* and other essential elements

METADATA*
FOR DIGITAL PROJECTS:
THINKING ABOUT THE NUTS & BOLTS

Murtha Baca, PhD

University of San Diego DIGITAL SYMPOSIUM, April 2018

Agenda

1:00	**Introduction and goals for the workshop. Participants will introduce themselves and briefly describe the digital projects that they are planning or would like to do.**
1:15	Instructor's presentation (with class discussion and questions): overview of metadata formats; "Deep Web" versus "Visible Web;" controlled vocabularies, "project-specific vocabularies," social tagging; issues of access and metadata sharing; steps for developing a metadata strategy; entity-relationship diagrams and "storyboards."
2:30	Break
2:45	Participants work on storyboards for their specific projects, possibly including a simple conceptual model, data model, or entity-relationship model.
3:15	Participants present their proposed projects and the instructor and class discuss them.
3:45	Lessons learned, final thoughts, wrap-up
4:00	Conclude

"Making a Website" ≠ Doing a Digital Project

Images and other digital assets without accompanying metadata are mostly useless, and generally "unfindable," unsharable, and not re-usable.

Digital Projects— Why bother?

Information technology makes it possible to frame research questions in a computational way, to use electronic tools and new research methods to work (and collaborate!) more efficiently, and to ask new kinds of questions.

It also facilitates sharing of both raw data and research findings—*if data and metadata are carefully and thoughtfully formatted.*

The "Visible Web" versus the "Deep Web"

• The Visible Web is what you see in the results pages from commercial search engines like Google.

• The Invisible or Deep Web consists of data from dynamically searchable databases that are not automatically indexed by search engines, because they are not static HTML pages that "live" somewhere—they are created on the fly when a user does a search.

METADATA FOR THE WEB

- The Web is not a "library"!
- Web searching is very hit-and-miss
- Some "places" for Web metadata exist, but not all institutions implement them consistently:
- TITLE HTML tag
- DESCRIPTION META tag
- KEYWORDS META tag
- "No index, no follow" META tag

METADATA FOR THE WEB *CONTINUED*

The most important elements for search engine optimization (SEO) are:

- The HTML "TITLE" TAG (appears at the top of a web page, and is used to bookmark the page)
- The actual indexable text on the page
- Referring links (the Google "popularity contest")

Speaking of the Web...

- Will your digital resource be "reachable" by commercial search engines?
- If yes, how will you "contextualize" individual objects?
- If not, what is your strategy to lead Web users to your main page/search page?

Order from Chaos: The Pieces of the Puzzle

- ❑ Data (aka "metadata")
- ❑ Assets (e.g., images, media files, texts, bibliography, etc.)
- ❑ People (with clearly defined roles)
- ❑ Skill sets (e.g. cataloging, TEI markup, software administration, database management, copy editing, Web writing/editing, interface/UX design)
- ❑ Standards!

The Pieces of the Puzzle, *continued*

- ❑ Appropriate software AND software support
- ❑ Institutional support
- ❑ A project manager!
- ❑ Physical & virtual space to work, and an institutional "venue" to publish research and supporting data, and to maintain (or, eventually, "retire") resources

DOCUMENTS VERSUS DATA

- What is a Web page?
- What is a wiki?
- What is a blog?
- What is a database?
- What is structured data?

WHAT IS METADATA?

- "Metadata" is often used interchangeably (and confusingly) with "data."
- "Metadata" is often used to refer to meta tags on HTML pages on the Web.
- "Metadata" (like "data") is a plural word, but usually used as if it were singular.

WHAT IS METADATA?

A structured description of the essential attributes of an information object. (Tony Gill, Chapter 2, *Introduction to Metadata* 3.0)

Metadata is normally structured to model the most important attributes of the class of information objects being described (e.g., the MARC format).

WHAT IS METADATA?

Metadata is structured information associated with an object for purposes of discovery, description, use, management, and preservation.

from the NISO *Framework of Guidance for Building Good Digital Collections*, 3.0.

TYPES OF METADATA

- *Administrative*: for managing and administering information resources (e.g. location information, version control)
- *Descriptive*: for the description or identification of information resources (e.g. specialized indexes, finding aids, individual object records)

TYPES OF METADATA *(CONT.)*

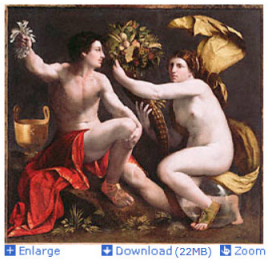
- *Preservation*: for the preservation management of information resources (e.g. documentation of data "refreshing" and migration)
- *Technical*: related to how a system functions or how metadata behaves (e.g. hardware and software documentation, tracking of system response times)
- *Use:* (e.g. use and user tracking, usability studies)

WHY IS METADATA IMPORTANT?

- for enhanced accessibility
- for retention of context
- for expanding use & sharing
- for multi-versioning
- for legal issues
- for preservation of data

Information standards and controlled vocabularies can help extricate us from our metadata dilemmas...

Allegory of Fortune



Enlarge Download (22MB) Zoom in

This image is available for download, without charge, under the Getty's Open Content Program.

Dosso Dossi
Italian, about 1530
Oil on canvas
70 1/2 x 85 1/2 in.
89.PA.32

Currently on view at
The Getty Center Los Angeles

What is a "record"?

Allegory of Fortune

Enlarge

Object Number: 89.PA.32
ObjectID: 943
Dept: Paintings
Permanent Collection

audio:
Audio: An Allegory of Fortune [open file]

Artist/Maker(s):
Dosso Dossi (Giovanni di Niccolò de Lutero) [Italian (Ferrarese), about 1490 - 1542]

Culture: Italian

Place Created: Italy
Full Geography

Classification/Object Type: Paintings/Painting

Medium: Oil on canvas

Date: about 1530

Dimensions: Unframed: 179.1 x 217.2 cm (70 1/2 x 85 1/2 in.) Framed: 214.6 x 228.6 x 8.9 cm (84 1/2 x 90 x 3 1/2 in.)

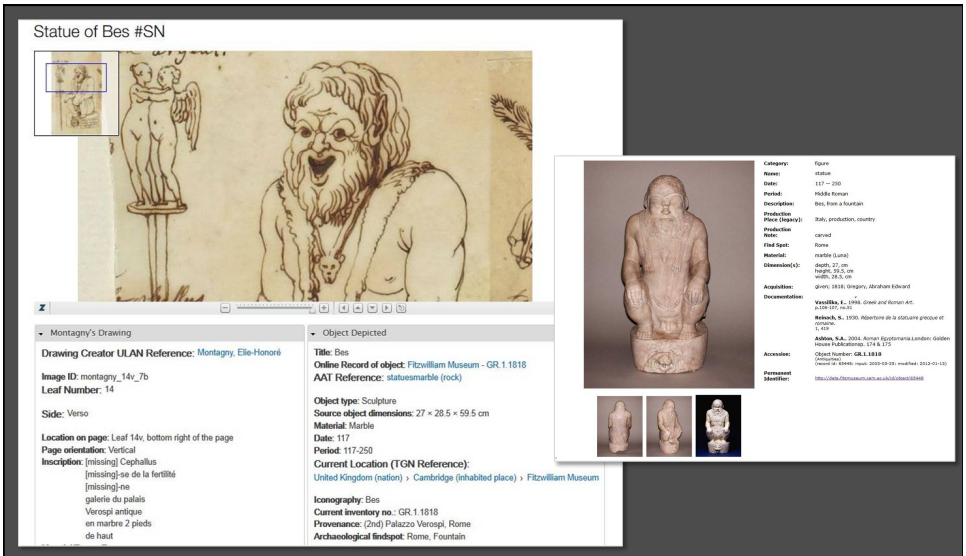
Description:
GettyGuide℠ Description

Current Location:
Center, Museum, North Pavilion, Gallery N205

Provenance:

- 1624	Possibly Cardinal Alessandro d'Este [Modena, Italy]
	Litta Collection [Milan, Italy]
- 1989	Private Collection [New England] (sold, Christie's, New York, January 11, 1989, lot 192, to Hazlitt, Gooden and Fox Ltd., London.)
1989	Hazlitt, Gooden & Fox Ltd., sold to the J. Paul Getty Museum, 1989.

Exhibition History:
"La prima donna del mondo": Isabella d'Este, Fürstin und Mäzenatin der Renaissance (February 13 to



Descriptive metadata records for an image in 19th-century album, the object depicted, and link to object on current repository's website (from the INHA "Digital Montagny" project)

DON'T GO INTO THIS BLINDFOLDED!

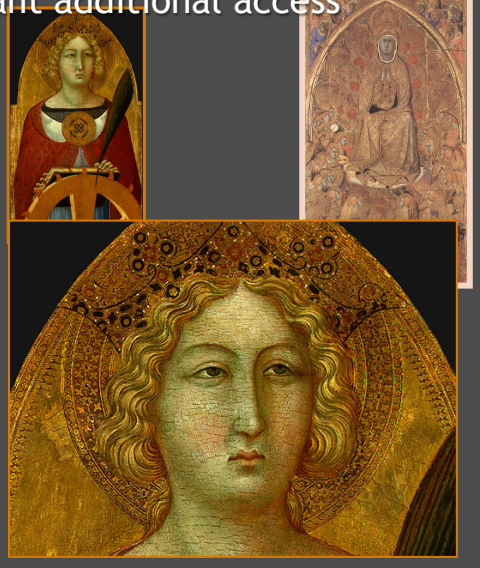
- ❑ What is the focus of your project, and what research questions do you want to ask?
- ❑ Where will your data come from?
- ❑ What is your source of labor?
- ❑ What are the intended users and uses?
- ❑ What is your data model?
- ❑ What standards will you follow?
- ❑ What will be the end-product?
- ❑ Where will your end-product "live"?
- ❑ How will users find it?

The Role of Language

Weeping Woman
Crying Woman
Femme qui pleure
La larmoyante
La Mujer que llora
La Mujer llorando
Donna che piange
Donna piangente

Controlled vocabularies reflect the critical & linguistic history of an person, object, concept, etc., and provide important additional access points

Bulgarini, Bartolomeo
Bartolomeo Bolgarini
Bartolomeo Bolghini
Bartolomeo Bulgarini
Bartolommeo Bulgarini da Siena
Maestro d'Ovile
Master of the Ovile Madonna
Ovile Master
Lorenzetti, Ugolino
Ugolino Lorenzetti



names from Getty Union List of Artist Names (ULAN)

Example from Getty Research Institute
Cultural Objects Name Authority
(CONA)

Αγία Σοφία

Ayasofya

Church of the Holy Wisdom

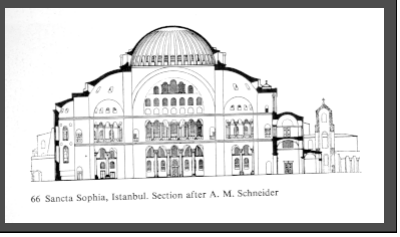
Hagia Sophia

Haghia Sophia

Saint Sophia

Sancta Sophia

St. Sophia



66 Sancta Sophia, Istanbul. Section after A. M. Schneider

Constantinople

Constantinopolis

Costantinopoli

Estambul

Istanbul

Konstantinopel

New Rome

Mikligard

Tsargrad

Tsarigrad

© The Hebrew University of Jerusalem & The Jewish National & University Library

names from Getty Thesaurus of Geographic Names (TGN)

Using language (and metadata) to reach broader audiences: this is where "collection-specific" or "resource-specific" controlled vocabularies can help.

cabinet?

desk?

chest?

cartonnier?

A Typology of Data Standards

(from *Introduction to Metadata*)

Type of Data Standard	Examples
Data structure standards (metadata element sets, schemas). These are "categories" or "containers" of data that make up a record or other information object.	*the set of MARC (Machine-Readable Cataloging format) fields, Encoded Archival Description (EAD), Dublin Core Metadata Element Set (DCMES), Categories for the Description of Works of Art (CDWA), VRA Core Categories*
Data value standards (controlled vocabularies, thesauri, controlled lists). These are the terms, names, and other values that are used to populate data structure standards or metadata element sets.	*Library of Congress Subject Headings (LCSH), Library of Congress Name Authority File (LCNAF), LC Thesaurus for Graphic Materials (TGM), Medical Subject Headings (MeSH), Art & Architecture Thesaurus (AAT), Union List of Artist Names (ULAN), Getty Thesaurus of Geographic Names (TGN), ICONCLASS*
Data content standards (cataloging rules and codes). These are guidelines for the format and syntax of the data values that are used to populate metadata elements	*Anglo-American Cataloguing Rules (AACR), Resource Description and Access (RDA), International Standard Bibliographic Description (ISBD), Cataloging Cultural Objects (CCO), Describing Archives: A Content Standard (DACS)*
Data format/technical interchange standards (metadata standards expressed in machine-readable form). This type of standard is often a manifestation of a particular data structure standard (type 1 above), encoded or marked up for machine processing.	*MARC21, MARCXML, BIBFRAME, EAD XML DTD, METS, MODS, CDWA Lite XML schema, Simple Dublin Core XML schema, Qualified Dublin Core XML schema, VRA Core 4.0 XML schema*

RELATIONSHIP BETWEEN "RECORDS" AND CONTROLLED VOCABULARIES: DATA "STRUCTURES" POPULATED WITH DATA "VALUES"

LINKED OPEN DATA (LOD): THE HOLY GRAIL?

DETERMINING WHAT METADATA IS NEEDED

- Who are your users? (current as well as potential) (e.g., library or registrarial staff, curators, professors, advanced researchers, students, general public)
- What information do you already have (even if it's only on index cards)?
- What information is already in automated form?
- What metadata categories & vocabulary tools are you currently using? Are they adequate for all potential uses and users? Do they map to any standard?

WHAT DATA DO YOU NEED?

- What common or core data is needed?
- What data do your various user groups need?
- What established metadata standards (e.g., MARC, METS, EAD, Dublin Core, VRA Core, LIDO) might fit the information needs of your collections and/or institution and your USERS?

DATA STANDARDS: ESSENTIAL STEPS

First Step: Select and Use Appropriate Metadata Element Sets

Data Structure Standards

(a.k.a. metadata standards)

✓ Guidelines for the structure of information systems: What elements should a database include?

✓ Meant to be customized according to institutional and/or project needs.

✓ MARC, EAD, MODS, Dublin Core, LIDO, VRA Core are examples of data structure standards.

Second Step: Select and Use Vocabularies, Thesauri, and Classifications

Data Value Standards

- ✓Data values are used to "populate" or fill metadata elements
- ✓ Examples are LCSH, AAT, TGM, MeSH, etc. , as well as "local" vocabularies

Data Value Standards continued

- ✓ Used as controlled vocabularies or authorities to assist with documentation and cataloguing.
- ✓ Used as research tools—vocabularies contain rich information and contextual knowledge.
- ✓ Used as search assistants in database retrieval systems and online collections.

Third Step: Follow Guidelines for Documentation

Data Content Standards

- ✓ Best practices for documentation (i.e., implementing data structure and data value standards)
- ✓ Rules for the selection, organization, and formatting of content.
- ✓ AACR (*Anglo American Cataloguing Rules)*, RDA (*Resource Description and Access*, the successor to AACR), DA:CS (*Describing Archives: A Content Standard*), CCO (*Cataloging Cultural Objects)*

Fourth Step:

Select the Appropriate Format for Expressing Data

DATA FORMAT STANDARDS

- ✓ How will you "publish" and share your data in electronic form?
- ✓ How will service providers obtain, add value, and disseminate your data?
- ✓ Candidates are Dublin Core XML; MARC21; MARC XML; VRA XML schema; LIDO XML schema; MODS, etc. And more recently—Linked Open Data (LOD).

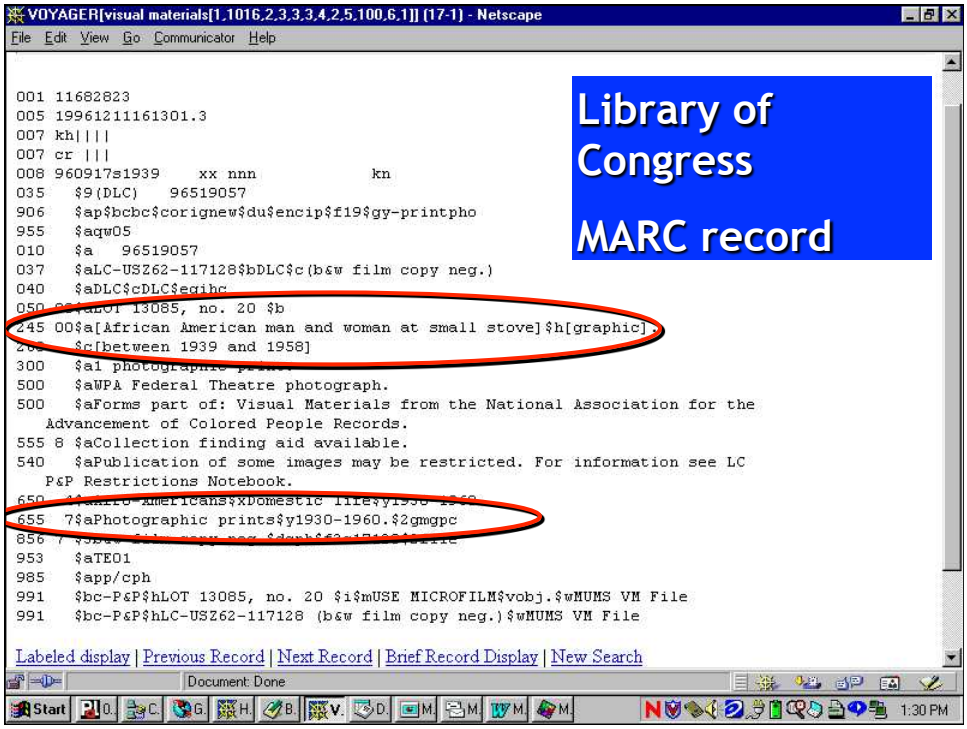
Looking at a tried-and-true metadata standard for libraries:

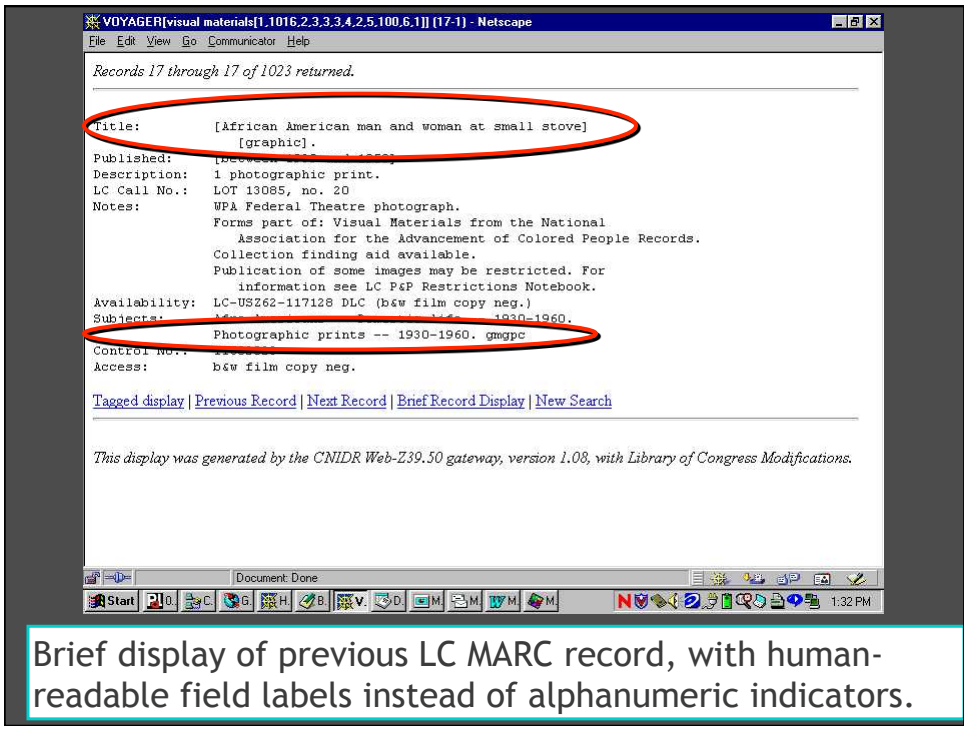
MARC

MARC (MACHINE-READABLE CATALOGING) FORMAT

- MARC is the technical "container" for the data in a bibliographic record (both a data structure and a data format standard)
- MARC records are formulated according to the Anglo-American Cataloguing Rules, 2nd edition, 1988 revision (AACR2), and now according to Resource Description and Access (RDA)
- MARC can be used to catalog books, audiovisual materials, sound recordings, computer files, and archival materials

  http://lcweb.loc.gov/marc/

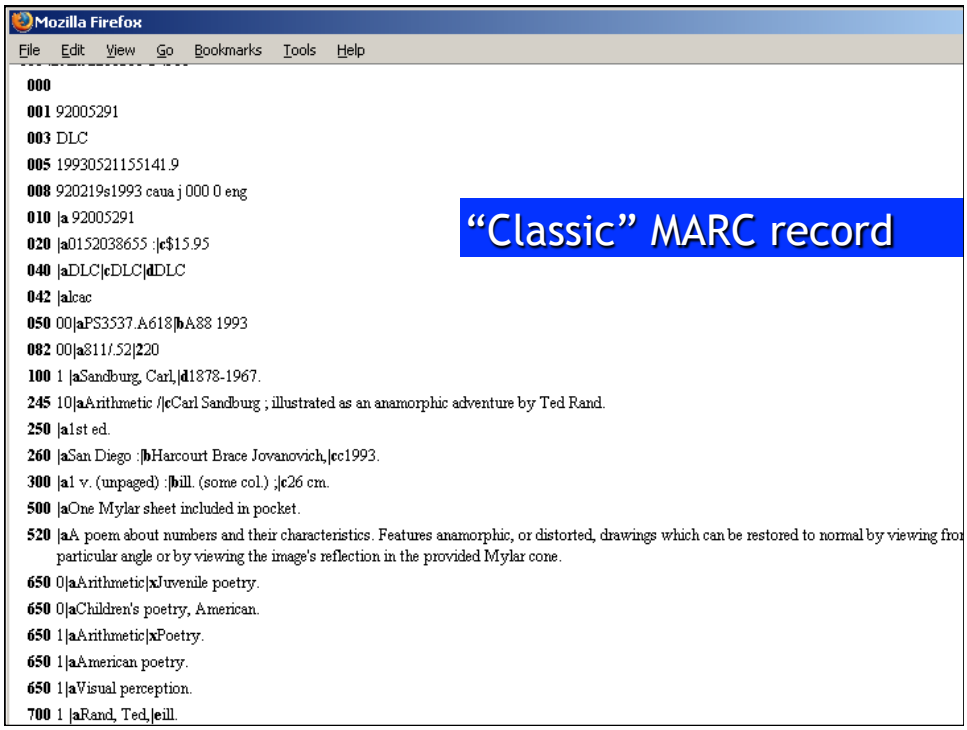


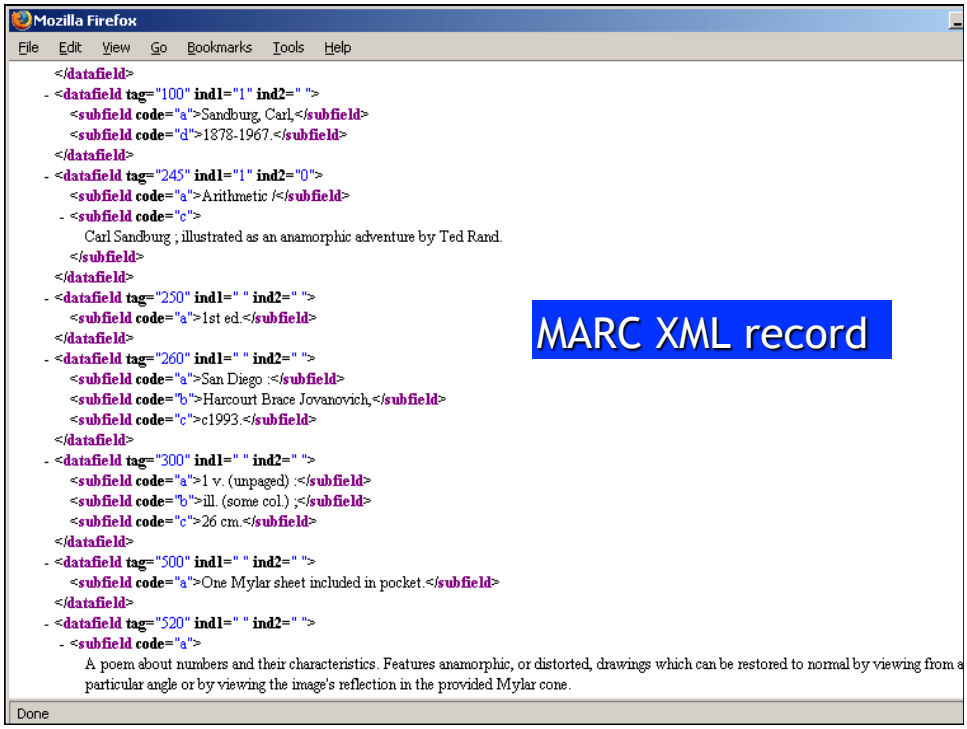


Brief display of previous LC MARC record, with human-readable field labels instead of alphanumeric indicators.

MARC records can also be expressed in XML format:

See http://www.loc.gov/standards/marcxml/





MODS:

RICHER THAN DUBLIN CORE, SIMPLER THAN MARC

METS:

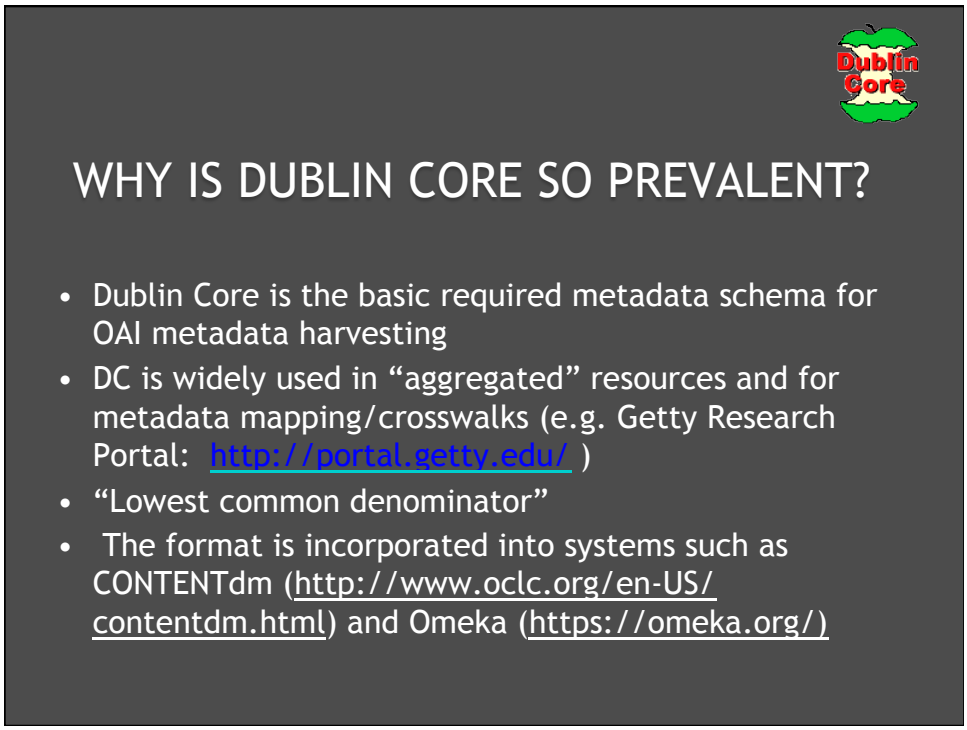
A METADATA "WRAPPER" FOR DIGITAL INFORMATION OBJECTS

METS

(Metadata Encoding & Transmission Standard)

METS is an XML schema designed for creating XML document instances that express the complex structure of digital objects, the names and locations of the files that comprise those objects, and the associated metadata.


dublincore.org
DUBLIN CORE:
"METADATA WITHOUT PAIN"?
Dublin Core Metadata Initiative®
Making it easier to find information.

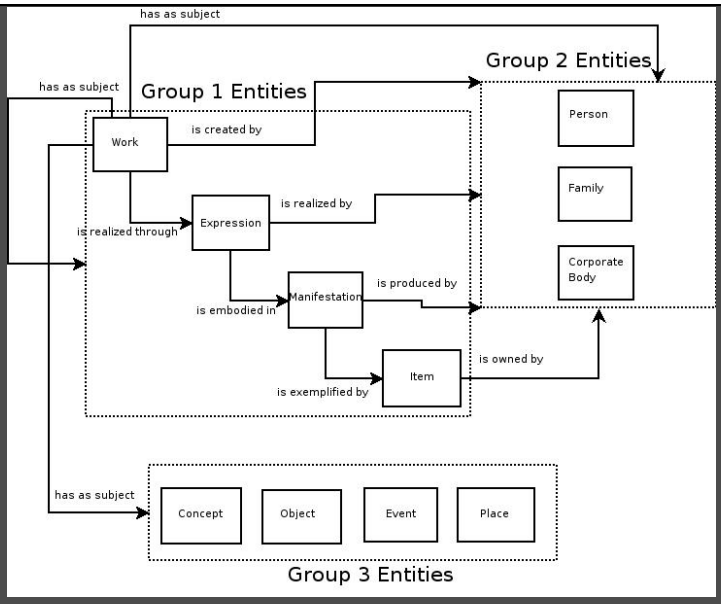

Dublin Core
WHY IS DUBLIN CORE SO PREVALENT?
• Dublin Core is the basic required metadata schema for OAI metadata harvesting
• DC is widely used in "aggregated" resources and for metadata mapping/crosswalks (e.g. Getty Research Portal: http://portal.getty.edu/)
• "Lowest common denominator"
• The format is incorporated into systems such as CONTENTdm (http://www.oclc.org/en-US/contentdm.html) and Omeka (https://omeka.org/)

THINKING ABOUT AND VISUALIZING DATA AND RELATIONSHIPS: ENTITY-RELATIONSHIP MODELS

ENTITY-RELATIONSHIP MODEL

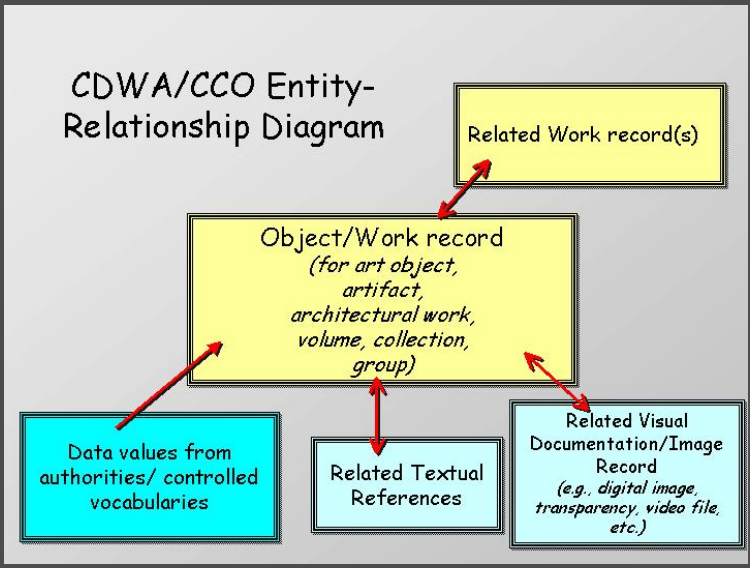
— first posited by Peter Chen of M.I.T. in 1976

http://portal.acm.org/citation.cfm?id=320440#abstract



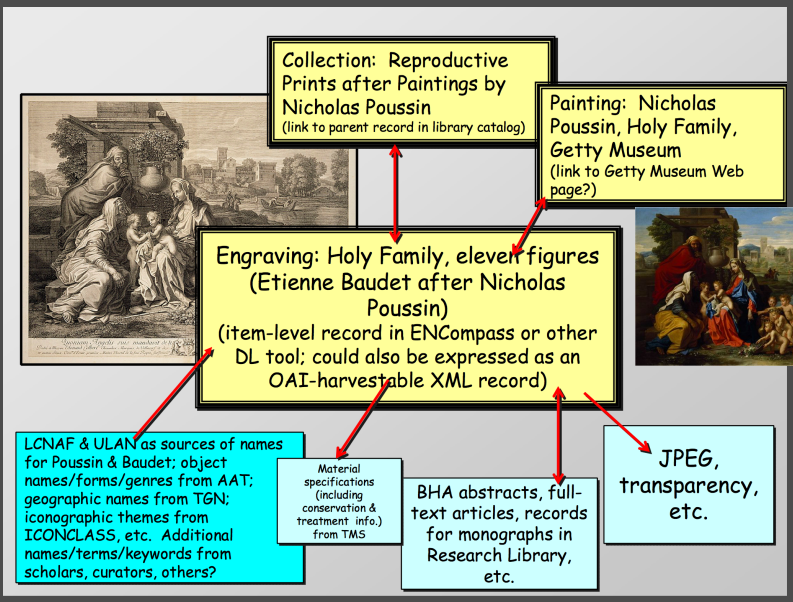
FRBR (Functional Requirements for Bibliographic Records)

Entity-Relationship Diagram

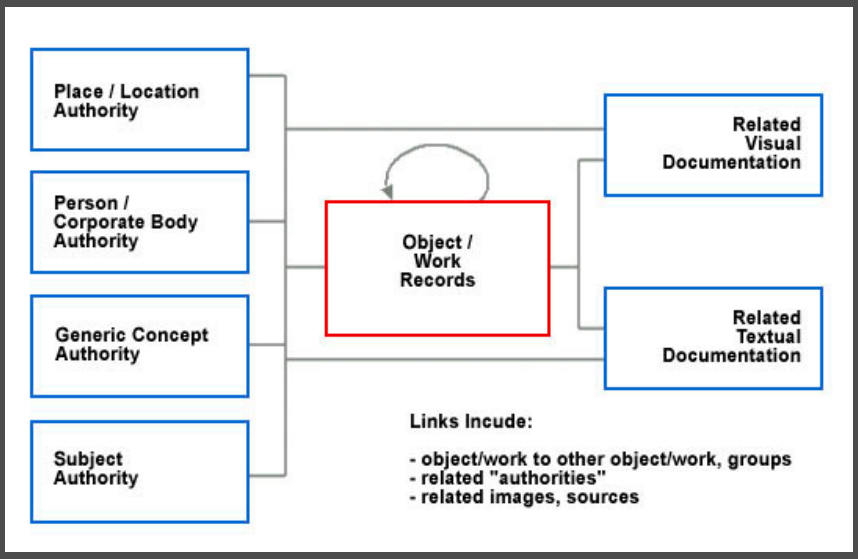


Cataloging Cultural Objects/CDWA

Entity-Relationship Diagram



Entity-relationship diagram of information and resources relating to item from Getty Research Institute Special Collections



Another simple visualization of the CCO/CDWA Entity-Relationship Model, stressing the use of authorities (aka controlled vocabularies)

storyboard

a sequence of drawings, typically with some directions and dialogue, representing the shots planned for a movie or television production.

MAIN POINTS TO ADDRESS

- What type of resource will you create? (e.g. searchable database, interactive website, data repository, digital publication, collection of digital objects, something else)
- Who are your intended users, and what do you expect they will want to do with your resource?
- Will your resource be "open content," and if so, what issues will you need to address? Will your data be "shareable?"
- What metadata standard(s) will you use, and why?
- What controlled vocabularies or thesauri will you use, and why?

MAIN POINTS TO ADDRESS *CONTINUED*

- Will the data for your digital resource be re-purposed from an existing source, created from scratch, or a combination of both?
- What is your strategy for the discoverability of your resource? (e.g. from search engines like Google and/or online catalogs like Worldcat). Will your resource be discoverable in multiple "places"?
- What resources (human, technical, monetary) will you need to build your resource?
- How will your resource be maintained and, if appropriate, updated?
- How will you measure success?

Over to you!