Library Hi Tech News

Integrating tools to remote access facility for improved online experience
Tanmay De Sarkar

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Introduction and review

The integration of various tools are used to access materials remotely for improved outreach to meet the needs of academic and research users. This study encompasses 80 university libraries worldwide.

Remote access has been introduced in libraries during the late 1990s (Tykoson, 1999; Wang and Hubbard, 2002) and is gradually becoming increasingly popular (Covey, 2003; Mikesell, 2004; Frederiksen, 2006; Blansit, 2007) with the integration of various tools and techniques (Bradley, 2007; Ritterbush, 2007; Colvin, 2008; Kroski, 2008; Burhanna *et al.*, 2009; Rieger, 2010; Ingham *et al.*, 2012; Sundarraj, 2014). Over the years, access to library resources and services for the remote users has become more convenient and indeed intuitive. A preliminary search among some library websites gave an interesting picture how libraries perceive the importance of convenience to access technology for remote users and are adopting new features to their websites to enhance this access.

Earlier investigations provides an overview of several technologies, such as proxy servers, VPN, Athens authentication, Shibboleth authentication, etc., which authenticate users having access rights to licensed library resources from local and remote locations (Bracke, 2001; Blansit, 2007; Hadro, 2008; Dai, 2011). Kilzer *et al.* (2008) in their study also emphasized technical aspects, how to overcome the local limitations to off-campus access technology and provide access to resources at the point of need. Ingham *et al.* (2012) focused on the initiative of the National Information Standard Organization (NISO), offering authorized users to gain access to licensed external resources utilizing single sign-on (SSO) authentication technologies which are intended to improve the overall user experience. Some other articles deal with operational principles of remote access technology (Harmening, 2013; Zhang, 2014).

Lawrence (2009) conducted a survey at the Library at Minnesota State University in Mankato, on the usability of proxy servers for remote access. Earlier the Library used Squid, a Web proxy software that required users to configure their browsers prior to getting access to online resources. However, with the introduction of EZProxy, the library provides remote access to users to online resources without complicated configuration and it works on any browser.

Bower and Mee (2010) explored how the Rochester Institute of Technology Libraries used Drupal, Desire2Learn, the MetaLib X-Server, EZProxy and ILLiad, in a variety of ways and provided convenient and seamless access to library collections to everyone, particularly those learning from a distance. Use of VPN and proxy servers (Blansit, 2007) has become the basic approach a library finds to provide off-campus access to proprietary resources and services. However, with the addition of various tools and techniques, the remote access has become more lively, time saving and convenient.

Use of a library toolbar – a Web browser plug-in (Bailey and Back, 2006; Brown, 2007) with multitude of functionalities offers enhanced access to library resources. Chilton and Thomas (2014) discussed the potential use of LibX – an open-source browser extension – that offers online resources and services out to users wherever they are on the Web at University of Connecticut Libraries. Another promising way of accessing library resources off-campus is through a proxy bookmarklet. A proxy bookmarklet, installed on the browser's bookmarks, allows users to log into the proxy server without having to browse from the library website (www.lib.washington.edu/help/proxyTools.html). However, many libraries are offering EZProxy, acquired by OCLC (Hadro, 2008), a Web proxy server, especially configured for library resources, to provide remote access to online library resources.

Burhanna *et al.* (2009) suggested that the library might integrate various online tools and support services onto their course management software, like Blackboard. Off-campus users may log on to the course management site directly from their browser's toolbar. Steiner (2009) and Click and Petit (2010) discussed at length the innovative use of social networking sites by libraries. Libraries integrate online applications with their OPAC and full-text database search capabilities to the social networking sites so that users may install library apps that allow users to directly log-on to proprietary resources. Users get improved online experience as they could interact with library resources while keeping their online social media active. Hartman and Mullen (2008) studied Google Scholar's integration with ARL library's websites. Off-campus users may directly log-on to a library's full-text resources through Google Scholar seamlessly linked to subscribed and licensed resources. Harris and Lessick (2007) explored the possibility to expand the library's Web presence and reach out to distant users. Embedding library applications to personalized start pages, a library may allows users to start research conveniently and easily from their preferred site while off-campus.

Remote access-related investigation, so far carried out, basically explored authentication and authorization solutions for accessing online resources

(Cary, 2012). The published literature is vast related to proxy servers and VPN connections used by the libraries for the purpose of remote access (Blansit, 2007). Some other investigations concentrated on specific tools, among them, Chilton and Thomas (2014), described the various areas where these applications can be effectively implemented and integrated for remote access. Up to now, no comprehensive study has been conducted that surveys how libraries are harnessing the effectiveness of various tools and techniques to offer off-campus access to library resources and services worldwide. The present study aims to identify the prevalence and use of various tools to offer off-campus access to resources among libraries and to answer the following research question:

RQ1. How do libraries provide access to their resources off-campus?

This paper, through a survey, explores how remote access tools are being implemented by examining the tools and techniques, integrated with remote access and to investigate their use.

Table I.
Tools and techniques for remote access

No.	Statements	Score (1/0)
1	Routing queries to the catalog through a proxy server	
2	Adding a library toolbar that can route websites through a proxy server	
3	Inserting proxy string into an URL	
4	Getting access to proxied links to resources through a bookmarklet	
5	Setting Google Scholar for library links	
6	Getting access to resources through embedded applications on personalized webpages	
7	Linking social networking sites with subscribed resources	
8	Inserting proxy strings with browser plug-ins on smart phones	

Table II.
Purposes of using remote access tools

No.	Statements	Score (1/0)
1	Carrying out search and getting access to scholarly resources via online library catalogue	
2	Searching library website for subscription based e-journals/e-books packages	
3	Access to restricted resource databases	
4	Subject guide/ course guide	
5	Research tools	
6	Online borrowing/ renewal facility	
7	Placing inter library loan request	

Methodology

The present study followed content analysis (Neuendorf, 2002) of sample websites. *The Times Higher Education* directory of the world's top universities, 2013-2014 (www.timeshighereducation.co.uk/world-university-rankings/2013-14/world-ranking) was consulted to construct the sampling framework. The above website alone had also been considered in a previous Web-based study encompassing world universities (Harinarayana and Raju, 2010).

The study limited its survey to North America, Europe, Asia and Oceania. A convenience sampling method was used to collect four samples of populations, one from each of the four continents. Non-English websites and websites not offering remote access were not considered in the present study. To minimize the time involved in conducting the survey, the number of library websites was limited to 80 with 20 libraries from each continent.

Criteria noted in Tables I and II were used as the survey instrument. The tables list a series of statements, each having alternative provisions of answers, either "yes" or "no", depending on the presence or absence of the criteria and features.

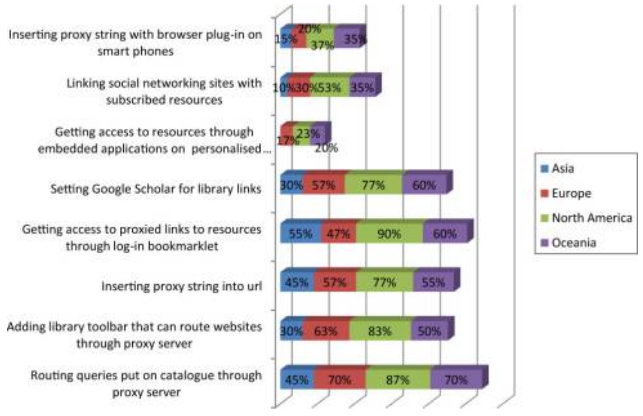
Data were collected over a period of four months during June to September 2014. Assistant researchers were assigned the task of identifying whether the selected academic websites offered various identification methods and their related hyperlinks – VPN, proxy, remote access, off-campus access, library tools, apps and software, tools and techniques, toolbar, bookmarklet, addons, plugins, etc. If information was not available through the library website, a search was performed in Google, appending those search terms. Next step of the analysis involved a thorough examination of those links and associated text, audio/video clips to develop improved understanding about the nature and intent of these applications. Whenever clarification was needed and if the library website had the provision of a chat facility, directs questions were asked to the librarians on duty. Data were analyzed to find different tools offered by the libraries and to identify the purposes these tools serve. Based on presence or absence of selected criteria, values "1" or "0" were entered in an Excel spreadsheet.

Findings

The current study presented an overall picture of implementation of various tools and techniques among the academic libraries across four continents, facilitating remote access to library resources and services. After data collection, followed by calculation of category scores along the select dimensions of checklists, it was noticed that libraries are using various online interactive tools and techniques for off-campus access.

Tools and techniques usually used by the libraries to offer off-campus access are illustrated in Table I and the rate of implementation of various tools and techniques by continent is displayed in Figure 1. It is clear from Figure 1 that libraries mostly route queries to their catalogue through a proxy server (81 per cent). Providing

Figure 1. *Rate of adoption of tools and techniques for remote access across the continents*



remote access to resources through embedded applications on personalized webpages is least observed among the libraries (7 per cent).

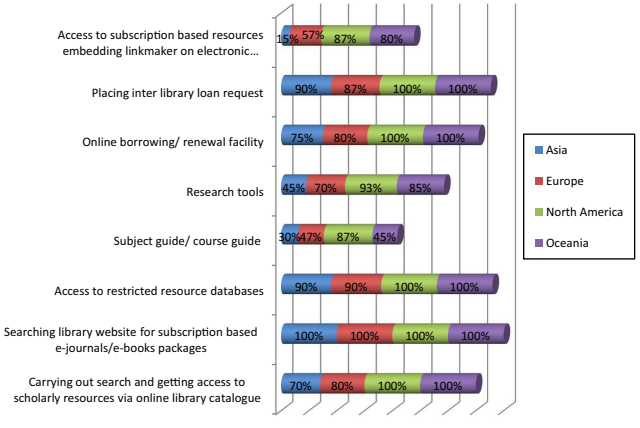
The LibX toolbar of University of Chicago offers quick and easy remote access to full-text e-resources. It also allows users to highlight any text on a webpage and right-click to search for details in a library database. At other institutions, while offsite, one can search any database and gain access to full-text by simply inserting the proxy string into the URL, e.g. Korea Advanced Institute of Science and Technology (KAIST) Library. On the other hand, Linkoping University Library allows users to get access to full-text of resource by just clicking the log-in bookmarklet, which, in turn, triggers reloading of the document through the proxy server without having to go through the library website.

Melbourne University Library suggests users using Google Scholar off-campus to set preferences so that they can link to full-text content available from the library. The usability of Google Scholar to connect library users to subscribed content through the use of local link resolvers has been recognized by many libraries (Hartman and Mullen, 2008). However, the findings contradict the view of Wu and Chen (2014) that libraries are yet to integrate Google Scholar into their websites. Interestingly, the University of Groningen Library advises users to use personalized starting pages and get safe and authorized access to proprietary library resources from off-campus. The Library suggests users to use a Netvibes or iGoogle start page to organize information using various apps and embed a search box to get quicker access to full-text resources. Promoting personalized Web applications, libraries intend to create a user-centred environment fostering collaboration and effective resource utilization while off-campus.

The University of Amsterdam Library offers Facebook and other social network sites to have catalogue search apps embedded so that users can get access to full-text through their preferred website while at off-campus. The finding supports observation of Kroski (2008) that many libraries innovatively use social networking sites, particularly allowing their users to search remote resources as a vehicle for outreach. Libraries are also offering apps for smartphones mobile devices, allowing users to get off-campus access to resources, e.g. Libraries of the University of Wollongong, University of Florida and University of Warwick provide bookmarklets for such devices. This also indicates an increasing trend of shifting access to information from online environments to mobile environments, a view supported by Li (2013). Remote access serves a multiplicity of purposes of libraries (Table II and Figure 2). Carrying out search and getting access to scholarly resources via the online library catalog is a very common purpose of using off-campus tools by libraries. Libraries use various tools and techniques to offer full-text access to resources right from the browser toolbar or embedded in social networking sites, e.g. University of Liverpool Library and University of Cincinnati Library.

By providing a suite of functionalities, some libraries also allow remote users to search library websites for subscription based packages of e-journals and e-books along with restricted databases, as if they were on the campus premises, often without changing their browser configuration, e.g. libraries of Stockholm University and Nanyang Technological University. Besides offering e-books and e-journals, the University of Edinburgh Library also offers remote access to exam papers and e-reserves. MIT Library provides course reserves through their library toolbar. Libraries also assist students in pursuing their course of study, advising them to integrate search tools into course websites. Northeastern University Library offers a URL converter widget to ensure proper construction of URLs for off-campus use of library resources in Blackboard course pages to facilitate teaching-learning activities. This supports the

Figure 2. *Purposes of using remote access tools across the continents*



findings of Xiao (2010, p. 654) that "integrating information literacy and course-specific library resources into Blackboard courses is an effective way to improve library instruction and student learning".

Applications are widely used as research tools (73 per cent) among the sample libraries. Remote access tools help scholars tracking resources, access research guides and citation management tools a bit faster and easier from any website off-premises. Queen's University Library offers *Research Database Search Boxes* that include widgets that allow users to embed those apps into their preferred site and get access to full-text content while at off-campus. Carleton University Library offers RefGrabIt, a citation management tool, to be added to a Web browser which helps researchers create, manage and format citations with various style sheets. The role of reference utilities as crucial components of scholarly output has been recognized by, Libraries – a view supported by Ram and Anbu (2014).

Cornell University Library and University of New South Wales Library allow remote users to submit interlibrary loan requests. Dartmouth College Library offers a browser plug-in that provides *Borrow Direct*, quick searching of the Catalog and the *e-Book and eJournal Finders*, as a "rapid, patron-initiated borrowing service" provided by the cooperative association of some academic and research libraries of North America, allowing eligible users of the member libraries to request reading materials from each other.

Libraries are constantly facing challenges that need to be properly addressed with the pursuance of qualitative information management guidelines and adoption of innovative forms of information delivery. New subject toolbars of University of Connecticut Libraries offer multiplicity of functionalities that off-campus users are benefited from: e-resources, interlibrary loan, citation managers, Live Chat, book renewal, Google to access full-text, a MyToDo list gadget, RSS news feeds and many more services. These suggest libraries can utilize remote technologies to cope with the changing expectation of users off-site.

Concluding remarks

The survey reveals that the adoption of remote access tools is most widely observed among libraries in North America followed by libraries in Oceania, Europe and least observed in Asia. However, a very high adoption rate is noticed for the implementation of a proxy bookmarklet and toolbar when examining adoption at individual application levels. These two applications can be easily integrated with Web browsers and are particularly helpful in creating proxied URLs, offering users direct links to licensed resources off-site. The substantially improved implementation of remote access tool in North America may suggest higher rates of adoption compared to other continents.

The paper may guide library professionals to plan and implement various tools to be integrated for remote access to support education and research. However, the study has some limitations; first, the very few libraries were chosen compared to the total size of the population; second, only English language websites were selected due to the language barrier of the author; third, the study was solely based on the author's perception and imagination of the particular set of software and the associated techniques integrated for remote access; and, last, each tool has its own purpose of use; however, the tools provided here are not exhaustive as new tools may become available soon. In the future, the study may be expanded to include public libraries and libraries of other continents to get a fuller picture of the remote access environment. Moreover, a user study may also be conducted in a few select libraries to receive and analyze user responses and find out the impact of remote access tools.

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