THE GETTY VOCABULARIES
AND LINKED OPEN DATA:
INTRODUCTION AND EDITORIAL PERSPECTIVE

revised September 2014

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The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

What are the Getty vocabularies?

- *Catherine wheel* or *rose window*? *Mona Lisa* or *La Gioconda*?

- The AAT, TGN, ULAN and CONA contain multilingual terminology and other related data to describe
  - visual art, architecture, other cultural heritage works, conservation, archaeology, archival materials, visual surrogates, and related bibliographic materials

The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

- Getty vocabularies are valued as authoritative
  - Grow through contributions from experts
  - Contributors and sources are cited

- Compiled, merged, edited, and published by the Getty Vocabulary Program and our talented, tireless technical team

- **Data is made available in various ways:** via online searching; relational tables, XML format, Web services APIs
  - **Now as Linked Open Data**: structured and published to make it openly accessible and shareable on the Semantic Web
    - **Open Data Commons Attribution License (ODC-By) v1.0**
    - Allows sharing, creation, adaptation of data with attribution

The Getty Vocabularies

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How can the Getty vocabularies be obtained?

- Consult the vocabularies on the Getty Web site, free of charge, by searching individual terms and names

- Raw data files may be licensed from the Getty in relational tables and XML format and through Web services APIs

Union List of Artist Names® Online

Search the ULAN | ? Help
Find Name or ID: | bartolo di fredi | Search
Role: | | Clear
Lookup
Nationality: | |
Lookup

Pop-up Search   Browse the ULAN hierarchies

Visits
1 | | | | | 547

The Getty Vocabularies

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Search Tools & Databases

- Primo Search
- ▸ Getty Research Portal
- Collection Inventories & Finding Aids
- ▸ Photo Archive
- ▸ Research Guides & Bibliographies
- Digital Collections
- ▸ Article & Research Databases
- ▸ Collecting & Provenance Research
- BHA & RILA
- ▾ Getty Vocabularies
  - ▸ Art & Architecture Thesaurus (AAT) ®
  - ▸ Cultural Objects Name Authority (CONA) ®
  - ▸ Getty Thesaurus of Geographic Names (TGN) ®
  - ▸ Union List of Artist Names (ULAN) ®
  - Contribute
  - Editorial Guidelines
  - Getty Vocabularies as Linked Open Data
  - Frequently Asked Questions

Getty Vocabularies as Linked Open Data

The Getty vocabularies are constructed to allow their use in linked data. A project to publish AAT, TGN, ULAN, and CONA to the LOD (Linked Open Data) cloud is underway. The documents on this page contain news and presentations about releasing the Getty vocabularies as LOD. These materials are subject to frequent modification and addition.

Linked Open data
GETTY VOCABULARIES

- News and Status of the Project
- What Is LOD?
- Introduction to Getty Vocabularie
- Linked Open Data Flier (PDF, 1 M
- List of External Advisors (PDF, 88

The AAT and TGN are now available a license.

- **Developers and programmers,** documentation to help you explore the AAT and TGN data is available at the SPARQL endpoint at vocab.getty.edu

- **Linked Open Data:** AAT, TGN, ULAN, and CONA will be released sequentially as Linked Open Data (LOD) through 2015
- AAT and TGN were released in 2014, published in SKOS and SKOS-XL formats under the ODC-BY 1.0 license

The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

- Getty vocabularies are thesauri compliant with national (NISO) and international (ISO) standards for thesaurus construction

- They are compliant with / map to other standards:
  - CDWA (Categories for the Description of Works of Art)
  - CCO (Cataloging Cultural Objects)
  - VRA Core (Visual Resources Association core categories)
  - LIDO (Lightweight Information Describing Objects)
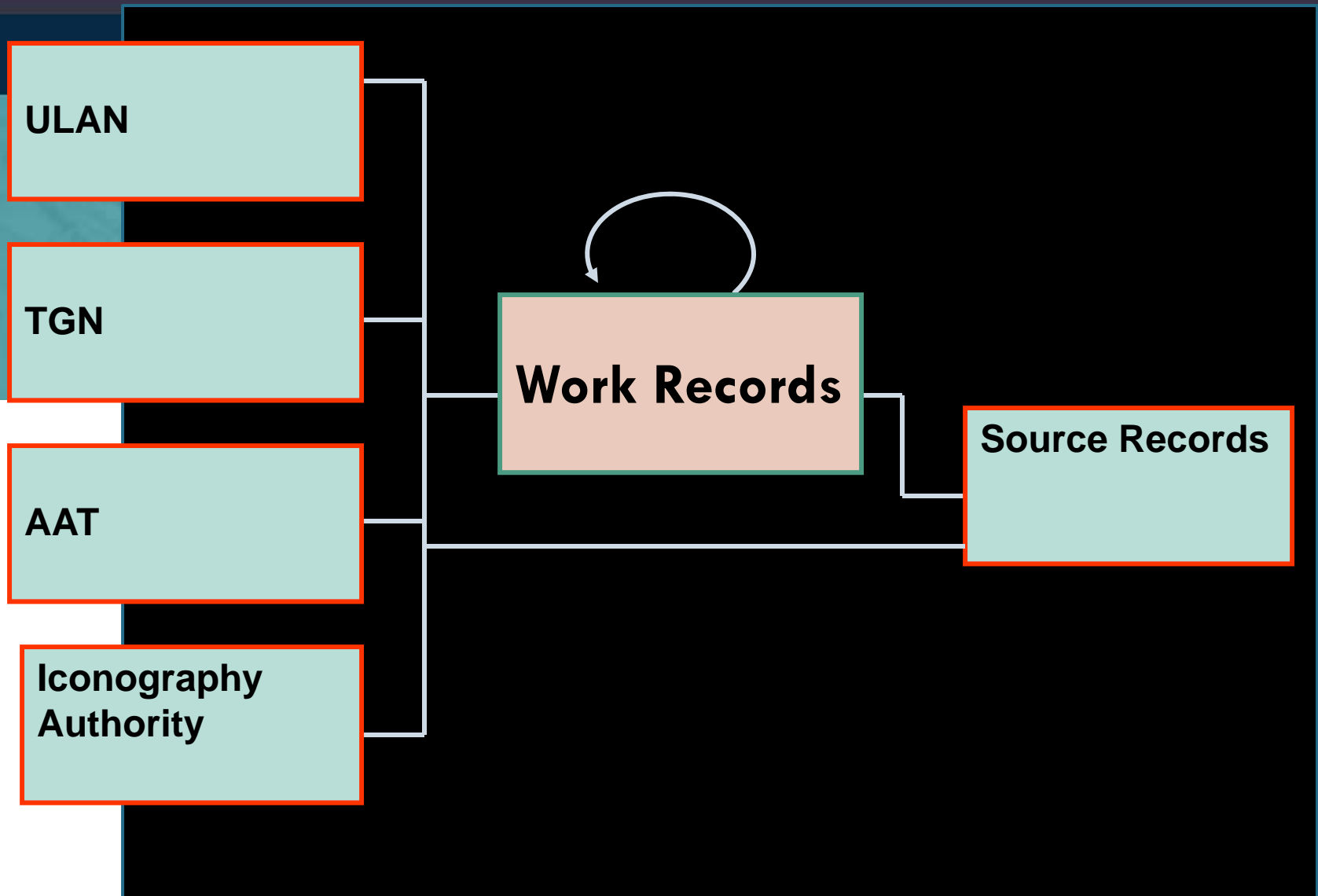 - CIDOC CRM (CIDOC Conceptual Reference Model) (ISO 21127:2006)
  - etc.

The Getty Vocabularies

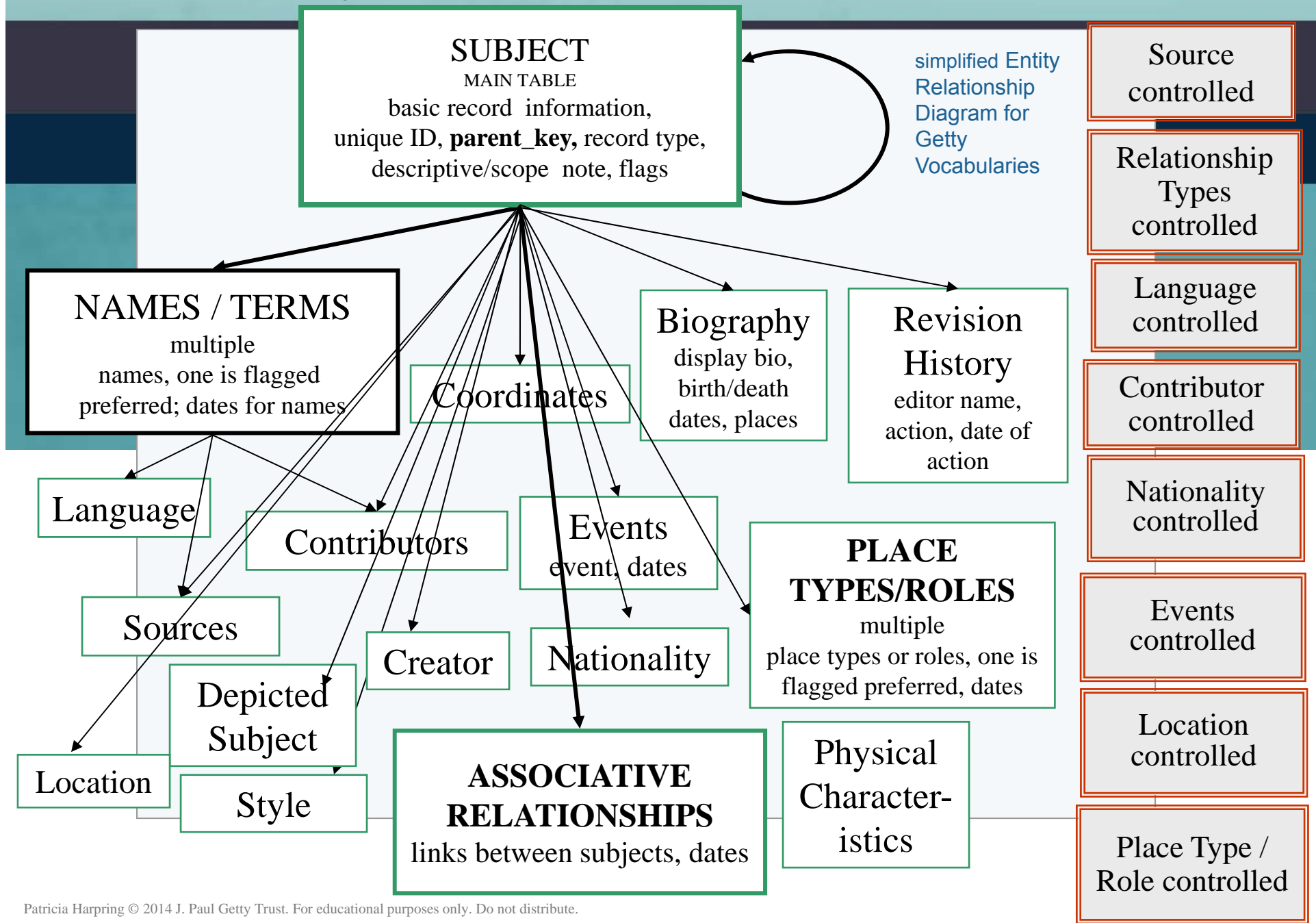Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

- Among the features that allow the Getty vocabularies to be used in cataloging, retrieval, and linking are the following:

  - Each Getty vocabulary records and terms are identified by **unique numeric IDs**
  - The Getty vocabularies are linked to each other
  - The Getty vocabularies share a core data structure

The Getty vocabularies are linked to each other

ULAN

TGN

AAT

Iconography Authority

Work Records

Source Records

The Getty vocabularies share a core data structure

SUBJECT
MAIN TABLE
basic record information,
unique ID, **parent_key,** record type,
descriptive/scope note, flags

simplified Entity
Relationship
Diagram for
Getty
Vocabularies

NAMES / TERMS
multiple
names, one is flagged
preferred; dates for names

Coordinates

Biography
display bio,
birth/death
dates, places

Revision History
editor name,
action, date of
action

Language

Contributors

Events
event, dates

PLACE TYPES/ROLES
multiple
place types or roles, one is
flagged preferred, dates

Sources

Creator

Nationality

Depicted Subject

Location

Style

ASSOCIATIVE RELATIONSHIPS
links between subjects, dates

Physical Character-istics

Source controlled

Relationship Types controlled

Language controlled

Contributor controlled

Nationality controlled

Events controlled

Location controlled

Place Type / Role controlled

The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

The LOD Team

- The majority of the work is being done by our in-house team, but we have established an open community and welcome collaboration: *vocabLOD@getty.edu*

- **The team**

Getty ITS	*Outside consultant, Ontotext*
Joan Cobb	Vladimir Alexiev
Gregg Garcia	

  Getty Vocabulary Program (GRI)
  Patricia Harpring, Jon Ward, Antonio Beecroft, Robin Johnson

  ITS and GRI joint LOD steering committee
  Murtha Baca, David Farneth, Joe Shubitowski, Mike Clardy, Marilyn Gillette, Joan Cobb, Gregg Garcia, Patricia Harpring

  External Advisors (*see list on our LOD page*)

How are vocabularies used?

Record Type: item

Object Type: **watercolor (AAT)**

Title: Henderson as Falstaff

Creator Display: Victor Moblard (American, born 1851 in Sweden), after an etching by John Kay (British caricaturist, 1742-1826)

Related People: artist: **Victor Moblard (ULAN)**

artist: **John Kay** (work depicted) **(ULAN)**

Materials and Techniques: drawing, watercolor on wove paper

Terms: **drawing (AAT) ; watercolor (AAT) ; wove paper (AAT)**

Dimensions: 14 x 9 1/2 inches

Date of Creation: late 19th century

Inscription: below figure: HENDERSON as FALSTAFF. / "I never see thy nose, but I think upon hellfire." / Kay fec 1785 ⟵ **(TGN)**

Locations: current: **Folger Shakespeare Library (Washington, DC, USA) (ULAN)**

address note: ART Box M785 no.3 (size L)

ID: Hamnet Holdings ID: 337094

Provenance: former owner: Toedteberg, Augustus, 1823-1826

Subjects: **literary theme (general); portrait (general)**

Falstaff, John, Sir (fictional character) (IA)

man (male human) (AAT) ; Henderson, John (British actor, 1747-1785) (ULAN)

Note: Kay's depiction may refer to a provincial performance of the play ....

Sources: Folger Shakespeare Library [online]

- **Various fields in a work record are controlled by vocabularies**
- **The work record itself could be contributed to CONA**
- **Getty vocabularies may be linked to others (VIAF, GIS, etc.)**

Scope and Content
of the Getty Vocabularies

AAT   TGN   ULAN   CONA

amfoor
amphorae
arc-boutant
brittleness
Buddhism
calligraphy
emulsifier
façades
flying buttress
飛扶壁
lithographer
litógrafos
luchtbogen
orthogonal plan
Macedonian
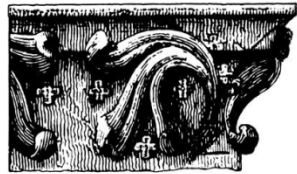millwork
Rinascimento
stupa
Sturzbecher
travertine
weft wrapping
yastiks
zeppelin
Zigula
zinc oxide

AAT, the Art & Architecture Thesaurus®

Generic terms for describing art and architecture (decorative arts, other material culture, visual surrogates, archival materials, archaeology, and conservation) (e.g., *oil paintings, Baroque, lithographers, sintering*).
Current totals: 36,000 records; 245,000 terms

- AAT is multilingual; large translation projects are underway

- Conceptually organized from terms to describe abstract concepts to generic terms for concrete, physical artifacts
- Facets are the upper levels of the AAT structure
- AAT is not organized by subject matter or discipline

Associated Concepts	Physical Attributes	Styles and Periods	Agents	Activities	Materials	Objects

AAT, the Art & Architecture Thesaurus®

Thesaural relationships

hierarchical

Objects Facet
.... Furnishings and Equipment
.... Containers
.... culinary containers
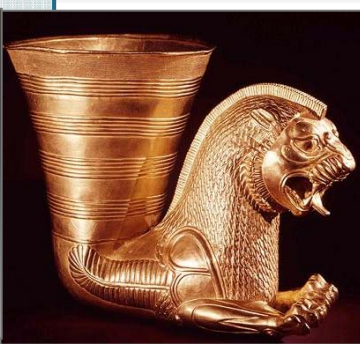**............... <vessels for serving / consuming food**
....

stirrup cups
coaching glasses
hunting glasses

associative

sturzbechers
Sturzbecher
stortebekers

rhyta *equivalence*
rhyton
rhytons
rhea
rheon
rheons
ritón

distinguished from

amfoor
amphorae
arc-boutant
brittleness
Buddhism
calligraphy
emulsifier
fa...
fly... ...ress
飛...
lithographie
litóg...
luch...
orth...
Maced...
millwork
Rinascimen...
stupa
Sturzbecher...
zinc oxide

AAT, the Art & Architecture Thesaurus®

Sample record

ID: 300132869

Terms:
bobbin lace (pref, en)
bone lace (en)
cushion lace (en)
梭心蕾絲 (zh)
線軸編織花邊 (zh)
kloskant (nl)
dentelle aux fuseaux (fr)
encaje de bolillos (es)
encaje de bolillo (es)
Klöppelspitze (de)
Klöppelspitzen (de)

Associative Relationships
requires ... lace pillows (<textile fabricating tools and equipment>...Objects Facet) [300132869]

Hierarchical Relationships (poly)
.Objects Facet
... Visual & Verbal Communication
..... Visual Works
.... visual works (works)
.... <visual works by material >
.... needlework (visual works)
.... lace (needlework)
.... bobbin lace

Contributors: VP,CHIN,AS,RKD,IfM-SMB-PK,CDPB-DIBAM
Sources: Earnshaw, Clabburn, Needleworker's Dictionary (1976); Identification of Lace, 2d ed. (1984); Ginsburg, Illustrated History of Textiles (1991)

Note: With "needle lace," one of two primary types of handmade lace. It is characterized by being made by ...

Chinese (traditional) ..... 與「針織蕾絲（needle lace）」同為主要的手工蕾絲，其特色是以纏繞於線軸或梭心...

Dutch ..... Een van de twee belangrijkste soorten met de hand vervaardigde kant; 'naaldkant' is ...

German ..... Zusammen mit der "Nadelspitze" eine der wichtigsten...

Spanish ..... Junto a "encaje a aguja", uno de los dos tipos principales de ...

Research

Art & Architecture Thesaurus® Online
Full Record Display

🔍 New Search   ◂ Previous Page

Semantic View (JSON, RDF, N3/Turtle, N-Triples)

Translations are underway

bobbin lace (**preferred**,C,U,LC,English-P,D,U,)
bone lace (C,U,English,UF,U,N)
cushion lace (C,U,English,UF,U,N)
lace, bobbin (C,U,English,UF,U,N)
pillow lace (C,U,English,UF,U,N)
梭心蕾絲 (C,U,Chinese (traditional)-P,D,U,U)
線軸編織花邊 (C,U,Chinese (traditional),UF,U,U)
骨架花邊 (C,U,Chinese (traditional),UF,U,U)
枕墊花邊 (C,U,Chinese (traditional),UF,U,U)
suō xīn lěi sī (C,U,Chinese (transliterated Hany)
suo xin lei si (C,U,Chinese (transliterated Piny)
so hsin lei ssu (C,U,Chinese (transliterated Wa)
kloskant (C,U,Dutch-P,D,U,U)
dentelle aux fuseaux (C,U,French-P,D,U,PN)
merletto a tombolo (C,U,Italian-P,D,U,PN)
encaje de bolillos (C,U,Spanish-P,D,U,PN)
encaje de bolillo (C,U,Spanish,AD,U,SN)
Klöppelspitze (C,U,German,AD,U,SN)
Klöppelspitzen (C,U,German-P,D,U,PN)
Klöppelspitzen (C,U,German-P,D,U,PN)

- **Getty Conservation Institute** (Los Angeles, California)
- **Academia Sinica** (Nankang, Taiwan)
- **Netherlands Institute for Art History** (RKD: Bureau AAT) (The Hague, The Netherlands)
- **Centro de Documentación de Bienes Patrimoniales** (Dirección de Bibliotecas, Archivos y Museos) (Santiago, Chile)
- **Staatliche Museen zu Berlin Preussischer Kulturbesitz** (Berlin, Germany)
- *[Canadian Heritage Information Network (CHIN) (Gatineau, Quebec, Canada), Istituto Centrale per il Catalogo e la Documentazione (Rome, Italy)(ICCD)] and other contributors of partial translations; future translations in French, Italian, Portuguese, other languages*

Angel Falls
Athens
Athínai
Αθήναι
Ayers Rock
Bay of Biscay
Bhārat
Bora-Bora
Burkina Faso
Casablanca
Chichén Itzá
Donner Pass
Firenze
Gdansk
Holy See
Los Alamos
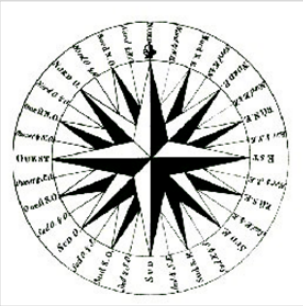Luxor
Micronesia
New Zealand
Perú
Rapa Nui
Taipei
臺北
Toronto
Yisrael

TGN, the Getty Thesaurus of Geographic Names®

Names, other information for current & historical administrative places (cities, nations, empires) and physical features (e.g., *Firenze, Roman Empire, Ganges River*).
Current totals: 1,241,000; 1,800,000 names

- It includes formerly inhabited places, archaeological sites, and historical places with unknown exact locations (i.e., "lost settlements")

- It focuses on places important to study of art and related disciplines

- It grows through contributions from large national geographic databases, the expert user community, archaeology projects, scholars, etc.

TGN, the Getty Thesaurus of Geographic Names®

Sample record

ID: 7011179

Names:
Siena (it,en,es,fr,nl,de)
Σιένα (el)
Siyenah
锡耶纳 (zh)
シエーナ (ja)
Sienese (en-adj)
Sienna (h-en)
Sena Julia (h-la)
Sanna (h)
Saena (h)

Hierarchical Rels. (polyhier.)

World (facet)
.. Europe (continent)
... Italy (nation)
.... Tuscany (region)
...... Siena (province)
.... Siena (inhabited place)

World (facet)
.. Europe (continent)
... Italian Peninsula (peninsula)
..... Etruria (former confederation)
.... Siena (inhabited place)
Historical: Late Etruscan

Associative Rels

ally of Pisa ..(inhabited place) [7006082]
Ghibelline allies, 13th-14th centuries

Place Types

inhabited place   settled by Etruscans
(flourished by 6th century BCE)
city
archiepiscopal see   **AAT**
commune (administrative) since 1125
cultural center
university center
world heritage site

Lat: 43 19 07 N (43.3180)
Long: 011 19 50 E (11.3300)
Elevation: 1056.430 feet (322.0000 meters)

Note: Siena was founded as an Etruscan hill town; later was the Roman city of Sena Julia (3rd century BCE). It flourished under the Lombard kings (6th century CE) and was Medieval self-governing commune ...

Contributors: BHA, FDA, GRLPSC, VP
Sources: Annuario Generale (1980); Canby, Historic Places (2007) 2/861; Dizionario Corografico Toscana (1977) 1508; Library of Congress Subject Headings (2002-); Milanesi, Storia dell'Arte Senese (1969) passim; NGA/NIMA database (2003-) -129709; TCI: Toscana (1984) 479 ff; Times Atlas of the World (1992) 183; UNESCO World Heritage Centre [online] (1992-) accessed 20 July 2010; Webster's Geographical Dictionary (2007) 1114

Images by be under additional copyright

Achilles Painter
An Qi
安岐
Bartolo di Fredi
Burgkmair, Hans, the elder
Galleria degli Uffizi
Gilbert & George
Katsushika Hokusai
Kicking Bear
Master of Boí
Méraud, Pierre-Antoine, père
Ngapatari, Hakaraia
O'Keeffe, Georgia
Pei, I. M.
Rothko, Mark
Saʿīd, Mahmūd
Skidmore, Owings & Merrill
unknown Mende
Vikramaditya I
Wren, Christopher
Zeuxiades
Ζευξιάδης

ULAN, the Union List of Artist Names®

Names, other information for people (artists, patrons, sitters) and corporate bodies (repositories, studios) related to the design, creation, patronage, collection, conservation, etc. of art, architecture, and other cultural materials (e.g., *Bartolo di Fredi, National Palace Museum*)
Current totals: 223,000 records; 582,000 names

- It includes current and historical associative relationships (e.g., *student-teacher*, *firm-member*)
- Contributions to ULAN are from expert communities (museums, art libraries, cataloging projects, etc.)
- ULAN is contributed to the Virtual International Authority File (VIAF) (joint project with US Library of Congress and numerous libraries worldwide to combine name authority)

ULAN, the Union List of Artist Names®

Sample record

ID: 500115493

Names:

Dürer, Albrecht (pref,de,en)
Albrecht Dürer
Duerer, Albrecht (en)
Durer, Albrecht (en)
Dürero, Alberto (it)
Durerus, Albertus (la)
Direr, Albreht
Djurer, Albrecht
Dyûrâ, Albrecht
Dĩrers, Albrehts
Alberto Duro Tedesco
デューラー, アルブレヒト (ja)
阿尔布雷希特·丢勒 (zh)

Nationalities:

German (pref)
Bavarian

AAT

Roles:

artist (preferred)
painter
printmaker
engraver (printmaker)
woodcutter
draftsman
illustrator
designer
mathematician
theorist
portraitist
religious artist

Gender: male

Birth and Death Places:

Born: Nuremberg (Bavaria, Germany) (inhab place)
Died: Nuremberg (Bavaria, Germany) (inhab place)

AAT   TGN

Events:

active: Nuremberg (Bavaria, Germany) (inhab pl)
active: Venice (Veneto, Italy) (inhabited place)

Associative Relationships:

apprentice of Wolgemut, Michael; 1486 to 148
..............(German painter, printmaker, 1434/1437-1519)
child of Dürer, Albrecht, the elder
.............(German goldsmith, 1427-1502)
founder of ...Albrecht Dürer Workshop
.... (German workshop, established 1495)
patron was ...Maximilian I, Holy Roman Emper
.... (Roman emperor, 1459-1519)

Contributors:
VP,JPGM,Avery,WCI,Prov,GRLPSC,BHA,CCA
Sources: Bartrum, Albrecht Dürer and his Legacy
(2002); Bénézit, Dictionnaire des Peintres (1976;
Bartsch, Le peintre graveur.

Adoration of the Magi
Tree of Life Quilt
Bhimesvara Temple
Cane Back Chair
Château de Versailles
Das Treffen der
    Heiligen Drei Könige
Empire State Building
Himeji Castle
姫路城
Irises
La Gioconda
Model for the Façade
    of San Lorenzo
Mona Lisa
MS Ludwig XV
Pantheon
Portrait of Napoleon
Square Ting Vessel of
    Duke Kang
西周早期 康侯方鼎
Still Life with Flowers
Venus and Cupid
Warrior on Horseback
Zwaardstootplaat

CONA, the Cultural Objects Name Authority®

Titles, other information for moveable works (paintings, sculpture, prints, drawings, photographs, ceramics, etc.) and architecture (buildings, bridges, etc.) (e.g., *Hagia Sophia, Mona Lisa, Fantastic Landscape with a Pavilion*).

Current totals: [5,500 records; 9,300 titles]

- It includes works executed or designed (e.g., a built work for which only design drawings exist); extant or destroyed / historical

- CONA is a thesaurus; it is also mapped to <u>CDWA, CCO, CIDOC CRM, and LIDO</u>

- CONA grows through contributions from repositories of art and the expert cataloging and scholarly community

CONA, the Cultural Objects Name Authority®

Under discussion are the possible applications of CONA:

Perhaps in the future

- CONA could be a resource to link the Getty vocabularies to records for art and architecture (in LOD or otherwise)

- CONA could link subject terminology to art and architecture records

- CONA could facilitate linking between works, including works held in different repositories but having historical relationships (e.g., studies, disassembled manuscripts, etc.)

CONA, the Cultural Objects Name Authority®

Sample record

1. CONA could link work records to Getty vocabularies

ID: 700001950

Titles:
Shiva met de maan in het haar (nl)
Shiva with the Moon in his Hair (en)

Catalog Level: item

Work Types:
sculpture (visual work) **AAT**

Classifications:
sculpture (preferred)

Creation Date: 1000/1200

Creator Display:
anoniem
sculptor: unknown Chola **ULAN**

Locations: **ULAN** **TGN**
Current: Rijksmuseum (Amsterdam, North Holland, Netherlands) AK-MAK-1291; RM001.collect.910; Bruikleen van de Vereniging van Vrienden der Aziatische Kunst
Creation: Tamil Nādu (India)

Materials: bronze founding **AAT**
Dimensions: 40 cm (height) x 24cm (width) x 10.5 (depth)
Events: exhibition: Metamorfoze/Geheugenproject Willem Witsen **AAT**
Cultures:
Indian   Chola **AAT**

General Subject:
human figure(s) (preferred)
religion and mythology

AAT
TGN
ULAN
CONA
CONA IA

Specific Subjects:
Shivá (Hindu iconography)
mudrā (pose, <visual and representational concepts>)
[link to Iconclass]

Contributors & Sources: [Rijksmuseum;VP]; Rijksmuseum XML file
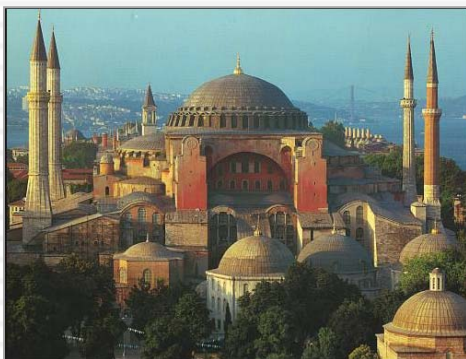
CONA, the Cultural Objects Name Authority®

Sample record

ID: 700000141

Titles/Names:

Hagia Sophia (en,de,nl)
Ayasofya (tr)
Αγία Σοφία (el)
Agia Sofia
Haghia Sophia
Sainte-Sophie (fr)
Santa Sofía (es)
Santa Sofia (it)
Sancta Sophia (la)
Sancta Sapientia (la)
Holy Wisdom (en)
Saint Sophia (en)
聖蘇菲亞大教堂 (zh)

Work Types: church; mosque; museum   **AAT**

Date: original structure dated from 4th century CE; present structure built 532-537 CE; rebuilt in 12th century

Creators: Anthemios of Tralles (Byzantine architect, ca. 474-ca. 534) and Isidoros of Meletus, the Elder (Byzantine architect, active mid-6th century);   **ULAN**
Patron: Justinian I (Byzantine emperor, ca. 482-565)

Built Work
... Hagia Sophia
Associative Relationship
depicted in *View of the Hagia Sophia in Constantinople*; Eduard Hildebrandt; watercolor; ca. 1852; Hermitage Museum (Saint Petersburg, Russia) [700008345]

Location: İstanbul (Marmara, Turkey)   **TGN**
Address Note: 41.008548°N; 28.979938°E

Materials: system bearing masonry, centralized plan; interior surfaces are sheathed with polychrome marble, porphyry, and mosaics   **AAT**
Dimensions: central dome: diameter 31 m (102 feet); height 56 m (184 feet)

General Subject: architecture   **AAT TGN ULAN CONA CONA IA**
Specific Subject: Holy Wisdom (Religion/Mythology)

Note: Domed basilica was commissioned by the Emperor Justinian; built in Constantinople in 6th century...

Contributors: Avery,BHA,FDA,VP
Sources: Fleming, Penguin Dictionary of Architecture (1999); Herrin, Judith, Byzantium (2007); Maidstone, Hagia Sophia (2002); Theoharidou, Architecture of Hagia Sophia (1988); Xydis, Chancel Barrier of Hagia Sophia (1947)
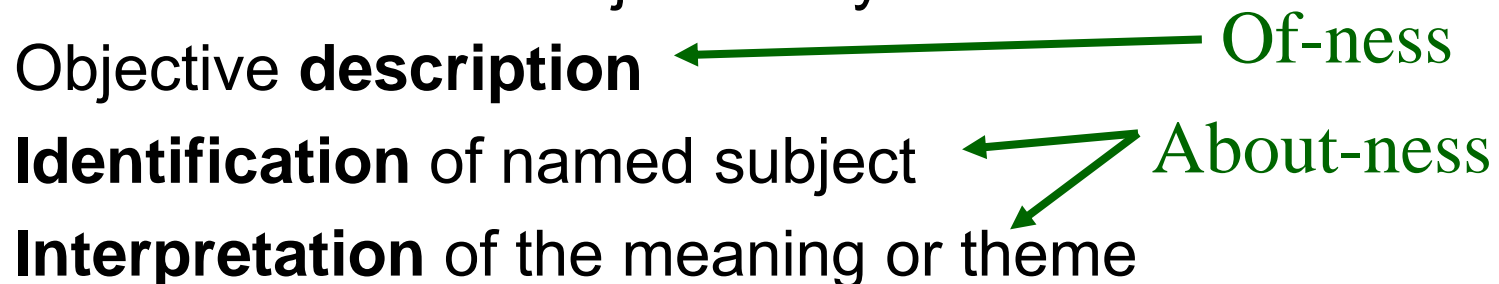
CONA, the Cultural Objects Name Authority®

2. CONA could link depicted subjects

- ❑ Whereas libraries have a tradition of cataloging the subjects of works

- ❑ Many art museums typically do not index subject matter depicted in / represented by works

  - ○ [sitters, places, events, iconographical themes, dedication of certain buildings, etc.]

  - ○ In a survey conducted of American art museums' data, of the core fields (agreed by consensus in CDWA, CCO, etc.), all museums included all core fields except the subject [by OCLC *(Online Computer Library Center, a nonprofit computer library service and research organization)*; core fields per CCO and CDWA (Categories for the Description of Works of Art)]

CONA, the Cultural Objects Name Authority®

Index three levels of subject analysis

Objective **description** ← Of-ness

Identification of named subject ← About-ness

Interpretation of the meaning or theme

- For such subject indexing: CONA can link to AAT, TGN, ULAN, CONA itself, and the CONA Iconography Authority

- As well as to other sources for subjects, such as the US Library of Congress authorities and Iconclass (*we intend to work closely with Iconclass, a Dutch classification system, www.iconclass.nl/*)

CONA, the Cultural Objects Name Authority®

Depicted Subjects
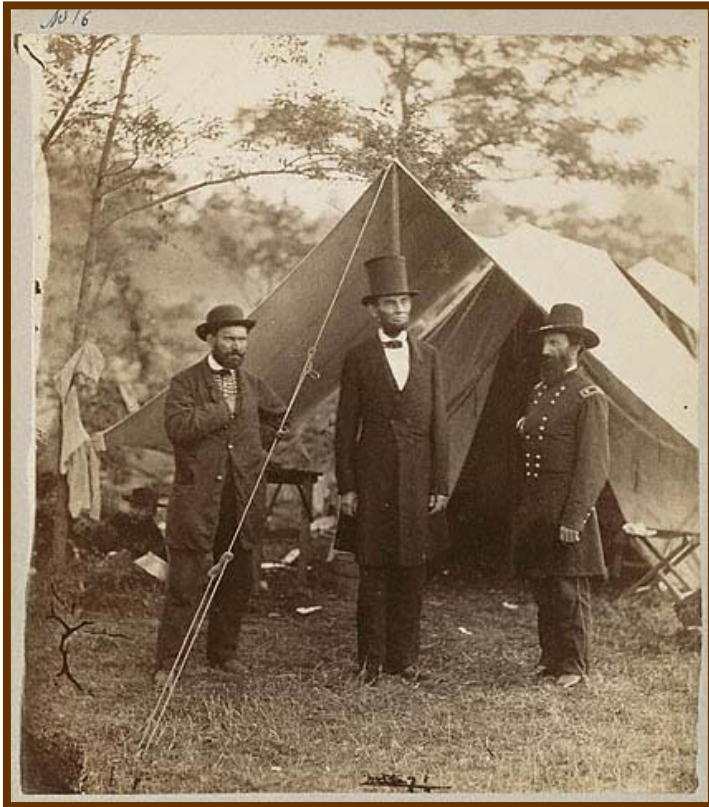
Lincoln on the Battlefield of Antietam; albumen print; Alexander Gardner (American photographer, 1821-1882); 1862; 8 5/8 x 7 3/4 inches; J. Paul Getty Museum (Los Angeles, CA); 84.xm.482.1

General
portraits
history and legend

Specific

Antietam National Battlefield (Sharpsburg, Maryland, United States) .	TGN
American Civil War (event)	CONA IA
Abraham Lincoln (American president, 1809-1865)	ULAN
John McClernand (American Union General, 1812-1900)	ULAN
Allan Pinkerton (American Secret Service agent, detective, 1819-1884) .	ULAN
army camp	AAT
tents (portable buildings)	AAT

CONA, the Cultural Objects Name Authority®
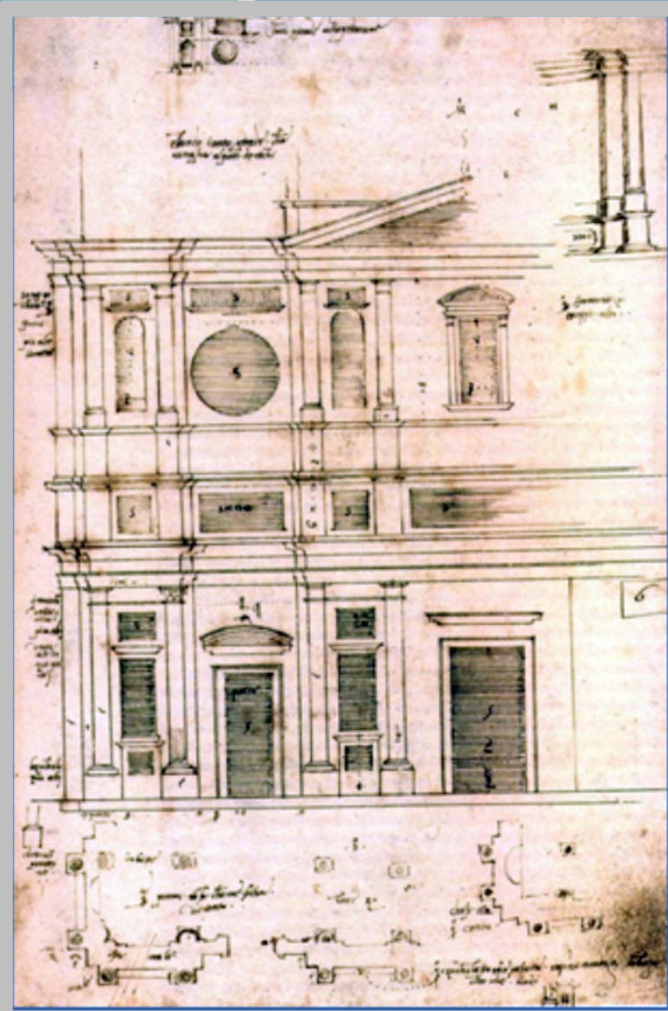
Plan and Elevation of the façade of San Lorenzo; drawing; Aristotile da Sangallo after Michelangelo; late 15th century; 32.0 x 21.5 cm (12 1/2 x 8 3/8 inches); pen and sepia ink; Staatliche Graphische Sammlung (Munich, Germany) #33258.

Depicted Subjects

General
architecture

Specific
San Lorenzo (built work, CONA
Florence, Italy) . . . . AAT
church . . . . AAT
façade . . . . AAT
elevation . . . . AAT
plan . . . . AAT

CONA, the Cultural Objects Name Authority®

Depicted Subjects

General

religion and mythology

human figure(s)

Specific

bodhisattva . . . . AAT

Avalokiteshvara. CONA IA

Maitreya . . . . CONA IA

compassion . . . . AAT

Battle of Little Bighorn
Nohochacyum
Amun
Ἄμμων
Valhöll
Valhalla
Pied Piper of Hamelin
Rattenfänger von Hameln
Shiva
Siva
Xiva
शिव
Adoration of the Magi
Adorazione dei Magi
Anbetung der Heiligen
   Drei Könige
Bambi
Battle of Salamis
Naumachia tēs Salaminos

Enthronement of Puyi
溥儀的登基大典
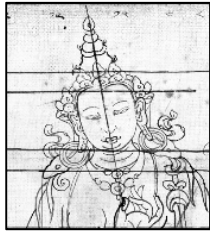
The CONA Iconography Authority
Named events, religious/mythological iconography, fictional characters and places, themes from literature

- Includes the proper names of subjects not covered by other Getty vocabularies
- The CONA Iconography Authority (IA) is a module within CONA; over time, it could become a stand-alone authority through contributions
- Includes links to other sources, such as Iconclass and the US Library of Congress subject authorities

The CONA Iconography Authority

Sample record

ID: 1000085

Names:

Avalokiteshvara

Avalokiteśvara

अवलोकितेश्वर

Kannon

Guanyin

Guānzìzài

觀自在

觀音

观音菩萨

AAT link:

role/attribute   bodhisattva
role/attribute Lotus (genus)
related to   Mahayana Buddhism
related to Theravada Buddhism

> **AAT**
> **TGN**
> **ULAN**
> **CONA**

Associative Relationship:

associated with .... Krishna (Hindu iconography)

Note: The bodhisattva of infinite compassion and mercy; embodies the compassion of all Buddhas. This bodhisattva is variably depicted and portrayed in different cultures as either female or male…

Contributors & sources

[VP] Encyclopedia Britannica Online (2002-); Bowker, Oxford Dictionary of World Religions (1997); Huntington, Art of Ancient India (1985)

Iconclass: *no*   **LC:** *LC control no.: sh 85010492*

Relationships in CONA

3. CONA could provide links between works

Whole/part relationships for groups, subgroups, items

The Dissipation; Jacques Callot (French, 1592-1635); etching; Lieure, no. 1407, State ii/iii; National Gallery of Art (Washington, DC); R.L. Baumfeld Collection; 1969.15.833.

CONA, the Cultural Objects Name Authority®

Relationships in CONA
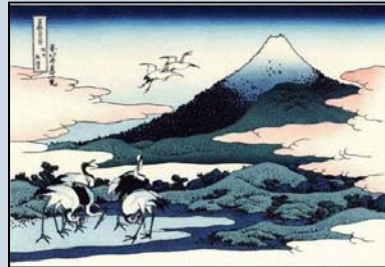
- Whole/Part Records for a series and items (conceptual relationship)

Great Wave at Kanagawa; Katsushika Hokusai (Japanese, 1760-1849); published by Nishimura Eijudo (Japanese, 19th century); woodcut, polychrome ink and color on paper; 25.7 x 37.9 cm (10 1/8 x 14 15/16 inches); Metropolitan Museum of Art, New York, New York, USA), JP1847.

Relationships in CONA

- CONA could virtually reconstruct disassembled works

- Held in different repositories or locations

- Manuscripts, paintings, sculpture, architecture, etc.
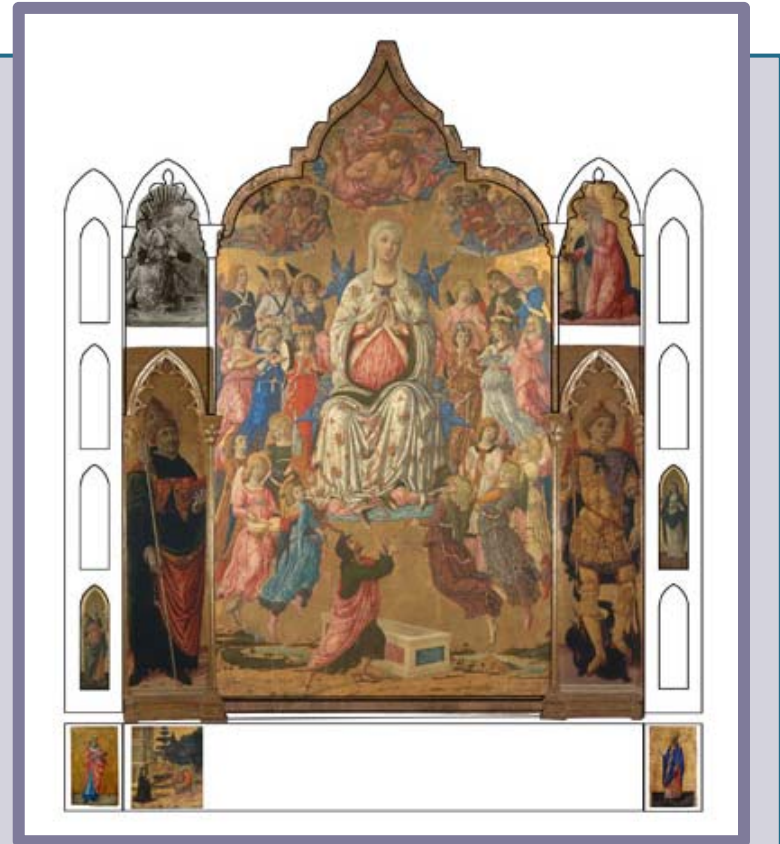
Proposed reconstruction of Matteo di Giovanni's Asciano Altarpiece by Rachel Billinge. Extant panels are now in National Gallery London, Siena, Asciano, Villa I Tatti, Esztergom, Altenburg, Rhode Island, and Private Collections.

Relationships in CONA

Related works in different repositories may be linked

Associative Relationships

study for

study is

Jean-Auguste-Dominique Ingres; Study for the Dress and the Hands of Madame Moitessier; 1851; graphite on tracing pape; 13 15/16 x 6 5/8 inches; J. Paul Getty Museum (Los Angeles, California); 91.GG.79

Jean-Auguste-Dominique Ingres; Madame Moitessier; 1851; Samuel H. Kress Collection, National Gallery of Art (Washington, DC); 1946.7.18

study for

part of
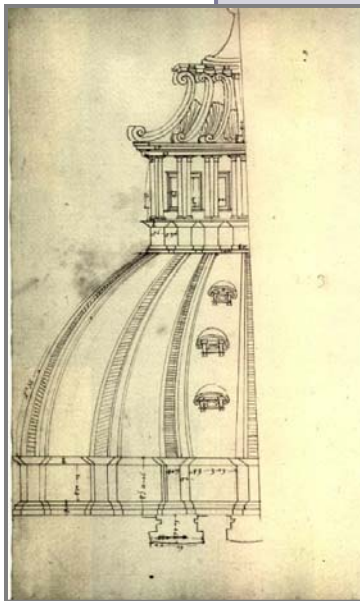
depicts
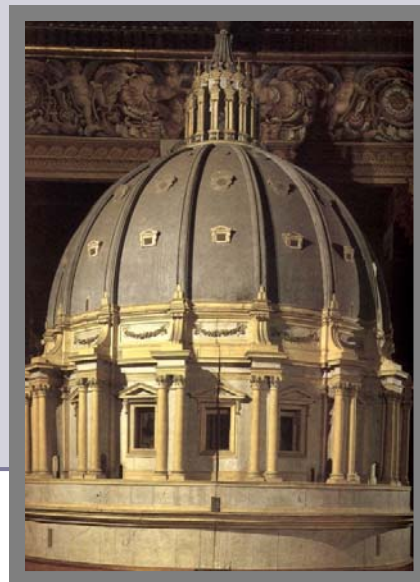
model for

- Complex relationships are possible between works in CONA
- Whole/part relationships
- Associative relationships
- *Built work – dome – design drawing – record drawing - model*

Getty Vocabularies to LOD:
Usage and Editorial Perspective

AAT   TGN   ULAN   CONA

How are vocabularies used?
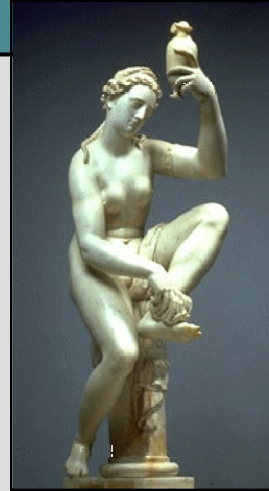
Giambologna
Female Figure;
Marble; H: 48 in.; 2008 J.
Paul Getty Museum;
82.SA.37

Giovanni Bologna
Triton, 16th
century (1560–70);
Bronze; H. 36 in;
Metropolitan Museum of
Art; Bequest of
Benjamin Altman, 1913
(14.40.689)

Jean Boulogne
Mercure volant; Bronze;
H 1,7 m; L 0,57m; Pr
1,4 m; Musee du
Louvre, Collection
du duc de Brissac
(saisie en 1794)?;
MR

Bologna, Giovanni da; *Christ Crucified*,
probably before
1588; bronze,
corpus, height including
foot rest: .371 x .254 x .078 m ;
National Gallery of Art,
Washington, DC; Gift of Mr.
and Mrs. John R. Gaines in memory …

• **Traditional use of vocabularies for retrieval focuses on the names**

• *If a user asks for one name/term, all of the synonyms can be used for retrieval*

• *For example, if a user searches on "Giovanni da Bologna"*

From ULAN

Giambologna

Giovanni da Bologna

Giovanni Bologna

Jean Boulogne

Jean de Boulogne

Bologna, Giovanni da

"giambologna" OR "giovanni da bologna" OR "giovanni bologna" OR "jean boulogne" OR "bologna, giovanni da"

How are vocabularies used?

LOD and new retrieval methods can incorporate hierarchical and associative relationships, and other links or implied relationships to answer more interesting complex questions and aid serendipitous discovery

Associative relationships

Marie de Medici (French queen, patron, 1573-1642)

had patron
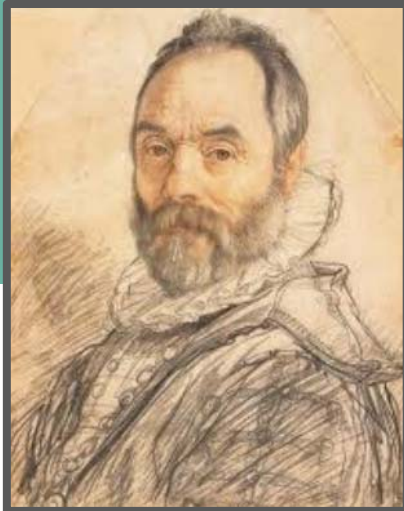
patron of

Giambologna *(Flemish sculptor and architect, 1529-1608, active in Italy)*

teacher of
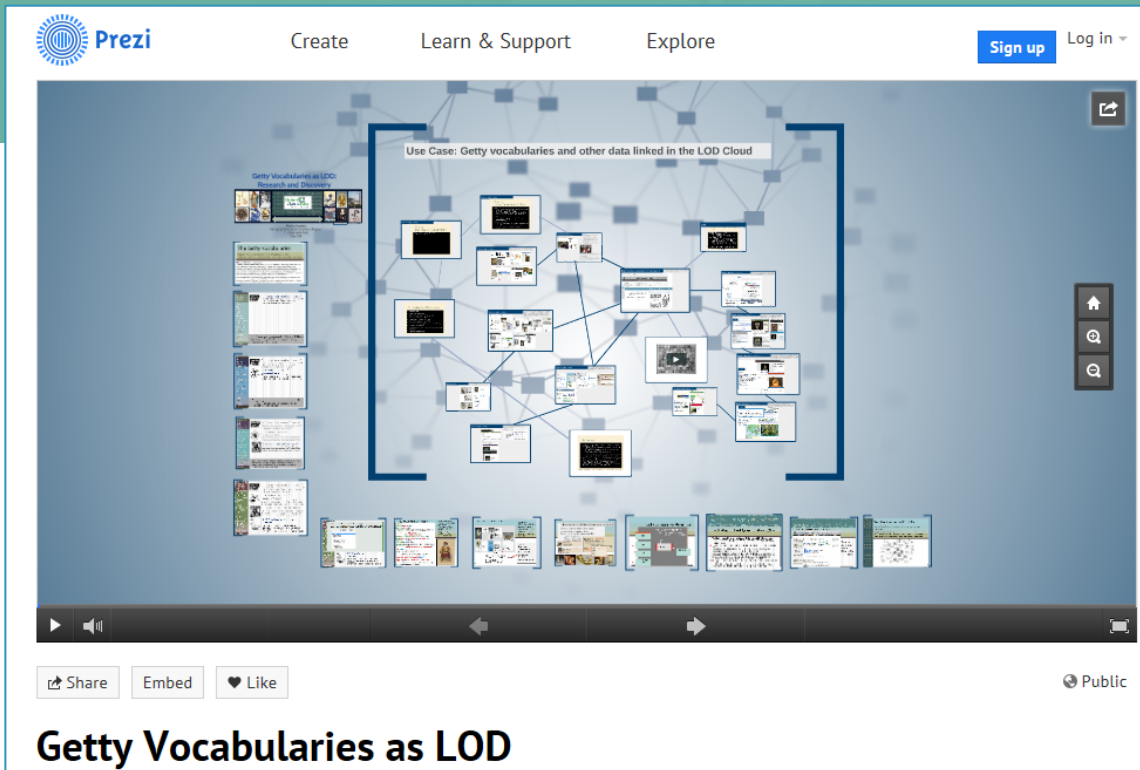
student of

Tacca, Pietro *(Italian sculptor and architect, 1577-1640)*

Display Date: from 1592
Start Date: 1592   End Date: 1608

How are vocabularies used?

Use Case scenario

Getty Vocabularies as LOD

- For an example of a "use case" illustrating how the Getty vocabularies can aid in research, see the Prezi presentation: Getty Vocabularies as LOD
- See how a researcher begins a journey to find out about incense burners, and within minutes rather than days finds all she wished to find, as well as unexpected discoveries through LOD

http://prezi.com/om6v5oa-o8ob/getty-vocabularies-as-lod/?utm_campaign=share&utm_medium

Editorial perspective: LOD

Editorial rules

Consistency in application of rules

Consistency in content of controlled terminology within each vocabulary
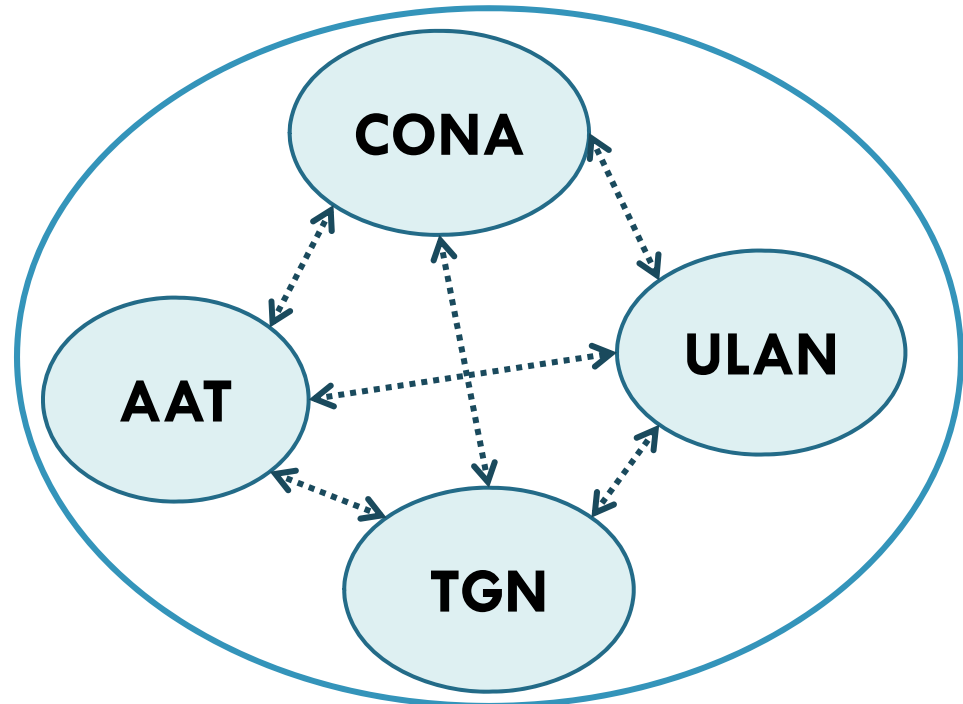
Creating actual links between vocabularies

□ The Getty vocabularies have always been compiled by experts

- o Using authoritative sources
- o Rules in extensive editorial manuals

□ Seen through the LOD lens, any inconsistency or omission become ever more obvious

□ Getty Vocabulary Program analyzes and cleans up of the data for LOD releases

{ "S... ri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate" : { "type" : "uri", w.w3.org/2000/01/rdf-schema#label" }, "Object" : { "xml:lang" : "el-latn", "type" : "literal" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "P : "uri", "value" : "http://www.w3.org/2000/01/rdf-schema#label" }, "Object" : { "xml:la iteral", "value" : "rhyta" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate" : { "type" : "uri", "value" : "http://www.w3.org/2000/01/rdf-schema#label" }, "Object" : { "xml:lang" : "en", "type" : "literal", "value" : "rhyton" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate"

Editorial perspective: LOD

- **From conceptual to actual links**

- Lookup lists had been based on AAT, but had gotten out of sync with AAT over the years

- E.g., nationalities, roles in ULAN and place types in TGN must map to AAT terms

{ p://vocab.getty.edu/aat/300198841 }, "Predicate" : { "type" : f-schema#label }, "Object" : { "xml:lang" : "el-latn", "type" : "literal", "value" : "rhyta" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate" : { "type" : "uri", "value" : "http://www.w3.org/2000/01/rdf-schema#label" }, "Object" : { "xml:lang" : "es", "type" : "literal", "value" : "rhyta" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate" : { "type" : "uri", "value" : "http://www.w3.org/2000/01/rdf-schema#label" }, "Object" : { "xml:lang" : "en", "type" : "literal", "value" : "rhyton" } }, { "Subject" : { "type" : "uri", "value" : "http://vocab.getty.edu/aat/300198841" }, "Predicate"

Editorial perspective: LOD

One example

- *Nationality/ Culture/ Race/ Ethnicity* in ULAN was conceptual, now needed to be linked to AAT

- Certain matches must be resolved by hand

no match

false match

ambiguous match

Many links cannot be made automatically

Matching ULAN Nationality to AAT

code	Nat/Culture ULAN	AAT subject_id	AAT term_id	AAT term
901614	Languedocian			
901615	Burgundian (Migration period)	300020847	1000020847	Burgundian (Migration
901620	Parisian			
901630	Gallic	300379855	1000540772	Gallic
901710	Swabian			
901800	German	300111192	1000111192	German
901810	East German			
901820	West German			
901830	Prussian			
901840	Bavarian	300385972	1000568017	Bavarian
901850	Hamburger			
901860	Hessian	300014076	1000014077	hessian
901870	Thuringian	300105675	1000105675	Thuringian
901880	Saxon	300379686	1000540441	Saxon
901890	Wendish	300263656	1000263656	Wendish
901900	Rhenish			
901910	Frankish	300019478	1000019478	Frankish
901920	Merovingian	300019512	1000019512	Merovingian (culture)
		300210049	1000210134	Merovingian (scripts)
901950	Carinthian	300385997	1000568044	Carinthian

This *hessian* is bad match, type of burlap

Editorial perspective: LOD

- Since CONA is linked to the other vocabularies, it is necessary to match incoming values to the AAT, ULAN, TGN, and CONA Iconography Authority when loaded
- The CVA/Processor was developed for editors to use where auto-links are not possible
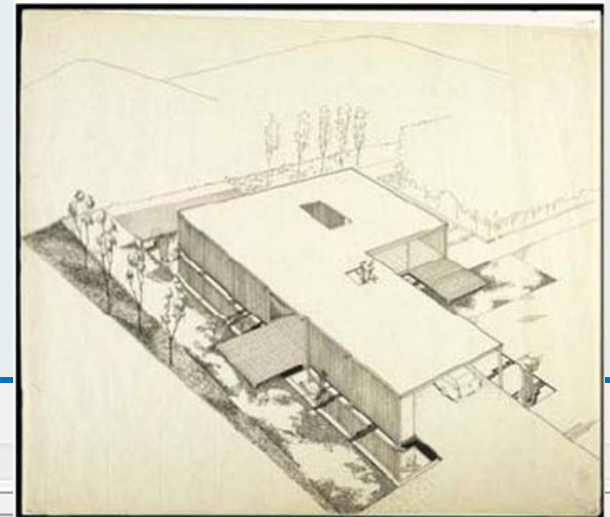
CONA record, creator

| WorkType/Class/Level | Creator Display | Related Person/Corp | Creation Date | Location | Physical Characteristics |

Person/Corp Label	ULAN ID	Role	Extent
Koenig, Pierre (American architect, 1925-2004) (P	500086520	architect/30010	

Koenig, Pierre (American architect, 1925-2004)   500086520

link to ULAN

Merging records
Finding matches

Manual or automated merge, vetted by VP editors

Subject Search

Result Limit: ALL	Search Type: KEYWORD	ENTER SEARCH CRITERIA
Subject ID:	Search Method: NEW SEARCH	SUBJECTS/TERMS: 2/5

Search Text: palamedesz and anthonie

Qualifier: Parent ID: Role: ID:

Sources: Contributors:

Birth Date — Least: Most:

Death Date — Least: Most: Nationality: ID:

Status Mark Preferred Name   Name   Biography

Names	**Biography**
Palamedesz., Anthonie	Dutch painter, active mid-17th century
Palamedes, Anthonie	
Pallemedes, Anthonie	Netherlandish artist, 1601-1673
Palamedsz., Anthonie	

What is LOD: In Brief

AAT   TGN   ULAN   CONA

www.getty.edu/research/tools/vocabularies/index.html

Introduction to
Controlled Vocabularies
Terminology for Art, Architecture, and Other Cultural Works
UPDATED EDITION

Patricia Harpring

TURRIS BABEL

- This presentation is not a primer on **controlled vocabularies** nor on **what is LOD**

- They focus on issues surrounding the Getty vocabularies specifically

- For basic information on vocabularies, see *Introduction to Controlled Vocabularies* (Harpring, revised 2013) and its bibliography

- For basic information on what is LOD, see this Europeana video http://vimeo.com/36752317. World Wide Web Consortium (W3C) Glossary: www.w3.org/TR/ld-glossary/
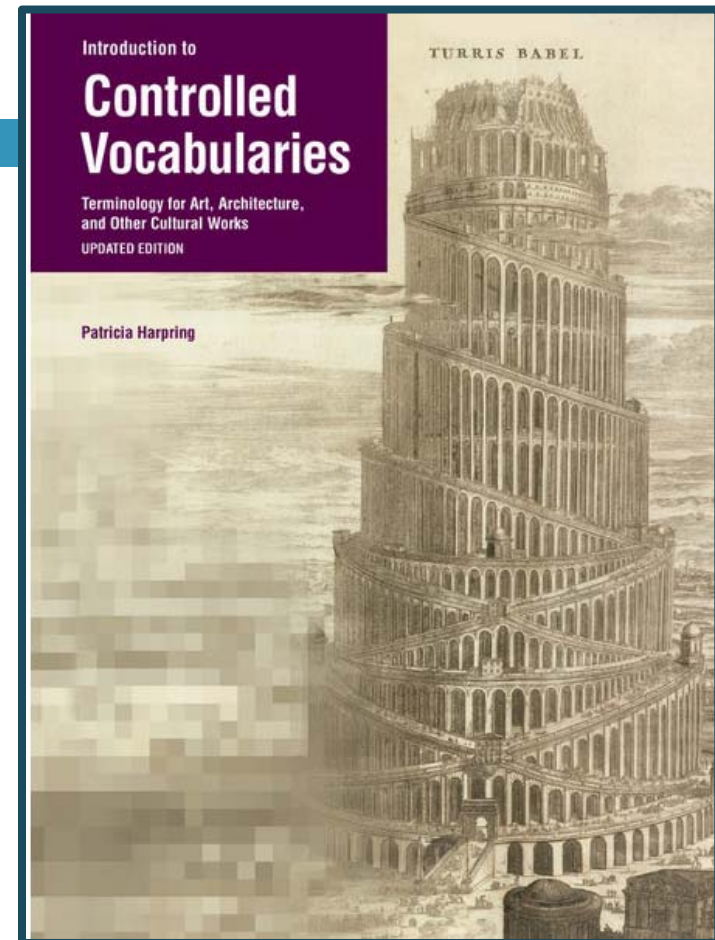
Why Linked Open Data?

- When data is linked and open = data is structured and published according to principles allowing it to be interlinked and made openly accessible and shareable on the Semantic Web

- Linked Open Data on the Web has the potential to connect data from diverse domains
  - can use the Web to create defined "typed" links for meaningful linking between data from diverse resources

- LOD will enable a new generation of search engines to follow the links between data resources in order to deliver ever more complete answers as new data sources become available

Triples

```
<aat:300198841> <skos:prefLabel> "rhyta"@en
<aat:300198841> <skos:altLabel> "ritons"@fr
<aat:300198841> <rdf:type> <gvp:Concept>
<aat:300198841> <gvp:broaderPreferred> <aat:300194567>
<aat:300198841> <gvp:aat2100_distinguished_from> <aat:300197140>
```

subject   predicate   object

rhyta   —   [are] distinguished from   —   stirrup cups

- W3C standards (RDF) to describe the data in triples
- Three column format – known as a triple – forms the fundamental building block of semantic representations.
- Subject - corresponds to the entity – a 'thing'
- Predicate – property of the entity - names, birth/death dates
- Object - Subjects in another triple OR Literal values

Why Linked Open Data?

```
<aat:300198841> <skos:prefLabel> "rhyta"@en
<aat:300198841> <skos:altLabel> "rifons"@fr
<aat:300198841> <rdf:type> <gvp:Concept>
<aat:300198841> <gvp:broaderPreferred> <aat:300194567>
<aat:300198841> <gvp:aat2100_distinguished_from> <aat:300197140>
```

Semantic View (JSON, RDF, N3/Turtle, NTriples)   ■ Representative Images: 1 2 3

ID: 300198841   Record Type: concept

⬥ **rhyta** (drinking vessels, <vessels for serving and consuming food>, ... Furnishings and Equipment (Hierarchy Name))

Note: Refers to vessels from Ancient Greece, eastern Europe, or the Middle East that typically have a closed form with two openings, one at the top for filling and one at the base so that liquid could stream out. They are often in the shape of a horn or an animal's head, and were typically used as a drinking cup or for pouring wine into another vessel. Drinking was done by holding the rhyton above the drinker's head and catching the stream of liquid in the mouth.

Terms:
    rhyta (**preferred**,C,U,LC,English-P,D,U,PN)
        (Greek (transliterated)-P,D,U,PN)
        (Spanish,UF,U,PN)
    rhyton (C,U,English,AD,U,SN)
        (Greek (transliterated) AD,U,SN)

Why Linked Open Data?

- In an LOD world, users' research will operate on top of an unbound, global data space

- LOD will facilitate the ability to derive new information from the information the user already has, through inference, classification, and other applications of logic onto the data

- Publishing information as LOD unlocks the full knowledge potential of databases, allowing researchers to access, query, and recombine data created and stored by institutions of all kinds—libraries, museums, archives, research centers, laboratories, universities, governments, publishers, and others

- LOD has the enormous potential to advance scholarship within the humanities and beyond

Why Linked Open Data?

- The time was right for the Getty, particularly as the LOD project coincides with the Getty's Open Content initiative

  - The J. Paul Getty Museum and Getty Research Institute (GRI) make available, without charge, all available digital images to which the Getty holds the rights or that are in the public domain to be used for any purpose. No permission is required

  - www.getty.edu/about/opencontent.html

- **Also, GRI Portal:** The Getty Research Portal™ is an online search platform providing global access to growing number of digitized art history texts

- The Getty Conservation Institute (GCI), GRI, and the Getty Museum are looking into releases of LOD metadata

Licensing the data

❑ Historically, the Getty vocabularies relational tables, XML, (MARC) were licensed, with use somewhat restricted; fees adjusted for not-for-profit and for-profit licensees

❑ Policy makers and legal experts analyzed which licensing was best for LOD

Open Data Commons Attribution License (ODC-By) v1.0

Allows that you (the users) are free to do the following:

☐ To Share: To copy, distribute, and use the database

☐ To Create: To produce works from the database

☐ To Adapt: To modify, transform, and build upon the database

☐ As long as you Attribute: You must attribute any public use of the database, or works produced from the database, in the manner specified in the license

　o For any use or redistribution of the database, or works produced from it, you must make clear to others the license of the database and keep intact any notices on the original database

☐ *http://opendatacommons.org/licenses/*

Linked Documents vs Linked Data

- Linked Documents on the Web
  - Connected by hypertext
  - Allows users to traverse via Web browsers
  - Data is made available in formats such as CSV, XML, or marked up as HTML tables
- Linked Data on the Web
  - Connects data from diverse domains such as people, books, scientific publications, films, genes, drugs and clinical trials, online communities, statistical and scientific data.
  - Enables new generation of search engines that follow the links between data sources to deliver more complete answers as new data sources appear
  - Operate on top of an unbound, global data space.
  - Uses the Web to create typed links between data from different sources.

Linked Open Data (LOD)

- Linked Data
  - A method of publishing structured data so that it can be interlinked and become more useful.
  - It builds upon standard Web technologies such as HTTP and URIs.
  - But, rather than using them to serve web pages for human readers, it extends them to share information in a way that can be read automatically by computers.

- Open data
  - The idea that certain data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control.

- Linked Open Data (LOD)
  - A community project, sponsored by the Semantic Web Education and Outreach group of the W3C, to extend the Web with a data commons by publishing various open datasets as RDF on the WEB and by setting RDF links between data items from different data sources.
  - Both linked and open.

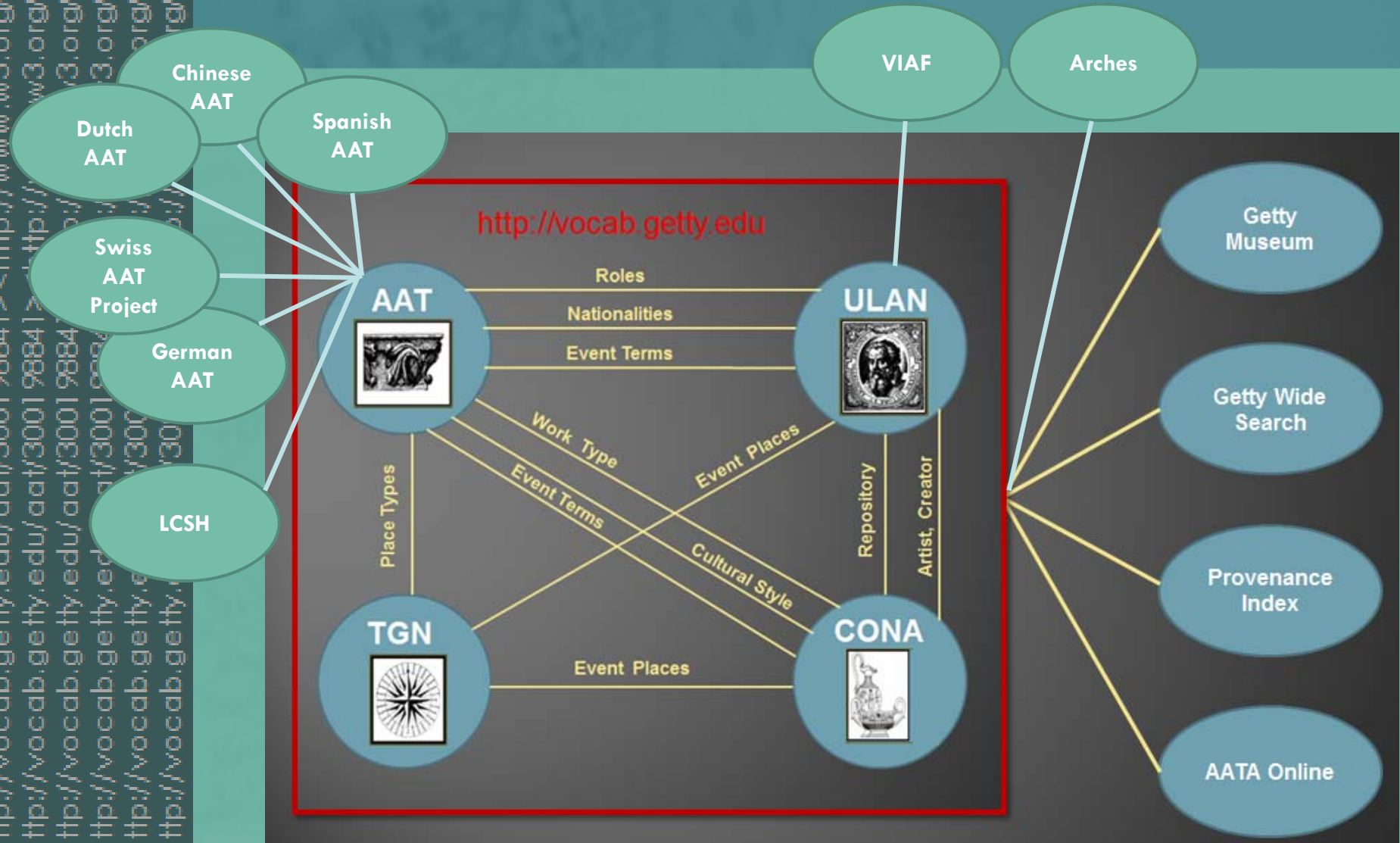# Linking Possibilities: Getty Vocabularies

http://vocab.getty.edu
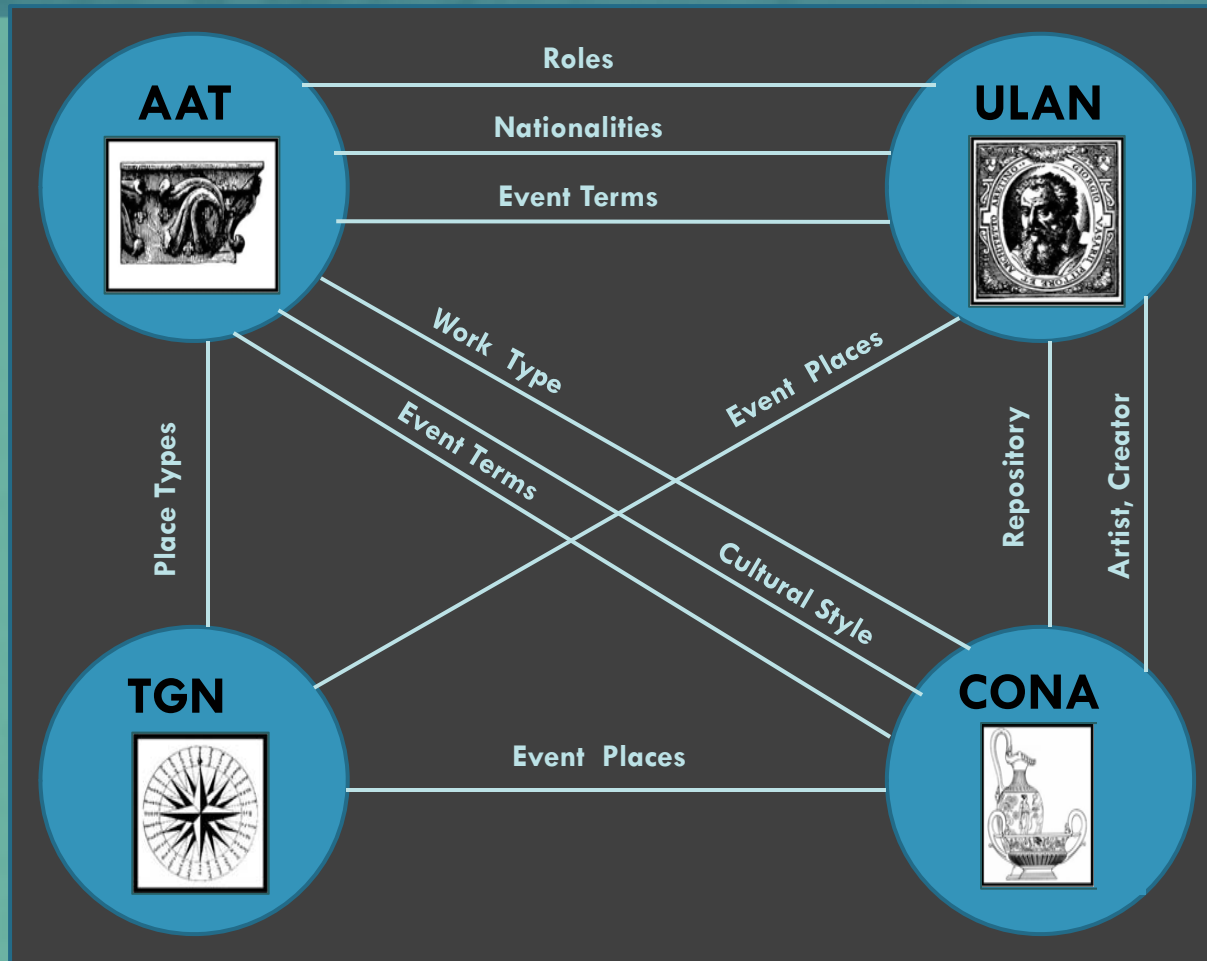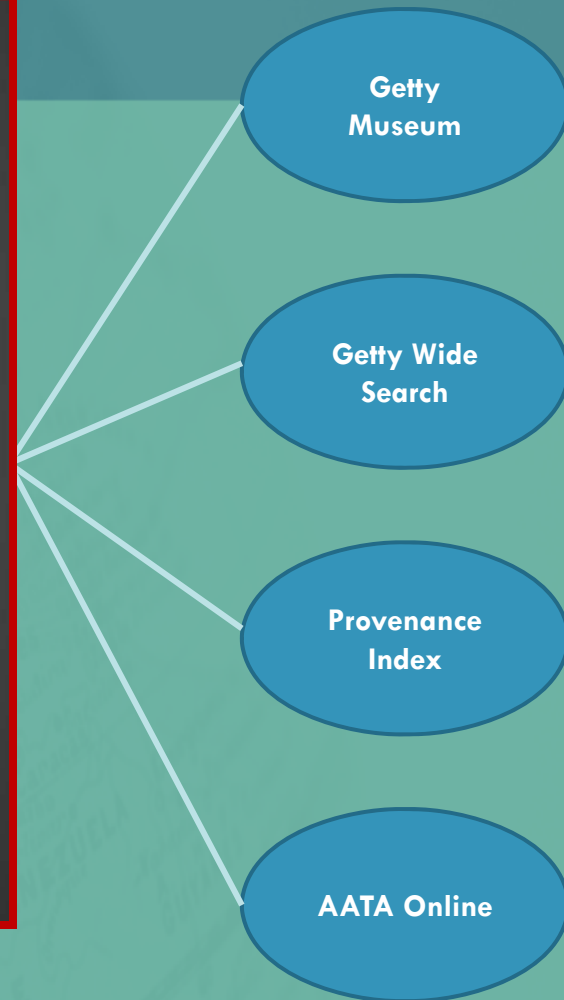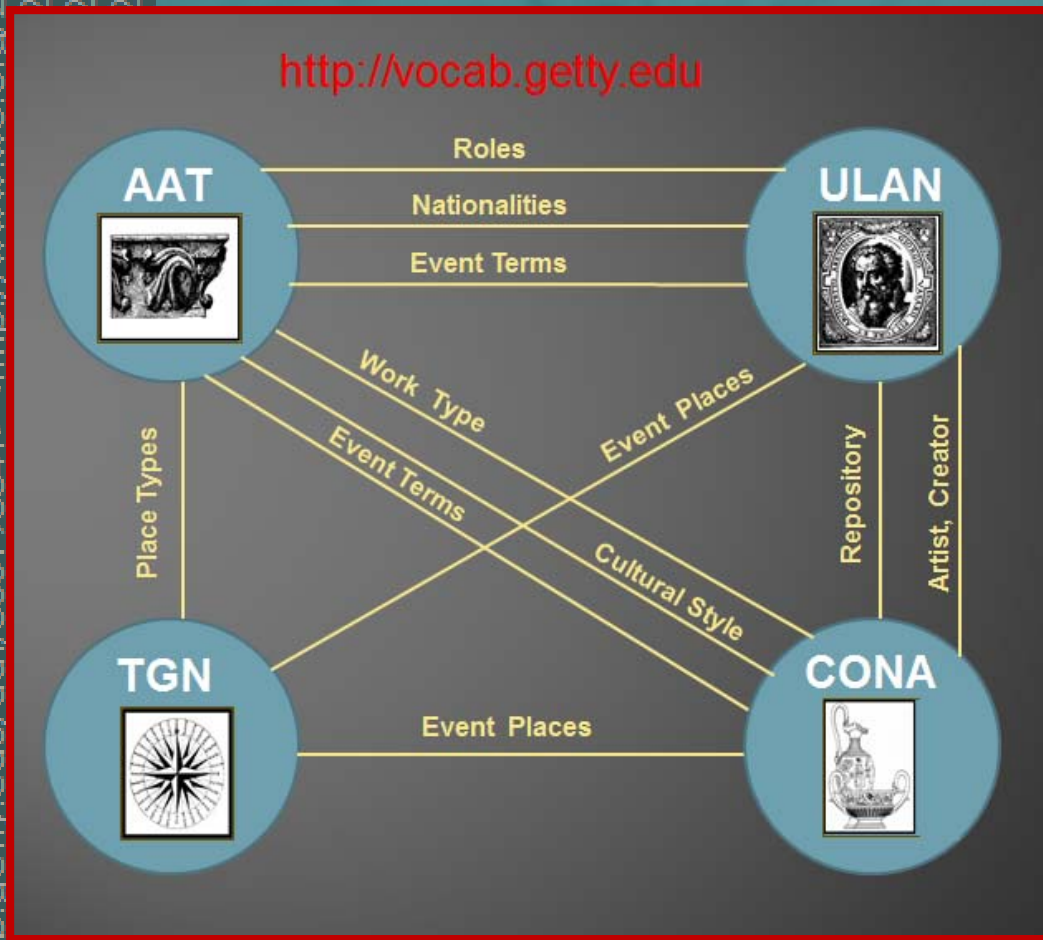
The Getty Vocabularies acts as a conduit to connect the projects to each other.

Linking Possibilities: Our Partners

Linking Possibilities: Our Partner's Partners
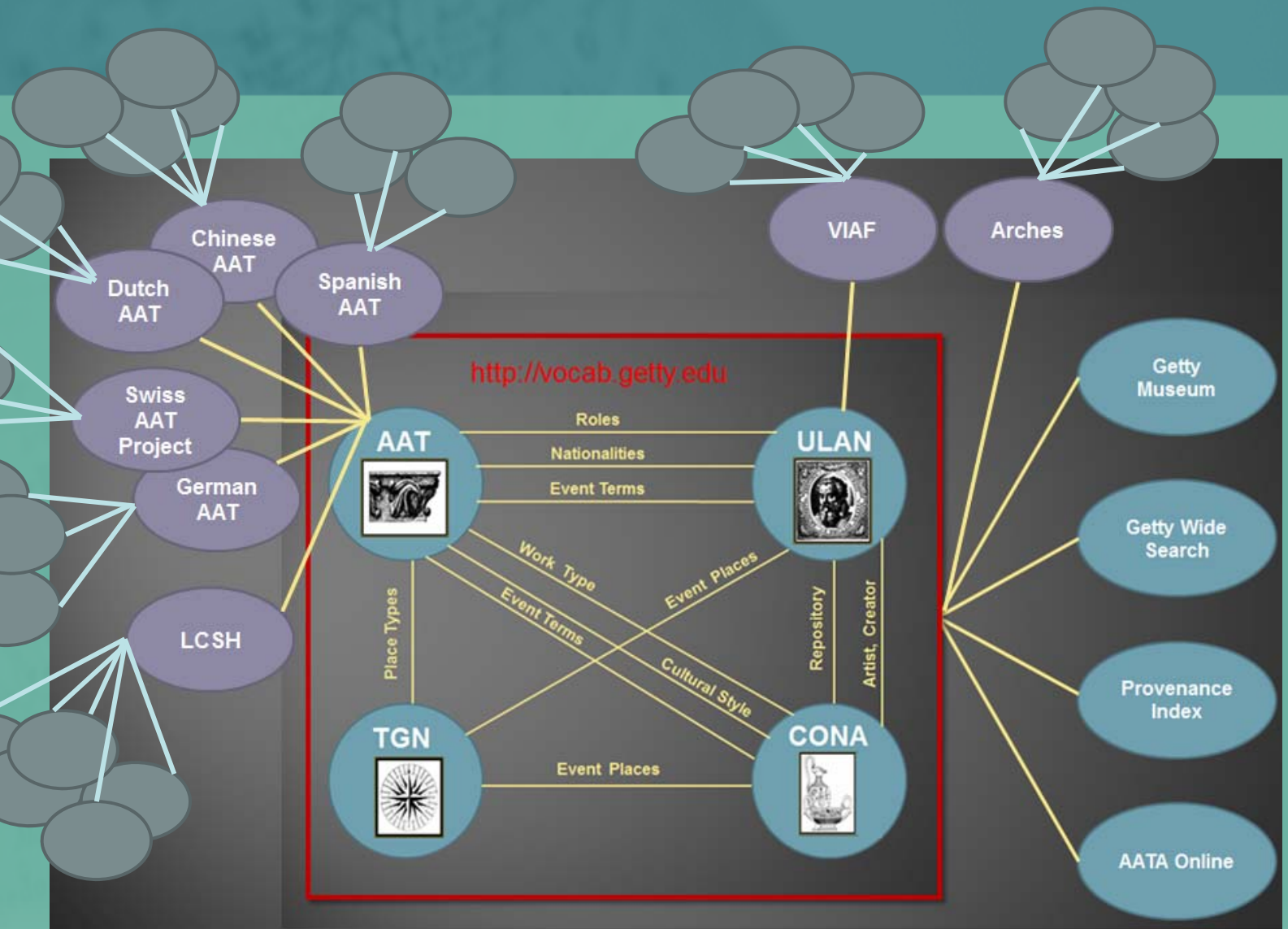
Resource Description Framework (RDF)

- One of the key ingredients of Linked Data.

- Provides a generic graph-based data model for describing things, including their relationships with other things.

- Three column format – known as a *triple* – *forms the fundamental building block of semantic representations.*

    - *Subject - corresponds to the entity – a 'thing'*

    - *Predicates – property of the entity - names, birth/death dates*

    - *Objects - Subjects in another triple OR Literal values*

- Conceptualized anything (and everything) in the universe as a resource.

- Specifically supports evolution of schemas over time without requiring all the data consumers to be changed

- RDF has varying representations (e.g., XML, text, JSON)

LOD Ontologies & Vocabularies

☐ Ontology

- o Used to capture knowledge about some domain of interest. An ontology describes the concepts in the domain and also the relationships that hold between those concepts.

☐ Vocabulary

- o A vocabulary in the sense of knowledge systems or ontologies are controlled vocabularies. They provide a way to organize knowledge for subsequent retrieval.

☐ Semantic Web Ontology

- o This is a formal specification of a shared conceptualization of the information to be published.
- o Examples of the vocabulary used in ontologies: class, object property, role, category, property, resource, etc.

Uniform Resource Identifier (URI)

□ Identifies a resource either by location (URL), or name (URN). It usually includes some type of unique and persistent identifier.

□ URIs are not URLs but every URL is a URI

□ The URI for a resource represented in an RDF statement is called the URI reference (URIref) for that graph node.

□ URIs are used as 'strong keys' that are assigned to each of the nodes so that we can refer to them consistently across all the triples that describe their relationships.

□ The URN that will be the base URI for AAT will be http://vocab.getty.edu/aat.

Web Ontology Language (OWL)

- Developed by the W3C

- Built as an extension to RDFS

- Provides a precise vocabulary that enables more powerful reasoning and inference over relationships with which to knowledge can be represented.

- Can be seen as a social contract between a data provider and a data consumer.

# Simple Knowledge Organization System (SKOS)

☐ A language designed for representation of thesauri, classification schemes, taxonomies, subject-heading systems, or any other type of structured controlled vocabulary.

☐ Based on RDF

☐ SKOS is currently developed within the W3C framework

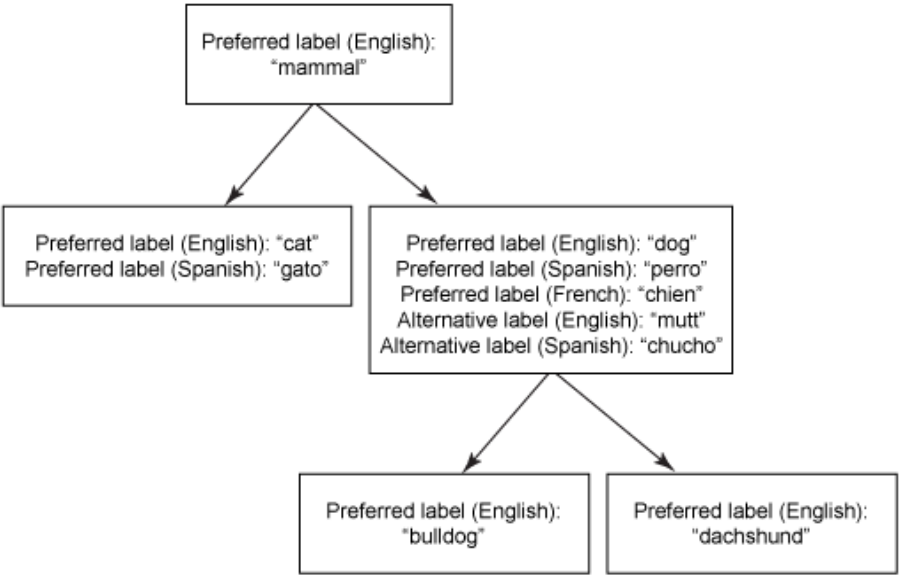☐ Can be used on its own, or in combination with other ontologies.

**Sample concepts relationship
in a pre-SKOS taxonomy**
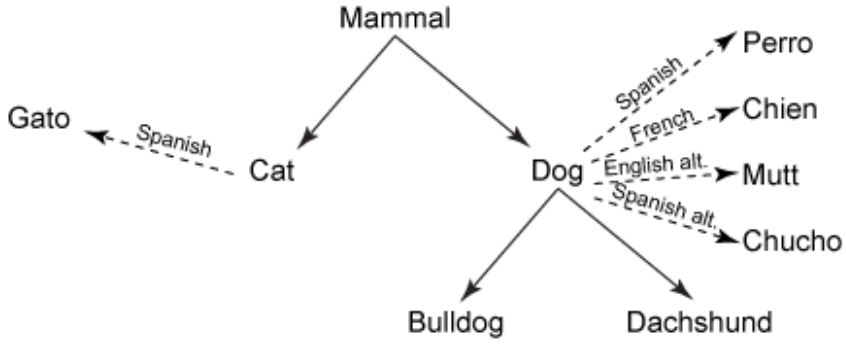
**Sample concepts relationship
in SKOS**

Triplestores

□ Are purpose-built databases for the storage and retrieval of the type of unstructured information express in RDF triples that makes up the Semantic Web.

□ Are not relational databases.

□ Query language used with triplestores is typically SPARQL

□ In addition to queries, triples can usually be imported/exported using RDF and other formats.

□ Some triplestores store billions of triples.

SPARLQL Protocol RDF Query Language

- Was made a standard by the RDF Data Access Working Group (DAWG) of the W3C.
- Is considered one of the key technologies of the semantic web.
- Allows users to write unambiguous queries.
- SPARQL endpoint is a service that accepts SPARQL queries and returns results.
- Queries can be distributed to multiple SQARQL endpoints.
- Fundamental difference between SQL and APARQL
  - Data exposed via SPARQL on *any server* can be queried by a SPARQL client.
  - Data from multiple places can be combined dynamically, as needed, to create new forms of information.

Why do we care?

- The way data is being published on the web is currently in transition.

- A current trend in managing art information is to increasingly make data art, architecture, and cultural heritage objects available as Linked Open Data.

- This applies to the information directly describing the objects, but also the vocabularies used in the descriptions.

- For years now, the Getty Vocabulary team has been receiving legitimate requests to publish our thesauri as LOD.

- It is time to stop asking "why" and to start exploring "how".

Key values to Linked Open Data

- *Everyone* can access, reuse, enrich and share the data published in LOD format!
  - It is somewhat like Wikipedia and it makes "interworkability" more feasible.
- LOD disambiguates your search. In other words it eliminates the noise you sometimes get in Google search. What you are seeking is more precise because of the way you tag the information you are converting to LOD.
- LOD connects you to all kinds of relevant information creating a playground for serendipity and it updates that information dynamically within the same web space.
- LOD is able to connect data from the Web that was not previously connected.

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THE GETTY

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The Getty Vocabularies

Discover, link, access, retrieve, research, catalogue, index
Explore art, architecture, cultural heritage, conservation, archaeology, and beyond

History of the Getty vocabularies:

- The AAT, ULAN, and TGN were begun in the mid-1980s

  - To meet the needs of the Getty and outside art museum, visual resources, archives, and art library communities for authoritative vocabularies to aid in the indexing and retrieval of art information

  - Each was conceived and constructed differently, with the AAT originally located in Williamstown, Massachusetts

  - Data structure, editorial rules, systems, management of AAT, TGN, and ULAN were united in 1995 in Los Angeles

  - Analysis for CONA was begun in 2005

- Even so, we are "standing on the shoulders of giants"

  - Original work on controlled vocabularies for art began with International Committee for the History of Art (CIHA), and the TAU (Thesaurus Artis Universalis) committee, Center for the Advanced Study in the Visual Arts (CASVA) at the National Gallery of Art, Washington, as well as dozens of talented visionaries, analysts, programmers, information scientists, managers, and editors at the Getty (AHIP, GII, and now the Vocabulary Program at the Getty Research Institute), with dedicated contributors and users worldwide.