OCLC’s Linked Data Work

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OVERVIEW

1. Linked Data 101
2. Linked Data Applications (R&D)
3. Q/A
LINKED DATA 101
Linked Data 101

- Linked data is a method for publishing data such that is can be interlinked with other data and use for semantic queries
- It is built on existing Web technologies:
  - HTTP
  - URIs
  - RDF
HTTP

- Stands for Hypertext Transfer Protocol
- If you have ever been to a Website you have used HTTP
URIs

• Stands for Uniform Resource Identifier
  – A URL (web address) is a type of URI
  – https://www.wikidata.org/entity/Q38082

• There is some odd HTTP stuff that goes on with URIs but it is not necessary for discussion now
  – https://www.w3.org/TR/cooluris/
Uniform Resource Identifier

scheme: //[user:password@]host[:port]/[/]path[?query][#fragment]
Uniform Resource Identifier

A URL (web address) is a type of URI

https://www.wikidata.org/entity/Q38082
RDF
Resource Description Framework
• It is a World Wide Web Consortium (W3C) Recommendation
• RDF is used to model entities and relationships
• RDF data is composed of individual statements called Triples

“Abraham Lincoln”

Person Entity

Name

Birthplace

BirthDate

“02-12-1809”

“Hodgenville”

Place Entity

Name
Understanding “RDF Triples”

A triple is a statement that relates one thing to another, specifying a Subject, Predicate, and Object. RDF triples use URIs for those three elements.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Predicate</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barack Obama</td>
<td>Was born in</td>
<td>Honolulu, Hawaii</td>
</tr>
</tbody>
</table>
RDF

Resource Description Framework

• RDF can be serialized in a variety of ways BUT it is all RDF and changing serializations results in NO semantic loss
N-Triples

<http://example.org/entity/1> <http://schema.org/birthDate> "02-12-1809" .
<http://example.org/entity/1> <http://schema.org/name> "Abraham Lincoln" .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix schema: <http://schema.org/> .
@prefix xml: <http://www.w3.org/XML/1998/namespace> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://example.org/entity/1> a schema:Person ;
schema:birthDate "02-12-1809" ;
schema:name "Abraham Lincoln" .
 JSON-LD – Machine Friendly

```json
{
  "@context": {
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "schema": "http://schema.org/",
    "xsd": "http://www.w3.org/2001/XMLSchema#"
  },
  "@id": "http://example.org/entity/1",
  "@type": "schema:Person",
  "schema:birthDate": "02-12-1809",
  "schema:name": "Abraham Lincoln"
}
```
RDFa – Also Machine Friendly

```html
<div xmlns="http://www.w3.org/1999/xhtml"
     prefix=""
     schema: http://schema.org/
     rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
     rdfs: http://www.w3.org/2000/01/rdf-schema#"
>
  <div typeof="schema:Person" about="http://example.org/entity/1">
    <div property="schema:name" content="Abraham Lincoln"></div>
    <div property="schema:birthDate" content="02-12-1809"></div>
  </div>
</div>
```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:schema="http://schema.org/">
    <rdf:Description rdf:about="http://example.org/entity/1">
        <schema:name>Abraham Lincoln</schema:name>
        <schema:birthDate>02-12-1809</schema:birthDate>
        <rdf:type rdf:resource="http://schema.org/Person"/>
    </rdf:Description>
</rdf:RDF>
Tim Berners-Lee coined the term in 2006 and defined 4 linked data principles:

1. Use URIs as names for things
2. Use HTTP URIs so that People can look up these names
3. When someone looks up the URI, provide useful information, using the standards
4. Include links to other URIs, so that they can discover more things
5 Star Linked Data

1. On the Web
2. Machine-readable data
3. Non-proprietary format
4. RDF standards
5. Linked RDF
Why?
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.

[Diagram showing interconnected data sources: Your Data, VIAF, LCSH, WikiData, Other Guy’s Data]
Leveraging the Web

- Publishing linked data is a two way street
  - People can use your data but you can also use other people’s data
Example

<http://exampleLibrary.org/entity/1>

<http://schema.org/author>

<https://www.wikidata.org/entity/Q38082>.
The Power of the Web

• You can use that WikiData URI to get more information about the thing without having to store it in your local databases
Descriptions

Charles Lutwidge Dodgson (/ˈtʃɑːrlz ˈlʌtwɪdʒ ˈdɒdsən/;[1][2][3] 27 January 1832 – 14 January 1898), better known by his pen name Lewis Carroll (/ˈkærəl/), was an English writer, mathematician, logician, Anglican deacon, and photographer. His most famous writings are Alice's Adventures in Wonderland, its sequel Through the Looking-Glass, which includes the poem Jabberwocky, and the poem The Hunting of the Snark, all examples of the genre of literary nonsense. He is noted for his facility at word play, logic, and fantasy. There are societies in many parts of the world[4] dedicated to the enjoyment and promotion of his works and the investigation of his life.
Images of the Thing
Other Images (created by the Thing)
And Much Much More Information

• Family relations
• Birth/death Date
• Cause of Death
• Associated topics
• Influences
• Etc.

All for the low low price of linking your data!!!
What about Search Engine Optimization?

• Can using RDF on your pages help improve your Google ranking tomorrow?

NO
Why?

• Just because Google can understand you does not mean that they care
But…

• Google does care about the relevance and popularity of your website!
• Being able to better understand the data on it makes their job easier
• PageRank
Pagerank
PageRank (in a nutshell)

- Pages that are linked to by other pages are important and relevant
- Google want to deliver relevant results of users
So what?

• Fostering an environment of linking could help influence others to link to you
LINKED DATA APPLICATIONS
EntityJS
EntityJS

- Although there is a lot of linked data available on the Web, there are not many applications that take advantage of it or use it.
- EntityJS was developed as a prototype application for searching for exploring across entities in a graph.
Search across entities

**Person**
- Pres. U.S. Abraham Lincoln, 1797 - 1806
- Mrs. Mary (Todd) Lincoln, 1810 - 1878
- Lincoln Kirstein, 1907 - 1996, 
- Robert Todd Lincoln, 1843 - 1926
- Lincoln family.
- iod Lincoln, 1853 - 1943
- Nancy Hanks Lincoln, 1784 - 1818
- Lincoln Steffens, 1866 - 1936,
- Levi Lincoln, 1782 - 1868
- George Lincoln Burr, 1857 - 1938

**Organization**
- William E. Barton Collection of Lincolniana (University of Chicago)
- Abraham Lincoln Presidential Library and Museum.
- Chamber Music Society of Lincoln Center.
- Jazz at Lincoln Center (Organization)
- United States. President (1861-1865; Lincoln).
- Lincoln Center Jazz Orchestra.
- McLellan Lincoln Collection (Brown University)
- Lincoln Memorial University
- Lincoln University (Pa.)
- Ford Motor Company. Lincoln-Mercury Division.

**Concept**
- Abraham Lincoln’s political career before 1861
- Lincoln automobile
- Lincoln automobile
- Funeral journey of Abraham Lincoln to Springfield
- Lincoln Memorial (Washington, D.C.)
- Lincoln-Douglas Debates, Ill., 1858
- Lincoln Continental automobile
- Lincoln Continental automobile
- Lincoln Day
- Lincoln (Bomber)

**Place**
- Nebraska-Lincoln.
- Massachusetts-Lincoln.
- Maine-Lincolnville.
- Illinois-Lincoln.
- England-Lincolnshire

**Event**
- Lincoln-Douglas Debates (Illinois : 1858)
- Lincoln Center Festival.
- Lincoln Center Festival.
- Lincoln Center Festival.
- Lincoln Center Festival.

**Work**
- Gettysburg address (Lincoln, Abraham)
- Emancipation Proclamation (United States. President (1861-1865 : Lincoln))
- Lincoln Truck Rental photographs, 1947 Feb. 17-1958 April 19 : 73 Gilbert Street
- Fort Lincoln : history and construction
Lincoln, Robert Todd, 1843-1926

About
Born: Aug 1, 1843
Died: Jul 26, 1926

Robert Todd Lincoln (August 1, 1843 – July 26, 1926) was an American lawyer and Secretary of War, and the first son of President Abraham Lincoln and Mary Todd Lincoln. Born in Springfield, Illinois, United States, he was one of two of Lincoln's four sons to live to adulthood, and the only one to survive into the 1900s.

Father: Abraham Lincoln
Mother: Mary Todd Lincoln
Spouse: Mary Eunice Harlan

Related Works
As a Creator
[Letter] 1911 April 28 [to] Mr. Starrett?


Autograph letter signed from Robert Todd Lincoln, Chicago, to Miss Post 1901 January 29.

Autograph signature of Robert Lincoln to a typewritten letter: Chicago, to Mr. Morgan, 1908 Jan. 20.

Letter: Chicago, to Belle F. Keyes, Boston, 1885 Dec. 16.

Letter: Chicago, to Clinton L. Conkling.

Related People
Abraham Lincoln
Mary Todd Lincoln
William Eleazar Barton
Mrs. James G. Blaine

Related Organizations
William E. Barton Collection of Lincolniana (University of Chicago)
Republican Party (U.S.: 1854- )
United States. Supreme Court.
United States. War Department

Related Places
United States
Illinois
Illinois–Chicago
New York (State)

Related Media

Show related entities
Show related entities

**Lincoln, Robert Todd, 1843-1926**

- **About**
  - Born: Aug 1, 1843
  - Died: Jul 26, 1926
  - Robert Todd Lincoln (August 1, 1843 – July 26, 1926) was an American lawyer and Secretary of War, and the first son of President Abraham Lincoln and Mary Todd Lincoln. Born in Springfield, Illinois, United States, he was two of Lincoln’s four sons to live to adulthood; the only one to survive into the 1900s.
  - Father: Abraham Lincoln
  - Mother: Mary Todd Lincoln
  - Spouse: Mary Eunice Harlan

- **Related People**
  - Abraham Lincoln
  - Mary Todd Lincoln
  - William Eleazar Barton
  - Mrs. James G. Blaine
  - Tad Lincoln
  - Edward Baker Lincoln
  - William Wallace Lincoln

- **Related Places**
  - United States. War Department
  - United States. War Department (State)

- **Related Media**

- **Related Organizations**

User-contributed “same as” relationships

EntityJS ArchiveGrid

Casablanca Conference

About
Is “Casablanca Conference” the same as one of these Wikipedia entries?
- Casablanca Conference
  The Casablanca Conference (codenamed SYMBOL) was held at the Anfa Hotel in Casablanca, French Morocco from January 14 to 24, 1943, to plan the Allied...
- List of World War II conferences
  This is a list of World War II conferences of the Allies of World War II. For the historical context see Diplomatic history of World War II. ...
- Casablanca directive
  The Casablanca directive was approved by the Combined Chiefs of

Related Works
As a Subject
- [Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 1]
- [Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 2]
- [Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 3]
- [Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 4]
- [Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 5]
- [Gabriel Heatter news. 1943-02-23, part 1]

Related Media
We looked but didn't find any related media for Casablanca Conference.

Related People
- J David Goldin
- Douglas Cornell
- Joseph Stalin
- Winston Churchill
- Viscount Bernard Law Montgomery

Related Organizations
- Marr Sound Archives
- Andrew W. Mellon Foundation
- White House Correspondents’ Association
- United States. Department of State
- United States. Army. Army, Third

Related Places
- United States
- Soviet Union
- Italy
- China
- United States
User-contributed “same as” relationships

```
INSERT DATA { GRAPH
  <http://id.worldcat.org/fast/1405559>
  <http://schema.org/sameAs>
  <http://www.wikidata.org/data/Q502093>
  <http://schema.org/sameAs>
  <http://dbpedia.org/resource/Casablanca_conference>. }
```
User-contributed “same as” relationships

Casablanca Conference

About
The Casablanca Conference (codenamed SYMBOL) was held at the Anfa Hotel in Casablanca, French Morocco from January 14 to 24, 1943, to plan the Allied European strategy for the next phase of World War II. In attendance were United States President Franklin D. Roosevelt, British Prime Minister Winston Churchill, and representing the Free French forces, Generals Charles de Gaulle, and Henri Giraud. Premier Joseph Stalin had declined to attend, citing the ongoing conflict in Stalingrad required his presence in the Soviet Union. The conference agenda addressed the specifics of tactical procedure, allocation of resources and the broader issues of diplomatic policy. The debate and negotiations produced what was known as the “Casablanca Declaration,” and what is, perhaps, its most historically provocative statement of purpose, “unconditional surrender.” The doctrine of “unconditional surrender” came to

Related Works
As a Subject
[Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 1]
[Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 2]
[Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 3]
[Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 4]
[Address by Franklin D. Roosevelt at the dinner of the White House Correspondents’ Association, Washington, D.C. on February 12, 1943. Part 5]
[Photo: http://commons.wikimedia.org/wiki/File:Roosevelt_in_Casablanca.jpg]

Related Media
Source: Wikimedia Commons

Related People
J David Goldin
Douglas Cornell
Joseph Stalin
Winston Churchill

Related Organizations
Marr Sound Archives.
Andrew W. Mellon Foundation.
White House Correspondents’ Association.
United States. Department of State.
United States. Armv. Armv. Third

Related Places
United States
Soviet Union
Italy
China
United States
Person Lookup Pilot
Person Entity Lookup pilot

• What’s the problem?
  – Libraries need a way to **find and identify people** using common identifiers
  – Many identifiers **lack statements about relationships**

• Answer
  – Develop an experimental service that allows user to lookup people based on identifiers or strings
  – Deliver that data as RDF via an API
  – Pilot test the service
Person Entity Lookup pilot

Janet A. Smith
Person Entity Lookup pilot

Name Authority File 1
Person Entity Lookup pilot

ID “Same As” API

Name Authority File 1

Janet A. Smith

Janet A. Smith

Janet Adam Smith
Name Authority File 2

Janet B. A. Smith
Name Authority File 3

Janet B. Adam Smith
Name Authority File 4
Person Entity Lookup pilot

Text String “Search Service” API

Janet Smith
Person Entity Lookup pilot

Text String API → <text string> → Janet Smith
Person Entity Lookup pilot

Text String API

Janet Smith
Name Authority File 1

Janet A. Smith
Name Authority File 2

Janet B. A. Smith
Name Authority File 3

Janet B. Adam Smith
Name Authority File 4
Data Refinery
Data Refinery

- There is a lot of library data in the world that does not have authority control
- Can we build an application that allows people to ‘clean up’ their existing string based metadata and turn it into RDF?
- Work with CONTENTdm’s Strategic Advisory Committee and their data to test this project
The Path to Transformation

ANALYZE
- View Fields & Values
- Define Field Profiles

CLEANUP
- Batch updates for metadata strings

RECONCILE
- Match against controlled vocabs
- Get persistent identifiers
- Add identifiers to Metadata

TRANSFORM
- Produce RDF Triples
- Search a Triple Store using SPARQL
The Path to Transformation: **ANALYZE**

### Field Profiles

31 Records

#### Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Profile</th>
<th>Values</th>
<th>#</th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>coverage</td>
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<td>Values</td>
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<td></td>
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<td>✓</td>
</tr>
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<td>creator</td>
<td>Profile</td>
<td>Values</td>
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<td>Profile</td>
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<td>✓</td>
<td>✓</td>
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<td>type</td>
<td>Profile</td>
<td>Values</td>
<td>31</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
The Path to Transformation: **ANALYZE**

### Field Values for "subject"

<table>
<thead>
<tr>
<th>Field Value</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore Museum of Art; Mosaics, Ancient -- Turkey; Antioch (Turkey) -- Mosaics, Roman; Pavements, mosaic -- Turkey -- Antioch</td>
<td>2</td>
</tr>
<tr>
<td>Art, Gothic; Furniture, Gothic; Baltimore Museum of Art -- Exhibitions; May, Saidie Adler, 1879-1951;</td>
<td>1</td>
</tr>
<tr>
<td>Artists -- Maryland; Baltimore Museum of Art -- Exhibitions; Paintings; Sculpture; Art museum visitors;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Art, Asian; Levy, Julius;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Davis, Stuart, 1892-1964; Dove, Arthur Garfield, 1880-1946; Gallagher, Edward Joseph, Jr.;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Degas, Edgar, 1834-1917 ; Picasso, Pablo, 1881-1973;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Kramer, Reuben, 1909-; Cherney, Marvin, 1925-1967; Painting; Sculpture;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Lounges; May, Saidie Adler, 1879-1951;</td>
<td>1</td>
</tr>
<tr>
<td>Baltimore Museum of Art -- Exhibitions; Matisse, Henri, 1869-1954; Cone, Etta; Cone, Claribel, 1864-1929;</td>
<td>1</td>
</tr>
</tbody>
</table>
The Path to Transformation: **ANALYZE**

Edit the Field Profile for subject

**RDF Properties**

- `defaultType`
  - `<http://schema.org/Intangible>`

- `predicate`
  - `<http://schema.org/about>`

- `lookupService`
  - `FAST`

**Field Separator Properties**

- `fieldSeparator`
  - `

- `subfieldSeparator`
  - `_`
The Path to Transformation: **CLEANUP**

**Pending Field Value Changes**

- Painting
- Antioch
- Art museum visitors
- Wrenn, Lewis and Jencks
The Path to Transformation: **RECONCILE**

### Reconciliation Data

<table>
<thead>
<tr>
<th>Accept</th>
<th>Input String</th>
<th>Matching String</th>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW</td>
<td>Antioch</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Antioch (Turkey)</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Architecture, Jacobean</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Art museum visitors</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Art, Asian</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Art, Gothic</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Artists</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Baltimore</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Baltimore Museum of Art</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Bartlett, Paul Wayland, 1865-1925</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Boronda, Lester D.</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Chairs</td>
<td>FAST</td>
<td>FAST</td>
</tr>
<tr>
<td>NEW</td>
<td>Cherney, Marvin, 1925-1967</td>
<td>FAST</td>
<td>FAST</td>
</tr>
</tbody>
</table>

- Match against controlled vocabs
- Get persistent identifiers
- Add identifiers to Metadata
### The Path to Transformation: RECONCILE

**Match against controlled vocab**

**Get persistent identifiers**

**Add identifiers to Metadata**

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Type</th>
<th>Predicate</th>
<th>Source Field</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://id.worldcat.org/fast/1216199">http://id.worldcat.org/fast/1216199</a></td>
<td>schema:Place</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/695628">http://id.worldcat.org/fast/695628</a></td>
<td>schema:Organization</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/813809">http://id.worldcat.org/fast/813809</a></td>
<td>schema:Intangible</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/815629">http://id.worldcat.org/fast/815629</a></td>
<td>schema:Intangible</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/815951">http://id.worldcat.org/fast/815951</a></td>
<td>schema:Intangible</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/816331">http://id.worldcat.org/fast/816331</a></td>
<td>schema:Intangible</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
<td><a href="http://id.worldcat.org/fast/817559">http://id.worldcat.org/fast/817559</a></td>
<td>schema:Intangible</td>
<td>schema:about</td>
<td>subject</td>
</tr>
<tr>
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<td>schema:Place</td>
<td>schema:about</td>
<td>subject</td>
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<td><a href="http://viaf.org/viaf/139120204">http://viaf.org/viaf/139120204</a></td>
<td>schema:Place</td>
<td>schema:creator</td>
<td>creator</td>
</tr>
</tbody>
</table>
The Path to Transformation: **RECONCILE**

- **Match against controlled vocabs**
- **Get persistent identifiers**
- **Add identifiers to Metadata**

<table>
<thead>
<tr>
<th>Publisher</th>
<th>Digital Maryland;</th>
</tr>
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<tr>
<td>Rights</td>
<td>Permission to reproduce this item is required and may be subject to copyright, fees, and other restrictions.</td>
</tr>
<tr>
<td>Source</td>
<td>E. Kirkbride Miller Art Research Library, Archives and Manuscripts Collections;</td>
</tr>
<tr>
<td>Title</td>
<td>Print Room, The Baltimore Museum of Art</td>
</tr>
<tr>
<td>Date</td>
<td>1890-1978</td>
</tr>
</tbody>
</table>

Description:
View of an unidentified exhibition in the Print Room of The Baltimore Museum of Art looking towards Jennewein's Cupid and Gazelle sits on the table. The Print Department opened in October 1931. Exhibitions of prints were held in two spaces on the ground floor of the Museum: the Print Room and a hallway leading to the Print Room.
The Path to Transformation: **RECONCILE**

- **Match against controlled vocabs**
- **Get persistent identifiers**
- **Add identifiers to Metadata**

---

**Example:**

- **Identifier:** http://collections.digitalmaryland.org/cdm/ref/collection/basc/id/3
- **Title:** Print Room, The Baltimore Museum of Art
- **Type:** Image
- **Subject:** Baltimore Museum of Art Exhibitions Prints Jennewein, Carl Paul, 1890-1978
The Path to Transformation: **TRANSFORM**

**RDF Data**

- Produce RDF Triples
- Search a Triple Store using SPARQL

The first 100 rows of the RDF Data are shown here. To retrieve the full set use the Download button.
The Path to Transformation: **TRANSFORM**

http://collections.digitalmaryland.org/cdm/ref/collection/basc/id/3

```json
{
    "@context": {
        "@vocab": "http://schema.org/
    },
    "@id": "http://collections.digitalmaryland.org/cdm/ref/collection/basc/id/3",
    "type": "CreativeWork",
    "@context": [
        {
            "@id": "http://id.worldcat.org/fast/1076012"
        },
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        },
        "description": "View of an unidentified exhibition in the Print Room of The Baltimore Museum of Art looking toward isPartOf": {
            "@id": "http://collections.digitalmaryland.org/cdm/landingpage/collection/basc"
        }
    }
}
```
Next Steps

• Continue to work with the members of the CONTENTdm Strategic Advisory Committee to refine the look and feel of the application and add additional features such as editing field values

• Release as a closed beta so CONTENTdm metadata managers can work with the data in the application
Library Linked Data in the Cloud
OCLC's Experiments with New Models of Resource Description

Carol Jean Godby
Shenghui Wang
Jeffrey K. Mixter

Data Science

The Web is the native environment of information seekers. OCLC Research recognizes that to be integrated into the Web, traditional library data must be transformed in various ways. We are analyzing the data in WorldCat and other sources to derive new meaning, insights, and services for use by libraries and others on the Web. Our work includes:

Aggregating library-created data
Leveraging OCLC members' collected knowledge investment for efficiency and reuse by libraries and other organizations.
Recent work:
VIAF Virtual International Authority File

Enhance aggregated data
Adding insights and information from library-created data pools and non-library sources to increase data impact.
Recent work:
Multilingual Bibliographic Structure

Mine data to create new knowledge
Making associations that improve library operations and provide users with new insights.
Recent work:
Cookbook Finder

Exposing and extending data
Transforming and optimizing data so it can be better utilized by Web applications to deliver library services and assets to information seekers.
Recent work:
OCLC Linked Data Research
OCLC’s Linked Data Work

Contact us

**Jeff Mixter**
Software Engineer, OCLC Membership and Research

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@JeffMixter

Together we make breakthroughs possible.