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Research Paper

*Cloud Computing: An Overview of the Influence of New Web
Technologies on Library Service and Education*

Much of what library science faces today, specifically where Internet technologies are concerned, are new concepts and practices which have yet to be definitively characterized. As more and more technological tools take shape, an equal number of proponents and skeptics haggle over their benefits and liabilities and over the very terminology used to define those practices and technologies. *Cloud computing* is a rapidly growing trend and buzz term and is indelibly connected with the maturity and expansion of Web 2.0. *Cloud computing* as a term has been defined in a number of ways. Lin Jaeger sees cloud computing as a sort of adaptation of utility computing. In a 2009 article in *First Monday*, Jaeger describes cloud computing as the “creation of large data centers that can be dynamically provisioned, configured, and reconfigured to deliver services in a scalable manner.”ⁱ In a recent article on the InfoWorld website, editor Eric Knorr writes that cloud computing “encompasses any subscription-based or pay-per-use service that, in real time over the Internet, extends IT's

existing capabilities.”ⁱⁱ On its website, Common Craft simplifies and illustrates these concepts in a brief video. In it, we meet Lucy the florist, who makes use of these data centers to help grow her business. Rather than face the challenge of managing all of her technology on her office computer, Lucy “can depend on a new kind of company to help take away the pain.”ⁱⁱⁱ This model shows two benefits inherent in what is really a very constricted definition by Jaeger: space and cost-efficiency. Web-based companies have unfathomable storage space, thus affording users worry-free ability to add, store, and manipulate information stored online. The alternative, of course, is buying space on your office computer or purchasing expensive servers that reside on your site. These servers may require equally expensive and potentially mind-boggling maintenance. Furthermore, because it is within the nature of cloud companies to back up information on multiple servers, Lucy’s files and information are safe in the cloud.

So all the world’s Lucys can create and save documents online—on maintenance-free servers with unlimited space and at little or no cost to the creator. Of course, some still have questions about the security of information on these free servers, as I will address in the pages to come. Others are wary of inadequate or limited accessibility. But with advances in communications technology, Lucy and her friends can now access web-based information from any location that has web

access. Nearly any PC, Mac, laptop, smart phone, or iPod can access the Internet wherever service is available. People now run entire businesses on their phones—without want of a physical space, other than one with WiFi. The library and the coffee shop are the new offices; the iPhone is the new computer.

Some other definitions of cloud computing have been comparatively less narrow in scope. A March 2009 piece by Erick Schonfeld on TechCrunch states that the term *cloud computing* “is broad enough to encompass most Internet startups and already is in danger of being latched onto as the next catch-all category.”^{iv} Even broader is the definition offered in the video Schonfeld analyzes here. In it, a business representative declares “cloud computing is the new dotcom.”^v Yet while people in different areas of business, media, or public service use *cloud computing* to mean different things, the broadest definition may simply be this: *any circumstance in which computing is performed using Internet-based software and storage*. I believe this is the definition that is most suitable to librarians and library students. In a large metropolitan library system, some computing will take place in smaller local branches that rely on servers operated by the network’s main library. Any electronic work that can be done without the use of these servers or the implementation of local servers will save those branches money, while allaying the

anxiety that comes with server maintenance. Likewise, students at all levels rely on the power and storage capabilities of someone else's servers where their information may not always be accessible. Cloud computing enables not only Lucy, but also librarians and students to create and maintain documents and media, engage in email and other online correspondence, and store myriad types of files at secure remote locations at little or no cost.

People in both the private and public sectors use cloud applications to perform daily operations. We have touched briefly on how the independent businessperson and the librarian use the cloud for reasons of space, capital, and responsibility. It now behooves us to outline some of the applications that benefit the library staff and students while noting the concerns raised by people not only in library science, but also IT professionals and others in computer science. The *cloud* is often defined simply as the Internet. To an extent, this is true. But to perceive a more accurate picture of the cloud, we can look at a variety of tools available on the Internet that facilitate cloud computing.

Communication

If we are to take recent literature at face value, most computing will be done in the cloud in the next few years. Cloud computing, with constant evolution of communications technology, is becoming

increasingly communications-centered. Accepting this trending toward hypercommunications, we can automatically see the inherent link to Library 2.0. At the heart of Library 2.0 are people and the connections they seek to information sources and among one another.

Advancements in web technology of recent years have blurred or ostensibly eliminated geographic barriers between people. These are perhaps the most salient features and applications of cloud computing to date.

Online email services like Gmail, Hotmail, and Yahoo! Mail are a form of cloud computing and have become an essential means of communication between and among library staff. As libraries further embed themselves in Library 2.0, many have opened their email lines to the public. The New York Public Library offers a form on its website where a user can enter a reference question and his email address and submit the form directly to a shared library inbox. Phone and email reference staff field email reference questions on a rotating schedule, assuring even expectations from staff members as well as expedient turnaround.

Of course, the NYPL email server is owned and maintained by its enormous central library. However, smaller and independent libraries may choose to use free email servers, be it for all library email correspondence or simply for E-reference. A cloud application like the

iGoogle online portal would give a reference librarian a personalized selection of online services available on a single web page. She would have her reference email, map service, RSS feeds, and pertinent headlines all appearing on a single home page.

Email is only the tip of the cloud communications iceberg for librarians. There are now numerous ways that the modern librarian can communicate with and serve its usership. One growing trend in the library community is instant messaging, or IMing. IMing allows librarians and library students to communicate in real time via the Internet and can be done on a PC or laptop, a smart phone or other mobile device with web access. The greatest new application of IMing in libraries is taking place in reference services. As modern libraries edge toward a 2.0 environment, some are using free IM software to perform reference tasks. A user opens an IM widget and submits a reference question or other query. The reference librarian or web librarian can respond in real time using free software such as Trillian, Pidgin, Meebo, Gaim, or Fire. Others may use screen-showing software, such as Skype or Unyte. The Ronald Williams Library at Northeastern Illinois University offers its users SMS (short message service) of several types: IM, text messaging, and chatting.

Texting is another growing trend in electronic reference. With the surge of development in mobile communications technologies,

people have become more reliant on their phones and other devices to perform operations that once necessitated time and travel, creating potential difficulties. Librarians can now use cloud software to field SMS reference questions. The ability to text short reference questions to a librarian has helped to eliminate borders and resolve those former difficulties and has helped bring libraries further into the collective consciousness of younger, tech-savvy members of their communities.

The same may be said about Twitter. The Skokie Public Library uses its free Twitter account to communicate on a daily basis with its community. Twitter is advantageous to libraries in a number of ways, not the least of which is as a means of performing reference. Twitter acts as an SMS service, as users from anywhere can easily direct a short question to SPL's Twitter page and expect a prompt response from a professional reference librarian. Furthermore, a Twitter user does not have to direct his question solely to his own library's Twitter account. The user has access to every library using Twitter for purposes of reference, giving him an entire network of reference professionals to locate information on even the most daunting queries. Twitter is one of the most popular trends in web librarianship and, as I will touch on a bit later in this paper, it serves several important roles for libraries.

One of the most constructive technologies developed and

improved in recent years is the wiki engine. Wikis are web-based applications which allow all users to create a broad knowledge base or an interactive website on any personal, corporate, or social topic, and share it with his or her community. The wiki engine enables library professionals and students to search, edit, and add articles, thereby improving and expanding the content of the wiki. A library offering a public wiki is one that seeks to engage itself with its community. Library staff and users alike can give opinions and suggestions, offer memories and stories, or share links to community- and library-related sites—all on a public wiki sponsored by the library. According to the wiki operated by The Loudoun County Public Library, “The scope of LoudounPedia is simple, Loudoun County. If there is information that is of interest to you then chances are someone else shares that same interest and that is why we need your help.”^{vi} This wiki invites users to share information, images, and links, and includes comprehensive instruction tools for uploading and editing files. Wiki software can be downloaded as a ready-made tool and in the majority of cases its use is free of charge. Wikispaces and PBworks (formerly PBwiki) are widely used in the education community and are just two of the more user-friendly wiki sites available to librarians.

Library Success is a wiki where librarians can share successful practices and programs, useful materials, and other library-related

information and news. This “one-stop shop for great ideas and information for all types of librarians”^{vii} gives librarians and library students a highly accessible means to effectively communicate with and learn from each other. This type of intraprofessional wiki can be just as valuable as a public wiki. Librarians and library students with varying degrees of education and experience can share ideas. Veteran library professionals who are less attuned to the practices and technologies that are fundamental to Library 2.0 can learn not only from peers, but also from new graduates of progressive library programs.

Marketing

Historically, libraries have often been slow to conjure and allocate funds for advertising and marketing, preferring to focus capital on other expenditures, such as collection development. Libraries can now use cloud software to push events and programs into the community. In recent years, most libraries have created websites or, at least, some type of web presence for themselves. Today, many libraries and library-related groups in suburban and rural areas are turning to open source website software (Drupal) and free blogsites (Wordpress, Tumblr) as their home on the web. Libraries are also using social networking sites (Twitter, Facebook, MySpace) to market themselves and to help foster interconnectivity in their communities.

Twitter is especially useful to libraries as it can be used to serve several functions beyond reference. For one thing, libraries can use Twitter to push programs and services to the tweeting community. In this way, Twitter functions as a means of free advertising for new acquisitions, book clubs, children's and adult programming, special events, and other forms of community outreach. Librarians can also use Twitter to link to other sites. The Ela Area Public Library can use its Twitter page to link to larger advertisements on the library's main website, directing users to fast information about forthcoming events and other library news. The Madison Public Library regularly links to photos on its Flickr site to showcase construction progress at several of its smaller branches. In this way, users can stay mindful of what is going on with their local libraries while getting a sense of involvement.

Some cloud sites function as brand monitoring tools. As practiced on sites like Twitter, Yelp, and Technorati, brand monitoring is a smart and practical use of cloud technology for libraries. The Skokie Public Library has a very active usership where Twitter is concerned. Librarians not only market events and programs, but they are also able to monitor conversations among users to analyze what the community is saying about the library. Conversations among library users may include praise for a service or event, criticism for a change in floor plan, or simply a tweet about a favorite chair or quiet

corner of the library.

Inherent in this type of connectivity is a strong element of hyperlocality. Nowhere is this more evident than in the culture of the microblog or, more specifically, the *metroblog*. Metroblogging is a host of over 50 blogs dedicated to the sharing of community-based information. Users, including libraries, can post news, images, editorials, and all manner of information that relates to a specific city, neighborhood, or community of people sharing a common interest. All of these conversations help the library gauge its reputation in the community and to know better what works and does not work, what to do more and what to stop doing, what is cost-efficient and what is wasteful.

Libraries can use Twitter and other social networking sites, as well as their websites and blogs, to present audio/visual media. The Schomburg Center for Research in Black Culture offers a brief video synopsis of its materials related to the Harlem Renaissance. Although the center cannot embed the video in a Twitter post, it can link to the video page on its website and to the video URL on YouTube. Facebook users have a page devoted to video downloads where a library can post their promotional videos at no cost. Even the creation of audio/visual marketing tools can be done in the cloud. Sites like Animoto afford libraries a free means to create more aesthetic

audio/visual imagery in support of events, programs, and library services. Furthermore, just as Madison Public Library documents construction progress on Flickr, libraries can use this and other photo sharing sites (Picasa, Photobucket) to give photo tours, display staff photo albums, or present images from exhibits and library programs and events. All images are stored safely in the cloud and are accessible from any location wired for Internet.

Document Processing and Project Management

In the past, one area of concern in many libraries was a lack of word and document processing software. Chicago Public Library offers Microsoft Office to patrons only at its three regional branches, leaving users to seek more accommodating facilities. Today, there are numerous cloud sites, such as Google Docs, Zoho Writer, Open Office, and Writeboard, where users, including children without email accounts, are able to create documents and presentations without cost or storage concerns. Furthermore, astute libraries can install bibliography software from Mendeley to which users can upload Microsoft Office documents, PDFs, and files in other formats previously confined to desktops and local storage devices.

What I have done to this point is outline just a few of the most popular and most fundamental applications of cloud computing in libraries. As it can, initially, be difficult to understand what is different

about contemporary cloud computing compared with what has been common practice for years, it is helpful to look at modern applications that are achieving greatest buzz and are the most widely anticipated. There are many other benefits of cloud computing to libraries on the 2.0 landscape. In fact, there are whole open source software and management systems (LibLime) available today. There are bookmarking sites (delicious) and cataloging websites (LibraryThing) for reference librarians.

But is the modern library prepared to look to the Internet and shift so much service attention to the cloud? Some library professionals are wary of certain elements of the cloud and remain loath to break from traditional practices. Two popular concerns among cloud critics are of information security and privacy. On her blog, *The Shifted Librarian*, Jenny Levine states that it simply isn't true that information stored in the cloud is safe and permanent and that it behooves library professionals to teach users that cloud computing can have consequences.^{viii} I tend to agree with this point and that education before any endeavor is advisable. However, it is perhaps the best idea to for researchers in library science to collect more data about the ways information is stored and backed up. The growth of the web in the last decade has given rise to new problems (i.e., handling of concurrent electronic transactions and search queries). To

accommodate this traffic, technology companies have built increasingly huge data centers and created networks of servers. It appears that, *in general*, our materials are safe for the time being.

These are not new concerns. Since the first documents were created and externalized on a cloud site, at least one creator was wary its incorruptibility. Years ago, someone was banking online. Some information was corrupted. Turmoil ensued. At the same time, someone was writing a term paper on a home PC. The computer crashed. Again, turmoil. The growth of cloud computing only polarizes the general suspicion that has always existed of electronic storage.

In his blog, Will Richardson suggests the nature of cloud skepticism is self-contradictory. He alludes to conversations with people who question the security of web companies. "These invariably lead to conversations about how mobile devices and Web enabled phones are changing the landscape and how the potential reward of easy collaboration and sharing at this point at least outweigh the risk of losing files."^{ix}

The literature tagged "cloud" certainly suggests that developments in communication, file creation, storage, social networking, and other web applications have created variant reactions and myriad questions. It suggests great competition and great change. What is clear is that libraries have increasingly expansive and varied

means by which they can operate on the web. Initially, this means dumping costs and storage headaches. Moreover, it means expanding ways for libraries to reach out to and embed themselves in the collective consciousness of their communities. It also means more ways to facilitate connectivity. And all with no money down.

Sources Cited

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- ⁱ Jaeger, Lin. "Where is the cloud? Geography, economics, environment, and jurisdiction in cloud computing." *First Monday* 14.5 (2009): Web. 1 Dec 2009. <<http://bit.ly/2uvUY>>.
- ⁱⁱ Knorr, Erick. "What cloud computing really means." *InfoWorld* 2009: Web. 6 Dec 2009. <<http://bit.ly/3pxIDP>>.
- ⁱⁱⁱ "Cloud Computing in Plain English." *commoncraft.com*. Web. 1 Dec 2009. <<http://www.commoncraft.com/cloud-computing-video>>.
- ^{iv} Schonfeld, Erick. "'The Cloud Is The New Dotcom' (Video Highlights)." *TechCrunch*. March 2009. *TechCrunch*, Web. 6 Dec 2009. <<http://bit.ly/12S15f>>.
- ^v "Who's Cloud Is It, Anyway?." *TechCrunch*. Web. 6 Dec 2009. <<http://bit.ly/12S15f>>.
- ^{vi} Loudoun County Public Library [wiki] <<http://www.loudounpedia.org/Contribute>>
- ^{vii} Library Success: A Best Practices Wiki http://libsucces.org/index.php?title=Main_Page
- ^{viii} Levine, Jenny, "We're Not All Ready for the Cloud Yet" [Weblog entry.] *The Shifted Librarian*. January 2009. (<http://theshiftedlibrarian.com/archives/2009/01/14/were-not-all-ready-for-the-cloud-yet.html>) 11 Dec 2009.
- ^{viii} Richardson, Will, "Is My Head (and My Life) in the Clouds?" [Weblog entry.] *weblogg-ed*. August 2008. (<http://bit.ly/2Htd1Q>) 6 Dec 2009.

Other Sources

Dempsey, Lorcan. "Always On: Libraries in a world of permanent connectivity." *First Monday* 14.1 (2008): Web. 1 Dec 2009. <<http://bit.ly/JutvF>>.

Barnatt, Christopher. "Cloud Computing." *ExplainingComputers.com*.
Nov 2009. Web. 6 Dec 2009.
<<http://explainingcomputers.com/cloud.html>>.

Haff, Gordon. "Cloud computing's dual identity" cnet 2009: Web. 6 Dec
2009. <http://news.cnet.com/8301-13556_3-10385218-61.html?tag=rtcol;relnews>.

Fontana, John. "Cloud computing inevitable? Not so fast, educator
says" NetworkWorld 2009: Web. 6 Dec 2009. <<http://bit.ly/3ybo1R>>

Hadro, Josh. "ALA Conference 2009: top Provocative Tech Trends"
Library Journal 2009: Web. 6 Dec 2009.
<<http://www.libraryjournal.com/article/CA6670900.html?q=cloud+computing>>

Hadro, Josh. "Libraries Taking up Residence in the Cloud." *Library
Journal* 2009: Web. 6 Dec 2009.
<<http://www.libraryjournal.com/article/CA6700349.html?q=cloud+computing>>

Stephens, Michael. "How Can Librarians Use the Cloud?" [Weblog
entry.] Tame the Web. August 2008. (<http://bit.ly/7vZ1Bp>) 6 Dec
2009.