

LUX: Illuminating the Collections of Yale's Museums, Libraries, and Archives

via *Usable*
Linked Open [^] Data

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LUX: Illuminating Yale's Collections via LOUD

Outline

- Overview of Yale's collections landscape
- Frameworks for cross-collection discovery
 - Collaboration
 - Implementation
- LOUD: why data usability matters
- High-level overview of Linked Art
- Current work and next steps



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Collections at Yale



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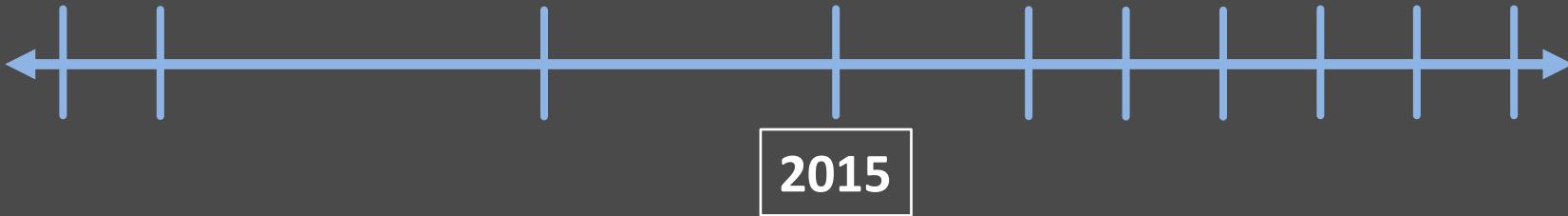
Timeline

- 2008: Office of Digital Assets and Infrastructure created.
- 2011:
 - Yale Open Access policy instituted.
 - Susan Gibbons selected as university librarian.
- 2012: Peter Salovey selected as Yale's 23rd president.



Timeline

- Susan Gibbons named Deputy Provost for Collections & Scholarly Communication.



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Timeline

- John Barden hired as chief information officer.
- Cultural Heritage IT (CHIT) pillar established in Yale ITS.



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Timeline

- CHIT Collaboration formed
- Cross-Collection Discovery (CCD) working group and Cultural Heritage IT Architecture (CHITA) group convened.



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Timeline

- International Image Interoperability Framework (IIIF) implemented for digital assets at Yale.



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Timeline

- Susan Gibbons named Vice Provost for Collections & Scholarly Communication.
- Sarah Prown hired as project manager.
- Workshop held with Design for Context.



Timeline

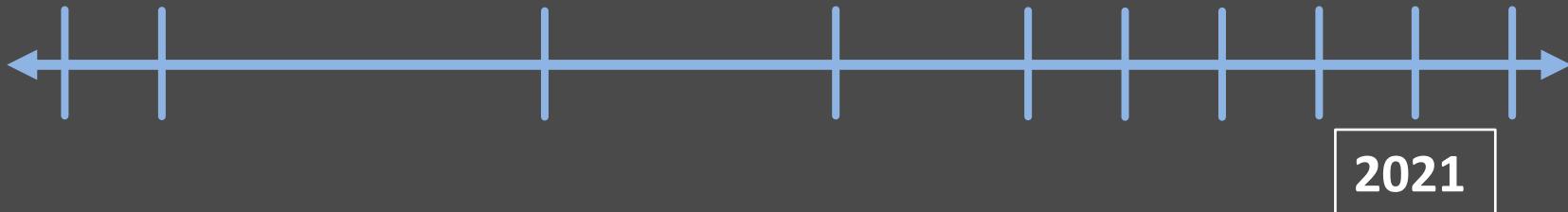
- Mellon Foundation grant awarded to support metadata reconciliation and library and museum collaboration.
- Rob Sanderson hired as Director for Cultural Heritage Metadata.



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Timeline

- LUX platform selection process carried out.



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Further Background

Part One: "DAMmed if You Don't," featuring Larry Gall, Yale Peabody Museum of Natural History



<https://www.youtube.com/watch?v=lEm1KUo9FFI>



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LUX: Yale Collections Discovery



[Yale University](#), public domain, via Wikimedia Commons

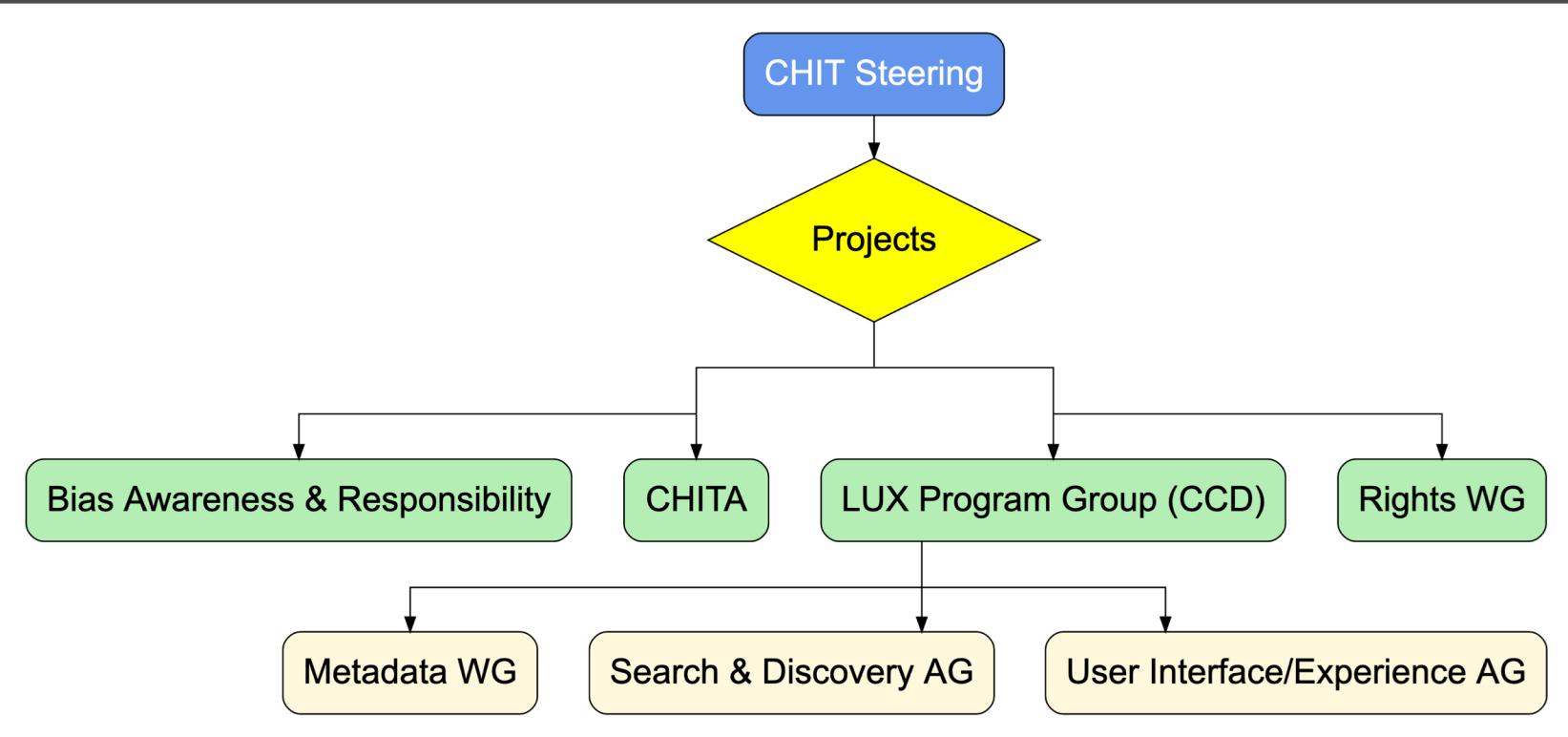


LUX: Yale Collections Discovery

- Reveal the cultural heritage collections of Yale University to the world.
- Provide a unified gateway to the holdings of Yale's museums, archives, and libraries.
- Enable users to identify, access, and engage with items of interest within Yale's physical and digital collections.
- Uncover relationships among items, inviting users to explore additional materials across collections.



Frameworks for Collaboration



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Frameworks for Implementation



The screenshot displays the Yale Digital Content search interface. At the top, a banner reads "Discover Yale Digital Content". On the right, there are links for "Yale CAS Login" and "Language ▾". Below the banner, a main search area features the text "Search 1,500,000 records; 250,000 digital assets from across Yale's collections". This is followed by a search form with a text input field, a dropdown menu set to "All Fields", a "Find" button with a magnifying glass icon, and a "Advanced" link. Further down, links to specific Yale collections are listed: "Yale Center for British Art", "Yale Peabody Museum", "Yale University Art Gallery", and "Yale University Library". At the bottom of the page, there are three columns: "Search Options" (with links to "Search History" and "Advanced Search"), "Need Help?" (with links to "Search Tips" and "Help and Suggestions"), and "About" (with links to "About this Service", "Permissions and Copyright", and "Privacy Policy"). The Yale logo is at the bottom left, and a copyright notice for Yale University (2020) is at the bottom center. The footer is a solid blue bar.

Discover Yale Digital Content

Yale CAS Login Language ▾

Search 1,500,000 records; 250,000 digital assets from across Yale's collections

All Fields Find Advanced

Yale Center for British Art
Yale Peabody Museum
Yale University Art Gallery
Yale University Library

Search Options

- Search History
- Advanced Search

Need Help?

- Search Tips
- Help and Suggestions

About

- About this Service
- Permissions and Copyright
- Privacy Policy

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IT at Yale - Contact us at dam.support@yale.edu.



Frameworks for Implementation

Solr Grouping	Solr Nesting	Solr Multi	Vend Lowercase	Solr Fieldname	Field Control
notes	DoubleNest		yes	note_alt_display : character_set	
notes	DoubleNest		yes	note_alt_display : direction	
notes	Yes			note_label	
languages	Yes			language_display	local harmonization
languages	Yes		yes	language_code	local harmonization
languages	Yes	Yes		language_URI	URI
agents	Yes			agent_display	
agents	Yes			agent_sortname	
agents	DoubleNest			agent_alt_display : value	
agents	DoubleNest		yes	agent_alt_display : language	
agents	DoubleNest		yes	agent_alt_display : character_set	
agents	DoubleNest		yes	agent_alt_display : direction	
agents	Yes	Yes		agent_URI	URI
agents	Yes		yes	agent_role_label	local harmonization
agents	Yes		yes	agent_role_code	local harmonization
agents	Yes	Yes		agent_role_URI	URI
agents	Yes		yes	agent_type_display	local vocab
agents	Yes	Yes		agent_type_URI	URI

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Frameworks for Implementation

blacklight

All Fields walkowitz

Search

Start Over walkowitz Campus Division > Yale University Art Gallery

Limit your search

Availability

Item Type

Usage Rights

Asset Rights

Campus Division
Yale University Art Gallery * 51

Collections

Agents

Places

Subjects

« Previous | 1 - 10 of 51 | Next »

Sort by Relevance 10 per page

1. [Rhythmic Lines: Dance Abstraction](#)

Artist:
Abraham Walkowitz, American, born Russia, 1878–1965

Subject(s):
American, Russian
20th century

Date Dated:
1920

Item type:
Drawings

Made, probably:
United States

Collection:
Prints and Drawings (YUAG)



2. [Standing Women](#)

Artist:
Abraham Walkowitz, American, born Russia, 1878–1965

Subject(s):
American, Russian
20th century

Date Dated:
1909



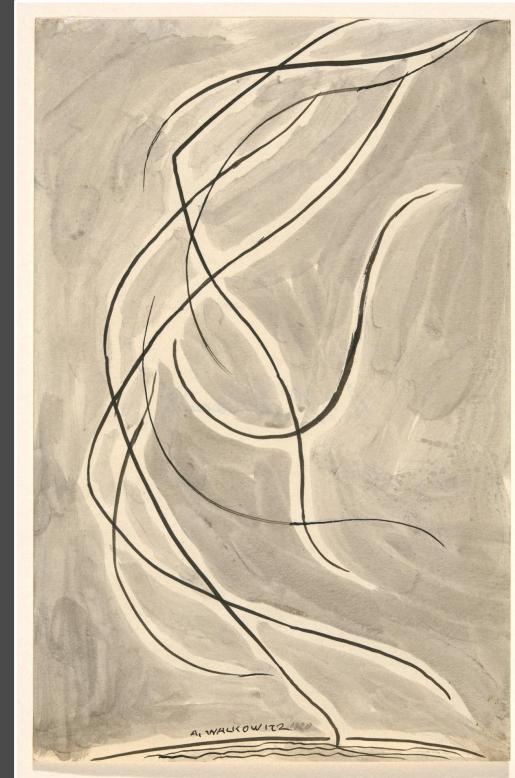
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Supertypes: Level 1	Supertypes: Level 2	Supertypes: Level 3
Text	Periodicals	Journals
Text	Periodicals	Newspapers
Text	Theses and Dissertations	
Text	Pamphlets	
Three-Dimensional Objects	Cartography	Globes
Three-Dimensional Objects	Numismatics	
Three-Dimensional Objects	Architectural Elements	
Three-Dimensional Objects	Clothing and Dress	
Three-Dimensional Objects	Clothing and Dress	Masks
Three-Dimensional Objects	Jewelry	
Three-Dimensional Objects	Decorative Arts	
Three-Dimensional Objects	Containers	
Three-Dimensional Objects	Furnishings	
Three-Dimensional Objects	Furnishings	Furniture
Three-Dimensional Objects	Furnishings	Flatware
Three-Dimensional Objects	Furnishings	Lighting Devices
Three-Dimensional Objects	Furnishings	Timepieces
Three-Dimensional Objects	Installations	
Three-Dimensional Objects	Installations	Wall Drawings
Three-Dimensional Objects	Kits	
Three-Dimensional Objects	Models	
Three-Dimensional Objects	Realia	
Three-Dimensional Objects	Tools and Equipment	Arms and Armor
Three-Dimensional Objects	Tools and Equipment	Equipment

Cross-Collection Alignment



Dance Abstraction:
Isadora Duncan
[Walkowitz]
Yale University Art
Gallery



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Cross-Collection Categories

Types

- Audio
- Cartography
- Collections
- Datasets
- Functional Objects
- Moving Images
- Scores and Notation
- Software and Electronic Media
- Textual Works
- Visual Works

Formats

- Born-Digital
- Cartographic
- Image
- Object
- Textual



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A Vision in Search of a Framework



[The Great East River Suspension Bridge](#)

Yale University Art Gallery



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A Vision in Search of a Framework

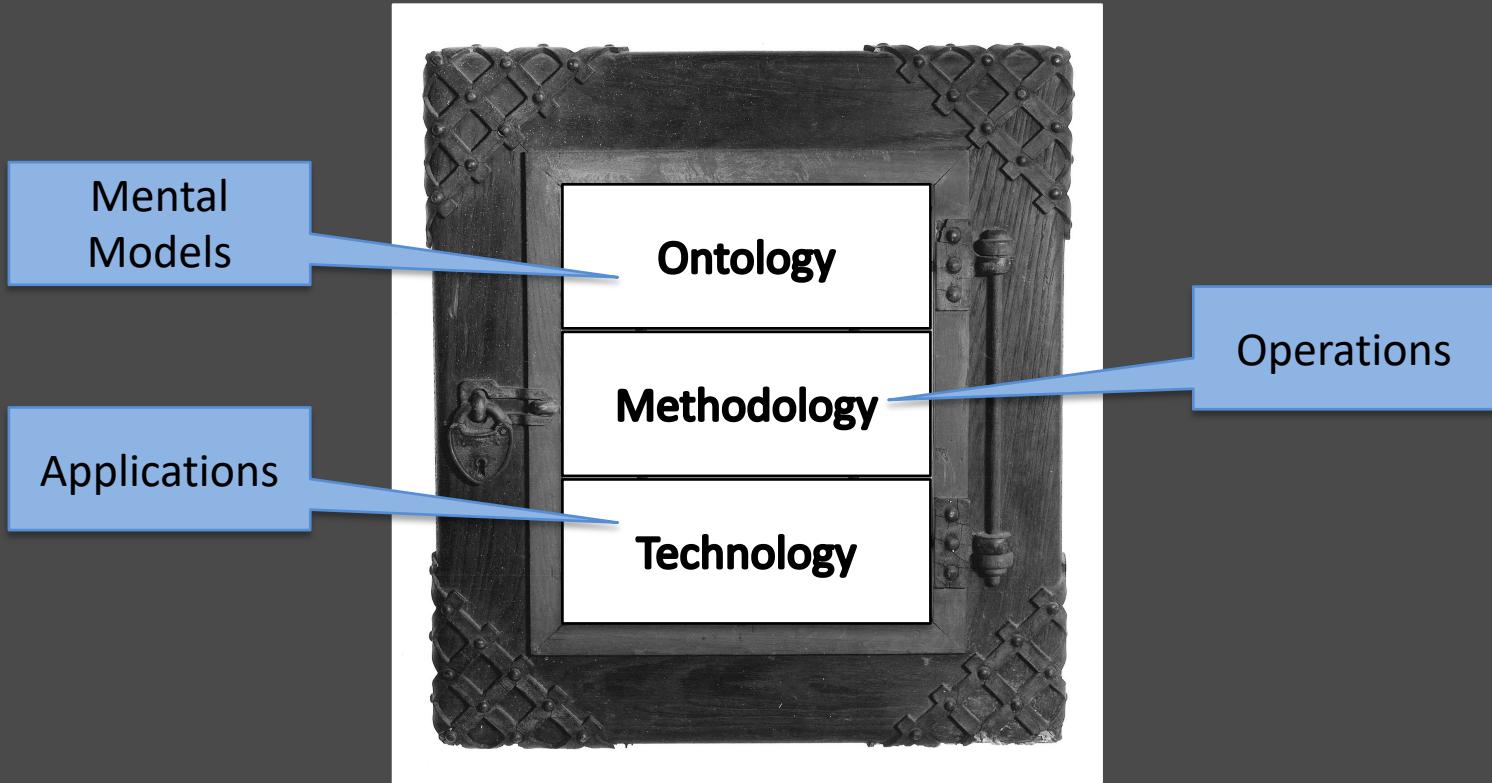


[Brooklyn Bridge \[Stella\]](#)
Yale University Art Gallery



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A Vision in Search of a Framework



Picture Frame
Yale University Art Gallery



Usable Data?

“

... usability is the degree to which [a thing] can be used by specified consumers to achieve [their] quantified objectives with effectiveness, efficiency, and satisfaction in a quantified context of use.

”

who
what
how
where

Usability is dependent on the Audience

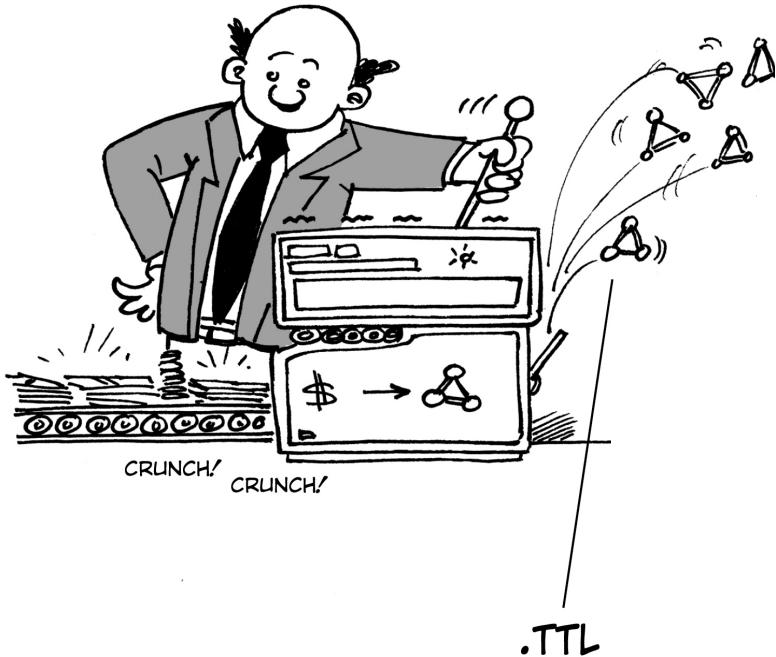


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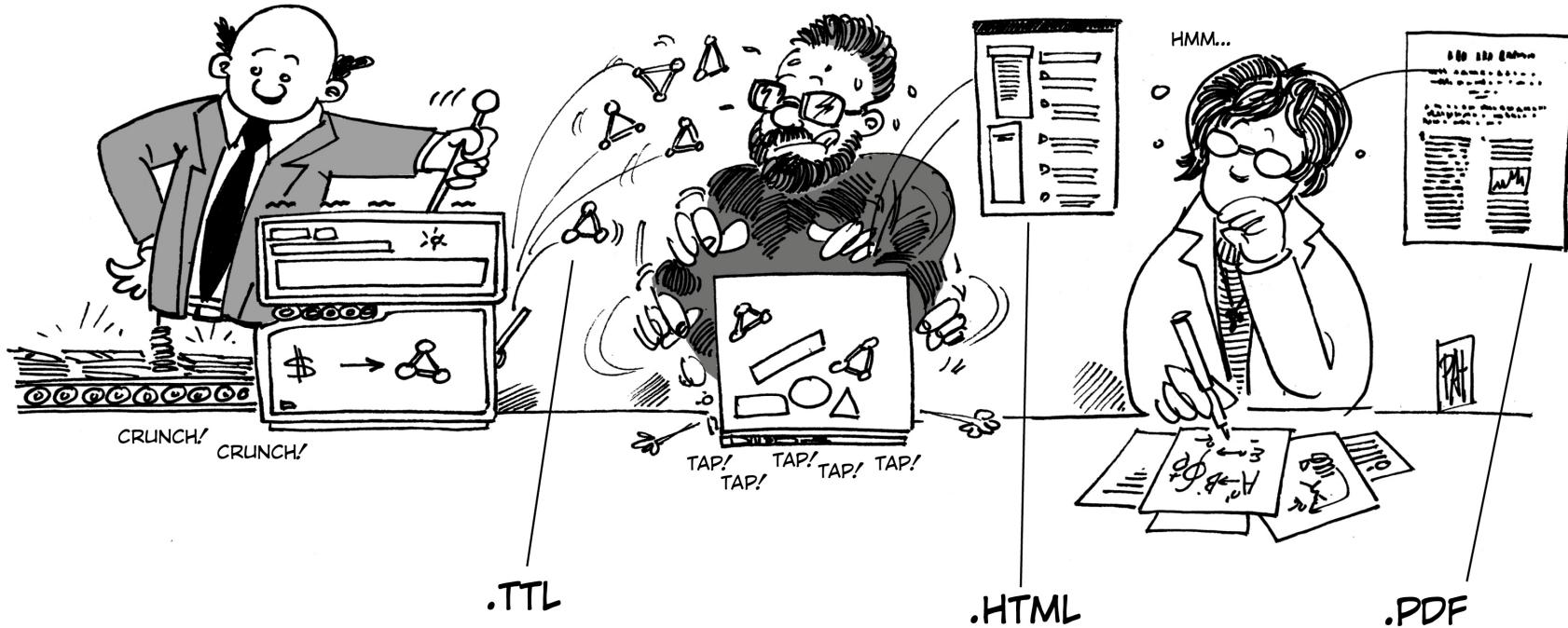
Who is the Audience for LOD?



With thanks to Patrick Hochstenbach, [.PDF](mailto:@hochstenbach)

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LOUD: Easy to Use ... by Developers!



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The API is the Developers' User Interface

“When it comes to APIs, developers are your users. The same principles of user-centred-design apply to the development and publication of APIs (simplicity, obviousness, fit-for-purpose etc)



W3C Priority of Constituencies

“

In case of conflict, consider ...

users ...

over authors ...

over implementors ...

over theoretical purity.”

Developers

Data Editors

Tool Builders

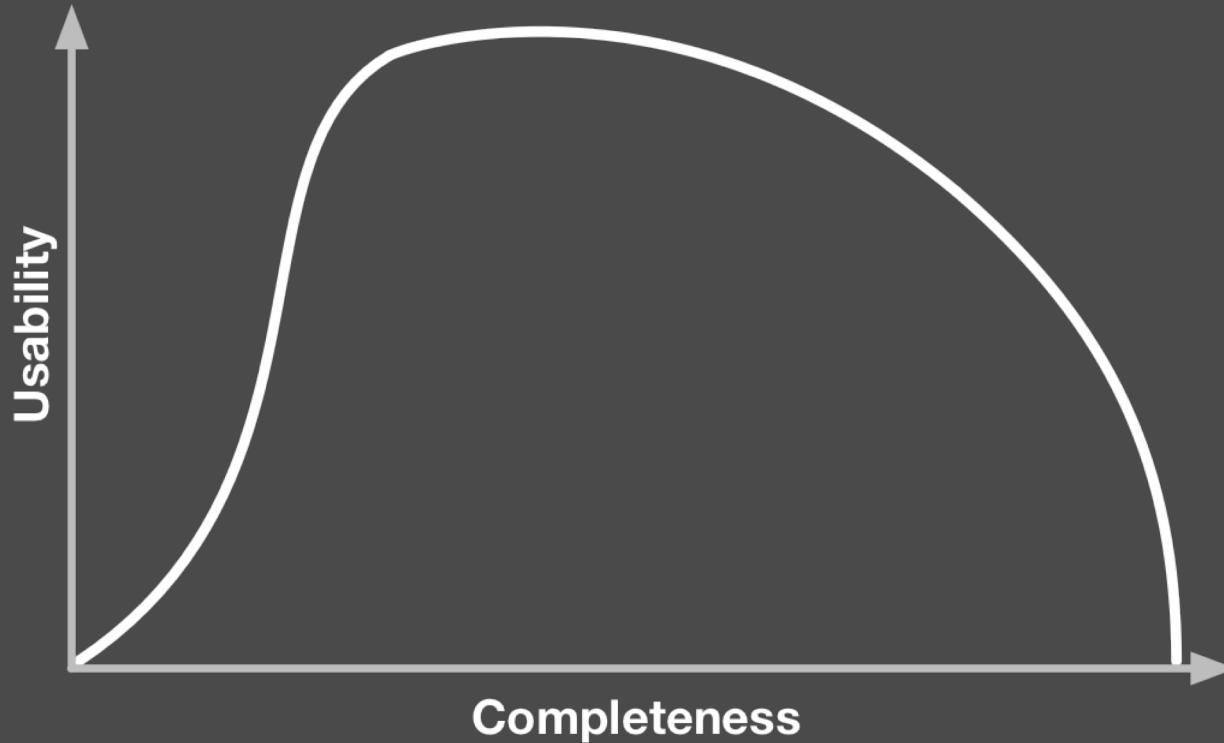
Ontology

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Trade Off: Usable vs Complete

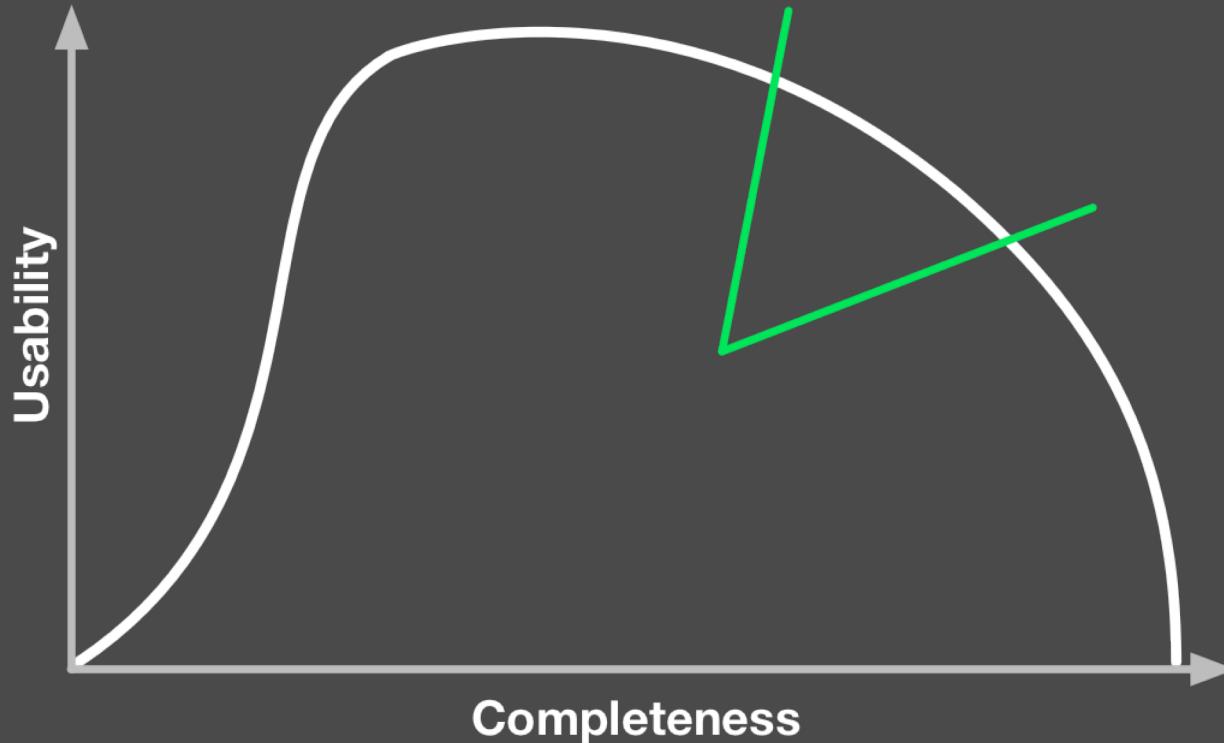


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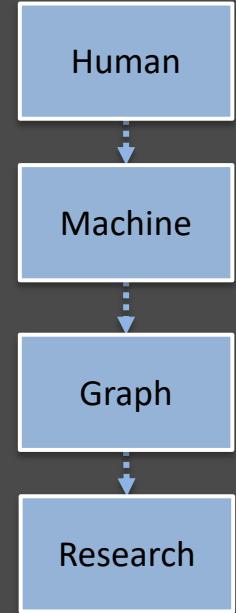
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Target Zone



Progressive Enhancement Principle

- Data for: Humans - *Strings*
 - Separate entities, with searchable textual descriptions
- Data for: Machines - *Structured*
 - Entities with machine-processable, comparable values
- Data for: The Graph - *d'Stributed*
 - Entities are connected (within and across systems)
- Data for: Research - *Stringent*
 - Sufficient accuracy and comprehensiveness to answer research questions from aggregated data

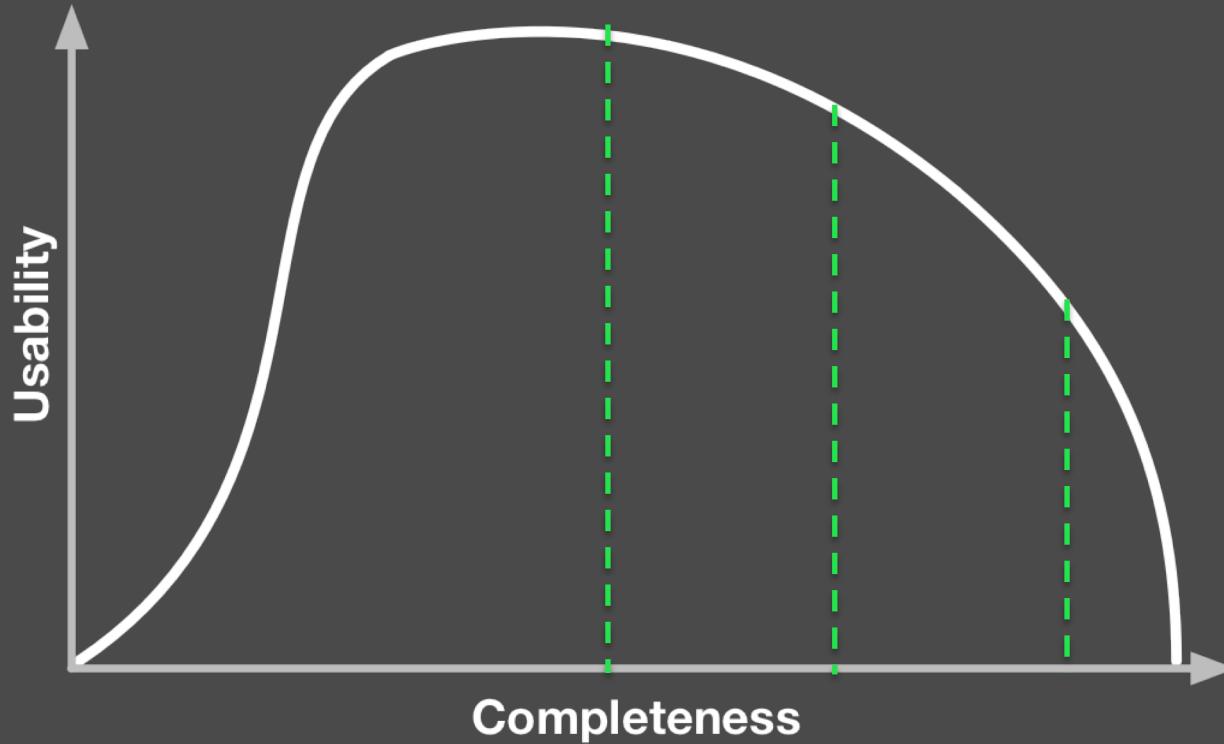


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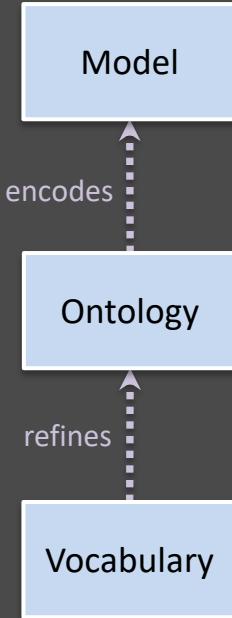
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Trade Off: Incremental Complexity



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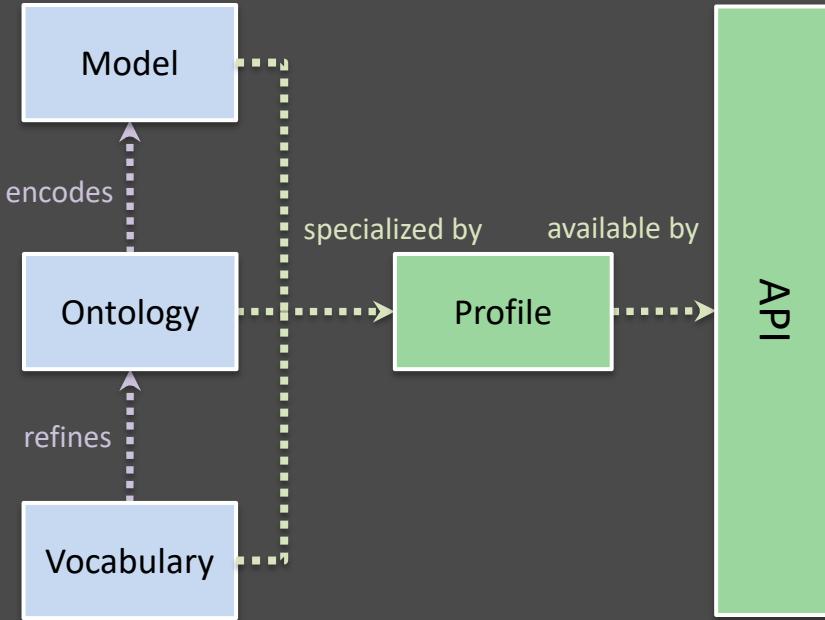


Abstraction Standards

- **Conceptual Model**
 - Abstract way to think about the world, holistically, consistently and coherently
- **Ontology**
 - Shared set of terms to encode that thinking in a logical, machine-actionable way
- **Vocabulary**
 - Curated set of sub-domain specific terms, to make the ontology more concrete

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Implementation Standards

A **Profile** is a selection of appropriate **abstractions**, to encode the **scope** of what can be described.

An **API** is a selection of appropriate **technologies**, to give **access** to the data managed using the profile.

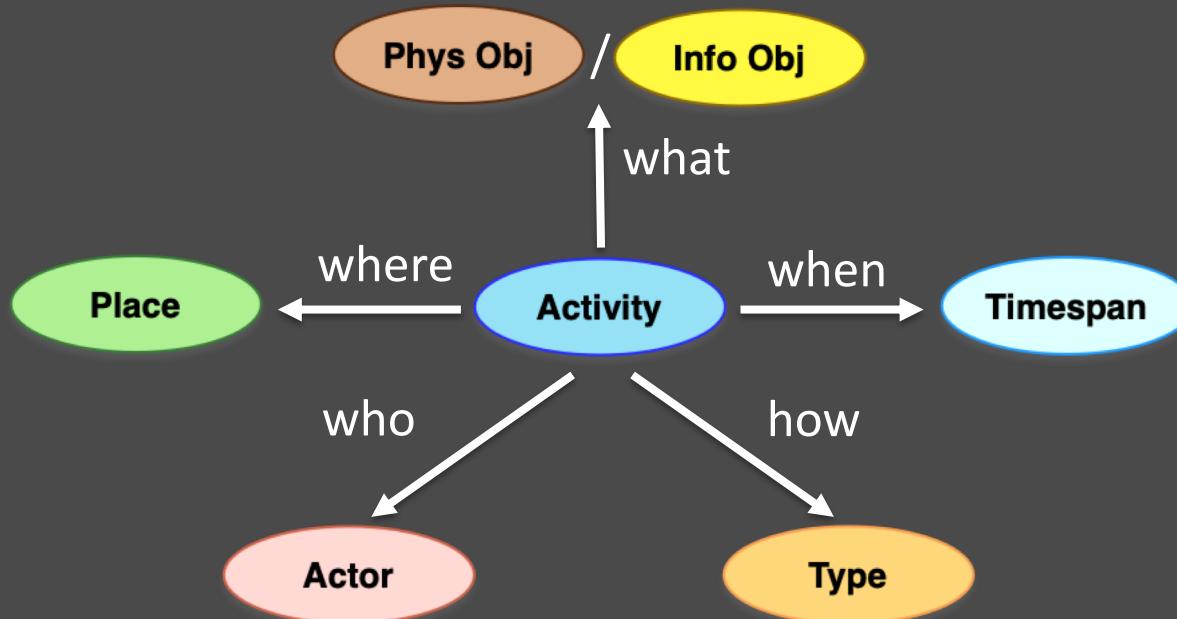
Linked Art Profile

- Domain: Cultural Heritage, especially Artworks
- Model: CIDOC Conceptual Reference Model
- Ontology: RDF encoding of CRM 7.1, plus extensions
- Vocabulary: Getty AAT, plus minimal extensions
- Format: JSON-LD with 10 primary document boundaries
- Target: 90% of the use cases with 10% of the effort

<https://linked.art/>

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Conceptual Model From 50,000 Feet



5 “Main” Entity Types

- Human Made Object:

A distinct physical thing that could be touched

- Linguistic Object:

Content in a human language that could be read/heard

- Visual Item:

Content with an identified appearance that can be seen

- Digital Object:

A digital thing that exists on a computer

- Set:

An identifiable grouping of zero or more entities

5 “Connected” Entity Types

- Person:
A human, alive or dead
- Group:
One or more Persons, or other Groups, that act collectively
- Place:
A geospatial extent, describable with coordinates
- Concept:
A conceptual thing, often used to characterize or classify
- Event:
An event or activity that occurred at some point in time

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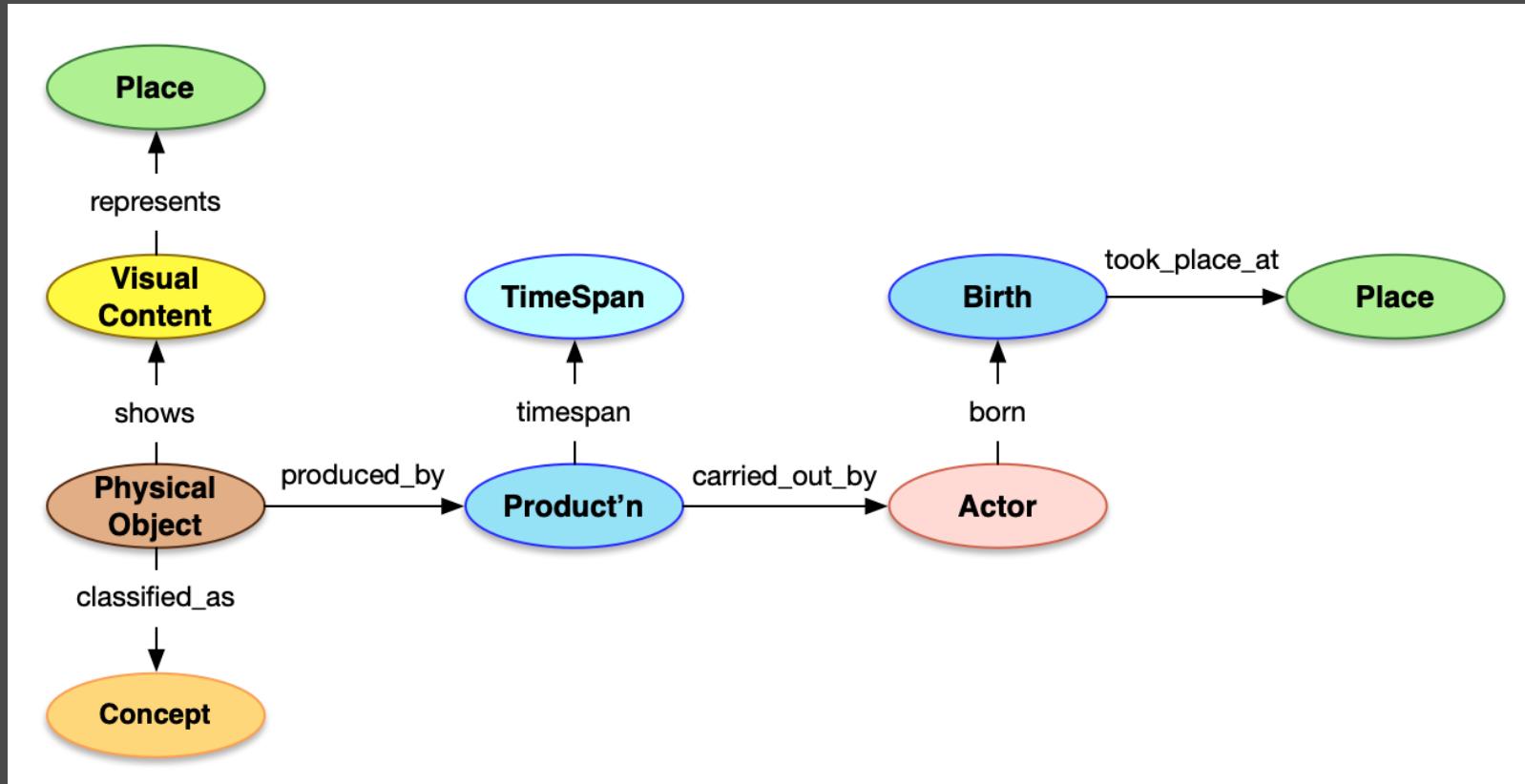
Yosemite Valley, Glacier Point Trail, Albert Bierstadt, 1873
<https://artgallery.yale.edu/collections/objects/4964>

Why?

How did European Artists paint the American West during the 1800s?

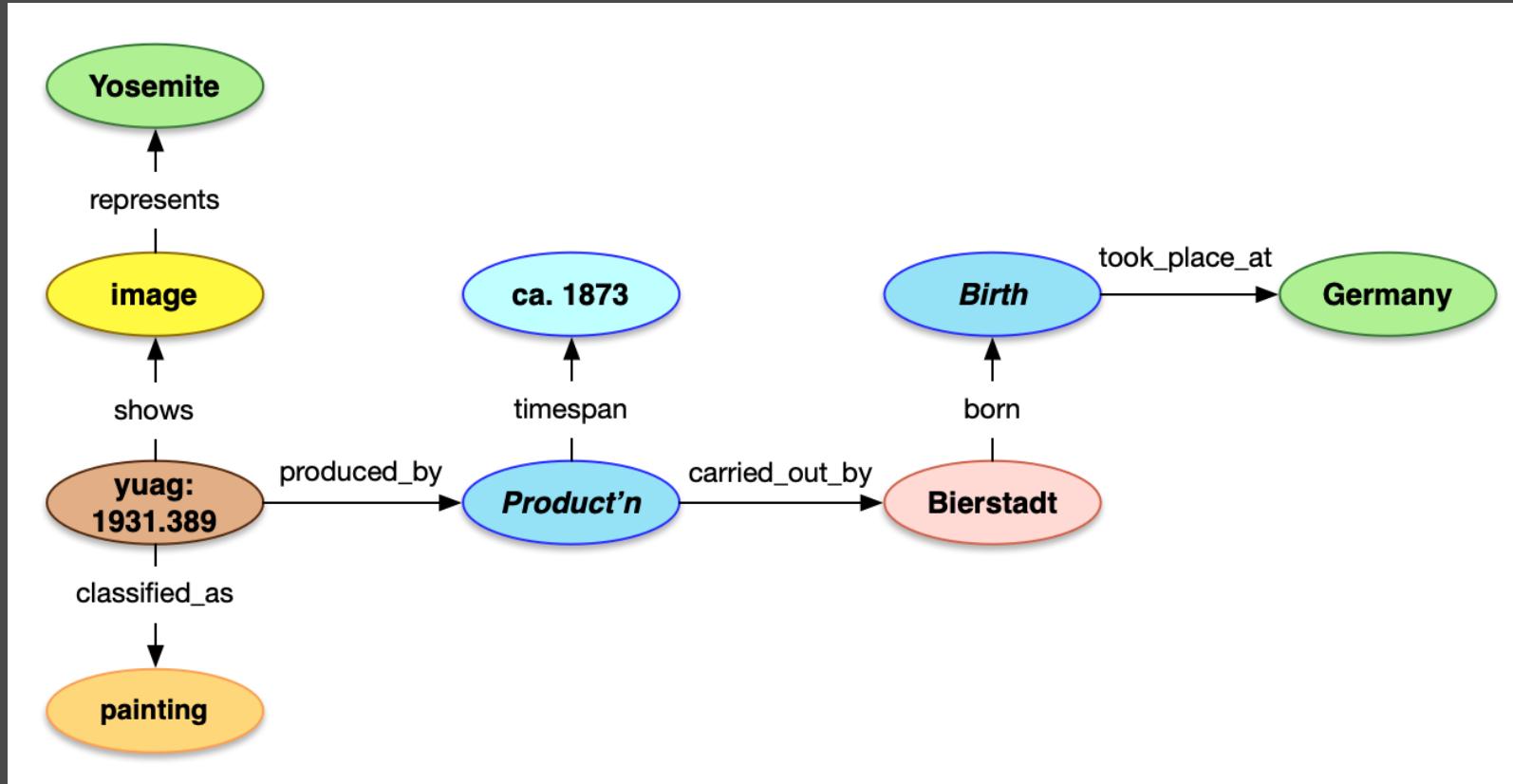
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Model



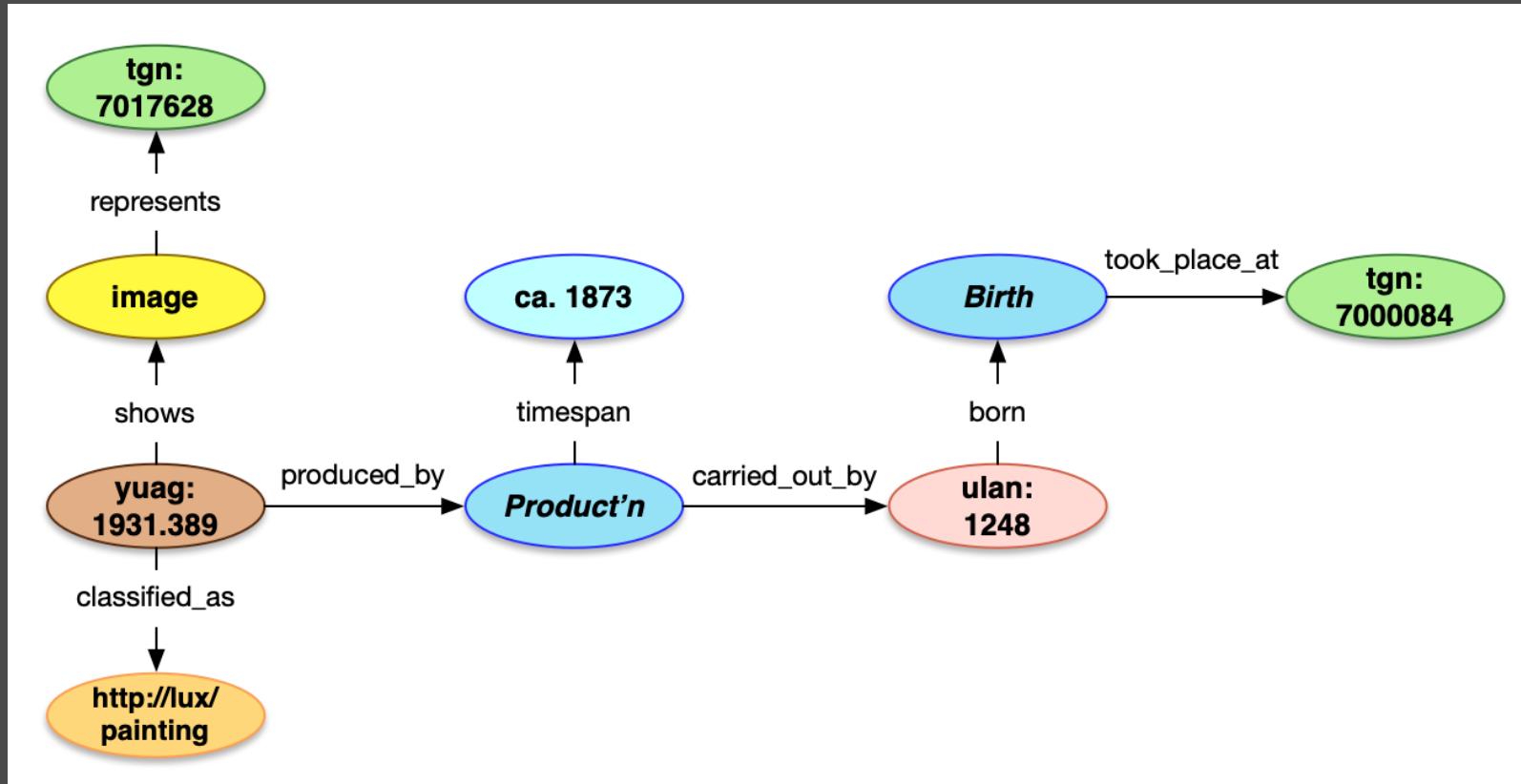
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Values from Data



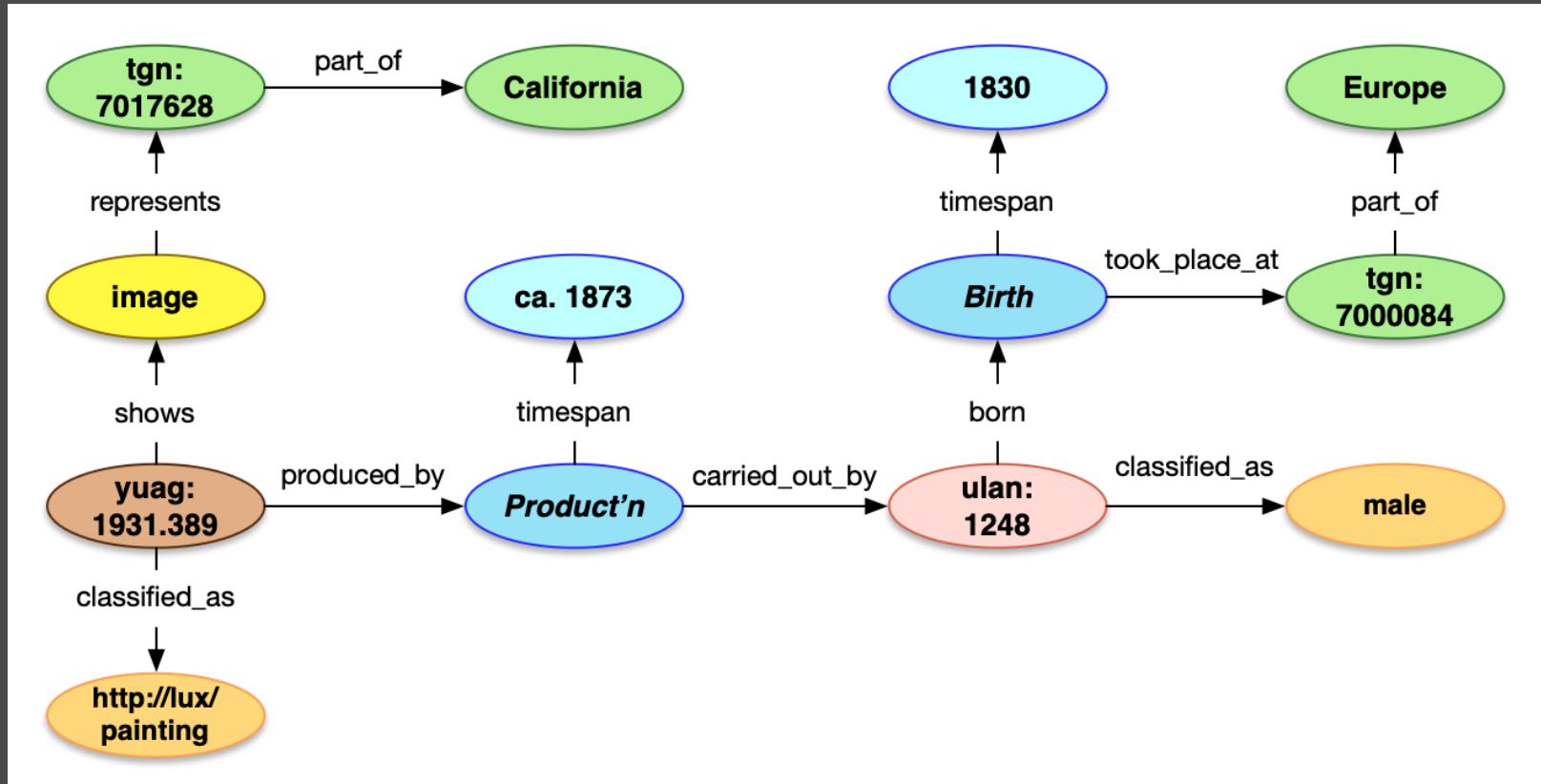
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Reconciled Entities



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Enriched from External Authorities



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LUX Data

- ~45 Million Entities (as JSON-LD)
- ~2.5 Billion Triples
- Reconciliation with and Enhancement from
 - Getty: AAT, ULAN, TGN
 - LC: LCSH, LCNAF, Vocabularies
 - OCLC: FAST, VIAF
 - Wikidata
- Currently v9 JSON to Linked Art JSON-LD, then enhanced

LUX Technology

- Licensed product after evaluation of 6 tech stacks
- Single system that manages JSON-LD as document and as triples
- Current architecture: 3 x 16 vCPU AWS nodes
- 14 hours to load and index
- Most queries sub-second responses
- Biggest challenge: generate faceted UI from the graph

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Thank You!

Discussion?



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