

An Article Delivery Environment that is Networked, Expedited, and Global

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Abstract

Billions of articles are now discoverable through powerful search utilities, though a majority are not easily accessible. Libraries are unable to provide unfettered access to unlimited electronic resources, while a great deal also remains analog. Networking unmediated and expedited access to content through discovery systems increases both access and use of information resources. This networked approach has been incredibly successful in a monograph environment across the United States (e.g., BorrowDirect and EZBorrow) and provides a model that could be replicated in an article-searching environment. Systems such as Summon, EBSCO Discovery Service (EDS), and Google Scholar provide gateways to an expanse of articles, but these utilities are primarily designed to provide direct, full-text access to locally-owned and -licensed resources. Unfortunately, the prohibitive cost of information makes licensing a large portion of the universe of full-text content unattainable for even the most elite institutions. Leveraging existing document delivery services for article requests, such as RapidILL in the United States, offers a promising way to seamlessly provide expeditious access to unlicensed content. By integrating those systems into link resolvers, requests can be expedited directly to the article request systems through application programming interfaces (APIs). This internationally extensible approach has promising implications for extending the utility of article-lending to unprecedented collaborative collection development initiatives for journal content regionally, nationally, and internationally. In addition to laying the foundation for an expedited article request system, this paper will also explore future collaborative collection opportunities, copyright implications, fulfillment management, system scaling, configuration and developments, as well as the implications of ratcheting up such a system globally.

Introduction

In 2014, the University of Pennsylvania Libraries, hereafter Penn Libraries, evaluated the use of library resources and services offered to users at the onset of a multi-year strategic planning cycle. During this continuously adaptive review process, which aimed to align the Libraries' strategic goals with those of the University community, it became starkly clear that our users' dependence on electronic resources was increasingly exponentially. At the same time, there was an unsurprising decline in the use of print materials, a trend which is now evident at many large academic research libraries across the United States (Anderson, 2017). A preponderance of scholarly information is generated year over year, making the ability for libraries to acquire everything more and more difficult; this dissonance is the primary driver for expedited access to resources through document delivery services. In the fall of 2014, to better understand the root of this trend, the Penn Libraries surveyed its body of students and faculty

about their perception and use of library resources and services. Of those results, the most prominent need expressed by users could be summarized in one statement:

“I want faster, simpler, less-hassled access to the world of resources I need and use to teach and conduct research.”

This appeal consists of essentially two parts, describing the user’s access to research content: 1) the speed and ease with which resources can be accessed, and 2) the breadth of resources available.

In seeking simpler and faster access to more resources, Penn is certainly not alone; the astonishing popularity of databases of pirated material, like SciHub, is a perfect indication that many scholars either lack licensed access to the content they want, or find the channels to library-provided access overly aggravating. In order to protect intellectual property and publishing revenues, publishers, and therefore libraries, have fabricated a whole host of hurdles and barriers to access licensed content. Though SciHub certainly is used by researchers in poor, or third-world, nations who lack the means to subscribe to the content they need, an analysis of user downloads persuasively indicates that even researchers at large research institutions, which do provide licensed access to publishers’ content, nevertheless prefer SciHub for its simplicity and speed (Bohannon, 2016). Relative to these hurdles, however, those required for a user to obtain access to the growing portion of resources not licensed by the home institution are even more cumbersome, making borrowing materials across institutions unnecessarily inefficient.

The “world of resources”

The “world of resources” to which the Penn Libraries, in particular, did not provide access became starkly obvious when the Libraries implemented its first discovery service, Summon, in 2015. As we determined which features we would enable on the site, we gave a good deal of thought to the “add results beyond your library's collection” checkbox. Libraries have the option to check this box either on or off by default. Checking the box incorporates search results from all content indexed in Summon, regardless of the presence of a subscription locally. Penn chose to leave the box checked off by default, but we were struck by the staggering number of articles to which we did not provide access locally: 880,000,000 articles appear locally available, but double that number, more than 1.7 billion articles, are actually indexed in Summon. This means there are almost a billion articles to which Penn does not provide local access, and we are no exception among our peers.

Unfortunately, not everything licensable can be made available, or more importantly, afforded, even by the most well-funded institutions. Five years ago, Harvard University, the wealthiest academic institution in the world, made headlines with its Faculty Advisory Council Memorandum on Journal Pricing, stating that “major periodical subscriptions, especially to electronic journals published by historically key providers, cannot be sustained: continuing these subscriptions on their current footing is financially untenable” (Faculty Advisory Council, 2012). In addition, scholarly output grows year over year, as does the proliferation of academic journals. Astoundingly, global scientific output has doubled every nine years since World War II (Bornmann & Mutz, 2015). The combination of rapidly increasing prices and the increasing number of resources published further divides the universes of licensed content and available content.

Among the most pressing and dire financial pressures facing libraries today, collections budgets are increasingly spent on ongoing subscriptions to serials and databases; these subscriptions regularly consume 75% or more of budgets for library resources. Indeed, academic journal publishers are posting higher profits than nearly any sector of commerce; in 2013, Elsevier posted 39% profits, while Apple posted only 37% (Schmitt, 2015). In addition, these expenditures grow year over year with regular annual increases to journal prices and packages that frequently exceed inflation and the growth of library budgets.

In the United States and globally, libraries are unable to afford subscriptions to the entire universe of journals their users demand. Faced with untenable budgetary environments, many are choosing to break their “Big Deal” journal packages (Anderson, 2017). Notable examples include SUNY Potsdam, which walked away from its American Chemical Society package (Rogers, 2012), the Université de Montréal, which canceled its subscriptions to journal packages from Wiley Online Library, Springer, and Taylor & Francis (Loon, 2017), and the German national consortium, which discontinued access to Elsevier journals online (Kwon, 2017). Though users at those institutions had, through packages, access to the breadth of those publishers’ journal collections, they are now faced with a considerable loss of content. In order to achieve any cost savings, libraries must subscribe individually to only a small minority of the journals they previously received through those packages. In reviewing journal packages at Penn, we have generally found them to follow the Pareto Principle, or 80/20 Rule, where just 20% of the titles in the package, sometimes even less, account for 80% of the use. Unfortunately, these 20% of the most-used titles usually equal or exceed in list price the total cost of the package. While many of these are little-used “filler,” there is often a middle ground of substantially-used titles that too must be cut, if any savings is to be achieved. Roger Schonfeld of Ithaka S+R recently argued for libraries to wrest back negotiating leverage from publishers, primarily for bundled journal packages (Schonfeld, 2017). He outlined a system for categorizing resources using a traffic-light metaphor (green for reasonably priced and great deal of value relative to price, yellow for modest degree of value relative to price, red for poor degree of value relative to price). Schonfeld suggests using these categorizations to generate greater buy-in across campus and to communicate proactively with content providers. These “yellow” journals are exactly those which would be ideal candidates for a collaborative shared collection across institutions. Libraries must find the means to cooperate to ensure continued access to a minimum number of subscriptions to at least a portion of the long tail of these journal subscriptions.

The twin problems of the growth of scholarly output and the increased cost of academic publishing only argue for the need for greater collaboration across institutions. The nature of library collections in the twenty-first century relies increasingly on the network and inter-reliance of libraries. Today, a whole host of programs for building, preserving, and even downsizing collections depends upon collaboration across institutions and creating sharing and delivery mechanisms to ease and expedite access for the user.

By further cooperating on licensed resource access, an avenue for ratcheting up a system to better share materials can be digitally born. As discoverability increases, the ability to collaborate on a much broader scale becomes inevitable. Partnerships can be established by refining access to licensed electronic resources and a myriad of analog textual materials that are exposed in systems, but lacking digital surrogates. As frameworks are established, understanding license agreements for electronic resources consorcially, nationally, and internationally can be incorporated into systems and processes. For example, in Italy the Italian Archivio Licenze Periodici Elettronici project—ALPE - <https://nilde.bo.cnr.it/licenze.php>--serves as a systematic

model for developing a database for categorizing license restrictions and access conditions for major publishers in order to facilitate document delivery (Mangiaracina, Russo and Tugnoli, 2015). The current document delivery system provides desultory access to a world of resources, but that access can be more consistent and that 'world of resources' can be much, much broader.

Devising an extensible article environment

Consortia have developed systems and processes to expedite unmediated access to physical collections. For example, Penn participates in both the Ivy Plus Libraries' BorrowDirect interlibrary loan service and the Pennsylvania Academic Library Consortium, Inc. (PALCI) EZBorrow interlibrary loan service. These networks are based on systems where requests are placed directly from local discovery environments through an application programming interface (API), or in a consortial discovery-to-delivery system that "offers library users a searchable collective catalog of all the partner libraries' holdings;" both of the two aforementioned groups use Relais D2D (Collins, 2012). The systems are interoperable with library management systems, which allow for a seamless user experience for borrowing library materials. Materials borrowed from partner libraries are checked out in the user's local system. The local circulation process is embedded in the circulation workflow through NISO Circulation Interchange Protocol (NCIP) integration of brief bibliographic records, item creation and hold notice being sent out all through local library management systems. When looking at this unmediated, timely, and effective network for loaning books, it begs the question: can elements of this approach be extended to international document delivery services?

It is already possible to request an article from another institution in another country, and obtain that article in a reasonable timeframe (Burke, Duncan and Smither, 2016). The main problem is that the current global framework for document delivery is still being established; collections are underexposed, systems are not always interoperable and outcomes are inconsistent. Substantial effort goes into sundry, time-consuming processes necessary to request an article, including identifying the institution, verifying holdings, request management, associated fees, confirming the article in question is the actual article requested, and delivering the article to the user without issue (need for rescan, optical character recognition, correct article, and various other issues). The process lacks directness to an increasing world of resources where efficiencies can be realized through embedded solutions in existing systems.

The current process for requesting items at Penn Libraries mirrors the process at most other institutions in North America. Local direct access is the most efficient means for accessing content, but as previously noted, the University cannot obtain access to everything that can be licensed. The implementation of the web-scale discovery system Summon at Penn (at other institutions this may be the alternative EBSCO Discovery Service) and other like services Google Scholar or OCLC have established gateways for users into a world of information that is impossible for any institution to provide direct, licensed access. Users that are unable to directly access articles via Summon, Google Scholar, or any of the numerous databases log into the current system through either discovery interface directly or through a web services link resolver (known locally at Penn as PennText) to select a services webpage. This webpage lists the services, such as article scan request (known locally as Scan & Deliver), place the item on course reserve (for faculty), note an issue with the record, or generally ask a librarian a question in relation to the resource or record. Users that select the article scan option are presented with a pre-populated form that captures their name, email, affiliation, a default delivery method (all

article scan requests are pre-assigned web delivery), and bibliographic information derived from the record. The user verifies the information in the form, requests the article, and is sent a verification email. The form is then ingested into our ILLiad Interlibrary Loan request processing software. The citations for articles or book chapters, which include the year and ISSN or ISBN are automatically sent to RapidILL. RapidILL is a tiered-based document delivery system that groups similar libraries in order to maximize borrowing/lending parity and resource fulfillment. The RapidILL system queries holdings for locally owned titles and returns the citation with location information for local fulfillment. Citations for content not locally owned are routed to one of the three Rapid Pods that we participate in -- PALCI, Association of Research Libraries or Medical -- to be scanned in roughly twelve hours after the request was made in the system (note: the form request to ILLiad to RapidILL may automatically port over with international standard numbers, and manually with content that needs identifying information to be better established) with a rate of completion success over ninety percent (Rapid, 2017). Citations not available in Rapid are returned to us and manually routed to other institutions via OCLC WorldShare ILL for fulfillment, which only account for roughly six percent of the transactions (Rapid, 2017).

All scans are automatically posted to a server and patrons receive a notification email with a link to the authentication-protected server to retrieve their scans in pdf format. In most cases the article is made available and the process is seen by the user and the Penn Libraries as a great success and serves as a working model for how to consistently expand access to a user group at a large research library. But, is it enough? How can discovery and access be further refined and expanded? How do we work towards a paradigm of more universal access? These questions and more drive the thinking behind a consistent service improvement model and serve as the basis of thinking about the issue differently.

The existing systems have the potential to be extensible and scalable. What is required is reconstructing the systems and processes in an order that maximizes access to resources. How to not only leverage the great efficiencies in document delivery, but how to build on these efficiencies with new workflows that mimic the concept of unmediated ILL transactions. When thinking about utilizing an increased network of discovery, it aids in formulating a starting point for addressing the current state of document delivery affairs: is there a way to review our various resource sharing components, devise a system where they work together, and create a global network that provides expedited access to resources within existing systems to provide users with the “faster, simpler, less-hassled access to a world of resources?”

Discovery

In “The Future of Library Resource Discovery,” Marshall Breeding puts forth the idea that discovery plays an ever critical role in expanding access of content to users (Breeding, 2015). Web-scale discovery systems are similar, but not the same in exposing resources (Ciccone and Vickery, 2015). Web-scale discovery services such as Summon, EBSCO Discovery Service (EDS), and Google Scholar provide broad, yet differing avenues of resources, but also subject-specific, aggregated databases, abstract and indexing (A&I) services and institutional repositories, also provide additional pathways to resources. There are options for discovery that could augment the multi-layered solution for access to resources.

By expanding web-scale discovery services to fullest spectrum of resources, not simply what a library licenses, which is the default option in Summon, allows users to select between

direct and document delivery access. It is then up to the user's discretion to request any items that are not immediately accessible, rather than libraries curating a subset of content for users.

This is all moot if requests are not integrated with the broadest possible network of discovery systems. Link resolver pages serve as the ideal bridge to not only move users from discovery interface to licensed content, but also from discovery interfaces to document delivery request systems. To what should link resolvers resolve when immediate access is not available? And, how can leveraging link resolvers help expedite a delivery system?

Link Resolvers and Inverting Request Workflows

Link resolvers, or library links in a Google context, serve as the intermediary between records and content. Link resolvers push users into the direction of their institutional authentication tool in order for users to pass through electronic resource paywalls. They are a necessary click-through system that opens up frustrating paywalls that users frequently face. It is worth noting that sometimes link resolvers are obviated by index-enhanced direct linking (IEDL) that is built into some discovery systems that allow users to click from record to resource without an intermediary page, but oftentimes users are faced with the link resolver. Link resolvers are tools with a specific purpose that also may include options besides direct access to full-text materials. Link resolvers can aid users in printing record information, permalinks, citing materials, bookmarking, or storing record metadata in the citation management tool of their choice and as discussed in the Penn Libraries workflow above, they can provide a portal into library services related to the record.

Currently, the process for interacting with a link resolver for requesting an article to which a user lacks direct access requires a series of internal processes that then funnel into a networked article fulfillment stream in RapidILL. Expedience could be gained if that process was inverted from working from a local system, such as ILLiad to a networked context, such as Rapid to beginning in the networked system and passing requests that locally can be filled into the local system. This approach could be accomplished in the United States by starting with a vendor such as RapidILL. The RapidILL system can establish what basic citation information is needed to verify local holdings and to disseminate the citation to the network in order for it to be filled effectively. If in the link resolver, the option for document delivery should pre-populate a form that is directly ingested in RapidILL, for example, where local availability and fulfillment distribution are dually managed. The critical component of this system, and possible collaborative endeavor for libraries, discovery system vendors, and resource sharing system vendors is to establish the basic citation information that is needed to have the best possible chance to fulfill a request. A web services API could transmit information from the various link resolvers that could be ingested consistently in most any modern resource-sharing system to initiate a bifurcated—networked and locally fulfilled—queue management stream.

Local processes differ across institutions. An inverted process would definitely require broad operations changes across libraries. These operational changes would be mitigated by the fact that most of the academic libraries currently using systems such as RapidILL would be working with it upstream in the process of queue management, as opposed to starting further downstream in the expedient scan and deliver context. A networked approach to managing requests and divvying requests into local and networked fulfillment streams would generate significant time savings that would take the onus off of local managing of user requests. It also would assist in the moving away from best practices and creating shared practices. These shared

practices would then consist of many of the same workflows, and in the networked uniformity of practices, additional resource turnaround time measures would then be realized.

Problems, Possibilities and Conclusion

Collaborating on collective collections with an extensible, composite document delivery system is possible to develop on an internationally networked scale. By expanding discovery and augmenting content in the broadest possible way, resource access can be expanded. Linking link resolvers directly to resource management systems will also streamline the process and make it more efficient. Exploring how these systems work on a national scale and how they may interoperate on an international level is a shared task that can be organized by the Document Delivery and Resource Sharing Section of the International Federation of Library Associations. A broad system cannot be instantiated without collectively addressing challenges, contemplating possibilities that refine and expand the concept of expanding a document delivery network internationally, and creating a roadmap for deepening international collaborations.

One of the major challenges facing internationally networked services is the barriers brought by licensing, copyright laws, and related Resource Sharing guidelines (such as the 1979 guidelines issued within the United State by the Commission on new technological users of copyright works, or “CONTU.”). Copyright law may vary substantially between countries, and in many cases is under review or revision. Even if copyright law permits the reproduction and scanning of library content, license clauses may forbid it. License restrictions further frustrate the sharing economy with non-disclosure agreements and generally poor transparency; while it’s often possible to know if a library subscribes to a journal, it’s often impossible to know if their license permits sharing.

These thorny issues have hindered international cooperation, but the literature has identified use cases and IFLA has established guidelines to help libraries navigate the complexities of document delivery in an international context (IFLA, 2015). The idea to revise these guidelines and incorporate more strategic guidance envisioning is underway (IFLA, 2017). Revising the guidelines to propel greater collaboration is central to figuring out how to accommodate a broader and more expedited system. In addition, internationally-lending libraries should seek collaborative opportunities to collectively work with publishers to create more transparent and resource-sharing-supportive license terms.

Reciprocity, or better stated, the lack thereof stands as a potential barrier to any system. If an organization cannot collectively engage in acquiring the most used materials and relies on an international network of libraries for a majority of their content it will create imbalance in the partnership and will run into insurmountable license restrictions. Users want instant access, and therefore institutions need to focus on licensing their community’s most sought-after journals and an international network that is expedient will lead to additional content becoming discoverable and available. Independent of licensing and copyright issues, a networked system works exceptionally well for pre-prints, grey literature, anything that does not have a digital equivalent, or out-of-print content.

The introduction of a decentralized, global network for expedited article delivery systems can expand on the discursive formation of ideas in interlibrary loan. As the resource sharing landscape continues to change, nascent collaborations across national networks can abound internationally (Bailey-Hainer, B., Beaubien, A., Posner, B., & Simpson, E. 2014). The potential system provides a foundation to explore taking advantage of a broad array of initiatives for

future research, such as creating distributed search interfaces by sharding indexes in order to further expand the massive amount of information in discovery systems; using document delivery fulfilment data to remediate discovery metadata; and further incorporating universal design principles into document delivery workflows. By developing a global tiered structure, akin to RapidILL's pods, based on type of institution, requests can be tiered to similar institutions across the globe and requests can be fulfilled in different time zones to maximize efficiency. The implications for partnerships are enormous. IFLA's Document Delivery and Resource Sharing section can take a leading role in this endeavor by forming working groups focused on networked licensing, discovery services, fully realizing the potential of link resolvers coupled with document delivery systems to expedite access and to properly scale an article environment across the globe through collaborative initiatives.

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