

New Developments in Library Discovery and Access

The library and scholarly publishing ecosystem is ever evolving. It can be difficult to capture a snapshot of this evolution without risking irrelevancy or obsolescence. Libraries are deeply affected by any advancements occurring within the information technology, information security, scholarly publishing, and library discovery service industries. Throughout this chapter we touch upon a broad range of technological developments, the new opportunities for access failure that they will elicit, and how these developments will influence library troubleshooting efforts.

New Developments in Linking: LibKey API and GetFTR

Struggles with the chronic OpenURL link resolver issues have given rise to new linking applications aimed at providing one-click access to full-text article content. Third Iron's LibKey API and its suite of products, including a discovery integration (LibKey Discovery), a browser extension (LibKey Nomad), a DOI and PMID article finder (LibKey.io), and a link resolver accelerator (LibKey Link), have become a well-established service in academic libraries. Through LibKey, rather than selecting links from a long list in the resolver menu, users are presented with links directly to article PDFs based on the library's electronic holdings. It also connects users to open-access resources that may not be discoverable from other library tools. LibKey Discovery puts this functionality within the library's discovery service, but other applications of LibKey, such as LibKey Link, enable one-click access within other interfaces, such as A&I databases, aggregators, and Google Scholar.

Get Full Text Research (GetFTR) is another one-click-access application new to the scholarly publishing market. Unlike LibKey, which relies upon the

subscribing library's knowledge base holdings and its own knowledge base of open-access content to deliver access, GetFTR uses its API to check an institution's entitlements on participating publishers' platforms. Since GetFTR is a service marketed to publishers for inclusion on their platforms, there is no financial investment on the library's end. And, as GetFTR says on its website, "Libraries and researchers do not need to opt-in, register, or download any new software" (GetFTR, n.d.). The one-click links will simply appear on participating publisher sites.

GetFTR is limited in several capacities, however, as compared to LibKey. The first is authentication. While LibKey is able to integrate with the full range of library authentication methods (IP, proxy, VPN, FIM), GetFTR was created primarily to function alongside SeamlessAccess, a FIM initiative. It has since added IP authentication methods, but this is a recent development, and it is unclear yet how well (or confusing) the integration is. Next, LibKey is able to be implemented across a variety of search interfaces, including major players such as Google Scholar and PubMed, but GetFTR is currently limited to subscribing publisher platforms. Aggregators and A&I databases have yet to sign on. This, too, may change in the future—GetFTR is currently seeking aggregators to test its product and Elsevier has launched a new discovery-esque pilot featuring GetFTR—but currently the one-click access is of limited use. Finally, assuming GetFTR is integrated with aggregators, questions remain about fair linking practices and how usage statistics will be counted. Because LibKey is a library service, libraries have more ability to configure linking options, such as choosing whether or not to link to prepublication manuscript (i.e., non-Version of Record). Libraries are also able to add their link resolver menu as a fallback option should no full-text holdings be found. GetFTR, conversely, is a publisher service relying on publisher entitlements. Therefore, linking configurations must

be agreed upon by the participating publishers and integrators, including whether or not an article hosted on the publisher site will receive linking priority over the same article hosted on an aggregator site. However, if GetFTR is able to work through its current limitations and answer these questions, it may become another well-established linking option on which researchers and libraries alike can rely.

New Horizons for Discovery: Elsevier, Yewno, and EBSCO Concept Maps

ScienceDirect Pilot

In early 2022, Elsevier launched a pilot project intended to alleviate the frustration end users experience when conducting literature reviews. Elsevier has partnered with publishers, including the American Chemical Society, the Royal Society of Chemistry, Taylor & Francis, and Wiley, for a six-month project to understand how it can help researchers find and access content more easily. During the pilot, researchers will be able to search and browse more than 70,000 articles in thirty-five journals in two major disciplines from participating publishers alongside Elsevier's content on ScienceDirect (L'Huillier 2022). Researchers will have an integrated search, browse, and display experience on ScienceDirect; however, content access and delivery will remain distributed across the multiple publisher platforms (Hinchliffe 2022).

Elsevier has been an innovator in the search and linking sphere since the early nineties. In the early 2000s, for example, it was experimenting with a linking program called ScienceDirect Gateway, which allowed linking between the ScienceDirect platform and affiliated publisher websites. It is no surprise, therefore, that Elsevier was an initial sponsor of GetFTR and is using it in its current pilot project to connect users to the full text on the participating publisher platforms. GetFTR in combination with SeamlessAccess aims to streamline navigation for users, whether they are starting their research from their library's website or the web at large, and whether on or off site. It will also reduce frustration by having scholarly content for a single discipline robustly represented on a single search interface, which will certainly increase discovery and end user satisfaction.

Elsevier may have launched this pilot program in response to websites like Sci-Hub and ResearchGate, which have been hubs for illegal sharing of academic papers. While some publishers, such as Springer Nature and Wiley, have syndicated their content to ResearchGate so users are directed to the article's validated version of record, Elsevier has taken a different tack with these websites and initiated lawsuits.

If Elsevier is successful in its pilot and expands to include other disciplines, this may signal the start of other content providers developing similar services for their own disciplines.

Elsevier's pilot may have implications for librarians tasked with ensuring their users can access subscribed resources. If issues with GetFTR linking arise, librarians may find themselves stuck in the middle, trying to troubleshoot and resolve the issue between the service and the content providers. Ideally, though, the linking will be more reliable than OpenURL and individual librarian oversight will be reduced as a result.

Visual Concept Mapping

Visual concept maps, or knowledge graphs, are another innovation in search and discovery to pick up steam in recent years. Concept maps, like those offered from Yewno and EBSCO, enhance discovery searches by showcasing relationships between terms in the form of a visual, web-like graph. Unlike traditional discovery, which relies upon controlled vocabulary, subject headings, and keyword indexing, concept maps analyze the text of documents through machine-learning (AI) programs to extract contextual relationships between assorted topics. Because these programs learn as they ingest new material and as users interact with them, new relationship threads can strengthen or lessen with time, leading to users unearthing new, at times unexpected, documents and research concepts. Concept maps have the potential to overcome the gap between controlled vocabularies, with which end users are often unfamiliar, and natural language.

The potential implications for troubleshooting are interesting to consider. Librarians are accustomed to reporting discovery service issues such as broken links and incorrect metadata source records for e-books, e-journals, streaming video, and so on. Concept maps may introduce new opportunities for failure in the form of incorrect subject assignments, content display issues, inaccurate subject associations, or other creative malfunctions.

Automation of E-resource Workflows

Libraries are increasingly looking for ways to automate their e-resource management workflows. KBART Automation, which we discussed in the last chapter, is now being employed by several vendors to automatically set e-resource holdings for libraries using Alma/Primo. EBSCO, too, has been implementing automated workflows between its various services. EBSCO Subscription Services (ESS) Auto-Population

in Holdings Management offers a way to automate the knowledge base holdings selection process. However, unlike KBART, this service can be activated only by libraries that employ both ESS (EBSCOnet) and EBSCO Discovery Services. As described on EBSCO's support center, this service "automates an otherwise manual library workflow to update your holdings to reflect your EBSCO E-journal and Package Subscription orders through ESS" (EBSCO Connect 2021). With ESS Auto-Population, new orders are processed and holdings are mapped to resources in EBSCO's Global Knowledge Base daily.

Regardless of the best intentions, many of the stark realities of acquisitions and cataloging will still necessitate a review of a library's holdings despite having ESS Auto-Population or KBART Automation enabled. For acquisitions, review may still be needed due to consortial purchases that experience annual updates with additions and cancellations to individually tracked titles. For cataloging, e-journal title changes and publisher transfers are likely to continue to wreak their current level of havoc regardless of attempts at automation.

Automated holdings attempts can also make traditional holdings tracking workflows more opaque. For example, ESS Auto-Population can set only library holdings that were ordered through ESS. Libraries currently cannot import comprehensive holdings coverage, which would include both current orders and previous orders with perpetual access acquired through other subscription agents, into EBSCOnet in order to be included in a library's holdings. EBSCO does provide options to prevent overwriting custom holdings changes, thereby preserving the manual efforts necessary to record custom access for a library's holdings.

There are still many benefits to automated holdings management, such as reduced staff time, fewer entitlements lost in translation from invoice to knowledge base holdings, and quicker access to content. Another significant advantage of KBART Automation is the ability to push out substantial updates at a moment's notice. During the COVID-19 pandemic, many content providers allowed time-limited free offers to their content, and these updates were able to be rapidly disseminated to libraries that had established KBART Automation.

Content providers, subscription agents, and knowledge base vendors will likely continue to form additional innovative partnerships to improve customer satisfaction through the rapid dissemination of holdings. These new efforts at automation are more likely to succeed in reducing access disruptions if they adhere to the various metadata standards that were covered in the last chapter and if vendors continue to closely partner with libraries to better learn the daily necessities required for adequate holdings management.

Moving to the Cloud

One of the most significant moves libraries have made in recent history is the shift from locally hosted library systems to library services platforms, such as FOLIO, WorldShare Management Services, and Alma, which are hosted in the cloud. Library services are not the only industry moving their systems into the cloud. Adoption of cloud infrastructure and platform services, such as Amazon Web Services (AWS), Microsoft Azure, and Google's cloud services, has become increasingly popular in recent history. However, the downside of this widespread adoption is that service outages could affect a library's entire access chain: from LSP to discovery service to vendor platform. Extensive service outages, such as the ones experienced by AWS in 2017 and 2021, are hugely disruptive for library users and well beyond the power of libraries to fix. However, for better or worse, they are much more clear-cut for librarians to troubleshoot.

The Death of IP Authentication

Cloud Application Security and Ransomware Protection Software

As institutions increasingly move their software applications to the cloud, new concerns emerge around cyber security. Many institutions are investing in cutting-edge cloud application security (CAS) and ransomware protection software to help protect their users, but such software can have unintended consequences for libraries, including disrupting IP authentication. Although libraries have employed IP authentication as the gold standard for many years, "most other consumer or industry vendor access methods stopped using IP authentication long ago" (SeamlessAccess.org, n.d.). As a result, many IT professionals are unaware of how these applications can affect library e-resource access.

At the 2022 Electronic Resources and Libraries Conference, one library shared its experience with cloud application security being installed on institutional laptops. On-site users at the institution and off-site users utilizing the VPN encountered paywalls when trying to access library e-resources. When the librarians investigated, they discovered the users' IP addresses were outside their institutional ranges. After contacting their institution's IT department, they discovered that the recently deployed CAS software was responsible for users being reassigned an IP address outside of normal institutional ranges. This in turn meant that the users could not access any library e-resources with an IP address outside institutional ranges that their content providers did not recognize. While the library at the conference said that it had

no permanent solutions, its IT department was working with its CAS vendor to implement the necessary exceptions.

Another cyber security solution able to wreak havoc on library e-resource access is ransomware protection software. Enterprise ransomware protection software solutions behave and function in different ways (some of which are proprietary trade secrets) in response to the different types of malware that could infect an institution's computers. Sometimes this behavior can adversely affect e-resource access. For example, ransomware protection software may block an institution's on-site traffic from accessing IP addresses previously flagged for having unusually high traffic or for containing suspicious adware. If a content provider's IP erroneously gets flagged, this could mean on-site users are blocked from accessing that platform. The interim solution would be to make necessary exceptions for IP addresses originating from e-resource content providers.

Browser Vendors Work to Increase User Privacy

Driven by online privacy fears, browser vendors are reconsidering long-held practices of how they track and target advertising to their users. In response to events like the 2018 Cambridge Analytica scandal and European regulators enacting the General Data Protection Regulations, browser vendors have been developing new security measures that will in turn greatly increase user privacy. Unfortunately for libraries, an unintended consequence of these proposed changes is that they may put an end to IP authentication as we know it. In an effort to preserve privacy, some browser vendors are introducing technology to obfuscate user IP addresses, which would prevent those utilizing these browsers from accessing IP authenticated e-resources. FIM authentication, including initiatives like SeamlessAccess, will also be affected. The browser technology changes being undertaken affect the way that cookies are stored. As SeamlessAccess.org explains, "The browser cannot tell the difference between a cookie that lets a service know the user is authenticated from a cookie that allows an advertiser network to track a user around the web"

(SeamlessAccess.org, n.d.). Currently, users can adjust their privacy settings on browsers employing this technology in order to allow platforms to read their IP address or cookies. However, such privacy measures are increasingly the default in browser settings.

This has tremendous implications for troubleshooting. Time-tested troubleshooting techniques, like recommending that off-site users employ the institution's VPN, may no longer be valid in an environment where institutional machine IP addresses cannot be used to authenticate access. Moving away from IP authentication would require a great amount of adjustment for libraries, and end users would be negatively affected while the new methods of authentication are worked out. Such a paradigm shift would no doubt cause ripple effects for years to come as libraries reorient themselves to new means of authentication and new troubleshooting best practices to deal with the issues that would inevitably spring up.

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