March 18, 2019

Ms. Virginia Steele
Norman and Armena Powell University Librarian
UCLA Library
280 Charles E Young Dr N
Los Angeles, CA 90095

Re: Digital Collections Management Systems

Dear Ms. Steele,

Please find enclosed an assessment of digital collections management systems, complete with a description of the technology, current issues it is facing, and future trends. The internet has undeniably shaped the nature of contemporary research and information seeking, as more and more people turn to Google as their first line of inquiry, for better or for worse. Digital collections management systems provide a way to bring UCLA Library's robust special collections online, facilitating increased access and scholarship.

That said, there are some facets of the technology that should be carefully evaluated before investing considerable resources into building out UCLA's digital collections. The technology's high switching costs and propensity for lock-in means that a very thoughtful decision should be made at the outset as to which platform to use. The technology also opens institutions to increased liability regarding copyright protection, given the exposure an online audience entails. Other considerations regarding the software's technical architecture and web standards will inevitably affect the technology's development in the long term. These concerns, however, do not necessarily outweigh the technology's potential benefits to the UC scholarly community, but instead should be carefully appraised and considered when selecting a software solution.

Thank you for your time in considering this technology for UCLA Library. Please feel free to be in touch directly should you have any questions or concerns.

Yours sincerely,

Savannah Lake
Department of Information Studies, UCLA

Digital Collections Management Systems

Overview

- Digital collections management systems integrate cataloging databases with web platforms, allowing collecting institutions to bring their collections online.

- While the market is diffuse and customers have a wide variety of platforms to choose from, the software exhibits high switching costs and lock-in, and is not built to be interoperable with other digital collections.

- The content-rich technology already faces challenges on slower internet connections, which will likely worsen as the internet at large confronts capacity problems in the coming years.

- Institutions expose themselves to greater risk regarding copyright infringement with the technology, and also must be aware of how web standards created by largely corporate interests may disadvantage disenfranchised or disabled users.

- The design of the systems continues to evolve, with improvements in user experience and technical capacity. However, this progress could be impeded by the economic instability of the technology's major client base.

Introduction

Digital collections management systems allow cultural heritage institutions to bring collections online, reaching patrons near and far. This dynamic technology encompasses multiple computing functions, including online networking, extensive file storage (often of various formats), and database cataloging. This briefing examines attributes of the technology, its challenges, and future trends.

Background

As libraries, archives, and museums confront the digital age of information and strive to stay relevant, more cultural heritage institutions are taking their collections online through digital collections management systems. These technologies are highly complex, integrating cataloging databases and records management systems with web platforms.

Customers have a wide variety of digital collections management systems to choose from. They can build their own customized solution, utilizing applications like Fedora and Ruby on Rails to build out databases and websites. If they already have a collections management system in place, like PastPerfect or Axiell, they can often buy the digital collections component as an add-on service. Or they can choose a system that focuses entirely on digital collections, like CONTENTdm. Some of these options are proprietary, with strong customer-service support and corresponding fees, while others are free and open-source platforms, requiring instead that the user have substantial technical know-how. Accordingly, the product options and market structure are rather diffuse, allowing institutions to choose solutions that best fit the needs of their collection and staff.

This multitude of options, however, does not necessarily enable customer mobility. While the market does encourage competition on functionality and price, high switching costs and lock-in are prominent features of digital collections management systems—making selecting the correct platform at the outset a high priority.

Technology Description

Collections management solutions allow users to organize, search, and manage their collections. Through the software, users can ascribe metadata to their holdings within a database of records. Digital collections management systems build on these solutions, making collections available online.

These technologies can take the form of installed software or web applications. Both forms represent a fundamentally different approach to computing. Web-based solutions follow the client-server architectural model, with processing and storage performed on the server side, in the cloud. Popular solutions that follow this model include CONTENTdm. Installed software packages, on the other hand, live in computers or on a shared internal server, with processing and storage taking place locally. Popular solutions include PastPerfect and Axiell. Some of these solutions, including PastPerfect, will offer to host customer files online in cloud storage, at a fee.[1]

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[1] "PastPerfect Online: Expand Your Audience by Providing Online Access," http://www.museumsoftware.com/pponline.html, (February 18, 2019)

Competitive digital collections management solutions are compatible with any browser and on any device, including laptops, tablets, smart phones, and PC and Mac systems. In addition to interoperability with web browsers and devices, digital collections management solutions can offer application programming interfaces (APIs) to more deeply embed the collection with other web functions. CONTENTdm, for example, developed its own API, which allows institutions to customize their collections with visual branding, maps, Drupal, and online shopping carts.[2]

Digital collections management software is largely used in professional settings by cultural heritage institutions. As such, regulations inherent to the profession influence the development of the technology—in particular, the use of metadata best practices. Digital collections management systems are designed with metadata input fields, which allow institutions to ascribe administrative, technical, and descriptive metadata to an object. Some digital collections management systems even integrate known metadata standards like Dublin Core and DACS (Describing Archives: A Content Standard) or controlled vocabularies (in the form of thesauri and authority lists) directly into the software.[3]

Key Challenges and Issues

Digital collections management systems confront a number of challenges, spanning the expanse of their technical architecture, design, interoperability, regulation, and standards.

1. High lock-in and switching costs

Digital collections management software—particularly the packaged solutions, like CONTENTdm, Axiell, and PastPerfect—exhibit lock-in and high switching costs. At the outset, institutions that already have a collections management solution in place, such as Axiell or PastPerfect, likely feel locked into that solution, finding it most convenient to simply extend the existing software to add on the digital collections component instead of using a different digital software solution.

This lock-in is compounded by the high switching costs that all of the solutions exhibit— even the more modular, homegrown solutions customers build themselves through applications like Fedora and Ruby on Rails. While most digital collections management software will

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[2] "CONTENTdm Features," https://www.oclc.org/en/contentdm/features.html, (February 2, 2019)
[3] "Resources," https://www.oclc.org/en/contentdm/resources.html, (February 10, 2019)

facilitate switching from one software solution to another by providing XML or DBF file exports, switching still requires time and resources, chiefly in standardizing data for migrations.[4] This means that there are high costs to switching platforms, even for open source solutions.[5]

Further, digital collections are not designed to interoperate with one another. This siloed approach forces users to look for items within each institution's digital collection instead of searching one universal collection that includes numerous institutions. Currently, the process of combining different digital collections is tedious, involving harvesting and standardizing metadata records, creating a website for the merged collections, and developing an API that allows the collections to be shared with external sites.[6] Some data aggregation tools can perform these functions, but the effort still requires time, staff, and resources. This has implications for UCLA libraries, if there is any desire to coordinate with the UC system at large to support more robust searching. The logistics of UC-wide coordination are especially challenging if certain UC institutions are already locked in to a certain platform.

2. Image-heavy technology requires sizeable bandwidth

Websites displaying digital collections are necessarily image-heavy, sometimes also including video and audio files. As such, users with slower internet access, or users accessing these websites via a mobile device, may have difficulty loading these content-rich pages and enjoying their full functionality. This is an issue as the ethos of the UCLA Library is that of equity and access. Scholars from communities with less web infrastructure or cheaper internet connections, for example, will not have the same access to digital collections. Further, even users with adequate internet access may find digital collections slow to load, if the page is particularly content-rich.

Software providers are continually modifying the design to improve user experience with speed and capacity. In its most recent version update, CONTENTdm, for example, added a functionality for users to choose how many results they receive from a search query on a single

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[4] "Moving from PastPerfect to CollectiveAccess," https://collectiveaccess.org/support/index.php?p=/discussion/387/moving-from-pastperfect-to-collectiveaccess, (February 18, 2019)
[5] Price, Sara, "Collection Management Systems – Oral History in the Digital Age," http://ohda.matrix.msu.edu/2012/06/collection-management-systems/, (February 17, 2019)
[6] Butler, Nick, "Sharing Digital Collections: A Guide for Galleries, Libraries, Archives and Museums," https://www.boost.co.nz/blog/2018/10/digital-collections-galleries-libraries-archives-and-museums, October 12, 2018

page, "depending on your local connection speed and personal preference."[7] However, small design adjustments like these may serve more as temporary relief than systematic fixes. Especially as the internet becomes increasingly burdened with capacity issues with the rise of internet usage and smart phones—internet traffic increased eightfold between 2006 and 2011 alone—image-intensive applications like digital collections management systems will have to reckon with functionality and capacity.[8]

3. Copyright liabilities

As stewards of artistic materials and intellectual property, cultural heritage institutions are well versed in copyright law. Digital collections, however, increase the responsibility, exposure, and liability of copyright protection by making materials widely available to the public. Managers of digital collections thus have to be vigilant in their stewardship of materials while using digital collections management software, as the scope of their responsibility is exponentially risen when given an online platform.

Fortunately, copyright law has shaped how digital collections management systems are developed and designed. Digital collections with original or representations of works of art need to honor rights of attribution and integrity.[9] To enable this, digital collections management systems have fields that allow institutions to properly attribute works of art. Furthermore, to help prevent unlawful dissemination of materials, digital collections management systems can make materials visible, but restrict the ability for users to download the materials. Of course, there is always the possibility for a user to screenshot the image. Accordingly, digital collections management systems can also list rights information along with the digital object, making it clear to users what is protected by copyright law. With this multi-pronged approach, institutions utilizing digital collections management software are making best efforts to prevent infringement, with the onus ultimately placed on the user to follow copyright law. To enact these design protections, however, institutions must be responsible and accurate in their rights settings.

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[7] "CONTENTdm Release Notes, March 2019," OCLC Support, February 28, 2019, https://help.oclc.org/Metadata_Services/CONTENTdm/Release_notes/2019_release_notes/100_CONTENTdm_release_notes_March_2019

[8] Blanchette, Jean-François, 2015, "Computing's Infrastructural Moment." In *Regulating the Cloud: Policy for Computing Infrastructure*, edited by Jean-François Blanchette and Christopher Yoo, 1–19. MIT Press.

[9] "COPYRIGHT OWNER'S RIGHTS," *Copyrightalliance* (blog), https://copyrightalliance.org/education/copyright-law-explained/copyright-owners-rights/, (February 24, 2019)

4. Web standards are developed by select decision makers

Web standards figure prominently in the design of digital collections management systems, as these software solutions are used to make collections accessible online. Additionally, many of these software solutions' database functions are designed to structurally rely on the Internet. CONTENTdm, for example, "uses a text-based search engine built using Internet standards and protocols" instead of being built as a relational database to facilitate faster performance for larger collections in an online setting.[10]

Accordingly, the development of web standards will inevitably impact digital collections management systems. Web standards are agreed-upon technical principles that help ensure that websites display content in the same way, no matter what browser a user might be using.[11] The World Wide Web Consortium (W3C) is a key player in this realm. W3C is an international community, with its 452 members including computing companies, corporations, financial institutions, media conglomerates, academic and research institutions, and government entities.[12] While the member list is quite extensive, members are predominantly from North America, Europe, and Asia, and largely consist of corporate, academic, and governmental stakeholders— not necessarily the public or humanitarian agencies.[13]

While the academic representation in standards-making organizations is encouraging for UCLA libraries, the distribution of W3C's members does not always serve disenfranchised or marginalized groups. As strong advocates of public service and equitable access, this might be a concern for UCLA libraries, in considering how to best serve all of its patrons. For example, in 2017, W3C published digital rights management (DRM) standards, which standardized how web video platforms allow browsers to display videos.[14] DRM technology is heavily protected by law. In the United States, for example, people who bypass DRM for legal reasons—such as making material accessible to those with disabilities—can still be prosecuted.[15] As such, some non-profits like the Internet Archive, UNESCO, and the Electronic Frontier Foundation

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[10] "Resources," https://www.oclc.org/en/contentdm/resources.html, (February 10, 2019)

[11] "Web Standards," https://www.washington.edu/accessit/webdesign/student/unit1/module3/lesson1.htm, (February 10, 2019)

[12] "Current Members - W3C," https://www.w3.org/Consortium/Member/List, (February 10, 2019)

[13] Dickens, "Web Standards: The What, The Why, And The How," *Smashing Magazine*, https://www.smashingmagazine.com/2019/01/web-standards-guide/, January 14, 2019

[14] "Encrypted Media Extensions," https://www.w3.org/TR/encrypted-media/, (February 10, 2019)

[15] Doctorow, "Amid Unprecedented Controversy, W3C Greenlights DRM for the Web," Electronic Frontier Foundation, https://www.eff.org/deeplinks/2017/07/amid-unprecedented-controversy-w3c-greenlights-drm-web, July 6, 2017

petitioned W3C to include in the standards that members would only prosecute those who bypassed DRM to explicitly infringe on copyright. While some of W3C's members agreed with this sentiment, including the German National Library and the U.K. Royal National Institute for Blind People, ultimately such protections were not voted through, likely due to the majority corporate representation of W3C members.[16] DRM standards directly affect institutions with videos in their collections, and will be the first of many decisions from W3C that could impact digital collections—a concern if the fundamental ethos of W3C's decision-making members is at odds with the service-oriented goals of UCLA Library.

Future Trends

While collections management software has been around for several decades, its digital counterpart is a bit younger, with most starting in the mid-2000s.[17, 18] As such, its future is full of potential challenges and opportunities.

On the design front, the technology will likely continue to improve across the bar. Industry leaders like PastPerfect and CONTENTdm regularly release software updates with improvements spanning technical capacity and user experience.[19, 20] Given the high number of competitors in the market—and the need to compete on functionality—these improvements will likely continue.

That said, there are potential economic impediments to the growth and continual improvement of the technology. Many cultural heritage institutions are on unsure ground as to funding. In times of economic recession especially, when ticket sales and donations are down, institutions can be forced into cutting back on programming and staffing.[21] Even in the best of economic times, cultural heritage institutions are not necessarily flush with income as other companies or organizations might be. Accordingly, the growth of digital collections management technology might be stymied by its clients' lack of resources.

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[16] Doctorow, "Amid Unprecedented Controversy, W3C Greenlights DRM for the Web," July 6, 2017

[17] "Omeka – Project," https://omeka.org/about/project/, (March 15, 2019)

[18] "PastPerfect Online User's Guide"http://museumsoftware.com/ppohelp/#t=Welcome.htm, (March 15, 2019)

[19] "Latest PastPerfect Museum Software Update Release Notes," https://www.museumsoftware.com/releasenotes.html, (March 3, 2019)

[20] "CONTENTdm Release Notes, October 2018," 2018, OCLC Support, https://help.oclc.org/Metadata_Services/CONTENTdm/Release_notes/2018_Release_Notes/090CONTENTdm_release_notes_October_2018

[21] Grant, Daniel, "How Do Museums Pay for Themselves These Days?" *Huffington Post*. September 7, 2012, https://www.huffingtonpost.com/daniel-grant/museum-cuts_b_1816309.html

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