Linked Data Reality Check

Andrew K. Pace, Executive Director, OCLC Research

April 18, 2018
Agenda

- Linked Data Primer
- Linked Data and OCLC
- Linked Data and Libraries
- Linked Data Reality Check
LINKED DATA
Problem statement

The library community’s foundational bibliographic standard is no longer sufficient to take advantage of the tremendous opportunities offered by the web.
Libraries rock the world…but they also rest on their laurels

CALL NUMBER: x


LIBRARY HOLDINGS AT
LOCATION: MCWHETER LIBRARY PERIODICALS
CALL NUMBER: Periodicals Main
STATUS: Currently Received

Linked Data basics

• First elaborated in a 2006 design document by Tim Berners-Lee

• A set of common practices for exposing data on the Web in way that:
  – Allows many parties to participate in a Web of data
  – Fosters creating connections in a Web of data
  – Produces new knowledge and added value

“The Semantic Web isn’t about putting data on the web. It is about making links, so that a person or machine can explore the web of data.”
- Tim Berners-Lee, 2006-07-27
Aspirations
What we have to work with

- A collection of text strings…
- Taken from the piece itself…
- Sometimes “enhanced” with inferred parentheticals (e.g., [1975])
- Or additional statements not on the piece (e.g., subject headings)
- Punctuation, which may or may not be present, is used (inconsistently) for structure
- *Mostly uncontrolled and only loosely connected to anything else*
- *Designed for description rather than discovery*
From records to Linked data
Quick Definitions

entity
/ˈɛntɪti/
noun
a thing with distinct and independent existence.

relationship
/rɪˈleɪʃ(ə)nʃɪp/
noun
the way in which two or more people or things are connected
Linked Data design principles

Linked data is a method for publishing data such that is can be interlinked with other data and use for semantic queries

• Use **URIs** to name (identify) things.
• Use **HTTP** URIs so that these things can be looked up (interpreted, "dereferenced").
• Provide useful information about what a name identifies when it's looked up, using open standards such as **RDF**, **SPARQL**, etc.
• Refer to other things using their HTTP URI-based names when publishing data on the Web.
Linked Data triples

- Subject (URI or blank node)
- Predicate (URI)
- Object (URI, literal or blank node)

Andrew Pace’s blog is called Hectic Pace.

Triples can.....establish relationships with other entities...

Albert Einstein
Person

Relativity: The Special and General Theory
Work

author

Physics
Concept

about
...with actionable links

- [https://www.wikidata.org/wiki/Q937](https://www.wikidata.org/wiki/Q937) and [http://viaf.org/viaf/75121530](http://viaf.org/viaf/75121530)
  - Wikidata and VIAF

- [http://experiment.worldcat.org/entity/work/data/369081611](http://experiment.worldcat.org/entity/work/data/369081611)
  - WorldCat Works

- [http://id.loc.gov/authorities/subjects/sh85101653.html](http://id.loc.gov/authorities/subjects/sh85101653.html)
  - Library of Congress Subject Headings
OCLC’s linked data resources

- WorldCat Catalog: 15 billion triples
- WorldCat Works: 5 billion RDF triples
- FAST: 23 million triples
- ISNI: 10-50 million triples
- VIAF: 2 billion triples
- OCLC's linked data resources
Triples, triples, everywhere!!!

Other library-related linked data resources

• **Library of Congress** ([id.loc.gov](http://id.loc.gov))
  – Enables developers to interact with vocabularies found in data & standards promulgated by LC as linked data.
  – 100,000+ requests/day; 100-500 million triples

• **Getty Art & Architecture Thesaurus**
  – A structured vocabulary for generic concepts related to art and architecture.
  – 100,000+ requests/day 100-500 million triples

• **Bibliothèque nationale de France** ([data.bnf.fr](http://data.bnf.fr))
  – Data produced by the Bibliothèque nationale de France more useful on the Web.
  – 10,000 – 50,000 requests/day; 100-500 million triples

• **Deutsche National Bibliothek**
  – Publishes authority and bibliographic data in RDF to make the data accessible to the semantic Web community with no need to know library-specific metadata schemes.
  – 100-500 million triples

• **Linked Data for Libraries!!** ([https://www.ld4l.org/](https://www.ld4l.org/))
BIBRAME basics

• Schema maintained by the Library of Congress
• General model for expressing and connecting bibliographic data
• Foundation for the future of bibliographic description, both on the web, and in the broader networked world
• Successor to MARC 21

schema.org basics

• Joint effort of major search engines
• Provides a common schema for general use
  – Extensions for some types of resources
  – Communities can propose community-specific extensions
• Enjoying rapid adoption
“While we believe that linked data representations will eventually become the de facto standard, we also believe that MARC will continue to be used by the library community for many years to come.”
SOME EXAMPLES IN PRODUCTION
### Bibliographic & Authority Data from Cologne-based libraries in Germany

**http://lobid.org/resource/HT012822405**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDFa</td>
<td></td>
</tr>
<tr>
<td>JLD</td>
<td></td>
</tr>
<tr>
<td>NT</td>
<td></td>
</tr>
<tr>
<td>TTL</td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td></td>
</tr>
<tr>
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<td>Moby Dick</td>
</tr>
<tr>
<td>Autor</td>
<td>Melville, Herman</td>
</tr>
<tr>
<td>Mitwirkender</td>
<td>McGrath, Patrick</td>
</tr>
<tr>
<td>Erscheinungsjahr</td>
<td>1999</td>
</tr>
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<td>Typ</td>
<td><a href="http://purl.org/dc/terms/BibliographicResource">http://purl.org/dc/terms/BibliographicResource</a></td>
</tr>
<tr>
<td>Sprache</td>
<td><a href="http://id.loc.gov/vocabulary/iso639-2/eng">http://id.loc.gov/vocabulary/iso639-2/eng</a></td>
</tr>
<tr>
<td>Exemplar</td>
<td><a href="http://lobid.org/item/HT012822405:DE-468:EJRF1169">http://lobid.org/item/HT012822405:DE-468:EJRF1169</a></td>
</tr>
<tr>
<td>Erscheinungsort</td>
<td>Oxford [u.a.]</td>
</tr>
<tr>
<td>Verlag</td>
<td>Oxford Univ. Press</td>
</tr>
<tr>
<td>ISBN</td>
<td>9780192100412</td>
</tr>
<tr>
<td>ISBN</td>
<td>0192100416</td>
</tr>
<tr>
<td>Identische Ressource</td>
<td><a href="http://hub.culturegraph.org/resource/HBZ-HT012822405">http://hub.culturegraph.org/resource/HBZ-HT012822405</a></td>
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<tr>
<td>Bestandteil von</td>
<td><a href="http://lobid.org/resource/HT012796616">http://lobid.org/resource/HT012796616</a></td>
</tr>
<tr>
<td>Weitere Information</td>
<td><a href="http://193.30.112.134/F/?func=find-c&amp;ccl_term=IDN%3DHT012822405">http://193.30.112.134/F/?func=find-c&amp;ccl_term=IDN%3DHT012822405</a></td>
</tr>
</tbody>
</table>
Organization name data presented as linked data from NCSU Libraries: brings together VIAD, LCNAF, ISNI, and Dbpedia Freebase

<table>
<thead>
<tr>
<th>AUTHORIZED NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>skos:prefLabel</td>
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<table>
<thead>
<tr>
<th>WEBSITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>foaf:homepage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VARIANT NAMES</th>
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<tbody>
<tr>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>OTHER LINKED DATA SOURCES</th>
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</thead>
<tbody>
<tr>
<td>skos:closeMatch</td>
</tr>
<tr>
<td>skos:closeMatch</td>
</tr>
<tr>
<td>skos:closeMatch</td>
</tr>
<tr>
<td>skos:closeMatch</td>
</tr>
<tr>
<td>skos:closeMatch</td>
</tr>
</tbody>
</table>
IEEE International Conference on Cloud Computing

URI: http://lod.springer.com/data/confseries/cloudcom

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference series name</td>
<td>IEEE International Conference on Cloud Computing (en)</td>
</tr>
<tr>
<td>Has DBLP ID</td>
<td><a href="http://dblp.org/db/conf/cloudcom">http://dblp.org/db/conf/cloudcom</a></td>
</tr>
<tr>
<td>Type</td>
<td>Conference series</td>
</tr>
</tbody>
</table>

Provenance information for RDF data: rdf/confseries/cloudcom

URI: http://lod.springer.com/data/rdf/confseries/cloudcom

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
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<td>Creator</td>
<td>Springer (en)</td>
</tr>
<tr>
<td>Date</td>
<td>2015-04-01 (xsd:dateTime)</td>
</tr>
<tr>
<td>Description</td>
<td>Meta-data about conference proceedings published by Springer. Includes the following series: LNCS (Lecture Notes in Computer Science), LNBIP (Lecture Notes in Business Information Processing), CCIS (Communications in Computer and Information Science), IFIP-ACM (Advances in Information and Communication Technology), LNICST (Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering)) (en)</td>
</tr>
<tr>
<td>In dataset</td>
<td><a href="http://lod.springer.com/data/dataset/springer/conferences">http://lod.springer.com/data/dataset/springer/conferences</a></td>
</tr>
<tr>
<td>Label</td>
<td>Provenance information for RDF data: rdf/confseries/cloudcom (en)</td>
</tr>
<tr>
<td>Publisher</td>
<td>Springer</td>
</tr>
<tr>
<td>Rights</td>
<td>CC0</td>
</tr>
<tr>
<td>Type</td>
<td>Dataset</td>
</tr>
</tbody>
</table>
BL was among the first to make its national bibliography available as Linked Open Data.
Pratt Institute: Linked Jazz
Digital heritage materials exploring the implications of linked data in end user experience.
So.. why again?

- It is **NOT** good enough to just be on the Web. You need to also be part of the Web
- That means linking!!
- Linked Data does just that – links your data to other data on the Web
REALITY CHECK TIME
“MARC Must Die”

• Rumors of MARC’s death are greatly exaggerated
• Roy’s assertion is still correct!!!!
Gartner Hype Cycle of Emerging Technologies

- Linked Data in Libraries (2017)
- Linked Data in Libraries 2018?
- Linked Data in Libraries 2020?
A NEW LINKED DATA PROTOTYPE...
Why?--Efficient, impactful workflows

**Today**
- Copy cataloging
- Original cataloging
- Authorities
- Searching

**In the future**
- Adding relationships
- Entity management
- Library-sourced vocabularies
- Amplified searching
An project vision statement

Work with our members through a foundational shift in the collaborative work of libraries, communities of practice, and end-users—dramatically improving efficiency, embracing the inclusive, diverse, and earnest OCLC membership, and empowering a new and trusted knowledge work enabled by the web.
Who

Phase I Partners (Dec ‘17 - Apr ‘18)
– Cornell University
– University of California, Davis

Phase II Partners (!!!!) (May ‘18 – Sep ‘18)
– American University
– Brigham Young University
– Cleveland Public Library
– Gale Cengage
– Harvard University
– Michigan State University
– National Library of Medicine
– North Carolina State University
– Northwestern University
– Princeton University
– Smithsonian Library
– Temple University
– University of Minnesota
– University of New Hampshire
– Yale University
WHAT & HOW
What

• Develop an Entity Ecosystem that facilitates:
  – Creation and editing of new entities
  – Connecting entities to the Web

• Build a community of users who can:
  – Create/Curate data in the ecosystem
  – Imagine/propose workflow uses

• Provide services to:
  – Reconcile data
  – Explore the data
What

RECONCILER

INDEX

RECONCILIATION API

RANKING BY

Local Bibliographic and Authority Data

External Client Applications

BATCH

UI

EDITOR

DUPLICATE DETECTION

WORLDCAT CREATIVE WORK ASSOCIATION

MINTING / EDITING API

ENTITY to ENTITY RELATOR

ENTITY ECOSYSTEM

AUTHENTICATION & AUTHORIZATION

External Client Applications

UI
How: A few key technologies

- Mediawiki
- Wikibase
- Refine
- Sparql
- Pywikibot
How: Disambiguating Wiki*

- **Wikipedia** – a multilingual web-based free-content encyclopedia
- **MediaWiki** - a free and open-source wiki software
- **Wikidata.org** - a collaboratively edited structured dataset used by Wikimedia sister projects and others
- **Wikibase** - a MediaWiki extension to store and manage structured data
How: MediaWiki Features

- Search/Autosuggest/APIs
- Multilingual UI
- Wikitext editor
- Change history
- Discussion pages
- Users and rights
- Watchlists
- Maintenance reports
- Etc.
How: MediaWiki+Wikibase Features

- Search/Autosuggest/APIs/Linked Data/SPARQL
- Multilingual UI
- **Structured data** editor
- Change history
- Discussion pages
- Users and rights
- Watchlists
- Maintenance reports
- Etc.
How: Wikibase advantages

- Open source
- An all-purpose data model that takes knowledge diversity, sources, and multilingual usage seriously
- Collaborative – can be read and edited by both humans and machines
- User-defined properties
- Version history
# Amelia Earhart

Amelia Mary Earhart

## In more languages

<table>
<thead>
<tr>
<th>Language</th>
<th>Label</th>
<th>Description</th>
<th>Also known as</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>Amelia Earhart</td>
<td>American aviation pioneer and author</td>
<td>Amelia Mary Earhart</td>
</tr>
<tr>
<td>German</td>
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<td>US-amerikanische Flugpioniérin und Frauenrechtsaktivistin</td>
<td>Amelia Mary Earhart</td>
</tr>
<tr>
<td>Spanish</td>
<td>Amelia Earhart</td>
<td>avionera estadounidense</td>
<td>La aviatora</td>
</tr>
<tr>
<td>Traditional Chinese</td>
<td>No label defined</td>
<td>No description defined</td>
<td></td>
</tr>
</tbody>
</table>

## Statements

- **instance of**
  - person
    - 0 references

- **employer**
  - Brigham Young University
    - 0 references

- **sex or gender**
  - female
    - 0 references

- **place of death**
  - Pacific Ocean
    - 0 references
<table>
<thead>
<tr>
<th>Item URL</th>
<th>Label</th>
<th>Description</th>
<th>Aliases</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://oclc.url.org/entity/Q585819">http://oclc.url.org/entity/Q585819</a></td>
<td>Amelia Earhart</td>
<td>American aviation pioneer and author</td>
<td>Amelia Mary Earhart</td>
</tr>
</tbody>
</table>

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<td>No description defined</td>
<td>La avionera</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Rank</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>instance of</td>
<td></td>
<td>person</td>
</tr>
<tr>
<td>employer</td>
<td></td>
<td>Brigham Young University</td>
</tr>
<tr>
<td>sex or gender</td>
<td></td>
<td>female</td>
</tr>
<tr>
<td>place of death</td>
<td></td>
<td>Pacific Ocean</td>
</tr>
</tbody>
</table>
Use case: Manual data entry

- For manual creation and editing of entities, Wikibase is the default technology.
- It has a powerful and well-tested set of features that speed the data entry process and assist with quality control and data integrity.
Jane Austen

English novelist
Austen, Jane

Statements

place of death
Winchester

instance of
person

death date
18 July 1817

sourcing circumstances
unspecified calendar, assumed gregorian

2 references
Concise Literary Encyclopedia

stated in
data.bnf.fr

retrieved
2 February 2018

reference URL
http://data.bnf.fr/en/11885603/jane_austen/

24 July 1877

sourcing circumstances
misprint

1 reference
Q1021841
Revision history of "Jane Austen" (Q664501)

Search for revisions:

From year (and earlier): 2018  From month (and earlier): all  Tag filter:

Diff selection: Mark the radio boxes of the revisions to compare and hit enter or the button at the bottom.

Legend: (cur) = difference with latest revision, (prev) = difference with preceding revision, m = minor edit.

Compare selected revisions:

- (cur | prev) 16.34, 13 March 2018 Admin (talk | contribs) (21,632 bytes) (+81) (Setting [en] alias: Austen, Jane)
- (cur | prev) 18.24, 28 February 2018 Admin (talk | contribs) (21,551 bytes) (+428) (Created claim: notable work (P137); Persuasion (Q315999))
- (cur | prev) 18.22, 28 February 2018 Admin (talk | contribs) (21,123 bytes) (-336) (Removed claim: ISNI ID (P40): 000000012236353X)
- (cur | prev) 17.59, 15 February 2018 Admin (talk | contribs) (21,459 bytes) (+351) (Created claim: SHARE-VDE ID (P145): Agent/2568128)
- (cur | prev) 16.06, 8 February 2018 Btwashburn (talk | contribs) (21,106 bytes) (+5) (Changed claim: death date (P10): 24 July 1877)
- (cur | prev) 00.00, 7 February 2018 Btwashburn (talk | contribs) (21,103 bytes) (+760) (Changed claim: death date (P10): 24 July 1877)
- (cur | prev) 23.50, 6 February 2018 Btwashburn (talk | contribs) (20,343 bytes) (+1,079) (Changed claim: death date (P10): 24 July 1877)
- (cur | prev) 23.43, 6 February 2018 Btwashburn (talk | contribs) (19,284 bytes) (+312) (Changed claim: death date (P10): 18 July 1817)
- (cur | prev) 23.39, 6 February 2018 Btwashburn (talk | contribs) (18,952 bytes) (+448) (Changed claim: death date (P10): 18 July 1817)
- (cur | prev) 18.59, 6 February 2018 Btwashburn (talk | contribs) (18,504 bytes) (+48) (Changed claim: death date (P10): 18 July 1817)
- (cur | prev) 18.58, 6 February 2018 Btwashburn (talk | contribs) (18,504 bytes) (0) (Changed claim: death date (P10): 18 July 1817)
- (cur | prev) 05:45, 1 February 2018 ClaimAdder (talk | contribs) (18,504 bytes) (+1,515) (Changed an item: Updating timeclaims)
- (cur | prev) 05:20, 13 January 2018 ClaimAdder (talk | contribs) (16,989 bytes) (+2,370) (Changed an item: Adding claims)
- (cur | prev) 07:27, 10 December 2017 HelloWikiBot (talk | contribs) (14,619 bytes) (+14,619) (Created a new item: Creating entity)
Use case: Autosuggest

Searching for entities as you type is supported by the Mediawiki API. This feature is found in both the prototype UI and in the SPARQL Query Service UI.
Use case: Complex queries

SPARQL (pronounced "sparkle") is an RDF query language ... a semantic query language for databases. The prototype provides a SPARQL endpoint, including a user-friendly interface for constructing queries. With SPARQL you can extract any kind of data, with a query composed of logical combinations of triples.

In this example SPARQL query, items describing people born between 1800 and 1880, but without a specified death date, are listed.
Use case: Reconciliation

- Reconciling strings to a ranked list of potential entities is a key use case to be supported.
- We are testing an OpenRefine-optimized Reconciliation API endpoint for this use case.
- The Reconciliation API uses the prototype’s Mediawiki API and SPARQL endpoint in a hybrid tandem to find and rank matches.
<table>
<thead>
<tr>
<th>Column 1: judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Column 1: best candidate's score</th>
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<tbody>
<tr>
<td>100.00 — 101.00</td>
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</table>

<table>
<thead>
<tr>
<th>Show as: rows records</th>
<th>Show: 5 10 25 50 rows</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Column 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1. Austin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin (100)</td>
</tr>
<tr>
<td>Austin Motor Company (100)</td>
</tr>
<tr>
<td>Austin (100)</td>
</tr>
<tr>
<td>Coe Finch Austin (100)</td>
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<td>Andrew D. Austin (100)</td>
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<td>Austin County (73)</td>
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<td>Austin Peay (71)</td>
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<td>Post Malone (71)</td>
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<td>Austin Augustus King (71)</td>
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<td>Austin Osman Spare (67)</td>
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<td>Austin Basis (67)</td>
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<tr>
<td>Austin-Bergstrom International Airport (67)</td>
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<td>Austin Warren (63)</td>
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<td>Austin Warne (63)</td>
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<td>Austin P. Pike (63)</td>
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<td>Henry Austin Dobson (63)</td>
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<td>Austin Wright (63)</td>
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<tr>
<td>Austin Mardan (63)</td>
</tr>
<tr>
<td>Austin Clarke (63)</td>
</tr>
<tr>
<td>Create new item</td>
</tr>
</tbody>
</table>
Use case: Batch loading

• For batch loading new items and properties, and subsequent batch updates and deletions, OCLC staff use **Pywikibot**.

• It is a Python library and collection of scripts that automate work on MediaWiki sites. Originally designed for Wikipedia, it is now used throughout the Wikimedia Foundation's projects and on many other wikis.
<table>
<thead>
<tr>
<th>Lessons Learned and concerns so far</th>
<th>Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Mediawiki-based API is not sufficient for reconciliation</td>
<td>Provide an OpenRefine API for matching by class and properties</td>
</tr>
<tr>
<td>The prototype data model for dates is capable but not user friendly</td>
<td>Document techniques for entering dates, mapping to LC's EDTF patterns</td>
</tr>
<tr>
<td>The prototype UI doesn't highlight connections to more information on the web</td>
<td>Prototype a UI that uses system data to connect to Dbpedia, Geonames, etc.</td>
</tr>
<tr>
<td>Autosuggested links aren't working well for personal names in indirect order</td>
<td>Add more aliases to the Wikibase to improve autosuggest matching, based on headings in VIAF</td>
</tr>
<tr>
<td>It's not yet clear how to handle creative works and editions in the prototype</td>
<td>Provide guidance and examples, beginning with works and translations</td>
</tr>
<tr>
<td>Will Wikibase / Wikidata scale to billions of entities?</td>
<td>Fruitful discussions with Wikimedia Deutschland started</td>
</tr>
</tbody>
</table>
OK, ANDREW...STILL, SO WHAT?
Lincoln, Abraham, 1809-1865.

Abraham Lincoln /Abraham Lincoln/ (February 12, 1809 – April 15, 1865) was the 16th President of the United States, serving from March 1861 until his assassination in April 1865. Lincoln led the United States through its Civil War—its bloodiest war and its greatest moral, constitutional and political crisis. In so doing he preserved the Union, abolished slavery, strengthened the federal government, and modernized the economy. Raised in a poor family on the western frontier, Lincoln was a self-educated lawyer in Illinois, a Whig Party leader, state legislator during the 1830s, and a one-term member of the Congress during the 1840s. He promoted rapid modernization of the economy through banks, canals, railroads and tariffs to encourage the building of factories; he opposed the war with Mexico in 1846. After a series of highly publicized debates in 1858 during which he denounced the expansion of slavery, Lincoln lost the

Related People
- Ulysses Simpson Grant
- Jefferson Davis
- William Henry Seward
- Robert Edward Lee
- Salmon Portland Chase
- Ambrose Everett Burnside

Related Organizations
- United States. Army.
- United States. Navy
- United States. War Department
- United States. Army of the Potomac
- United States
- Democratic Party (U.S.)

Related Places
- United States
- Tennessee
- United States–Confederate States of America
- New York (State)
- Illinois
- South Carolina

Related Concepts
- Assassination
- Political science
- Soldiers
- Military campaigns

Related Events
- American Civil War (1861-1865)
- Reconstruction (United States : 1865-1877)
- Gettysburg, Battle of (Pennsylvania : 1863)
- Mexican War (1846-1848)

Also Known As ...
- Abraham Linken
- Abraham Lincoln
- Abrahams Linkolns
- Abrahams Lénkóins
At the end of the day…

- Evolving practices in knowledge work
- Increasing the efficiency of library workflows
- Next-generation search and discovery

Work with our members through a foundational shift in the collaborative work of libraries, communities of practice, and end-users—dramatically improving efficiency, embracing the inclusive, diverse, and earnest OCLC membership, and empowering a new and trusted knowledge work enabled by the web.
Questions?

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