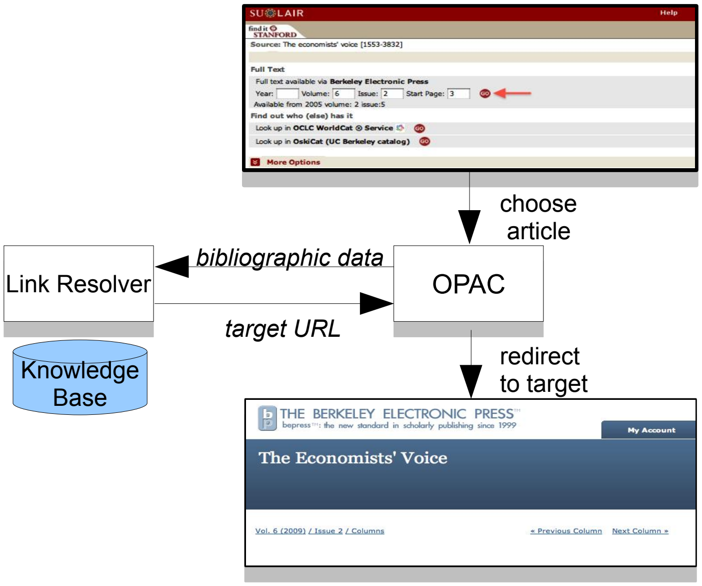
More Options

When the user selects a target and enters the bibliographic information for the content, the OPAC sends this information back to the link resolver. The link resolver generates and returns the URL for the requested content at the selected target. Finally, the OPAC *redirects* the browser to this URL.



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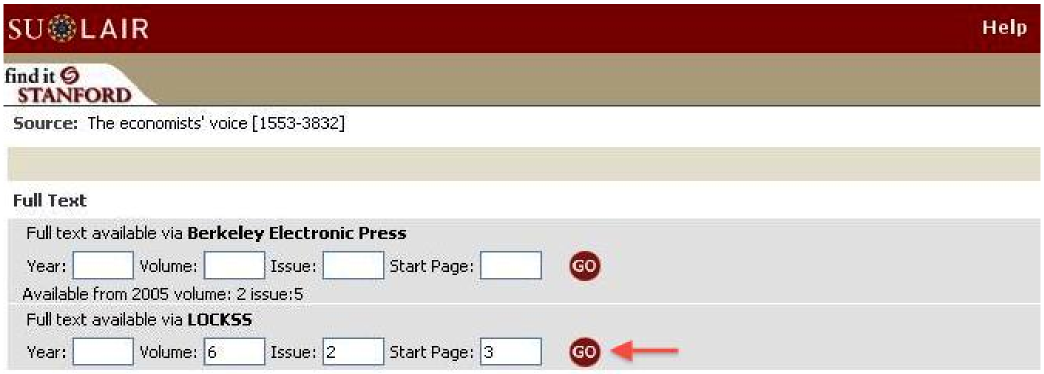
Benefits

The link resolver frees users from having to know which targets can supply specific content, and how to interact with a target to retrieve it. It also frees libraries from having to maintain their own knowledge base of titles and targets. Vendors who supply link resolver products revise their knowledge base from publisher data, and periodically push updates out to library customers under their product maintenance agreements. Most OPAC vendors support integrations with one or more link resolvers.

The first link resolver was developed by Herbert Van de Sompel at the University of Ghent in the late 1990s. It was subsequently purchased by the library automation company Ex Libris Ltd. and marketed as SFX. Other companies who market link resolvers include OCLC (WorldCat Link Manager), Swets (SwetsWise Linker), Serials Solutions (360 Link), and many others. There are also several open-source link resolvers, including CUFTS and Umlaut.

Integrating LOCKSS with Link Resolvers

Integrating LOCKSS with link resolvers is an effective way to make LOCKSS content available to library users. OPACs already use link resolvers to provide access to a library's on-line content. The integration of a LOCKSS box as a link resolver target provides users with a reliable way to access content, regardless of whether it is still available from the publisher or another target. LOCKSS becomes the target of choice for accessing preserved content, because it automatically “fails over” to the content archived in the LOCKSS box if it is no longer available from the publisher.



Source: The economists' voice [1553-3832]

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Full text available via **Berkeley Electronic Press**

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Enhancements to the Link Resolver

LOCKSS is working with the major link resolver companies to integrate with their products. The work required to integrate with one can be leveraged to integrations with other link resolvers. All the link resolver specific enhancements for integrating with LOCKSS are to done within that product. The first is to add LOCKSS as a target in the link resolver. The LOCKSS target definition includes a parameter that allows a library to specify their local LOCKSS box as part of its local link resolver configuration. Target URLs returned by the link resolver are to the LOCKSS box specified by this parameter. For example, the parameter for the LOCKSS box at XYZ University may be **`http://lockss.xyz.edu:8082/`**.

The second enhancement is to define a method for creating a LOCKSS target URL from bibliographic information. Various link resolver products refers to this by different names, such as a *target parser* or an *article linker.* It is a simple code module written in a programming language like Perl, that is associated with the target definition. LOCKSS in some cases LOCKSS creates this module and in other cases it is created by the vendor. A configuration LOCKSS target configuration includes for a link resolver includes this module and the local LOCKSS configuration parameter.

When the user selects the LOCKSS target for a title in an OPAC, the link resolver runs the LOCKSS code module and passes in the user's bibliographic data. The LOCKSS code module formats the data into an OpenURL, an industry standard way to encode bibliographic information in a URL. The link resolver redirects the user's web browser to this location, and the LOCKSS box uses the information in the OpenURL to return the requested content. The OpenURL returned by the LOCKSS link resolver code module for the earlier example is:

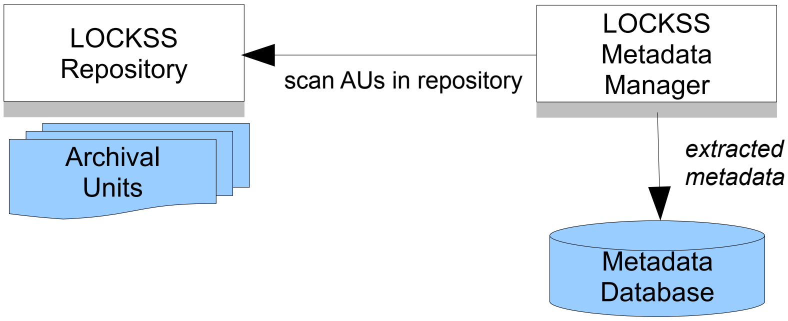
`http://lockss.xyz.edu:8082/ServeContent?issn=1553-3832&volume=6&issue=2&spage=3`.

The third enhancement is to add titles preserved in the LOCKSS box to the link resolver's knowledge base. LOCKSS will periodically supply the link resolver vendor with a current list of titles available for preservation. The vendor will add the list to the knowledge base it distributes to its customers. Link resolver vendors accept title lists using an industry standard format specified by the Knowledge Bases and Relational Tools (KBART) working group. Since most link resolver vendors now accept this format, LOCKSS can send the same list to every vendors as we add to our list of supported link resolvers.

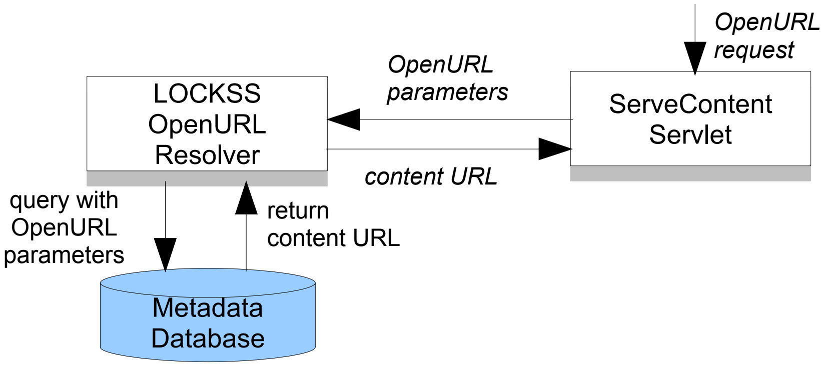
Enhancements to LOCKSS

Several enhancements are required for the LOCKSS to process OpenURL requests from a link resolver. LOCKSS manages *Archival Units* (AUs) for titles. AUs are collections of files that are convenient as units of preservation. Accessing preserved content using bibliographic information requires an additional database of metadata about individual articles, issues, and volumes contained in AUs, and their locations. This database is maintained by a new LOCKSS subsystem called the *Metadata Manager*.

Extracting metadata is a time-consuming process, so the Metadata Manager works in the background, scanning recently preserved AUs, and extracting metadata such as title ISSNs, volume and issue numbers; and article DOIs, titles, authors, and page numbers. The Metadata Manager adds this information to the metadata database, along with the content locations.



Finally, the LOCKSS box's *ServeContent* servlet has been extended to recognize OpenURLs, and pass them to to a new subsystem, the *OpenURL Resolver*. The OpenURL Resolver accepts bibliographic information from OpenURL parameters, and uses the metadata database to return the URL of the requested content. ServeContent and the OpenURL Resolver accept a full range of OpenURL queries, in both the simpler OpenURL 0.1 and the richer OpenURL 1.0 formats.



If the content specified by the returned URL is preserved by the local LOCKSS box and is the most recent version from the publisher, ServeContent returns the content in the local LOCKSS repository. If the content is not preserved by the local LOCKSS box or the publisher's version is more recent, ServeContent returns the content from the publisher. This is similar to a web browser returning locally cached content.

Summary

The integration of LOCKSS and link resolvers is an effective way for libraries to provide reliable access to the digital content that they own, even if they lose access to it through the publisher. Most OPACs allow users to access on-line content from title records through close integrations with commercial and open-source link resolvers. Together, LOCKSS, link resolvers, and OPACs simplify access by using existing library IT infrastructure and user interfaces that are already familiar to library users.

Although the details of integrating LOCKSS with a link resolver are specific to the vendor, many of the vendors have adopted common practices, enabling the work done for one integration to be leveraged to integrations with other vendors' systems. LOCKSS has been enhanced to retrieve archived content in terms of its bibliographic data, encoded in the industry-stand OpenURLs format. As a result, link resolvers can simply encode a user request as an OpenURL, and redirect the request to the local LOCKSS box.

For content that is archived in a local LOCKSS box, the LOCKSS target for a title displayed by a library's OPAC is the most reliable source, because it automatically “fails over” to the archived version if access through the publisher becomes unavailable, like an “uninterruptable power supply” for content.

Further Reading

“OpenURL”. *[http://en.wikipedia.org/wiki/OpenURL]*.

“The Lure of Linking”. Library Journal.com. 4/1/2004. *[http://www.libraryjournal.com/article/CA405398.html]*.

“LOCKSS”. *[http://www.lockss.org/]*.

Reich, Victoria A. “Lots of Copies Keep Stuff Safe as a Cooperative Archiving Solution for E-Journals” , Issue in Science and Technology Librarianship. Fall 2002. *[http://www.istl.org/02-fall/article1.html]*.