



Piles of Stuff: On Aggregating Digital Collections

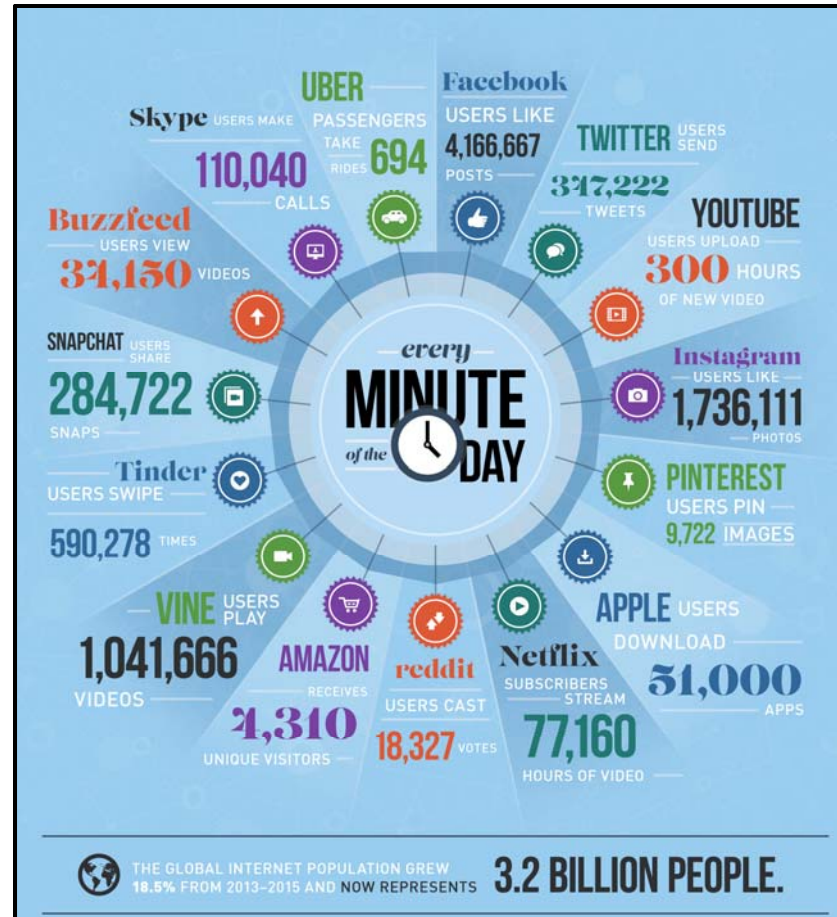
Paul Conway

University of Michigan School of Information

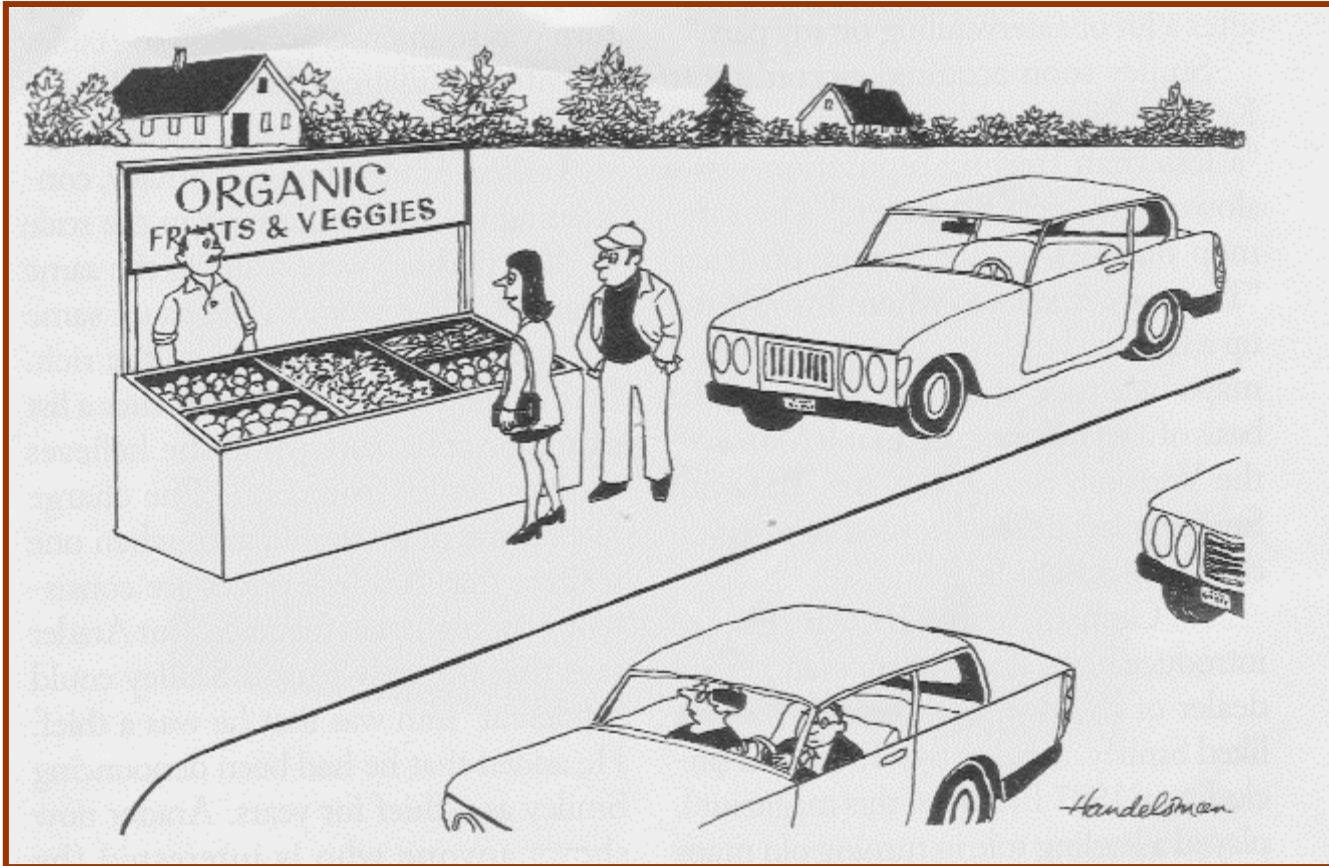
2016 Digital Commonwealth Annual Conference



How much data is generated every minute?



<https://www.domo.com/blog/2015/08/data-never-sleeps-3-0/>



“Organic is nice, but haven’t you got anything digital?”



Point of Reference - 2006

-- *The (Digital) Library Environment: Ten Years After*



- Transitions: 1996-2006
 - Discovery 2 **Delivery** + Creation 2 **Curation**
- Significance of new for-profit models
- Trends ahead from 2006



Lorcan Dempsey, OCOC VP
Membership and Research &
Chief Strategist

Lorcan Dempsey, "The (Digital) Library Environment: Ten Years After. *Ariadne* 46 (2006). <http://www.ariadne.ac.uk/issue46/dempsey/>



Key Notes

Digitization and aggregation

- Brief histories



Three super aggregators

- Europeana
- Digital Public Library of America
- Collex (NINES)



The next wave for aggregation

- Education & Training
- Analytics



Digitization is Image Science.



First Digital Image, 1957
Russell Kirsch, National Bureau of Standards



Boyle & Smith, 1969
First Charge-Coupled Device



Steven Sasson, 1975
First Digital Camera



First Flatbed Scanner, 1978
Ray Kurzweil



Digitization in the Cultural Heritage Sector

... from experiments to projects to programs

RLG Digital Image Access Project (DIAP) - 1993-1995

is mostly here, but the need to index and make images available has only become more pressing thereby. The RLG Digital Image Access Project (DIAP) decided to explore what happens when multiple sources of images reflecting many different indexing traditions are searched together. Not surprisingly, McClung reported that this was the hardest and least conclusive project on which she had ever worked. Her approach has always been to get the brightest people together and give them a well formulated problem and then the solution is arrived at. In this case they

“... McClung reported that this was the hardest and least conclusive project on which she had ever worked.”

Top Digitization Guidelines - 2000s



National Archives (2004)



Library of Congress (2006)



North Carolina (2007)



Colorado (2008)



Federal Agencies Digitization Guidelines Initiative



DRAFT September 2, 2015

Technical Guidelines for Digitizing Cultural Heritage Materials



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FA DGI Federal Agencies Digitization Guidelines Initiative

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<http://www.digitizationguidelines.gov/>



What is an Aggregator?

- **ag·gre·ga·tor** 'agrəˌgādər/ *a website or program that collects related items of content and displays them or links to them.*
 - Open Archives Initiative - Protocol for Metadata Harvesting
 - Based on Dublin Core descriptive metadata framework
 - Resource Description Framework - W3C Semantic Web
 - Mapping diverse local collections to a common scheme
 - Most aggregator services assemble metadata only
 - A distributed model designed for scale



Thematic Research Collections

CORPUS THOMISTICUM
INDEX THOMISTICUS
by Roberto Busa SJ and associates
web edition by Eduardo Bernot and Enrique Alarcón
English version

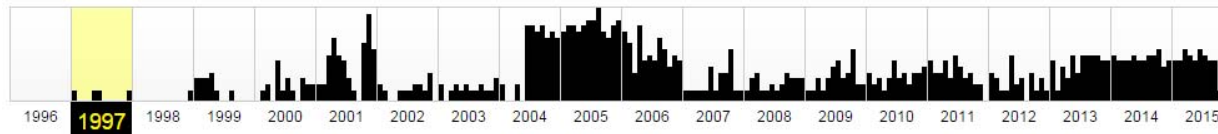
Search:

[concordances](#) [terms](#) [works](#) [options](#) [new search](#)




Thematic Research Collections

The screenshot shows the Perseus Project website. At the top left is a logo of a figure with a bow and arrow. To its right is the text "Περσεύς PROJECT" in blue. Further right is a box with the text "Tufts University Classics Department Gregory Crane Editor-in-Chief" and a link "About Perseus". Below this is a grid of navigation buttons: "What's New", "Art & Archaeology", "Searching Tools", "Texts Greek/English", "Greek Lexica", "Secondary Sources", "Starting Points", "Order Perseus 2.0", "Teaching With Perseus", "Documentation & Help", "Related Links", and "Mail & Mailing Lists". Below the grid is the text "An Evolving Digital Library on Ancient Greece and Rome". Underneath is a link: "Check out our preliminary plans for a library of Shakespeare's sources and other Renaissance materials!". At the bottom of the screenshot is a notice box with the text: "Notice: Due to the annual maintenance on the electrical system at Tufts, this server will be off-line on either the 24th or 25th of May. We expect to restore service on the 26th of May. We apologize for any inconvenience." Below the screenshot is a bar chart showing data from 1996 to 2015, with the year 1997 highlighted in yellow.







Thematic Research Collections

**PERSEUS DIGITAL LIBRARY**
GREGORY R. CRANE, EDITOR-IN-CHIEF
TUFTS UNIVERSITY

("Agamemnon", "Hom. Od. 9.1", "denarius")
[All Search Options \[view abbreviations\]](#)

[Home](#) [Collections/Texts](#) [Perseus Catalog](#) [Research](#) [Grants](#) [Open Source](#) [About](#) [Help](#)

Welcome to Perseus 4.0, also known as the **Perseus Hopper**.
Read more on the [Perseus version history](#).
New to Perseus? Click [here](#) for a short tutorial.


Perseus Digital Library Updates

- **9/1/2015** [Collaborating Courses on Fifth-Century Greek History in Spring 2016?](#)
Call for Collaboration Gregory Crane Leipzig and Tufts Universities September 1, 2015 This is a preliminary call for comment ...
- **8/7/2015** [Open Patrologia Graeca 1.0](#)
August 8, 2015 <http://tinyurl.com/nlvhy9b> Comments to munson@dh.uni-leipzig.de Federico Boschetti, CNR, Pisa Gregory Crane, ...
- **7/28/2015** [Essays on Digital Classics and Digital Humanities](#)
Gregory Crane Professor of Classics and Winnick Family Chair of Technology and Entrepreneurship Tufts University Alexander von ...
- **7/28/2015** ["Privashing" vs. publishing — in search of an accurate term for a problematic academic tradition](#)
Gregory Crane Comments to gcrane2008@gmail.com [Draft as of July 28, 2015] Alexander von Humboldt Professor of Digital ...
- **7/20/2015** [Revislon to "The Big Humanities, National Identity and the Digital Humanities In Germany"](#)
I have integrated a number of comments and clarifications from my colleagues in Dariah-DE and TextGrid in revising "The ...
- **7/20/2015** [The Work of Classical Studies in a Digital Age](#)
Gregory Crane gcrane2008@gmail.com [Draft as of July 20, 2015] Alexander von Humboldt Professor of Digital Humanities Leipzig ...


Popular Texts

- Caesar, *Gallic War* (English, Latin)
- Catullus, *Carmina* (English, Latin)
- Cicero, *In Catilinam I* (English, Latin)
- Vergil, *Aeneid* (English, Latin)
- Herodotus, *Histories* (English, Greek)
- Homer, *Odyssey* (English, Greek)
- Plato, *Republic* (English, Greek)
- Tom Martin, *Overview of Classical Greek History from Mycenae to Alexander* (English)


Art and Archaeology




Aegina, Temple of Aphaia



Silver obol from Athens



Satyr on Attic red figure vase



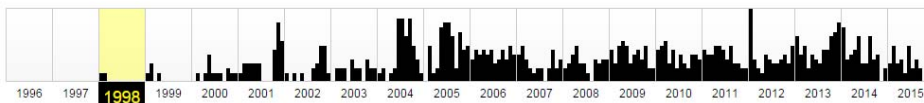
The Barlett Head



Aggregation - Digital Library Origins

The screenshot shows the homepage of the American Memory website. At the top, there is a navigation bar with links for "[text-only]", "January 10, 1998", and "Today in History". Below this is the "The LIBRARY of CONGRESS" logo. The main heading is "American Memory" with the subtitle "Historical Collections for the National Digital Library". The page is divided into three main sections: "SEARCH", "BROWSE", and "LEARN". The "SEARCH" section includes a search box and a "Go" button. The "BROWSE" section lists "Titles | Topics" and "Library Divisions". The "LEARN" section offers "Organized help for using the collections". Below these are links for "Photos & Prints", "Documents", "Motion Pictures", "Maps", and "Sound Recordings". A "Showcase" section features "New Collections" with links to "Jackie Robinson and other Baseball Highlights" and "Voices from the Dust Bowl". A "Sample Collection" section shows a portrait of a man. At the bottom, there is a section titled "A Unique Public-Private Partnership Supporting the National Digital Library" and several links for "Previews and Future Collections", "How to View These Collections", "LC/Ameritech Competition", "Copyright and other Restrictions", "Background Papers and Technical Information", and "About the Special Collections of the Library of Congress".

The screenshot shows a more modern version of the American Memory website. At the top, there is a navigation bar with links for "HOME", "BROWSE", "ABOUT", "HELP", and "CONTACT". A search box is located on the right side. Below this is the "The Library of Congress > American Memory Home" breadcrumb. The main content area is divided into two columns. The left column is titled "Browse Collections by Topic" and lists various categories such as "Advertising", "Literature", "African American History", "Maas", "Architecture, Landscape", "Native American History", "Performing Arts, Music", "Cities, Towns", "Presidents", "Culture, Folklife", "Religion", "Environmental, Conservation", "Sports, Recreation", "Government, Law", "Technology, Industry", "Immigration, American Expansion", "War, Military", and "Women's History". There are also links for "More browse options" and "List all collections". The right column is titled "Collection Highlights" and features two featured collections: "George Washington Papers" (1741-1799) and "Voices from the Days of Slavery" (Former Slaves Tell Their Stories). Below this is a "Notice: Some Collections Have Moved" banner with a message about migrating collections to new presentations. A "Today in History" section for October 5 features a clock icon and a message about mining historical collections. At the bottom, there are links for "Teachers" and "Ask a Librarian".





Thematic Collections and Digital Humanities



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News

April 4, 2016


How to Survive the Robot Apocalypse

February 23, 2016

IHGC to Hold Spring Symposium for Mellon Fellows

February 18, 2016

IATH Helps a Course Find Evidence of Slaves at UVA

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The Walt Whitman Archive



Folsom, Ed - *The Carver Professor of English at The University of Iowa*
Price, Kenneth M. - *The Hillegass Professor of American literature at the University of Nebraska, Lincoln*
Networked Associate Fellows 1997

The Walt Whitman Archive is an electronic research and teaching tool that sets out to make Whitman's vast work, for the first time, easily and conveniently accessible to scholars, students, and general readers. Whitman, America's most influential poet and one of the four or five most innovative and significant writers in



2015-2017 Fellow

Jennifer Petersen, Associate Professor
Archaeology of Legal Definitions of Speech

Associate Fellows

Derrick Aldridge, Education
Brad Pasenек, English

IATH: <http://www.iath.virginia.edu/>



Making of America - Bound and Structured



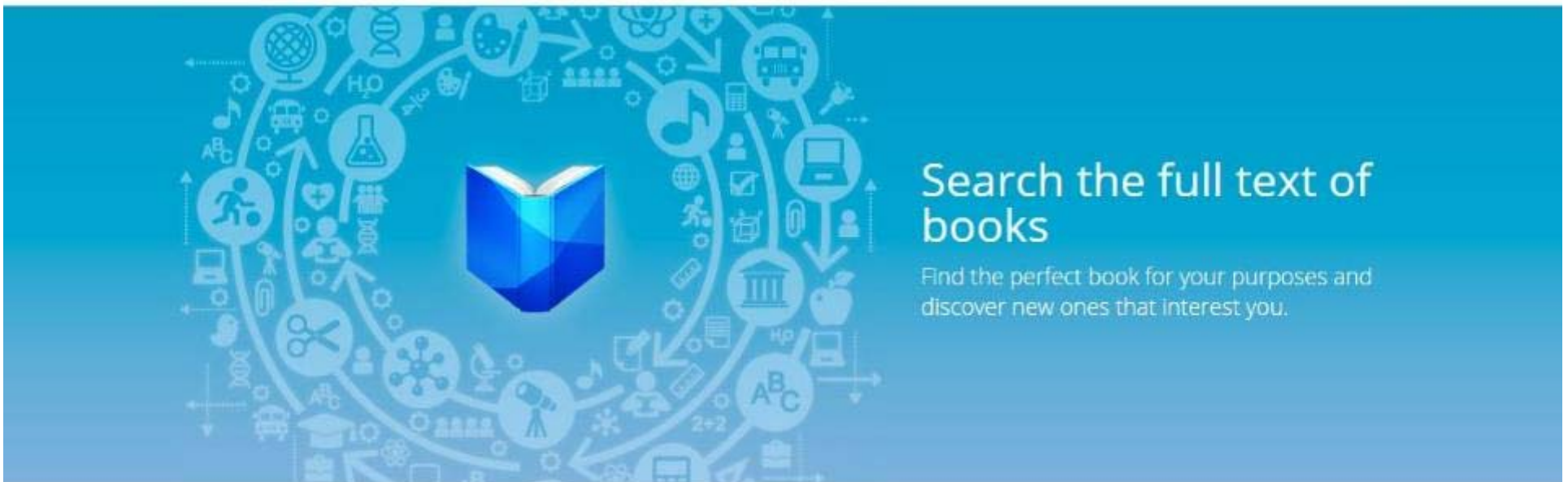


Google Books and HathiTrust Digital Library

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**requires institutional login*



Google Books and HathiTrust Digital Library

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Microfilm : a history, 1839-1900 / by Frederic Luther. Luther, Frederic.

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Permanent link to this book: [https://books.google.com/books?id=...](#)

Search: microfilm

Jump to: Go

Search in this text: Find

Navigation:

Thumbnail 1: Dark cover with a small label.

Thumbnail 2: Cover with 'University of Michigan Library' logo.

Thumbnail 3: Spine of a book.

Thumbnail 4: Blank page.

Thumbnail 5: Title page: MICROFILM / A History / 1839 - 1900 / BY FREDERIC LUTHER.

Thumbnail 6: Table of contents page.

Thumbnail 7: Blank page.

Thumbnail 8: Text page with a heading.

Thumbnail 9: Text page with a heading.

Thumbnail 10: Text page with a heading.

Thumbnail 11: Text page with a heading.

Thumbnail 12: Text page with a heading.

Thumbnail 13: Text page with a heading.

Thumbnail 14: Text page with a heading.

Thumbnail 15: Text page with a heading.



Key Notes

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- Brief histories



Three super aggregators

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- Collex (NINES)



The next wave for aggregation

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- Analytics

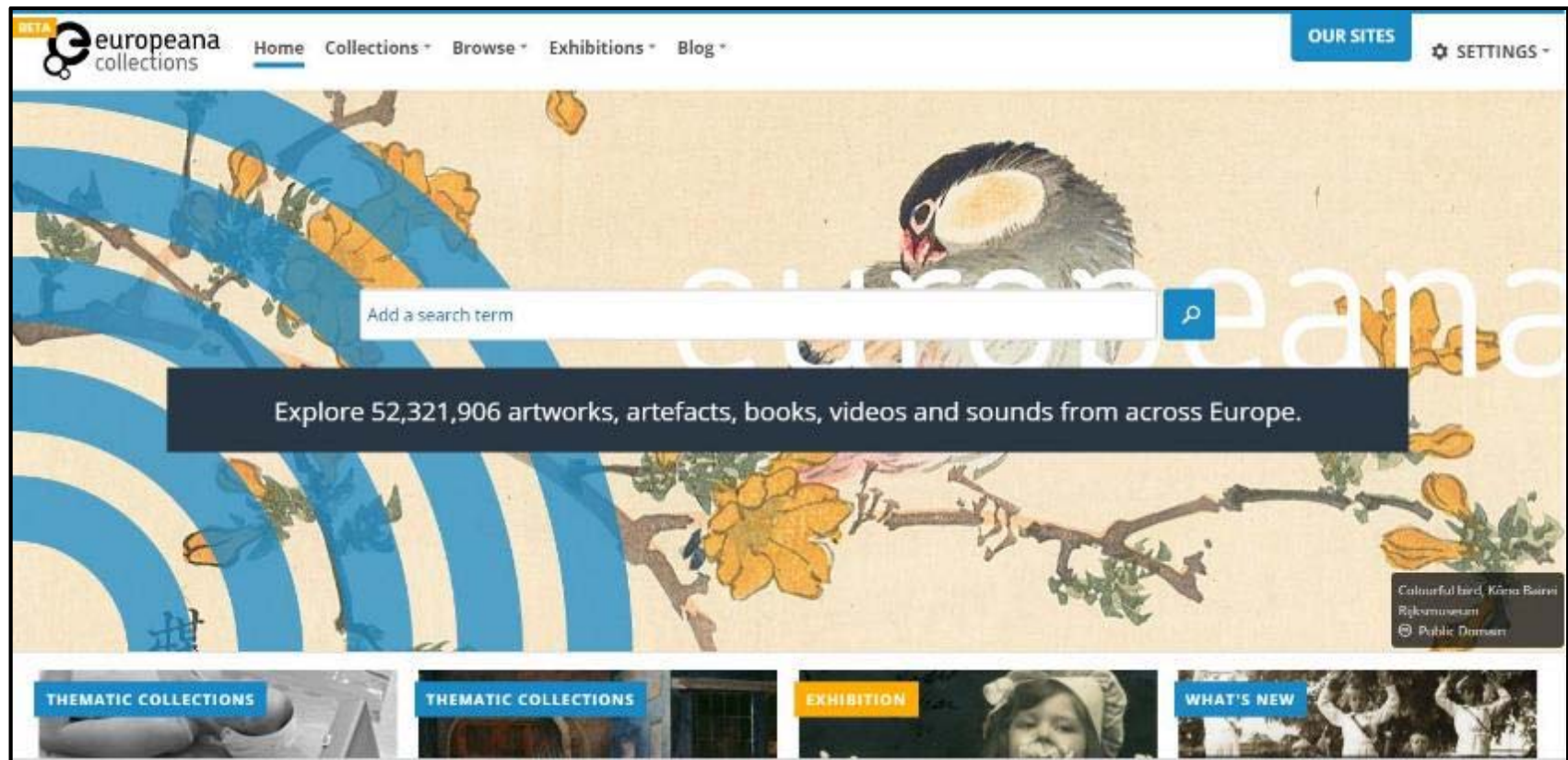


Emerging Lessons from Three Aggregators





Europeana Collections



<http://www.europeana.eu/portal/>



Europeana Collections - Innovations

- + path breaking standards compliance and development
 - Resource Description Framework (RDF)
- + extraordinary progress on metadata manipulation
- + technical documentation optimized for developers
- + innovation in visualization
- + alliances with computer/info science researchers

The screenshot shows the top navigation bar of the Europeana Collections website. It is divided into four main sections: Discover, Network, Develop, and Connect. Below these are sub-sections: Collections (Explore Europe's cultural heritage), Pro (Get involved, share your data or use ours), Labs (Remix cultural content with our APIs & datasets), and Research (Connecting to the academic community). The footer of the navigation bar includes the Europeana Collections logo with a 'BETA' tag, a navigation menu with 'Home', 'Collections', 'Browse', 'Exhibitions', and 'Blog', and buttons for 'OUR SITES' and 'SETTINGS'.



Europeana Publishing Framework

Here you see how the different tiers of the publishing framework work. In this example we use images. For video, audio, text and 3D, please see the Europeana Publishing Framework Appendix.

TIER	DIRECT LINK TO OBJECT PROVIDED	RIGHTS STATEMENTS	EUROPEANA API DISPLAYS	BENEFITS (CUMULATIVE)
1 Europeana as a search engine . <i>'I want people to find my collections'</i>	No	Any from the Europeana licensing Framework	Metadata, no direct link to object	Findability - indexed by search engines, linked data technology Web traffic - click-throughs to your site Analytics - from our statistics dashboard
2 Europeana as a showcase . <i>'I want people to find and view my collections on Europeana'</i>	Yes. Minimum of 800+ pixels wide	Any from the Europeana licensing Framework	Metadata plus direct link to object	Use in thematic channels - providing context and relation to other collections on Europeana More marketing through Europeana
3 Europeana as a distribution platform for non-commercial re-use. <i>'I want people to find, view and use my collections - but not for commercial gain'</i>	Yes. Minimum of 1,200+ pixels wide recommended	Any from the Europeana licensing framework that allow for some re-use	Metadata plus direct link to object and can filter to show only re-usable objects	Impressions - collections viewed on platforms outside of Europeana Use in Europeana's existing partnerships and projects in e.g. education and research Use in apps and services by third parties
4 Europeana as a free re-use platform . <i>'I want people to find, view and use my content - however they want'</i>	Yes. Minimum of 1,200+ pixels wide recommended	Any from the Europeana licensing framework that allow free and open access	Metadata plus direct link to object and can filter to show only re-usable	Use on open platforms like Wikimedia Use by creative industry and tourism sectors Use in commercial apps and services



Digital Public Library of America

The screenshot shows the homepage of the Digital Public Library of America (DPLA). At the top left is the DPLA logo with the text "DIGITAL PUBLIC LIBRARY OF AMERICA". To the right is a navigation menu with links for "Home", "Exhibitions", "Map", "Timeline", "Bookshelf", and "Apps".

The main content area is divided into several sections:

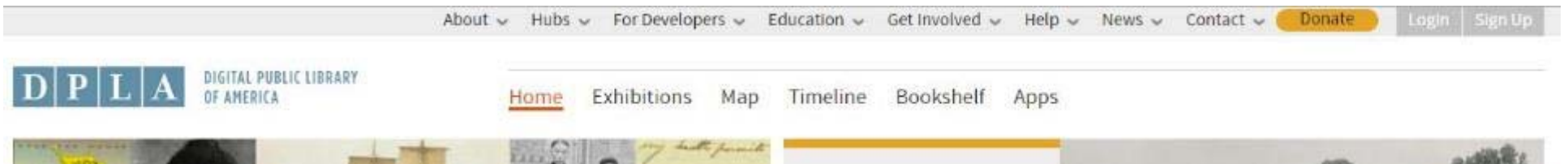
- Exhibitions:** A large image of three women riding a roller coaster labeled "Scrambler". Below it is a "View all >" link.
- Explore by Place:** A map showing "Clemson" with a red dot, next to a photo of a man in a suit. Below the map is a "Map >" link.
- Explore by Date:** A photo of a horse race. Below it is a "Timeline >" link and a year selector showing "1946", "1947", "1948", "1949" (highlighted), "1950", "1951", and "1952".
- A Wealth of Knowledge:** A dark banner with the text "A Wealth of Knowledge" and "explore 11,776,547 items from libraries, archives, and museums". Below this is a search bar with the placeholder text "Search the Library" and a magnifying glass icon.

<http://dp.la/>



DPLA -- Innovations

- + Hubs and Service Hubs distribute effort and commitment
- + Extraordinary documentation for API developers
- + Cross connections to K-12 education [public library!]
- + Strong commitment to books [HathiTrust/Google]
- + Tools for geospatial, temporal, and thematic displays





NINES - Nineteenth Century Scholarship Online

The screenshot displays the NINES website interface. At the top, there is a navigation bar with the NINES logo and the tagline "Nineteenth-century Scholarship Online". Below the navigation bar, there is a search bar with the text "Search NINES:" and a "Search" button. To the right of the search bar, there is a link to "What is NINES? | Peer Review".

The main content area is divided into three columns:

- Featured Object:** Displays a featured object titled "The holiday vanity fair" with a small image of the book cover. Below the title, it says "Date: 1843" and "Site: NYPL Digital Gallery". A link is provided: "Click to browse more objects like The holiday vanity fair."
- Browse Recent Tags:** A list of tags including "charles", "gender", "cover", "volume 11", "socialization", "volume 12", "sensation", "gib", "frankenstein", "criticism", "victorian", "death", "burial", "consciousness", "victorian", "net", "volume 5", "the yellow book", "volume 3", "death", "rituals", "mourning", "romanticism", "romanticism", "romanticism", "romanticism", "painting", "history", "sherlock", "england", "china", "explosion", "africans", "challenger", "warden", "science", "person", "fiction", "philosophy", "science", "explosion", "militarism", "letter", "by the author of romanian", "financing", "quest", "american", "history", "japanese", "chinese", "cultural", "study", "xos", "francisco".
- Recent News:** A list of news items including "Call for Chapters: International Migration in the Victorian Era", "Lecture by Tom Mole at New York School, March 17", "Cuthie Lester's Online work available on NINES", "NINES Database for DHISI", "Pedagogical Outreach for NINES", and "MORE".

Below the main content area, there is a section titled "Federated Websites" with three featured items:

- The Ambrose Bierce Project:** An online forum and resource for the study of Ambrose Bierce (1842-1914), the American satirist, topographer, journalist, and writer. The ABP strives to bring together Bierce scholars and students from around the globe. VISIT SITE
- Dickinson Virtual Reference Shelf:** The Dickinson Electronic Archive (DEA) is a website devoted to the study of Emily Dickinson, her writing practices, writings directly influencing her work, and critical and creative writings generated by her work. VISIT SITE
- The Journals of the Lewis and Clark Expedition:** The Journals of the Lewis and Clark Expedition Online makes available the text of Gray E. Mottin's Neotoma edition of the journals that Lewis and Clark kept of their journey to the Pacific Ocean and back from 1803-1806. The site provides a wealth of supplementary materials relevant to the journey. VISIT SITE

At the bottom of the page, there is a footer with the text: "NINES: aggregating 890,760 peer-reviewed digital objects from 139 federated sites. Questions? Find a bug? Contact us. (Powered by Collex v1.0.1.)"



Collex Search Results

The screenshot shows the NINES (Nineteenth-century Scholarship Online) search results page. The search query is "Abraham Lincoln" and the results are sorted by Relevance. The page displays three search results, each with a thumbnail image, a title, source information, author, tags, and site. The results are:

- Abraham Lincoln**: Source: George Eastman House; By: Matthew B. Brady; Tags: [mattew brady](#) (add tag); Site: [George Eastman House on Flickr Commons](#)
- Ticket with portrait of Abraham Lincoln**: Source: World's Columbian Exposition Collection, The Field Museum Library; By: Unknown; Tags: [\(add tag\)](#); Site: [The Field Museum Library on Flickr Commons](#)
- [Abraham Lincoln]**: Source: Library of Congress, Prints and Photographs Division, Washington, D.C. 20540 USA; Artist: Unknown; Tags: [lincoln](#) (add tag); Site: [Flickr Commons: Civil War Passes](#)

On the right side of the page, there are two sections: "Currently Searching..." and "Limit Results to...".

Currently Searching...

Resource	# of Objects
NINES	14
Connect	
MESA	
Great Lakes	
Total	3

Limit Results to...

Select a resource below to limit your search results

Resource	# of Objects
Other Digital Collections	14

Other helpful facets...

Select a facet below to limit your search results

Facet	# of Objects
Access	# of Objects
Free Culture Only	11
Format	# of Objects
Physical Object	4
Still Image	14
Discipline	# of Objects
Art History	14
History	14
Genre	# of Objects
Photograph	14
Visual Art	7



Collex -- Innovations

- + Conceived, developed, and lead by scholar-users
- + Peer review of collection contributions
 - Selectivity improves overall quality
- + Strong commitment to internal analysis tools
 - Juxta for juxtaposition and annotation
 - Commentary
 - Personal collections
- + Efforts to foster a publishing environment
 - Exhibits, attempts at open access journals



Aggregating Great Lakes Environmental History

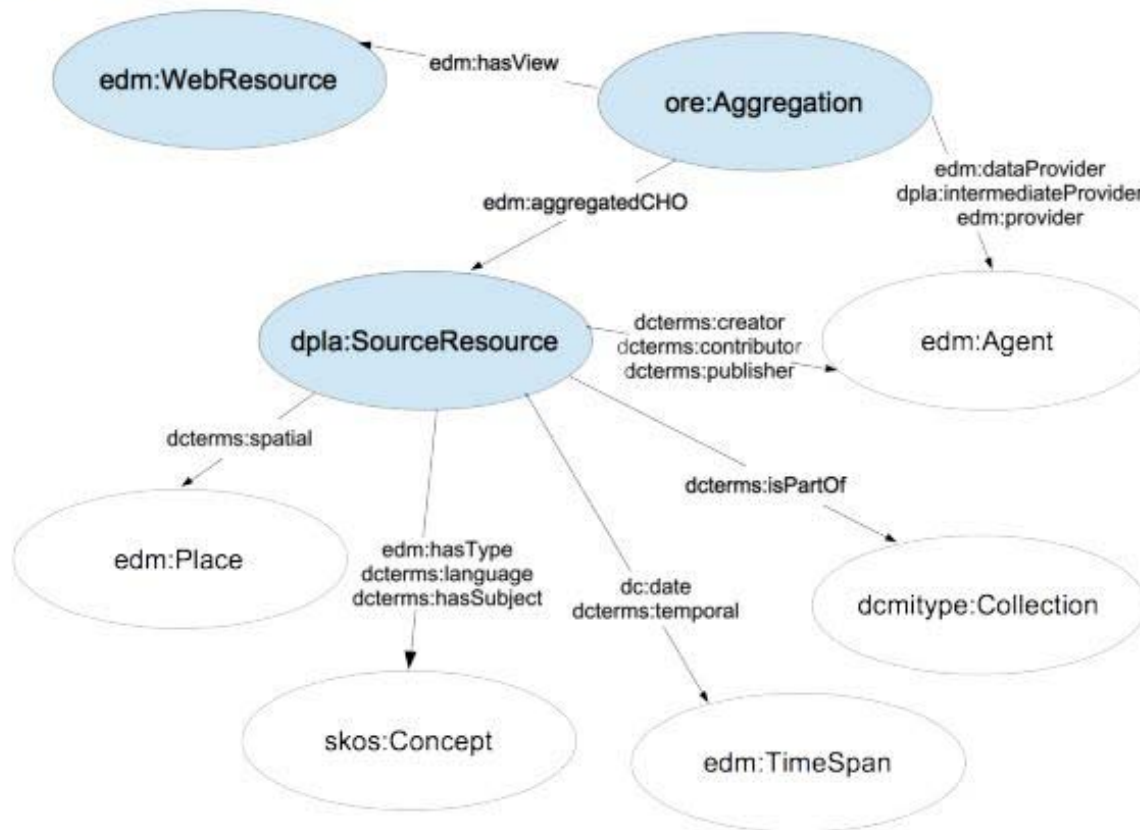
- www.greatlakescollections.org

The screenshot shows the homepage of the Great Lakes Aggregator. At the top left is the logo for "Great Lakes AGGREGATOR" with a map of the Great Lakes region. To the right of the logo is a "LOG IN" link. Below the logo is a navigation bar with "MyGLA" and "Search" buttons. The main content area features a search bar with the text "Search Great Lakes Aggregator:" and a "Search" button. Below the search bar, it says "Searching 54,006 peer-reviewed digital objects from 7 federated sites" and "Advanced Search". There are three columns of content: "Popular Discussions" with a "MORE" link, "Browse Recent Tags" with tags like "history", "junks", and "warren's_suffrage", and "Recent News" with a "MORE" link. Below this is a section for "Federated Websites" with three featured items: "Great Lakes Digital Library" (a collection of research papers), "Edward E. Ayer Digital Collection" (a collection of ~750 photographs, manuscripts, drawings, and maps), and "Great Lakes Maritime Database" (a database of ~23,000 images and documents). At the bottom, there is a footer with the text "Great Lakes Aggregator: aggregating 54,006 peer-reviewed digital objects from 7 federated sites. Questions? Find a bug? Contact us. (Powered by Collex v1.5.1)".



DPLA Metadata Application Profile (MAP)

Figure 1. DPLA MAP 4.0 Class Diagram



http://dp.la/info/wp-content/uploads/2015/03/Intro_to_DPLA_metadata_model.pdf



DPLA Where to Start?

- Prospective partners ... test their standards against DPLA's expectations ...
 - ... hubs are responsible for data quality
 - ... make sure data is as error-free as possible
 - ... elements and properties are consistently implemented
 - ... contextualize your data on a global level
 - ... descriptions useful to an unfamiliar audience
 - ... field tags are internally consistent across sub-collections



Europeana - Focus on Metadata Quality

- “ ... Accessibility, accuracy and consistency of metadata and content are hugely important for the service we want to develop with **you, our data partners.**”
- Every metadata record must have
 - dc:title or dc:description
 - dc:language (texts)
 - dc;subject or dc:type or dc:spatial or dc:coverage
 - edm:dataProvider (source institution to aggregator)
 - edm:provider (aggregator)
 - edm:isShownAt (URL link to item)
 - edm:rights (intellectual property)
 - persistent identifier

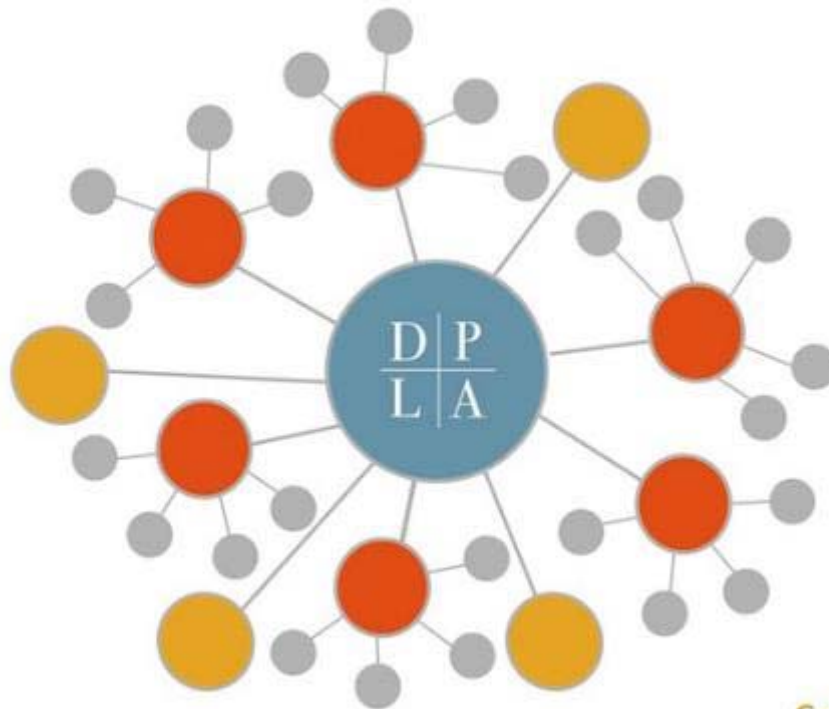


Europeana Publishing Guide v1.3 (2015).

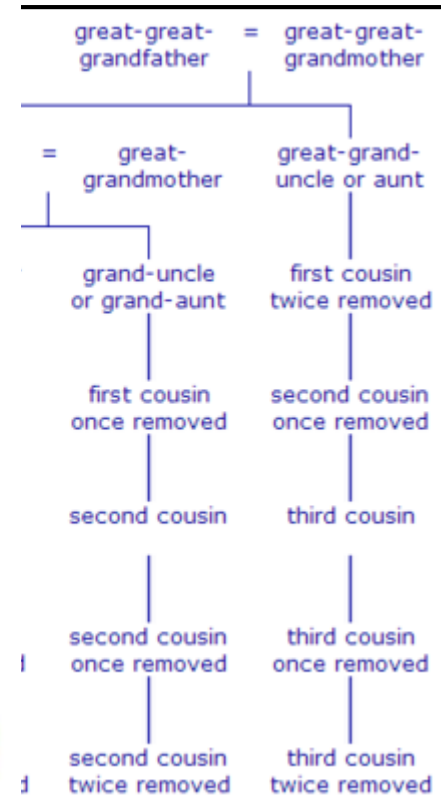
http://pro.europeana.eu/files/Europeana_Professional/Publications/EuropeanaPublishingGuidev1.3.pdf



“Hubs” or “Twice Removed” ?

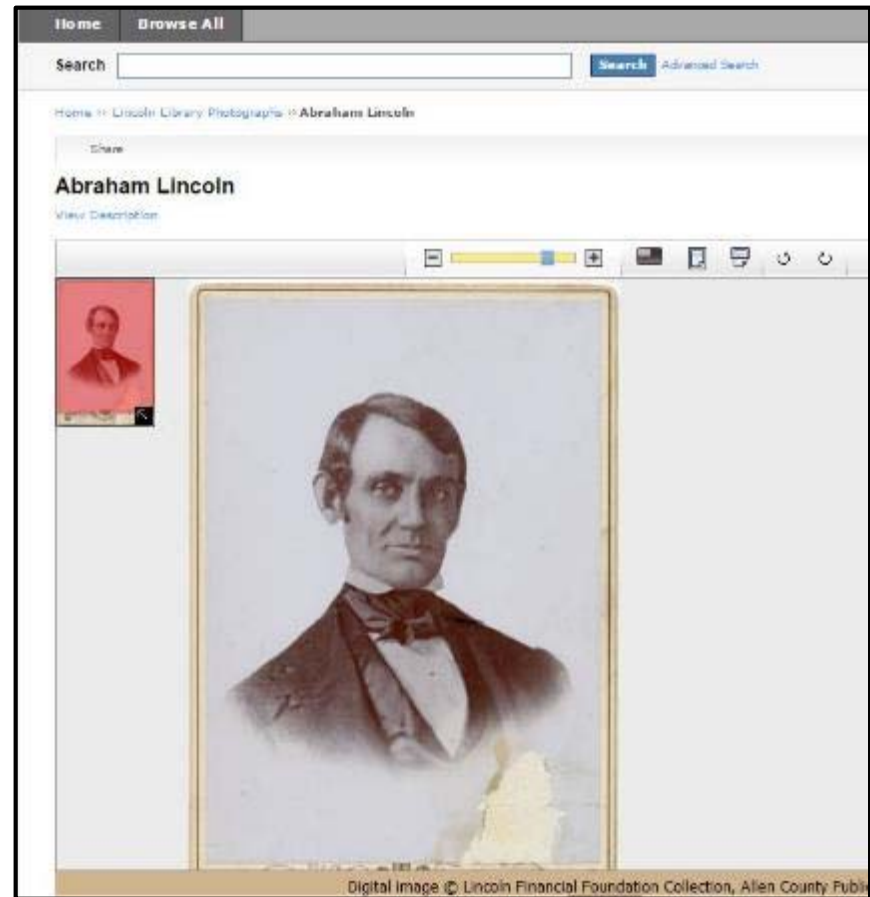


Content Hubs
Service Hubs





Pass Through to Source/Provider





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Point of Reference - 2006

-- *The (Digital) Library Environment: Ten Years After*



ARIADNE

Web Magazine for Information Professionals

- Collective action on D2D services, including ...
 - Unified, syndicated, and extended discovery services
 - Progress!
 - Virtual reference networks
 - Barely attempted
 - Aggregated user feedback
 - Not in the frame, yet

Lorcan Dempsey, "The (Digital) Library Environment: Ten Years After. *Ariadne* 46 (2006). <http://www.ariadne.ac.uk/issue46/dempsey/>



Lorcan Dempsey, OCOC VP
Membership and Research &
Chief Strategist



Educate and Train for Life Beyond Search

- Anticipate the impact of **RDF aggregation** on users and use
- Give care to **derivative images** [and the landing interface]
- Explore the lingering value of “**hier-archival**” context
- Embrace the full **curation lifecycle** - D2D & C2C
- Curate cultural heritage **organizations**



Compete with Data Analytics


- Preserve **ethical commitment** to privacy and confidentiality
- Take a **page** from Google and Amazon
- Capture and use data on search, discovery, transactions, feedback to **drive the experience** of aggregation



Explore historical collections
from libraries, museums, and
archives across Massachusetts

All Fields ▾

Search...

Search 



Map

Use the map to search for materials
from locations across the globe.



Collections

Explore curated collections of
historic materials grouped by topic,
date, location, or format.



Institutions

View materials from libraries,
historical societies, museums, and
other cultural institutions.



Formats

Photographs, maps, postcards,
manuscripts, books, artifacts, and
more.



Thank you for your attention!

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