

DOMAIN SCANS

(new items as of 11/21/08 in yellow)

Domain: **Technical Infrastructure (DLIST functional scan) and Virtual Environment**

The most influential impact to the Technical Infrastructure of the Library is the reduced budget of the past and future. Though there are wonderful new and exciting technological opportunities that could be pursued, they all require maintenance money to keep them viable over the years. Strategic money is great to play with new ideas, but none of the ideas will be able to live past the testing phase if the Library has no funds to increase the support for the idea during the long term. The Library has embraced a variety of new technologies or uses of technologies (chat reference, video streaming, pod casts, digitization of books, articles, sound, videos, etc.) but without the ability to maintain the technical infrastructure the items will vanish.

Other large impact issues:

1. Effect of reduced budget on possible changes in student fee \$ and Library priorities
2. Corollary – with reduced budgets other options become more viable such as collaboration, using open source software more or cloud computing (possible replacement of office, email, etc. similar to ASU). Priorities change when there is no money.
3. Money for the ILC is not certain and could impact the Library
4. The Transforming Technology Support Services Transformation Proposal has a group that is researching ways to “to identify which, if any, services should be provided centrally, assess the differential impact of the centralization of particular functions on diverse units and activities, and assess where and whether significant cost savings and/or service improvements could be realized. But most importantly, this committee must be a mechanism for working with all potentially affected campus constituencies.” (excerpt from “SPBAC Recommendation on White Paper #131: Transforming IT Support Services” dated October 22, 2008)
5. Improvements in e-paper and on demand printing might start to increase the use of e-books
6. ISP bandwidth restrictions and increased cost could change student use of services such as streaming video
7. RFID tags reduced size and costs could become more viable for the library (books, laptops, etc.)

Below is a list followed by the details of other large areas of interest for the Library regarding technology (i.e. neat things that are happening in technology).

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Topic: Digital access to and preservation of content

Trends:

- Ensuring our repository can meet the *Trustworthy Repositories Audit & Certification: Criteria and Checklist* created by a collaboration of CRL, OCLC, RGL and NARA. - <http://catalog.crl.edu/search~S1?XCertification+of+Digital+Archives&searchscope=1&SORT=R/XCertification+of+Digital+Archives&searchscope=1&SORT=R&SUBKEY=Certification%20of%20Digital%20Archives/1,4769,4769,B/1856~b2212602&FF=XCertification+of+Digital+Archives&searchscope=1&SORT=R&2,2,,1,0>
- No discovery tools or processes that integrate all levels of searching needed by all users have been developed yet. Interoperability will be key to achieving such functionality. New tools are being developed that can improve web search ability. The Library has a project to add OCLC Local to our front page as part of the Website Redesign, but we must continue to be vigilant in meeting customers search needs.
- Archiving of digital products is of significant concern to libraries, scholars and researchers. There are now nine archiving initiatives of scientific journals including JSTOR, Portico, E-print Repositories, Open Access Model, LOCKSS, OCLC Digital Archive, JISC PubMed Central and KB e- However, for many publishers, print remains the archival copy of choice.
- The issue of economic sustainability for digital preservation and persistent access continues to be looked at by a task force, with funding from the NSF, and the Andrew W. Mellon Foundation, with support from the Library of Congress, the San Diego Supercomputer Center, the National Archives and Records Administration, the Council on library and Information Resources, and the Joint Information Systems Committee of the United Kingdom. – They have their own web page but have posted no conclusions yet: <http://brtf.sdsc.edu/about.html> ,
- The proliferation of digitization projects at the Library is resulting in development of silos of data in unconnected repositories, (MINISIS, ContentDM, Special collection exhibits, UAiR), with no way to search across or connect them. The development and implementation of interoperability standards and collaboration are needed. The library is trying to move appropriate items to UAiR but this will require time and policy development.
- Google is planning to host terabytes of open-source science datasets – “The storage would fill a major need for scientists who want to openly share their data, and would allow citizen scientists access to an unprecedented amount of data to explore.” Palimpsest was name of project but all they have done so far is create a blog type space. - <http://weblogs.elearning.ubc.ca/googlescholar/archives/044492.html> , <http://research.google.com/> , <http://blog.wired.com/wiredscience/2008/01/google-to-provi.html#more>

- The Library of Congress uses JPEG2000 as a standard for many projects, and collaborates with XEROX for large scale digitization projects. Because many web browsers don't support JPEG2000, it is not in wide use across the Internet - http://www.digitalpreservation.gov/library/challenge/formats2_challenge.html , http://en.wikipedia.org/wiki/Jpeg_2000
- Google and other mega search sites are affecting (only 30% though) the ways libraries act, but very slowly
- Arizona State Library is a partner in Library of Congress's National Digital Information Infrastructure and Preservation Program (NDIIPP) to preserve important state government information in digital form. Their project is "Persistent Digital Archives and Library System." - <http://www.loc.gov/today/pr/2008/08-004.html>
- The Library of Congress has just opened a state-of-the art conservation center for its audio and visual works making heavy use of donated funds - <http://www.digitalpreservation.gov/library/challenge/packard.html>
- Copyright of objects continues to be of great importance, especially regarding potential changes in fair use, as indicated by Educause's **Topic: Update on Key Copyright Developments in the U.S. on February 29, 2008** . We now have UA's new Office of Copyright Management and Scholarly Communication: <http://www.library.arizona.edu/help/tutorials/copyright/index.html>
- Council on Library and Information Resources, (CLIR), is asking questions about how research will be changed by large digitization projects, as well as finding out who is using IR's and the information in digitization project since there are little mechanisms to track basic user information - <http://www.clir.org/pubs/issues/issues62.html#who>
- Though creating electronic objects is relatively easy, the problems of selecting, managing, discovering Etc., will continue to have large impact on the current work of librarians and archivists. Jobs, skills and approaches will need to change. - <http://www.archives.gov/rocky-mountain/records-mgmt/conferences/digital-preservation.html>
- Community intelligence could be used to help add metadata to digital collections - <http://net.educause.edu/ir/library/pdf/CSD5320.pdf> - The Horizon Report from EDUCAUSE (emerging technologies that impact education)
- To enable users to access library metadata on the web the metadata used in the future will need to be expanded and changed unlike any current metadata used by library catalogues - https://urresearch.rochester.edu/retrieve/14621/Bowen_article_27n2.pdf
- Many view Special Collections as a means to work with researchers to make available the most currently needed 'special' collections - [The Impact of Digitizing Special Collections on Teaching and Scholarship: Reflections on a Symposium about Digitization and the Humanities"](#)

Supporting Data:

From previous scan: Primary Research Group has published *Libraries & the Mega-Internet Sites (A Survey of how Libraries Use and Relate to Google, Yahoo, Wikipedia, eBay, Amazon, Facebook, YouTube & Other Mega-Internet Sites)*, ISBN 1-57440-096-7

Summary Analysis:

Since the Library is very involved in digitization projects and storing data, these issues are of extreme importance to the Library. The Library needs to engage in the issues of proper selection of and management of digital assets, much more than we have, or we will end up spending money creating items no one wants to use nor manage/curate in the future.

Opportunities and/or need for change to be strategic:

The Library must find continuous permanent funding for the large expense of expanding, maintaining and providing archival quality copies of our data.

Topic: Open Source Information Library Systems

Trends:

There is an increased interest among libraries seeking open source solutions for Information Library Systems (ILS). Some of this interest is due to increasing competition from alternative solutions such as Google; some is due to vendor-based ILS applications using technology that is 15-20 years old and thus not meeting the changing needs of libraries. But open source comes with a price, as libraries well know.

First, some of the more visible projects surrounding open source:

- The *Open Library Environment Project* (OLE) is in the midst of “defining a next-generation technology environment based on a thoroughly re-examined model of library operations and connected to other enterprise technology systems” Their effort will gain input and feedback from the library community and result in a design document by July 2009 for next-generation library systems. They seek to use Service Oriented Architecture, a technology where modules are built independently and interchangeable; one that will assist the 21st century Library needs and beyond.
- *Evergreen*, a product enabling a host of libraries to join a “consortial-quality library” and is “software to help library users find library materials and to help libraries manage, catalog, and circulate those materials” is free, open source software. Evergreen was first put into production at Georgia PINES, a consortium of over 270 libraries. Today, they claim hundreds of libraries on the system. A library doesn’t have to belong to a consortium to obtain the software; it could run stand-alone if wanted. Concerns over having technical expertise on site for the product are directed to a company called Equinox who provides support for libraries using Evergreen. The list of libraries joining and/or acquiring the software is said to be growing and the website has a good presence in that it provides blogs, documentation and source code.
- *Koha*, claims to be the first open source ILS. It is used worldwide and provides core functionality that exists in vendor-supplied ILS’ today. Like other open source products, it is free; however it could be said to fall under the traditional model of open source where it is given away “in the hopes that others will help them develop the software.” Support options are a ‘do it yourself’ or one can pay for support from a list of various companies who either deal with open source products in general or Koha specifically.

Some studies indicate a correlation between the satisfaction of a library with their ILS Vendor and the possibility of moving to an Open Source ILS environment. The results were as expected; the higher the satisfaction with the vendor-supplied ILS, the less likely a move away from it to an Open Source model. However, it must be noted that many libraries take a ‘philosophical’ perspective rather than a competitive process when deciding to move to open source. That is to say, they become dissatisfied with their current vendor and seek the ‘greener grass’, thinking open source is the answer. Luckily, the library community understands a move to open source is not “free software”.

One of the largest concerns among libraries is the support and service surrounding an open source product. Another trend, as mentioned above, is a business model where the library obtains the

free ILS software and they partner with another company for support of the free software. “Growing pains” are sure to be experienced in this business model when the support companies see an influx of libraries seeking support. Libraries should be sure to enter the contract carefully, for example, a Service Agreement in hand.

Early adopters of open source ILS’ (like mentioned above) and continued success in the efforts are said to certainly pave the way for open source systems to increase significantly – perhaps in the next few years, but it is not the mainstream right now.

Summary Analysis:

There is much interest, discussion, efforts and projects surrounding open source ILS products. While the discussion and products are heating up, open source ILS’ are not the mainstream just yet. The reasons are various: lack of an interoperable model, basing new systems still on old technology, budgetary and support issues have prevented many libraries from ‘taking the leap’. But they are certainly thinking and talking about it.

The largest concern with libraries and open source is support and service. New business models are appearing to address some of these issues. Open source does not necessarily mean “non-commercial”. However, a ‘run’ on companies who provide service or support could certainly put libraries in a position they didn’t want to be in: lack of support or unexpected downtime.

Open source seeks to close the gap on many of the problems seen today with vendor-supplied ILS’, and it does; creating flexible, customizable systems with the capability to meet some of the more complex needs facing Libraries today. However, concerns surrounding a re-examined model include issues such as interoperability and continued support. While the trend is certainly taking off, it hasn’t reached its zenith just yet.

Marshall Breeding makes a good point: “For open source ILS’ to truly be mainstream, these systems will need to be able to compete on their own both functionally and financially.”

Supporting Data:

1. <http://oleproject.org> — OLE project website; With support from The Andrew W. Mellon Foundation, the Open Library Environment (OLE) Project will convene the academic library community in the design of an Open Library Management System built on Service Oriented Architecture.
2. <http://www.indexdata.com/> - Index Data website; works in a variety of development environments with technologies such as Ajax, Dublin Core, MARC, PHP, RSS, SOAP, SRU/SRW, XML, and Z39.50.
3. <http://www.librarytechnology.org/lrg-displaytext.pl?RC=13134> – Article by Marshall Breeding, “Making a Business Case for Open Source ILS” Copyright © 2008 Library Technology Guides
4. <http://www.librarytechnology.org/perceptions2007.pl> - Article by Marshall Breeding, January 9, 2008, “Perceptions 2007: An International Survey of Library Automation” Library Technology Guides
5. <http://www.koha.org/> - Koha website; “Koha is a full-featured open-source ILS. Developed initially in New Zealand by Katipo Communications Ltd and first deployed in January of 2000 for Horowhenua Library Trust, it is currently maintained by a team of software providers and library technology staff from around the globe.”
6. <http://evergreen-ils.org/> - Evergreen website; “Evergreen is an enterprise-class library automation system that helps library patrons find library materials, and helps libraries manage, catalog, and circulate those materials, no matter how large or complex the

libraries. As a community, our development requirements are that Evergreen must be stable, robust, flexible, secure, user-friendly. Evergreen is open source software, freely licensed under the GNU GPL.”

Topic: Finance

Trends:

- The Libraries’ data management and storage needs are increasing, due to the increase in projects that will reside in UAiR future replacement of the storage is very expensive. The costs of power and cooling continue to rise thus increasing the costs of server rooms. Providing reusable virtual environments might be a solution
- ABOR approved the University using KUALI to replace FRS. The University is going to use PeopleSoft to replace PSOS and SIS. Student Administration, Financials, Human Resources / Payroll, and Research Administration are all being replaced under a project called MOSAIC. Because of the granularity required by the Library administration it is not clear if we would need a replacement to the current Budget Atlas system the Library uses- <http://mosaic.arizona.edu/>
- Others are using Student Fees to fund new technology and involving students in all aspects of decision making regarding new technologies is very useful - [Students: The Real Angel Investors](#) (from EDUCAUSE)

Supporting Data:

From previous scan, DITC meeting.

Summary Analysis:

Because of the large amount of money involved these issues are very important to the mission of the Library.

Opportunities and/or need for change to be strategic:

The Library should be working closely with KUALI programmers so that when KUALI becomes production, the Library will also be able to use the new system, or have a shadow system that works with KUALI. Creation of a shadow system is a very large (at least 1 full time programmer and a full time analyst, possibly more) project. DLIST does not have the expertise for this work so we would have to pay someone else to do this work.

Topic: Social Computing

Trends:

- Social computing is the use of computer technology to facilitate interaction and collaboration. Variants include social bookmarking and folksonomic tools, social writing platforms, blogs, and RSS services. Examples are MySpace, Socialtext, and Feedstar.
- As faculty and students integrate social computing tools into their work, they may want the Library to provide support such as meeting hardware and software, making pieces of micro-content drawn from Library resources available, and assistance with use of freely available tools. Yet, Universities should be leery of jumping in to social computing without prior thought. Students don’t necessarily want school stuff mixed with their personal tools - <http://connect.educause.edu/Library/ECAR/DecipheringSocialNetworks/47253>

- The primary lifespan of social web sites is said to be between 16 and 30 months. Sites reach plateaus and declines for different reasons, but the pattern of hits and length of stay are said to apply universally for all non-gaming social sites.
- Some social computing sites take advantage of advanced gaming hardware that the library is not providing in our public computers.
- Many public and free (advertiser supported) web services are really controlled by the customer. "Facebook launched and then shut down an advertising program called Beacon (behaviorally targeted ads) that alerted users to purchases and other activities their "friends" made outside Facebook" because its customers complained. Basically private information must be "opt-in" not "opt-out". - <http://online.wsj.com/article/SB119760316554728877.html>
- Possible reduction in keeping personal information personal as social networking sites expand and people add more private information (already HR departments are learning about data that is ok and not ok to use from Facebook, etc) and companies request more data to provide more targeted marketing.
- Increased ability to stay in touch with friends during all aspects of your life.
- Twine a social network of what you know not who you know, was released to the public as Version 1 Oct 20, 2008 - http://news.cnet.com/8301-10784_3-9877934-7.html?part=rss&subj=news&tag=2547-1_3-0-5 , <http://blogs.zdnet.com/semantic-web/?p=220>
- The Sakai project (course management system) is a type of social computing that requires consistent involvement but the outcome of such collaboration meets uses needs often better than the alternative. - [Dynamics of Supporting Sakai Through Local and Global Collaboration](#) (from EDUCAUSE)
- A further relevant outcome of the use of microblogging is that it increases the sense of ongoing learning for the students. Parry (2008) said that he has found that students who use microblogging truly are aware that there are no walls to the classroom and that what happens and is discussed within the class has direct and immediate relevancy outside the classroom. http://campustechnology.com/articles/69158_4/
- Hulu as an upcoming major player and competitor for YouTube. They offer higher quality content and that seems to be pushing all players toward higher quality. <http://blog.wired.com/business/2008/11/hulu-is-catchin.html> , <http://blog.wired.com/underwire/2008/11/youtube-to-stre.html>

Supporting Data:

From previous scan. <http://www.technologyreview.com/Infotech/20048/page1/> , "Hiring: The Hidden Risks of Using Google, Facebook, MySpace, and Other Websites to Scope Out New and Prospective Hires; What You Need to Watch Out For", Wall Street Journal January 28, 2008; Page R1" Thinking About Tomorrow"

Summary Analysis:

Currently, social computing is not a mission critical trend for the Library.

Opportunities and/or need for change to be strategic:

Continue to watch for opportunities for the Library

Topic: Mobile Technology and mLearning

Trends:

- Mobile devices (portable faming systems, iPods, other MP3 players, PDAs, cell phones) continue to become cheaper and lighter. These devices can connect to high speed networks. 19% of 75% of adults that have cell phones have used them for “information access” - <http://www.libraryjournal.com/info/CA6539095.html>
- Back in 2004 Duke handed iPod’s out to all students, then changed to only those enrolled in classes that use them. This year Abilene Christian University is handing them out for educational enrichment. <http://www.engadget.com/2008/02/26/acu-dishing-out-iphone-ipod-touch-to-all-incoming-freshmen/>
- Faster networks are supporting data transfer at greater speeds.
- Cell phones are incorporating more and more features including music players, web browsing, calendaring, and text messaging.
- Some universities are still supporting mobile device but not as whole heartedly as before. Duke’s Digital Initiative program continues (last year they gave out a few tablets), MIT supports iPods and other mobile devices as part of their campus IT support.
- These devices are being used to support both in-class activities and out-of-the-classroom learning. Not a lot of research to show that mLearning is any better.
- It may be beneficial to examine Library content to determine which portions users would find beneficial to access using mobile devices.
- Product changes are currently smaller and more features (mobility, granularity and personalization) on old technology. Barriers for educational use are expected to be much smaller in the next 1-2 years.
- Teleportec teleporter allows a person to be shown in 3d at a different location, allowing interactive lecturing without having to be in the room - <http://uanews.org/node/18510> , [http://www.kurzweilai.net/pressroom/pdf/Kurzweil%20 Teleportec fact sheet.pdf](http://www.kurzweilai.net/pressroom/pdf/Kurzweil%20Teleportec%20fact%20sheet.pdf)

Supporting Data:

From previous scan, http://online.wsj.com/article_print/SB119905604752158353.html,
<http://www.nmc.org/pdf/2008-Horizon-Report.pdf>

Summary Analysis:

Currently, the charge for the Library website redesign has incorporated support for mobile technology <http://intranet.library.arizona.edu/xf/webredesign/workBreakdownStructure.html>.

Opportunities and/or need for change to be strategic:

Topic: Text Messaging

Trends:

- Text messaging is becoming more common as an accepted means of mass communication.
- Numerous services offer text messaging as an alternative to email as the primary means of sending data to their customers.
- According to Pew Internet & American Life Project Survey in 2006, 40% of US mobile phone users send text messages. Among college aged users, 80% send text messages.
- In the second quarter of 2008, Americans sent more text messages on cell phones than they made calls.
- The amount of texts being sent continues to increase as more providers offer plans that include unlimited texting.
- There is an increase in sites that use text-messaging as part of their core functionality.

Summary Analysis:

Text messaging (SMS) is a fairly straight-forward technology. Messages can often be sent via email to text-capable mobile devices. People are using text messages to communicate with one another, to get updates on the weather, updates on sporting events, update their social networking profile pages, vote on reality TV shows, and even to keep up with political candidates. The use of text messaging continues to permeate numerous areas, including higher education. According to David Batho from Exter College, "As most young people seem to have a mobile 'phone these days, text messaging seemed an obvious way for them to be able to contact us, and for us to reply to them quickly and easily".

Opportunities and/or need for change to be strategic:

Because we already use email for communicating with our customers, the Library should be considering text messaging as an option when discussing alerts, marketing, etc. In the future, it may also be important to consider how the Library might be able to receive text messages from customers as a preferred means of communication. This will be key in keeping in step with the way our customers communicate and expect to be communicated with.

Supporting Data:

1. <http://gigaom.com/2008/08/24/what-obamas-text-message-campaign-reveals/>
2. <http://www.gainesville.com/article/20081021/ZNYT05/810213021/1109/SPORTS?Title=Popularity+or+Income+Two+Sites+Fight+It+Out>
3. <http://www.m-science.com/news/sms-in-higher-education.php>
4. <http://www.itworld.com/internet/56925/eight-ways-twitter-will-change-your-life>
5. <http://www.latimes.com/business/la-fi-cellphones13-2008oct13.0,594460.story>

Topic: Search Engines and Other Tools

Trends:

- Microsoft tried to compete with Google Scholar and Google Books but **Live Search Books** and **Live Search Academic** were discontinued in May 2008. - http://news.cnet.com/8301-13577_3-9951460-36.html?part=rss&subj=news&tag=2547-1_3-0-5
- Open Content Alliance is a group of library's providing a similar function without the access restrictions Microsoft and Google place.
- The Library may need to evaluate whether or not it would be beneficial for us to participate in the Google projects and/or Microsoft projects should they occur.
- The advantages of collaboration for UAL-specific materials would be increased market (on a global scale) and increased accessibility.
- When people talk about searching (in futuristic articles) they do not mention the Library but Google and they don't talk about research needs for searching but social/personal needs for searching.
- News of the future will not come from big news sources but more from friends sending links or search results and be readable on hand held devices (and you might have to pay for it – like Kindle).
- NISO (National Information Standards Organization) held a forum **Next Generation Discovery: New Tools, Aging Standards** - Chapel Hill, NC on March 27-28, 2008 because standards aren't necessarily keeping up with searching tools. - <http://www.niso.org/news/events/2008/discovery08/>

- Association of College and Research Libraries (ACRL) presented an e-learning webcast, "Getting Started with Screencasting," offered March 11, 2008. Screencasting is digital recording of computer screen output and used for teaching.
- Google now offers searching within certain sites like Wikipedia without going to the Wikipedia's site - http://news.cnet.com/8301-10784_3-9886155-7.html as well as helping Libraries use Google scholar- <http://scholar.google.com/scholar/libraries.html> and providing a Google Librarian Newsletter -
- WorldCat can now be accessed on Facebook but only about 57 people a day use it - <http://www.powerhousemuseum.com/dmsblog/index.php/2008/06/13/just-how-popular-is-that-facebook-application-artshare-and-steve-art-tagger-and-developer-analytics/>
- The need to find things on the internet has led to others to improving searching, finding patterns of others searches, etc. including offering advice - <http://www.flickr.com/photos/morville/collections/72157603785835882/>, <http://findability.org/>
- MINES is a new ways of surveying and searching information regarding use of the Library (point of use 3 questions web survey supported by ARL) - <http://www.arl.org/stats/initiatives/mines/minesresources.shtml>
- Top level domain names (.uk, .com, .edu) is now open to any language and any words though it will be expensive to create. This might eventually make searching by domain name more difficult - <http://news.bbc.co.uk/2/hi/technology/7475986.stm>

Supporting Data:

From previous scan,

<http://www.nytimes.com/2007/10/22/technology/22library.html?ex=1193716800&en=abc109c23daee1fe&ei=5070&emc=eta1>

Summary Analysis:

Our customers mainly want easily understood access to all of our holdings, yet this is the one thing we have not been able to provide. This is a mission critical need for the Library. We now must play catch up with companies like Google who are able to provide people with one search box (federated searching capabilities). Though we have tried with Scholars Portal, SiteSearch and Serials Solutions CentralSearch we have yet to succeed. This should be our main goal until we are successful. New tools are being developed that can improve web search ability. **Currently, DLIST has a project to add WorldCat Local to our front page.**

Opportunities and/or need for change to be strategic:

This issue is not only ours, but it is an issue for all Libraries. We need to partner and collaborate with other Libraries and Library organizations to solve this problem. All other projects are less critical to the Libraries survival.

Topic: Cloud Computing

Trends:

Cloud computing is the utilization of computational or storage services provided as a network service. Fees are typically based on usage, as opposed to the traditional model of purchasing servers with the cost up front.

Cloud computing is currently placed by Gartner on the hype cycle as approaching the "peak of inflated expectations" (to be followed by the trough of disillusionment, the slope of

enlightenment and the plateau of productivity). Sounds a bit like Dante. The estimated time to mainstream adoption is 2 to 5 years.

http://www.gartner.com/hc/index.jsp?hc_id=159496 (login via UA site license).

For a platform for library applications the advantage would be quick start up with a minimal investment up front. The down side could be higher costs in the long run. For example, Bob looked at Amazon S3 a couple of months ago and concluded the long term costs would be higher than the purchase of more server storage. However, companies such as SmugMug do find using the service cost effective. For implementing a new service with a minimum of up front funding it could be a practical alternative, especially if the use was expected to be short term.

There are some specific challenges to cloud computing, one of the greatest of which is the issue of privacy. Storing sensitive data on a remote web server not wholly owned by you or your company poses huge questions, including some beyond the issue of privacy, like ownership of data and who has the right to use it for what purpose.

Supporting Data:

1. http://en.wikipedia.org/wiki/Cloud_computing
2. <http://delivery.acm.org/10.1145/1330000/1327513/p16-weiss.pdf>
3. <http://aws.amazon.com/>
4. http://news.cnet.com/8301-13556_3-9886307-61.html
5. <http://chronicle.com/weekly/v55/i10/10a01601.htm>
6. <http://net.educause.edu/ir/library/pdf/PUB7202.pdf>

Topic: Applications on the Web

Trends:

- Google and others (including Microsoft's Office 14 <http://www.informationweek.com/news/software/hosted/showArticle.jhtml?articleID=211800059>) are putting applications on the web that require no fees to use, for example Google Apps with its version of Word, Excel and PowerPoint. The applications and storage of the items is all done on the web so there are no issues with licensing costs. Because the files are stored on the web, they are accessible from any computer which reduces the issues of accessibility. There are concerns about privacy though. ASU provides Google Apps that have been customized for ASU students as well as email. <http://help.asu.edu/node/529> , other universities also use Google mail <http://support.appstate.edu/answers/faq/asu-webmail-powered-by-google-faq>
- If this becomes widely used, the need for Office products and other applications the Library provides students will change. This will affect the amount of money need, as well as the licensing needed. Companies (now more than 1 million businesses) using Google's apps found out on Oct. 16 – 17, 2008 that Google made major changes without telling people and company staff could no longer access their gmail or other critical apps. The company IT were not able to do anything because the apps are hosted by Google who had to provide the solution http://www.computerworld.com/action/article.do?command=viewArticleBasic&taxonomyName=storage&articleId=9117426&taxonomyId=19&intsrc=kc_top
- Online collaboration tools could improve the ease of collaboration, especially across space.

- Adobe launched a free version (less features) of Photoshop online - <http://www.washingtonpost.com/wp-dyn/content/article/2008/03/27/AR2008032700230.html>
- Mozilla Prism is a package that allows you to create a dumbed-down web browser that works for just that application – perhaps creating a plethora of app specific browsers - <http://www.sitepoint.com/blogs/2008/03/25/mozilla-prism-stuck-in-the-middle-with-ui/>

Supporting Data:

Use of such applications

Summary Analysis:

Currently, Applications on the Web is not a mission critical trend for the Library.

Topic: Semantic Web

The semantic web provides the framework (semantics) by which information, services and the relationships between them can be described in a way that can be treated computationally, allowing retrieval not just of static information, but of information that can be manipulated and integrated based on its underlying structure.

Although the semantic web promises to deliver significantly enhanced access to data and services, on one has yet developed a "killer app" that would cause it to take off. Given the complexity of encoding data for the semantic web it's probably unlikely to flourish without a killer app.

The promise offered by the semantic web makes it a topic worth watching.

Supporting Data:

1. http://www.readwriteweb.com/archives/semantic_web_what_is_the_killer_app.php
2. http://en.wikipedia.org/wiki/Semantic_Web
3. <http://www.sciam.com/article.cfm?id=the-semantic-web>
4. http://eprints.ecs.soton.ac.uk/12614/1/Semantic_Web_Revisted.pdf

Topic: Video and books on Demand

Trends:

- The increased availability of videos on the web is changing the way people watch TV and movies. YouTube will soon have full length movies (<http://www.nytimes.com/2008/11/10/business/media/10mgm.html?em>) This one site claims 80 million movies <http://www.80millionmoviesfree.com/index.php>, yet a survey in the UK reports 47% read paper or books regularly and only 6% watch full movies on streaming sites http://www.entertainmentmediaresearch.com/reports/DigitalEntertainmentSurvey2008_SummaryReport.pdf 1/5 of US households with internet watch TV online, mainly steamed 68% or free download 38% <http://www.conference-board.org/economics/consumerBarometer.cfm> In the future, low budget movies (under \$10 million) could be made for only the web, and access to fans with appetites for series can be easily met (both regarding cost and content). Also, the quality of the image continues to improve. The increased ease of creating your own “grassroots video” is

- exploding (YouTube) and opportunities are being found for educational uses.
<http://www.broadbandtvnews.com/download/onlinetv.pdf> Newspapers like the Christian Science Monitor is moving to only online access
<http://www.nytimes.com/2008/10/29/business/media/29paper.html?bl&ex=1225512000&en=3a166f6e6c323327&ei=5087%0A>
- Products like Joost (free online movies) and Flash 9 (allows you to view interactive content such as YouTube) continue to improve, minimizing the difference between capability of DVD's and online viewing.
 - Intellectual property suites and increased video on demand use will fuel the fair use debate
 - The ability to have a digital books bound could affect the services the Library provides.
 - Kindle like products continue to be used and there will be a new version of Kindle for students soon (though they can't get textbooks on it).
<http://www.alleyinsider.com/2008/8/how-can-the-kindle-crack-the-college-market-by-not-selling-textbooks-amzn->
 - Ebook use has not increased as expected <http://www.teleread.org/blog/2008/02/06/slow-e-book-rev-growth-reported-by-idpf-in-first-three-quarters-of-07-but-lets-think-long-term/> The Springer survey results indicate that eBooks are best suited for research purposes or in a search environment where the user needs to locate specific information. Users are not reading eBooks cover-to-cover in the traditional sense but instead approach them as a resource for finding answers to research questions.
http://www.masternewmedia.org/ebooks_usage_trends_and_statistics/
 - More people are listening to books and now products are coming out to hold audio books besides just an iPod - <http://store.playawaydigital.com/How-to-Play/Getting-Started>

Supporting Data:

<http://www.parksassociates.com/research/reports/tocs/2004/vod.htm> ,
<http://www.joost.com/whatsjoost.html>, <http://www.flashmagazine.com/1431.htm>,
http://www.umi.com/products_umi/bod/
<http://www.nmc.org/pdf/2008-Horizon-Report.pdf>

Summary Analysis:

Changes in Video on Demand must be watched because of our current Video Furnace and FMG projects that provide video access to students.

Opportunities and/or need for change to be strategic:

This becomes strategic for the Library to monitor because of the large amount of money we have invested and continue to invest in our video projects.

Topic: Improvement in Hardware, Software and Operating Systems (OS)'s

Trends:

- Solid state drives might change the pricing on current drives and has the potential to offer us new opportunities for solutions to our storage needs.
- Virtual Machines continue to be popular for large businesses. DLIST uses them as much as possible and continues to research.

- The decrease in the cost of disk space and the increase in storage needed by the Library are allowing different options for backup to be available such as Disk-to-Disk, Outsourcing, etc. Tape backup is no longer a viable solution for terabytes of storage. **The Library now has a mirror of the IR at UITS along with the Video Streaming service.**
- Video camera's are now included in laptops and the Library is now lending laptops with video cameras. The Library also has increased the amount of video cameras in the Library for security. Issues of privacy and illegal use should be researched, understood and possible policies written.
- The University is researching adding more campus software agreements. This might reduce the costs of software and time to manage licenses for the Library. Different licensing models continue to be created for different software.
- The ability to have an open source operating system and other open source software on a CD might change the way the Library and University provides computers and software to students
- Book readers like Amazon's Kindle, continue to be produced but currently offer mainly mass produced/best seller list books, not books we offer our customer.
- Prices of hardware that provides what most people need has dropped substantially so that we could purchase a \$400 laptop or \$800 desktop that could allow access to the internet, wireless connection and basic productivity software (MS Office or open source versions of Word, PowerPoint and Excel). **The Library has piloted the ASUS small laptop with Library customers who really like the product and the extended checkout (3 days).**
- The ability to combine data in new ways "data mashups" has the potential to change the way we understand and use information. Combining this with collective intelligence (Wikipedia, community tagging) will expand our understanding of ourselves and our use of information and technology.
- Social operating systems (based on people not content) is just starting but has promise to change education substantially.
- **UITS can now offer 2 new super computers which will help faculty - <http://www.hpc.arizona.edu>**
- **The ability to turn 2D pictures into 3D may revolutionize the way games are created or the way we view images - <http://www.technologyreview.com/Infotech/20385/?nlid=921&a=f>**
- **The best researchers will continue to need the advanced networking capabilities but the UA continues to have massive budget cuts. When will the UA be able to improve its networking capacity because if it is too late it will lose top researchers. - [Advanced Networking Services: Current Issues in Higher Education](#) (from EDUCAUSE)**
- **More and more lecture capturing software has emerged and integration issues are large but whether the software is increasing learning has not been confirmed - [University Business "Lecture Capture: A Fresh Look"](#)**
-

Supporting Data:

http://en.wikipedia.org/wiki/Solid_state_drive , http://en.wikipedia.org/wiki/Virtual_machine ,
<http://www.ubuntu.com/products/WhatIsUbuntu/desktopedition> ,
<https://help.ubuntu.com/community/LiveCD> ,
<https://help.ubuntu.com/community/LiveCDPersistence>

Summary Analysis:

These issues must be watched because of the large expenditures on Hardware, Software and OS's.

Topic: IT Security

Trends:

- IT Security will continue to be a major concern for the Library and the University
- The new Information Security Officer continues to look at ways to improve. The Personal Information Sweep was the latest project.
- DLIST has a large priority project to improve the security of the Library.
- Just-signed legislation requires the 222,000-student Tennessee's public university system to spend an estimated \$9.5 million (.pdf) for file sharing "monitoring software," "monitoring hardware" and an additional "recurring cost of \$1,575,000 for 21 staff positions and benefits (@75,000 each) to monitor network traffic" of its students.
<http://blog.wired.com/27bstroke6/2008/11/tennessee-adopt.html>
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Supporting Data:

<http://security.arizona.edu/>, DITC meetings, <http://www.itsecurity.com/features/security-trends-2007-010807/>

Summary Analysis:

IT security is a mission critical issue because of the disruption to the Libraries work and services offered to our customers.

Opportunities and/or need for change to be strategic:

We must continue to be diligent in implementing security solutions.

From Educause's Horizon report <http://www.nmc.org/pdf/2008-Horizon-Report.pdf> for 2008, the following challenges were mentioned as effecting academia in the next 1-5 years:

- *Significant shifts in scholarship, research, creative expression, and learning have created a need for innovation and leadership at all levels of the academy.*
- *Higher education is facing a growing expectation to deliver services, content and media to mobile and personal devices.*
- *The renewed emphasis on collaborative learning is pushing the educational community to develop new forms of interaction and assessment.*
- *The academy is faced with a need to provide formal instruction in information, visual, and technological literacy as well as in how to create meaningful content with today's tools.*

Future Work:

- How is work in your area changing? What new work is emerging?
 - We continue to be asked to purchase, support and maintain new types of hardware and software. For example, tablet PCs, laptops with video cameras, new software for the IC and specialty software for staff.
 - We continue to be asked to support new services that often require new software. For example, **the IR will bring Drupal** content management software to the Library. Last year we added Joomla (another content management system for the Afghan project), Koha (a library catalogue system for the Afghan project), MINISIS (a museum content management system for CCP and Special Collections). Streaming video added Video Furnace software and FMG software and new vendors to work with. SDKE will no longer use Drupal, but will be written to port directly to the Digital Commons.

- We continue to see an expansion of storage needs. DLIST has changed the way we approach backup, storage and failover. For Video Furnance and UAiR we have our backup servers co-located at UITS. This increases our security and reduces our cost for certain hardware that UITS provides, though there is recurring support cost to UITS. We are looking at providing a similar capability for other services.
- We continue to be asked to create and/or support new web sites such as SDKE, AZ Atlas and LessonLink.
- What are barriers to accomplishing new or different work?
 - In order to support the continual barrage of different software, hardware, and services we have to learn not only how to use them but how to change them, support them and upgrade them. We have little time to do this important and lengthy work. It can take a month or two of pure learning and testing to be able to create, use or support a new piece of hardware or software.
 - There is very little work that we can stop doing because we are an infrastructure team and many of the new projects are not replacements for other projects but truly new unique projects.
 - Our continual exclusion from decisions regarding IT makes it difficult for us to be proactive and fully support the Library.
 - We now refresh (replace hardware which for the IC takes about 50 minutes/machine/tech and for staff can take about 3 hours) a third of the following yearly: 405 IC compatible computers, 400 staff/student computers, 67 loaner laptops, 6 staff laptops, and specialty hardware such as the presentation rooms. We also have to create images and ghost all of the software for this equipment two times a year (at least 10 different images). This continues to be more problematic as the complexity of the software continues to grow. The amount of hardware initially included only the 400 staff/student computers, then a few years ago we added all the IC computers and in the last year and a half we have added all the laptops and specialty equipment. We have not added any more staff to XWING to support this work.
 - The current hiring freeze makes it difficult to maintain our current systems and almost impossible to add new functionality. We try to use students and temps where appropriate.
- What tools are available that the Libraries and CCP aren't using to their fullest extent?
 - Data available in systems such as Innovative, ERES could be mined for information both for teams as well as for strategic information.
 - Many of the special applications available on some library employee desktops are not capabilities understood by staff. There could be more cross learning and usage of these special applications across the whole library.