Artframe
Connecting two Worlds

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Melanie Wacker
Metadata Coordinator, Columbia University Libraries
Nov. 14, 2016, Metropolitan Museum of Art
Linked Data for Production (LD4P)

“The Andrew W. Mellon Foundation has awarded Stanford a $1.5 million grant to support library initiatives that develop and advance the use of linked open data. Stanford Libraries will coordinate a team representing Columbia, Cornell, Harvard, Library of Congress and Princeton to upgrade the current infrastructure libraries use to create, store, and share bibliographic data.”

Source: https://library.stanford.edu/news/2016/04/stanford-libraries-leads-collaborative-grant
LD4*


LD4L-Labs (2016-2018): Cornell-lead collaborative project with Harvard University, Stanford University, and library researchers at the University of Iowa.

LD4P Projects

- Columbia: Art objects (two & three dimensional)
- Cornell: Non-commercial LPs from the Hip Hop collection & rare materials
- Harvard: Library cartographic resources (printed maps, atlases, digital geospatial datasets, etc)
- Library of Congress: BIBFRAME 2.0 test, audio-visual material, Prints & Photographs, BIBFRAME & RDA
- Princeton: Archive of the philosopher Jacques Derrida (1930-2004); annotations
- Stanford: Tracer bullets; Performed music ontology
Artframe -- a BIBFRAME extension

- Many libraries own art objects
- Art objects have been described in MARC
- Larger institutions often have libraries as well as museums -- lack of communication
- BIBFRAME is supposed to work with “various content models” and accommodate “different needs for resource descriptions” (Library of Congress (2012). *Bibliographic Framework as a Web of Data*. Page 15)
John Singleton Copley
*Portrait of Myles Cooper*
ca. 1768, oil on canvas

Anna Hyatt Huntington
*Cranes Rising*
1934, bronze

Suzuki Harunobu
*The Brine Maidens*
Japan, Edo period
1769-70, woodblock print
George Romney  
*Portrait of David Hartley, M.P.*  
1784

Alice Neel  
*Portrait of Jack Beeson*  
1979

Samuel Adoquei  
*Portrait of Constance Baker Motley*  
2015
Florine Stettheimer
*Self-Portrait with Palette (Painter and Faun)*, ca. 1915

Florine Stettheimer
*Portrait of Myself*, 1923
Arthur Rothstein
*Girl at Gee’s Bend (Artelia Bendolph)*
1937, gelatin silver print

Bruce Davidson
*Time of Change*
1962, gelatin silver print
Plaque with a hunter and lion
Iran, 8th-7th century BCE
ivory or bone

Standing Buddha, China
Northern Qi dynasty (550-577)
marble with limestone base

Etruscan black-figure amphora
9th-8th century BCE
earthenware
Daniel Chester French
*Alma Mater*
1903, bronze

Auguste Rodin
*The Thinker*
1930, bronze
Clement Meadmore, *Curl*, 1967, Cor-Ten steel
(conservation completed Fall 2015)
Students working in the lab
NYU Institute of Fine Arts Conservation Center

Virgin Mary polychrome wood figurine, Mexico or South America, 18th century, with X-ray
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Portrait of Frederick A. P. Barnard (1809-1889)

**Creator:** Johnson, Eastman, 1824-1906, artist.

**Title:** Portrait of Frederick A. P. Barnard (1809-1889).

**Produced:** United States, 1886.

**Physical:** 1 painting; 49 x 39 1/2 in. (124.4 x 100.3 cm).

**Properties:** Oil on canvas.

**Inscription:** Signed and dated lower left: E. Johnson / 1886.

**Notes:** Plaque on frame: FREDERICK A. P. BARNARD, D.D., LITT., LL.D. / A.B. Yale College 1828 / President of the University of Mississippi 1856-1861 / President of Columbia College 1864-1889.

**Credit Line:** Commissioned by the Trustees, 1886.

**Subjects:** Barnard, Frederick A. P. (Frederick Augustus Porter), 1809-1889, depicted.

**Subjects (Genre):** Paintings (visual works) > American > 19th century. Portraits > American > 19th century.

**Format:** Art Work (Original)

**Available from:**
- **Avery Art Properties - By appt. (Non-Circulating)**
  
**Today's Hours:** 9am - 5pm

By appointment only. See the [Avery Art Properties webpage](https://www.columbia.edu/cu/pcards/av/)

**Call Number:** C00.0110

**Bookmark As:** [https://cio.columbia.edu/catalog/12003862](https://cio.columbia.edu/catalog/12003862)
But Why linked data?
Library cataloging: a guide for a basic course,

Author: Immroth, John Phillip.
Title: Library cataloging: a guide for a basic course, by John Phillip Immroth and Jay E. Daily.
Description: 202 p. illus. 22 cm.
LC Subjects: Cataloging--Outlines, syllabi, etc.
Also Listed Under: Daily, Jay Elwood, author.

Holdings Information:

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COLLECTIONS OF CORRESPONDENCE AND MANUSCRIPT DOCUMENTS

NAME OF COLLECTION: FABIAN ESSAYS--Collection

SOURCE: Purchase 54799C

SUBJECT: Fabian Essays in Socialism

DATES COVERED: 1890 NUMBER OF ITEMS: 50
Dramatic Museum Realia

https://exhibitions.cul.columbia.edu/exhibits/show/realia
Semantic Web to the Rescue?

● Linking data (resources) instead of documents (information resources)

● Identifying resources using URIs instead of text strings

● Structured data instead of unstructured data

● Explicit semantics instead of ambiguity (semantics = meaning)

● Goal: machine consumption in addition to human consumption
What is Linked Data?

Component part of the Semantic Web

Building blocks:

- URIs or IRIs (resource identifiers)
- HTTP (hypertext transfer protocol)
- Structured data using controlled vocabulary terms and dataset definitions expressed in Resource Description Framework [RDF] serialization formats such as RDFa, RDF/XML, N3, Turtle, or JSON-LD
- Linked Data Platform

(source: https://en.wikipedia.org/wiki/Linked_data#Components)
RDF--Resource Description Framework

- Used to express linked data
- Graphs, not records
- RDF statements are called triples
- RDF triples consist of a subject, a predicate, and an object
RDF Triple

Subject: Self-portrait
Predicate: depicts
Object: Andy Warhol

http://worldcat.org/entity/work/id/1817278820
http://id.loc.gov/vocabulary/relators/dpc
http://viaf.org/viaf/56617645
RDF Graph
Linked Data Vocabularies & Ontologies

- Vocabularies vs. value vocabularies
- Define classes of objects, the relationship of objects, and the properties of resources
- Often expressed in RDFS or OWL
- Examples: FOAF, dcterms, schema.org, BIBFRAME ...
Linked Data in Libraries

- ID.LOC.GOV
- Bibliographic Ontologies (e.g. schema.org + bib. Extension; BIBFRAME)
- Linked Data projects
LC Linked Data Service
Authorities and Vocabularies

Search

Enter Keyword or Phrase

All
- LC Subject Headings
- LC Name Authority File
- LC Classification
- LC Children's Subject Headings

**Please Note: LC Classification entries are not included in general search results. You must explicitly select LC Classification in order to search the scheme. This is temporary while the impact of adding LCC to the current system is better understood.**

Search  Reset

Available Datasets
The Linked Data Service provides access to commonly found standards and vocabularies promulgated by the Library of Congress. This includes data values and the controlled vocabularies that house them. The following are currently offered as part of this service:

- LC Subject Headings
- LC Name Authority File
- LC Classification
- LC Children's Subject Headings
- LC Genre/Form Terms
- LC Medium of Performance Thesaurus for Music
- LC Demographic Group Terms
- MARC Relators
- MARC Countries
- MARC Geographic Areas
- MARC Languages
- ISO639-1 Languages
- ISO639-2 Languages
- ISO639-5 Languages
- Extended Date/Time Format

Schemes and smaller code lists
- Identifiers
- Carriers
- Content Types
- Media Types
- Resource Types
- Description Convention

http://id.loc.gov/
Andy Warhol (1928-1987)

Country: États-Unis
Language: anglais
Gender: masculin
Birth: Pittsburgh (Pa.), 05-08-1928
Note: Peintre, graphiste, cinéaste
Field: Peinture, Arts graphiques, Audiovisuel
Variant of the name: Andrew Warhola (1928-1987)
ISNI: ISNI 0000 0001 2134 0483

Occupations

- Auteur du texte (23)
- Illustrateur (17)
- Réalisateur (12)
- Décors (3)
- Graveur (2)
- Contributeur (2)
- Scénariste (1)
- Sérigraphie (1)
- Auteur adapté (1)
- Costumes (1)
- Compositeur (1)
- Photographe (1)
- Auteur ou responsable intellectuel (2)
- Autre (3)

http://data.bnf.fr/11928892/andy_warhol/
Bibliographic Framework Initiative (BIBFRAME)

• Develop a new format that accommodates different content rules and data models

• Determine aspects of MARC that should be retained and translate to a LD model

• Based on Semantic Web and Linked Data technologies

• Foster reuse of existing rich metadata

• Plan for migrating existing metadata into a new structure

• Integrate bibliographic metadata with other rich metadata on the Web

(slide courtesy of Rebecca Guenther)
Overview of the BIBFRAME 2.0 Model
https://www.loc.gov/bibframe/docs/bibframe2-model.html
Linked Data in Art

● Getty vocabularies

● Art ontologies

● Linked Data Projects
Art Vocabularies

- The Art & Architecture Thesaurus (AAT)
- The Getty Thesaurus of Geographic Names (TGN)
- The Union List of Artists Names (ULAN)
- Thesaurus for Graphic Materials (on id.loc.gov)
Art & Architecture Thesaurus (AAT)

acrylic paintings (visual works)

Source: http://vocab.getty.edu/aat/300181918

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CIDOC-CRM

- CIDOC = International Committee for Documentation of ICOM (International Council of Museums)
- CRM = Conceptual Reference Model
- Official ISO standard since 2006
- Currently in version 5.0.4
Yale Center for British Art (CIDOC-CRM)

Search Details

Creator: Francis Hayman, 1707/8–1776, British

Title: The Good Samaritan

Date: between 1751 and 1752

Medium: Oil on canvas

Dimensions: 78 1/2 x 48 1/2 inches (199.4 x 123.2 cm)

Credit Line: Yale Center for British Art, Paul Mellon Fund

Accession Number: B1979.20

Collection: Paintings and Sculpture

Link to This Record: http://collections.britishart.yale.edu/vufind/Record/1669220

Subject Terms: Bible | bishop (prelate) | blood | blood (animal material) | bottle | costume | donkey | injuries | levite | men | mule | New Testament | nude | pity | pouring | priest | reading | religious and mythological subject | scroll (information artifact) | the good Samaritan (Luke 10:30-37) | traveler

Place: Cusworth | Cusworth Hall | England | United Kingdom |
Machine-readable form in CIDOC-CRM

YALE CENTER FOR BRITISH ART  Linked Open Data

URI: http://collection.britishart.yale.edu/id/object/499

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View Collections Online Record
# VRA Ontology

Vocabulary for representing entities in the VRA data model.

The Ontology was developed by Jeff Mixter, Rebecca Guenther, Trish Rose-Sandler, Michael Dulock and Esme Cowles

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<th>State</th>
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<th>Style Period</th>
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<th>Work</th>
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### Object Properties

| area | author | base | based on | builder | cartoon for | circumference | collector | commissioner | component of | composer | contractor | copy of | count | counter proof for | creative activity | creator | cultural context | dealer | decorator | depicted in | depicts | depth | derived from | designed for | designer | developer | diameter | director | distance between | donator | drafter | drawer | duration | editor | engineer | exhibited at | facsimile of | financier | formerly larger context for | formerly part of | former owner | former repository | former site | has cartoon | has component | has context | has copy | counter proof is | has culture | has facsimile | has image | has impression | has inscription | has model | has plan | has printing plate | has prototype | has replica | has study | has style period | technique | has version | height | image of | inventory level | is related to | larger context for | length | location of | manufacturer | mate of | material | model for | owner | painter | partner in set with | part of | pendant of | performer | photographer | place of creation | place of discovery | place of exhibition | place of installation | place of intention | place of ownership | place of performance | place of publication | place of repository | place of site | plan for | preparatory for | printer | printing plate for | producer | programmer | prototype for | relief for | replica of | restorer | running time | source for | study for | venue for | version of | was alteration | was broadcast | was commission | was created | was designed | was destroyed | was discovered | was performed | was presented | was produced | was published | was restored | weight | width | writer |
The Intersection: Libraries AND Art

FRBRoo

“The FRBRoo is a formal ontology intended to capture and represent the underlying semantics of bibliographic information and to facilitate the integration, mediation, and interchange of bibliographic and museum information.”

A working group formed in 2003 aimed to develop a formal ontology “ a) Expressing the IFLA FRBR model with the concepts, tools, mechanisms, and notation conventions provided by the CIDOC CRM, and: b) Aligning (possibly even merging) the two object-oriented models with the aim to contribute to the solution of the problem of semantic interoperability between the documentation structures used for library and museum information, …”
The Artframe Project

Objectives:

Evaluate the suitability of the BIBFRAME model and vocabulary for describing art objects, both two-dimensional (e.g. paintings, photographs) and three-dimensional (e.g. sculptures, ceramics).

Identify and document any descriptive needs of art objects that are currently not covered by BIBFRAME.

Evaluate other linked data ontologies and initiatives in the art domain.

Develop a profile for the description of art objects.

Convert a selection of art resources cataloged according to the Art Properties collection's local schema to the profile.

Engage with related projects in the museum/art library domain, including the Library of Congress Prints and Photographs Division.

Participate in data exchange with other partners.

Develop workflow to connect public facing linked data to MARC circulation and other inventory data in spreadsheets or other sources.

Evaluate the project and share recommendations.
The Columbia Project Team

Project team consisting of librarians and domain specialists

Amber Billey (Metadata Librarian)
Roberto C. Ferrari (Curator of Art Properties)
Kate Harcourt (Director, Original and Special Materials Cataloging)
Erin Petrella (Metadata Assistant; until August 2016y)
Margaret Smithglass (Registrar and Digital Content Librarian, Avery Library)
Project Coordinator: Melanie Wacker (Metadata Coordinator)

Project wiki: https://wiki.duraspace.org/display/LD4P/Columbia
Pre-project Activities

- Create test dataset in spreadsheet form representing a variety of art formats
- Reconcile spreadsheet data to external controlled vocabularies
- Characterize objects in the Art Properties collection based on sample data
- Survey existing linked data developments in the art domain
- Map Art Properties data to Bibframe 1.0
- Document issues and omissions in BIBFRAME 1.0 relating to art descriptions
- Map Art Properties data to VRA RDF
Characterization of Sample Data

Sample data describing art objects in the Art Properties collection. Subset of the overall collection, so should not be seen to represent the entire collection

Formats

Physical Description

Location

Acquisitions Type Information

Events

Creators

Titles

“Ofness” vs. “Aboutness”
Literature Review

- Contemporary literature on art and linked data
- Information-seeking behavior for art and visual resources
- Non-MARC metadata schema development and modeling for art and visual resources
- Mapping descriptions for art and visual resources into MARC
Artframe Extension Group

- Columbia Project Team
- Penny Baker (Clark Art Institute)
- LC’s Prints & Photographs Division
- Paul Frank
- Arden Alexander
- ARLIS/NA Cataloging Advisory Committee:
  - Chair: Marie-Chantal L'Écuyer-Coelho
  - Board Liaison: Jamie Lausch Vander Broek
  - ALA Committee on Cataloging: Description & Access (CC:DA) Liaison: Karen Stafford
- ALA MARC Advisory Committee Liaison: John A. Maier
- ALA Subject Analysis Committee (SAC) Liaison: Sherman Clarke
- Members: Bronwen Bitetti, Tamara Fultz, Maria Oldal
## Use Cases

<table>
<thead>
<tr>
<th>Title (Goal)</th>
<th>2.5 Part: Whole relationships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode of use</strong></td>
<td>Collection management, cataloging/inventory, curatorial, exhibition</td>
</tr>
<tr>
<td><strong>Primary Stakeholders (who uses it)</strong></td>
<td>Collection managers, curators</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Discoverability</td>
</tr>
<tr>
<td><strong>Priority</strong></td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Story</strong></td>
<td>A gift of 10 engravings from an 18th-century portfolio of prints has been received, but the original portfolio was published with 15 engravings. The collection manager wants to identify other institutions who may have the entire portfolio to determine how best to catalog and inventory this gift. A museum owns a collection of various porcelain Sèvres dishes custom-made for a member of a French aristocratic family, and they are want to identify other institutions that own related pieces from this set for an upcoming exhibition.</td>
</tr>
<tr>
<td><strong>Submitted/updated by:</strong></td>
<td>Roberto Ferrari 9/8/16</td>
</tr>
</tbody>
</table>
Use Case Categories

1. Names
2. Related Works
3. Genre; Facets; Types; WorkType; Classification; Styles
4. Physical Characteristics; Properties
5. Condition
6. Object History
7. Related Images of a Work
8. Subject/Aboutness
9. Annotations
10. Titles
11. Administrative metadata
12. User contributed data
## Ontology Extension Development

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Type</th>
<th>Property</th>
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</thead>
<tbody>
<tr>
<td>1.2 Reconcile name changes seamlessly in discovery systems</td>
<td>Agent</td>
<td>hasAuthority</td>
</tr>
<tr>
<td>1.3 Reconcile different name forms seamlessly in discovery systems</td>
<td>Agent</td>
<td>hasAuthority</td>
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<tr>
<td>1.4 Find all artists who received a given award</td>
<td>Agent</td>
<td>Awards</td>
</tr>
<tr>
<td>1.5 Relating Agents to Works</td>
<td>Agent</td>
<td>Role</td>
</tr>
<tr>
<td>2.0a The work is related to another work</td>
<td>Works</td>
<td>related</td>
</tr>
<tr>
<td>2.0b Discover works held by the same institution</td>
<td>Works</td>
<td>Agent</td>
</tr>
<tr>
<td>2.1 Discover the works held other institutions</td>
<td>Works</td>
<td>Agent</td>
</tr>
</tbody>
</table>
Mapping to BF 2.0

(fictional mapping to visualize the process)

<table>
<thead>
<tr>
<th>Local Element</th>
<th>BIBFRAME</th>
<th>Other</th>
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<tbody>
<tr>
<td>Title</td>
<td>bf:title</td>
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<tr>
<td>Dimensions</td>
<td>bf:dimensions</td>
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<tr>
<td>Portrait subject</td>
<td></td>
<td>relator:dpc</td>
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<tr>
<td>Culture</td>
<td></td>
<td>vra:culturalContext</td>
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</table>
Inscriptions/Signatures

bf:note [ a bf:Note ;
bf:noteType “Inscriptions/ Signatures” ;

Or

vra:hasInscription ?

Or something else?
Tools

- OpenRefine
- KARMA: A Data Integration Tool
- VitroLib
- Transformation Tool
## Tools: LODRefine for Reconciling Data

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<tr>
<th>Classification</th>
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Tools: Karma for Mapping and Visualization
What is VitroLib?

VitroLib is an ontology-based cataloging editor enabling manual cataloging in RDF based on a generalized bibliographic ontology with extensions for specialized cataloging. Built on Vitro, a generalized semantic web ontology and instance editor with customizable browsing, VitroLib is a joint product of the Mellon-funded Linked Data for Libraries Labs and Linked Data for Production projects.

With VitroLib, you can:

- Create or load ontologies in OWL format
- Edit instances and relationships
- Build a public web site to display your data
- Search your data

Search VitroLib
Andy Warhol

has preferred title

has title
What’s next?

● In-person meeting in Washington DC (Nov. 17-18)
● More modelling!
● More mapping!
● More testing!
Questions?

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rcf2123@columbia.edu