Linked Data: Publication, Coreferencing and Usage with the Getty Vocabularies

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What Are the Getty Vocabularies?

AAT   TGN   ULAN   CONA

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

Patricia Harpring

TURRIS BABEL

- These presentations are not primers 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
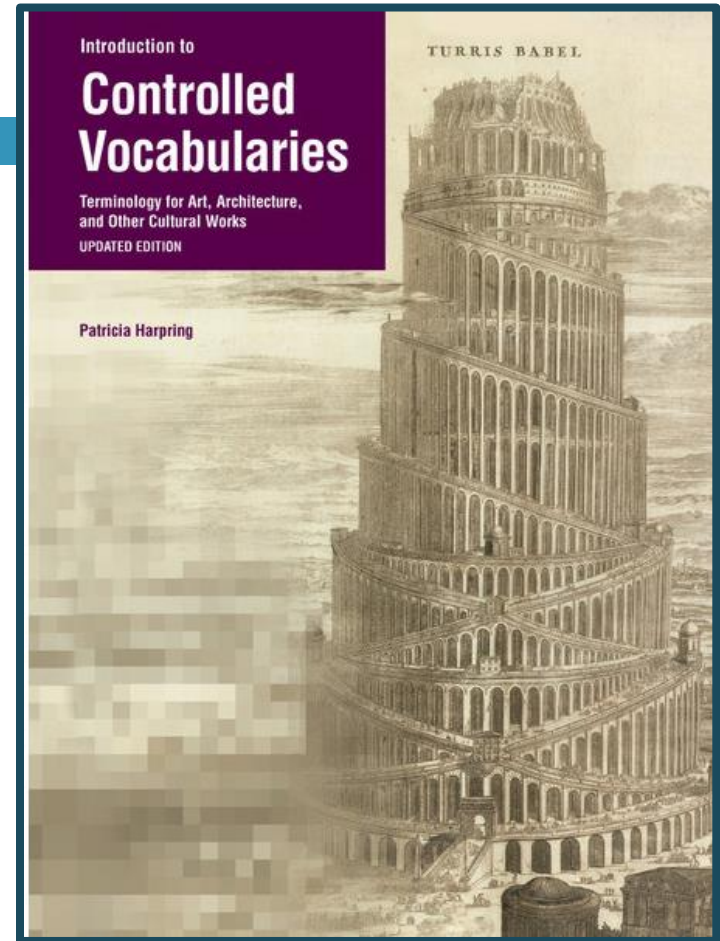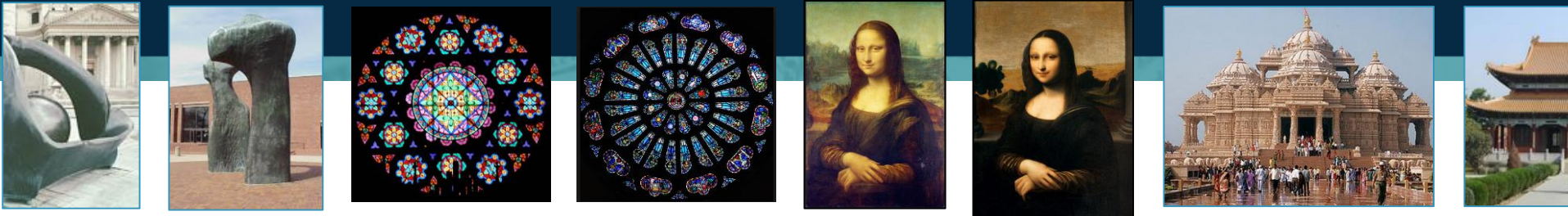
- For basic information on what is LOD, see this Europeana video *http://vimeo.com/36752317*. World Wide Web Consortium (W3C) Glossary: www.w3.org/TR/ld-glossary/

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

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□ Getty vocabularies are valued as authoritative

  o Grow through contributions from experts

  o 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

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

☐ They are compliant with / map to other standards:

- o CDWA (Categories for the Description of Works of Art)
- o CCO (Cataloging Cultural Objects)
- o VRA Core (Visual Resources Association core categories)
- o LIDO (Lightweight Information Describing Objects)
- o CIDOC CRM (CIDOC Conceptual Reference Model) (ISO 21127:2006)
- o 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
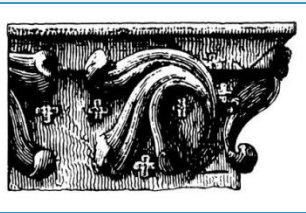 - The Getty vocabularies share a core data structure

Scope and Content
of the Getty Vocabularies

AAT   TGN   ULAN   CONA
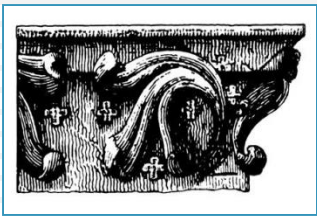
AAT, the Art & Architecture Thesaurus®

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®

amfoor
amphorae
arc-boutant
brittleness
Buddhism
calligraphy
emulsifier
fa...
fly...ress
飛
lithograph...
litóg...
luch...
orth...plan...
Maced...
millwork
Rinascimer...
stupa
Sturzbecher...

zinc oxide

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

distinguished from

rhyta *equivalence*
rhyton
rhytons
rhea
rheon
rheons
ritón

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)

- **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
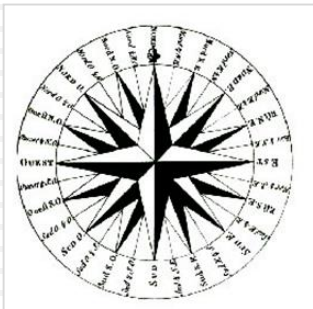
TGN, the Getty Thesaurus of Geographic Names®

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
commune (administrative) since 1125
cultural center
university center
world heritage site

AAT

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

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)
Düʼrero, Alberto (it)
Durerus, Albertus (la)
Direr, Albreht
Djurer, Albrecht
Dyûrâ, Albrecht
Dīrers, 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.

Basics of Linked Data

- Universal Resource Identifier (URI) – "an ASCII string used to identify things on the Semantic Web" (http://www.w3.org/wiki/URI)

  http://vocab.getty.edu/aat/300198841

  http://vocab.getty.edu/tgn/1000193

- URIs are linked to each other through triples composed of subject-predicate-object relationships

  <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2008/05/skos-xl#prefLabel> <http://vocab.getty.edu/aat/term/1000198841-en> .

  <http://vocab.getty.edu/aat/300198841> <http://www.w3.org/2004/02/skos/core#prefLabel> "rhyta"@en .

- The definitions of data elements and links described by ontologies

  http://www.w3.org/2004/02/skos/core#

  http://www.w3.org/ns/prov#

  http://purl.org/dc/elements/1.1/

- Data is delivered to a requesting agent through a triple serialization using HTTP

  RDF/XML, Notation-3 (N3), Turtle, N-Triples, RDFa, and RDF/JSON

Growth of the LOD Cloud since 2007

LOD as of August 2014
570 Datasets
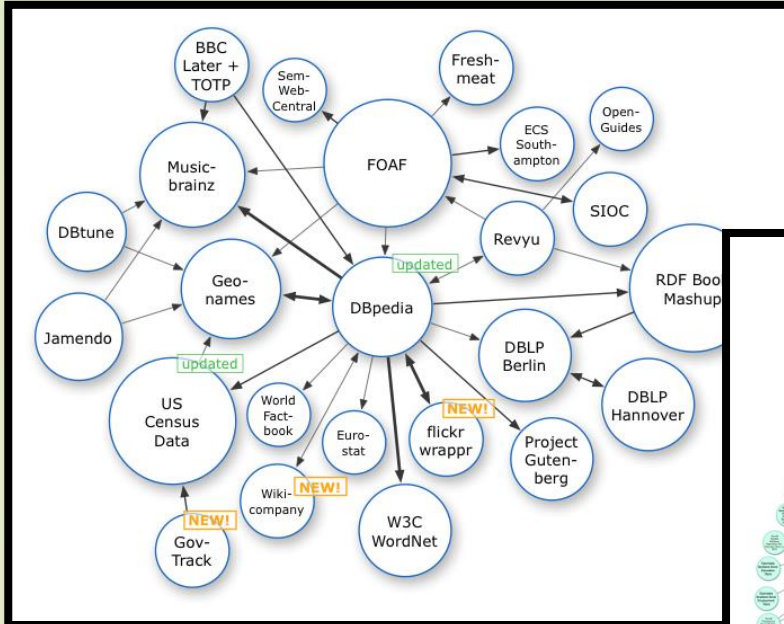
View of LOD as of October 2007

12 Datasets

http://lod-cloud.net/
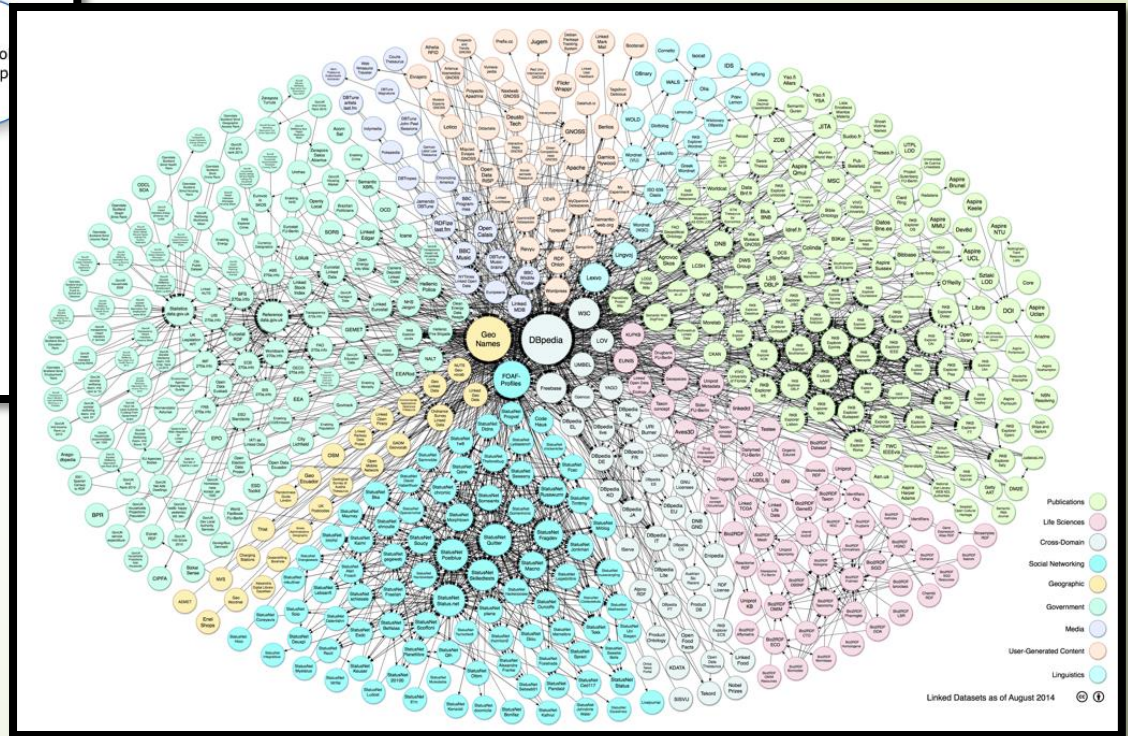
Where to start the implementation?

- Using the mapping developed by Marcia Zeng, we wanted to see what the Getty AAT looked like as LOD

- D2RQ provided a simple platform for taking our existing RDBMS tables and serving them as URIs

- Attached property definitions to exiting database fields

AAT Subject Record in D2RQ (1st try)

HTML

**ID: 300198841**

rhyta (drinking vessels, <vessels for serving and consuming food>, ... Furnis... Name))

Note: Refers to vessels from Ancient Greece, eastern Europe, or the Middle East t... with two openings, one at the top for filling and one at the base so that liquid cou... the shape of a horn or an animal's head, and were typically used as a drinking cu... another vessel. Drinking was done by holding the rhyton above the drinker's hea... liquid in the mouth.

Terms:

- **rhyta** (**preferred**,C,U,LC,English-P,D,U,...
  (Greek (transliterated)-P,D,U,PN)
  (Spanish,AD,U,SN)
- **rhyton** (C,U,English,AD,U,SN)
  (Greek (transliterated),AD,U,SN)
  (Spanish,AD,U,SN)
- **rhytons** (C,U,English,UF,U,N)
  (French-P,D,U,PN)
  (Spanish-P,D,U,PN)
- **rhea** (vessels) (C,U,English,UF,U,N)
- **rheons** (C,U,English,UF,U,N)
- **rheon** (C,U,English,UF,U,N)
- **ρυτόν** (C,U,Ancient Greek,UF,U,U)
- **rhûtôn** (C,U,Ancient Greek (transliterated),UF,U,U...
- **rytons** (C,U,Dutch-P,D,U,U)
- **ryton** (C,U,Dutch,AD,U,U)
- **ritons** (C,U,French,UF,U,N)
- **riton** (C,U,French,UF,U,N)
- **ritóns** (C,U,Spanish,UF,U,SN)
- **ritón** (C,U,Spanish,UF,U,SN)
- **escanciadora** (C,U,Spanish,UF,U,SN)
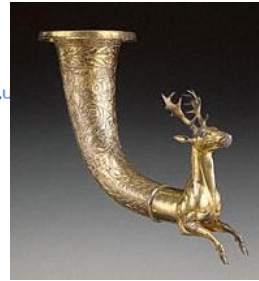
Facet/Hierarchy Code: V.TQ

Hierarchical Position:

```
Objects Facet
.... Furnishings and Equipment (Hierarchy Name) (G)
........ Containers (Hierarchy Name) (G)
........... containers (receptacles) (G)
.............. <containers by function or context> (G)
.................. <culinary containers> (G)
...................... <containers for serving and consuming food> (G)
.......................... <vessels for serving and consuming food> (G)
.............................. drinking vessels (G)
.................................. rhyta (G)
```

Additional Parents:

```
Objects Facet
.... Furnishings and Equipment (Hierarchy Name) (G)
........ Containers (Hierarchy Name) (G)
........... containers (receptacles) (G)
.............. <containers by function or context> (G)
.................. ceremonial containers (G)
...................... ceremonial vessels (G)
.......................... rhyta (G)
```

```
Objects Facet
.... Furnishings and Equipment (Hierarchy Name) (G)
........ Containers (Hierarchy Name) (G)
........... containers (receptacles) (G)
.............. <containers by form> (G)
.................. vessels (containers) (G)
...................... vases (G)
.......................... plastic vases (ancient vessels) (G)
.............................. rhyta (G)
```

Additional Notes:

Dutch ..... Vaten uit de Griekse oudheid in de vorm van een dierenkop, wer... of om wijn in een ander vat te gieten.

Spanish ..... Refiérase a vasijas de la Antigua Grecia, Europa del Este, o del... son cerradas pero con dos aberturas, una en el extremo superior para pod... para que el líquido pudiera salir. A menudo tienen la forma de un cuerno o u... lo común usadas como copas para beber o para vaciar vino en otras vasijas.

Related concepts:

distinguished from .... **drinking horns**
.... (drinking vessels, <vessels for serving and consuming
                                    Equipment (Hierarchy Name)) [300043229]
distinguished from .... **stirrup cups**
.... (drinking vessels, <vessels for serving and consuming
                                    Equipment (Hierarchy Name)) [300197140]
distinguished from .... **sturzbechers**
.... (beakers (drinking vessels), drinking vessels, ... Furnis
                                    Name)) [300197148]

XML

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          [300198938], containers                    ming food [
          containers [300197577],                    or context
          (receptacles) [30019719                    chy Name)
          and Equipment (Hierarch                    , Objects Fa
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        + <Note_Sources>
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          menudo tienen la forma de un cuerno o una cabeza de anir
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RDF

|	
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skosxl:altLabel	rhea
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skosxl:altLabel	rhyton
skosxl:altLabel	rhytons
skosxl:altLabel	rhûtôn
skosxl:altLabel	riton
skosxl:altLabel	ritons
skosxl:altLabel	ritón
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skosxl:altLabel	rytons
skosxl:altLabel	ρυτόν
is skos:broader of	<http://karma.getty.edu:2020/resource/AAT/Subject/300265000>
skos:broader	<http://karma.getty.edu:2020/resource/AAT/Subject/300194567>
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gvp:broaderNonPreferred	<http://karma.getty.edu:2020/resource/AAT/Subject/300198865>
is gvp:btgRelationshipType of	<http://karma.getty.edu:2020/resource/AAT/Subject/300194567>
is gvp:btgRelationshipType of	<http://karma.getty.edu:2020/resource/AAT/Subject/300198333>
is gvp:btgRelationshipType of	<http://karma.getty.edu:2020/resource/AAT/Subject/300198865>
gvp:btgRelationshipType	<http://karma.getty.edu:2020/resource/AAT/Subject/300265000>
gvp:facetCode	V.TQ
is gvp:historicFlagCurrent of	<http://karma.getty.edu:2020/resource/AAT/Subject/300194567>
is gvp:historicFlagCurrent of	<http://karma.getty.edu:2020/resource/AAT/Subject/300198333>
is gvp:historicFlagCurrent of	<http://karma.getty.edu:2020/resource/AAT/Subject/300198865>
gvp:historicFlagCurrent	<http://karma.getty.edu:2020/resource/AAT/Subject/300265000>
rdfs:label	SUBJECT #300198841
skos:note	Refers to vessels from Ancient Greece, eastern East openings, one at the top for filling and one at the base so that liquid could st an animal's head, and were typically used as a drinking cup by holding the rhyton above the drinker's head and catching the strea
skos:note	Refi$00erase a vasijas de la Antigua Grecia, Europa del Este, o del Medio C con dos aberturas, una en el extremo superior para poder llenarlas, y otra e menudo tienen la forma de un cuerno o una cabeza de animal y eran por lo para vaciar vino en otras vasijas.
skos:note	Vaten uit de Griekse oudheid in de vorm van een dierenkop, werden vaak g gieten.
skosxl:prefLabel	rhyta
gvp:recordType	Concept
is skos:related of	<http://karma.getty.edu:2020/resource/AAT/Subject/300043229>
is skos:related of	<http://karma.getty.edu:2020/resource/AAT/Subject/300197140>
is skos:related of	<http://karma.getty.edu:2020/resource/AAT/Subject/300197148>
skos:related	<http://karma.getty.edu:2020/resource/AAT/Subject/300043229>
skos:related	<http://karma.getty.edu:2020/resource/AAT/Subject/300197140>
skos:related	<http://karma.getty.edu:2020/resource/AAT/Subject/300197148>
gvp:subjectContrib	<http://karma.getty.edu:2020/resource/AAT/Contrib/10000000>
gvp:subjectContrib	<http://karma.getty.edu:2020/resource/AAT/Contrib/10000088>
gvp:subjectContrib	<http://karma.getty.edu:2020/resource/AAT/Contrib/10000131>
gvp:subjectContrib	<http://karma.getty.edu:2020/resource/AAT/Contrib/10000205>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/DescriptiveNote/34904>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/DescriptiveNote/77124>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/DescriptiveNote/83378>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000198841/70051>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000198841/70411>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000198841/70641>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000272716/70051>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000272717/70051>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000272718/70051>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000297235/70051>
is gvp:subjectId of	<http://karma.getty.edu:2020/resource/AAT/Term/1000297235/70411>

Issues Discovered Through Prototype Development

- How to represent lookup lists, associative relationships, N-ary relations, revision history

- Tool limitations – no functionality for getting language attributes from a database column

- Use RDBMS or triple store?

- Environment limitations – RDF uses much more space on filesystems

- Need for a semantic/ontology expert to help connect data to established standards

- What to do with lookup lists

Opportunities for Connecting Data - Coreferencing

- Language list made into its own hierarchy in AAT

- Languages coordinated with IANA Subtag Registry

- TGN place types connected to AAT subjects

- ULAN roles connected to AAT subjects

- ULAN nationalities connected to AAT subjects

- ULAN events connected to AAT subjects

- ULAN places connected to TGN subjects
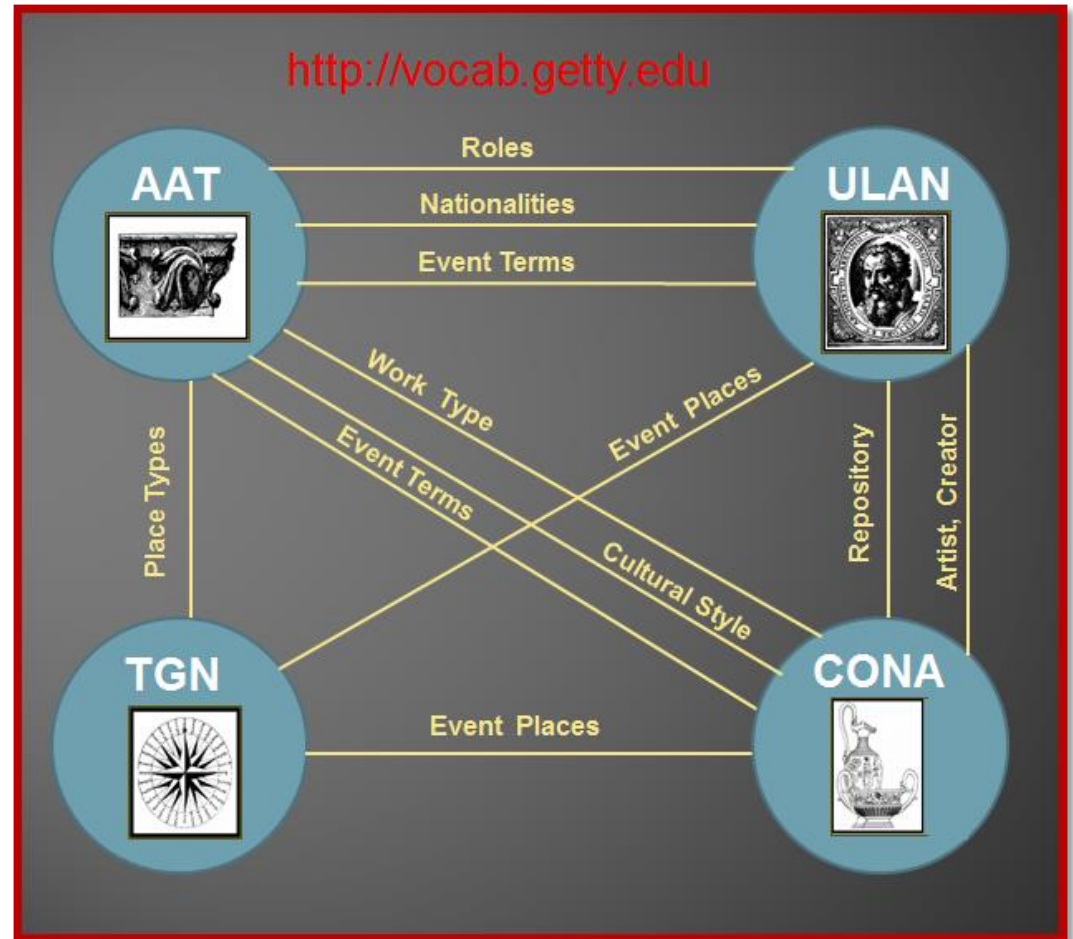
Query Example

- Get all nations from TGN for a lookup list

Linking Possibilities: Getty Vocabularies

http://vocab.getty.edu
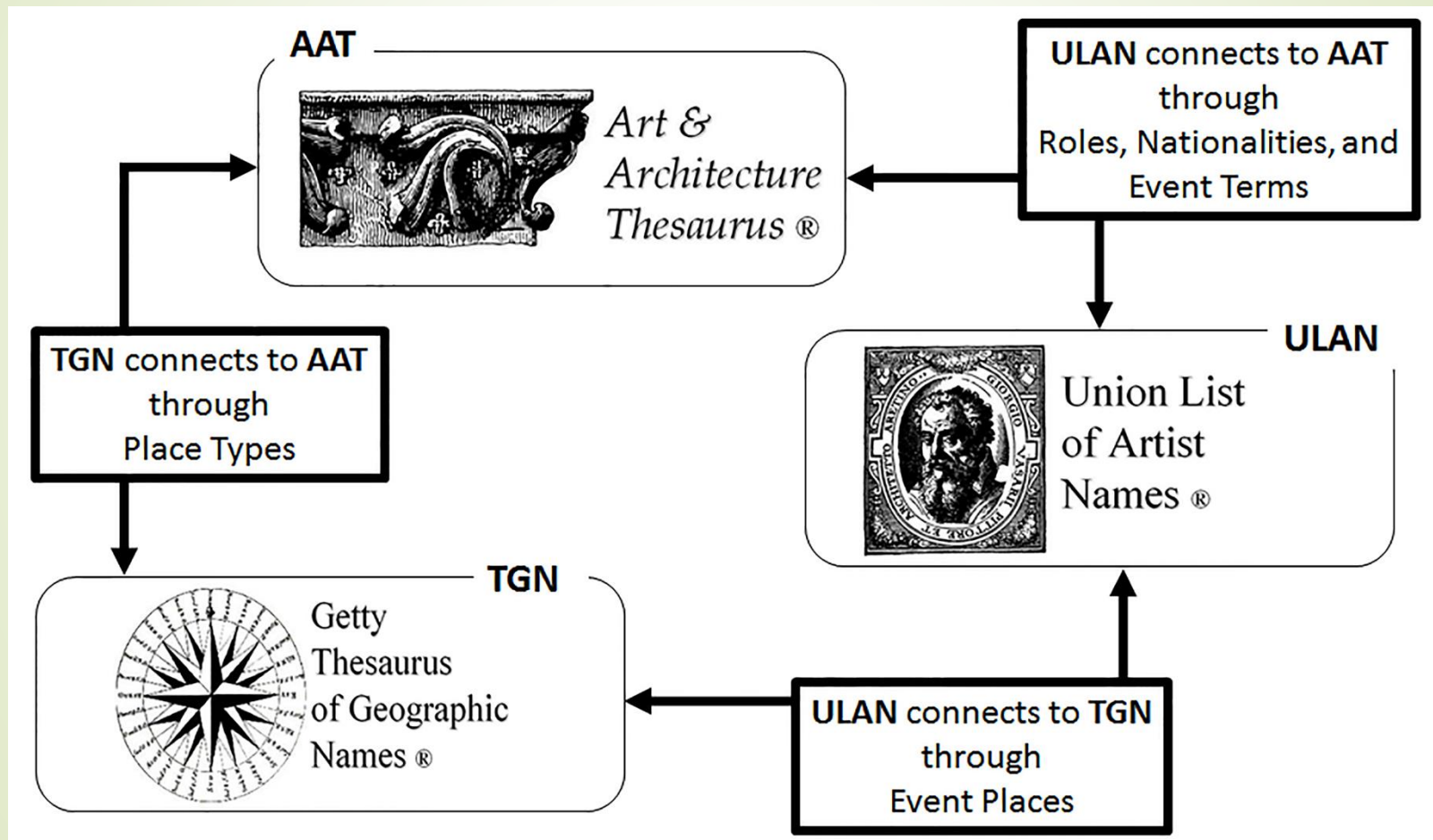
Editorial perspective: LOD

- *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

Our vocabularies express as LOD can be used to connect other resources
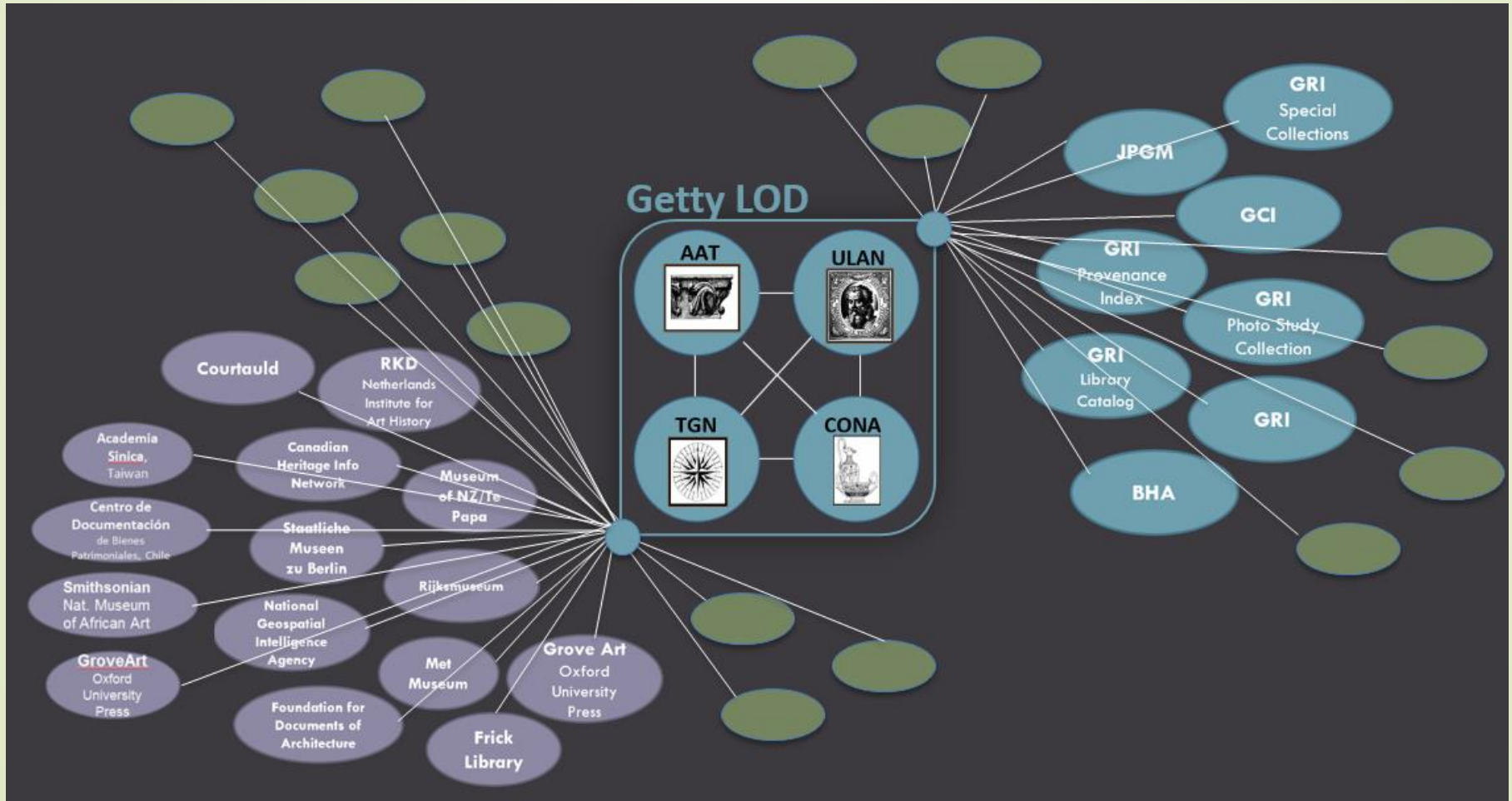
Triple Store vs. RDBMS

Triple Stores (GraphDB, 4store, Virtuoso)

- Built for storage and retrieval of triples
- Queried using SPARQL
- Import/export using RDF and SPARQL Update

Relational Database Management Systems (Oracle, SQL Server, MySQL)

- Data is organized into flat, two-dimensional tables containing fields
- Queried using SQL
- Import/export using DML statements along with whatever formats are supported by RDBMS such as comma-delimited files and XML

Tools for Transforming RDBMS Data into RDF Triples

- R2RML standard developed by the W3C for mapping RDBMS tables to RDF triples

- Use perl RDF-RDB2RDF module for implementing R2RML scripts

- Custom scripts for creating staged download files in N3, NT, RDF and JSON serializations

- Use OWLIM triple store and customized Forest application for HTTP server to handle user requests

Triple Extract Process
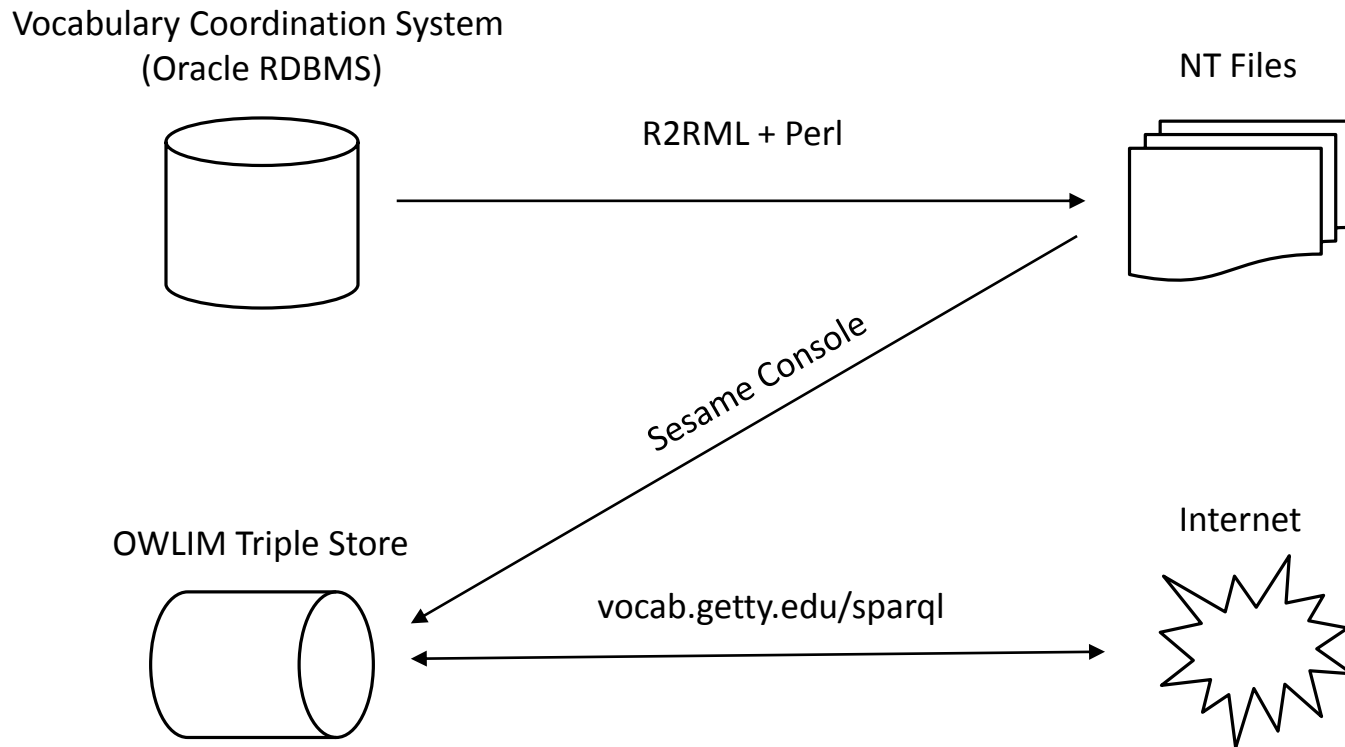
Architecture Diagram AAT & TGN

Server 1

OWLIM Data Center 1

4 cores
64 GB RAM

Vocab Repository
AAT & TGN

Worker Node 1

Master Node 1

HP ProLiant
Linux
128 GB RAM

Forest 1 HTTP Server
GVP Web Application
SQARQL Endpoint

4 cores
32 GB RAM

Server 2

OWLIM Data Center 2

4 cores
64 GB RAM

Vocab Repository
AAT & TGN

Worker Node 2

Master Node 2

HP ProLiant
Linux
128 GB RAM

Forest 2 HTTP Server
GVP Web Application
SQARQL Endpoint

4 cores
32 GB RAM

OWLIM Load balancer

vocab.getty.edu
Load Balancer

Getty Vocabularies: LOD   SPARQL   Queries   Any ▾   Search...   Search   Brief ▾

The Getty Vocabularies

Welcome to the SPARQL endpoint vocab.getty.edu

The Getty Vocabularies: The AAT, TGN, ULAN, and CONA contain structured terminology for art and other material culture, archival materials, visual surrogates, and bibliographic materials. Compliant with international standards, they provide authoritative information for catalogers and researchers, and can be used to enhance access to databases and Web sites. The Getty Vocabularies are produced by the Getty Vocabulary Program (GVP) and grow through contributions.

NOW Available:

The Art & Architecture Thesaurus (AAT) ®
Catherine wheel or rose window? AAT is a structured vocabulary, including terms, descriptions, and other information for generic concepts related to art and architecture.

The Getty Thesaurus of Geographic Names (TGN) ®
London or Londinium? TGN is a structured vocabulary, including names, descriptions, and other information for places important to art and architecture.

The Union List of Artist Names (ULAN) ®
Titian or Tiziano Vecellio? ULAN is a structured vocabulary, including names, biographies, and other information about artists and architects.

Ontology Update Note: There are changes to the ontology and mapping, see Version 2.0 Changes and Version 3.0 Changes.

Documentation and Downloads:

- **GVP Semantic Representation:** HTML (for linking), PDF (for printing).
  Sections GVP URLs and Prefixes and Semantic Resolution describe the used URIs and provide examples. All prefixes that we use are in prefixes.ttl.
  Comprehensive Sample Queries are included.
- **GVP ontology:** HTML, RDF/XML, Turtle
- **Datasets:** (NTriples Zip, see doc section Export Files before using!):
  - AAT: full.zip (all statements), explicit.zip (only explicit statements)
  - TGN: full.zip (all statements), explicit.zip (only explicit statements)
  - ULAN: full.zip (all statements), explicit.zip (only explicit statements)
- **VOID:** void.ttl (see doc section Descriptive Information)
- **Associative Relationship Types:** Full Matrix by Codes PDF|Excel
- **General information about the Linked Open Data projects**

Explore the Dataset:

- **Text search**: Use 'All/AAT/TGN/ULAN' to select the vocabulary. Enter either text or concept ID in the query box. Multiple words in the text are 'AND'ed. Use 'Brief' to search only

Documentation and Downloads:

- **GVP Semantic Representation:** HTML (for linking), PDF (for printing).
  Sections GVP URLs and Prefixes and Semantic Resolution describe the used URIs and provide examples. All prefixes that we use are in prefixes.ttl.
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- **GVP ontology:** HTML, RDF/XML, Turtle
- **Datasets:** (NTriples Zip, see doc section Export Files before using!):
  - AAT: full.zip (all statements), explicit.zip (only explicit statements)
  - TGN: full.zip (all statements), explicit.zip (only explicit statements)
  - ULAN: full.zip (all statements), explicit.zip (only explicit statements)
- **VOID:** void.ttl (see doc section Descriptive Information)
- **Associative Relationship Types:** Full Matrix by Codes PDF|Excel
- **General information about the Linked Open Data projects**

Existing Standards (Ontologies) Used

- **Thesaurus information:** SKOS, SKOSXL, ISO 25964

- **Common properties:** Dublin Core (DC), Dublin Core Terms (DCT)

- **Sources and contributors:** Bibliographic Ontology (BIBO), Friends of a Friend (FOAF)

- **Geographic information:** W3C Geo Ontology (WGS)

- **Revision History:** Provenance (PROV)

- **System properties:** Resource Description Framework (RDF), RDF Schema (RDFS), Web Ontology Language (OWL), and XML Schema Definition (XSD)

- **Implementation of the conversion:** RDB to RDF Mapping Language (R2RML)

Link to the HTML version of the full documentation:
http://vocab.getty.edu/doc/

Discussion Groups

Community Support Forum

NEW TOPIC   ⟳   Help

Shared publicly
31 of many topics G+1   ⌄

We hope the community will use this gettyvocablod forum to ask questions, discuss issues, and find solutions related to the technical aspects of this publication. Usage examples are especially welcome.

Welcome to our community discussio... `announcement` By Getty Vocabularies LOD - 1 post - 75 views 📢		6/11/15
Why ISO-8859-1 c... `content-negotiation` `encoding` `sparql` By Christopher Johnson - 7 posts - 18 views		Apr 10
large results download limits `performance` `sparql` `ulan` By Matthew Lincoln - 2 posts - 22 views		Mar 8
Getty vocabulary in S... `sparql` `usage-story` `visualization` By Sandor Kopacsi - 13 posts - 69 views		Feb 19
Getting more data out of ULAN `sparql` `ulan` By Vladimir Alexiev - 3 posts - 50 views		Jan 31
ULAN Import Error Completed `ulan` By Nabeel Ahmed - 2 posts - 18 views		Jan 13
How to get all Subjects of a Given Parent in ... `sparql` By Ykje - 3 posts - 23 views		12/22/15
Help with a query `ulan` By Karan - 2 posts - 25 views		12/22/15
Wrongly merged biographies By Gabriel Kerneis - 2 posts - 13 views		12/15/15

Tweets

🔁 thisisaaronland Retweeted

Who's On First @alloftheplaces
you know / just indexing a copy @thegetty 's github.com/thisisaaronlan... in a copy of @mapzen 's github.com/pelias/pelias on a lazy saturday

pelias/pelias
pelias - Pelias is a modular open-source geocoder using ElasticSearch for fast geocoding.
github.com

♡   ↪   21 May

Who's On First @alloftheplaces
you know / just indexing a copy @thegetty 's

Embed   View on Twitter

Getty Vocabularies: LOD   SPARQL   [Any ▾]   [Search...]   [Search]   [Brief ▾]

rhyta

Source: http://vocab.getty.edu/aat/300198841

| Subject (100 of 424) | Predicate | Object | All | Website | Hierarchy | Download in: JSON | RDF | N3/Turtle | N-Triples

Inference [Explicit and implicit ▾]

Statements in which the resource exists as a subject.

Predicate	Object
rdf:type	gvp:Concept, gvp:Subject, skos:Concept
rdfs:label	Rhyta@de, Rhyton@en, escanciadora@es, lai t'an chiu pei@zh-latn-wadegile, lai tan jiu bei@zh-latn-pinyin-x-notone, lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu, rhea (vessels)@en, rheon@en, rheons@en, rhyta@es, rhyta@el-latn, rhyta@en, rhyton@es, rhyton@en, rhyton@el-latn, rhytons@es, rhytons@en, rhytons@fr, rhǔtón@grc-latn, riton@fr, ritons@fr, ritón@es, ritóns@es, ryton@nl, rytons@nl, ῥυτόν@grc, 萊坦酒杯@zh-hant, 角杯@zh-hant, 角狀杯@zh-hant
rdfs:seeAlso	http://www.getty.edu/vow/AATFullDisplay?find=&logic=AND&note=&subjectid=300198841
dcterms:contributor	aat_contrib:10000000, aat_contrib:10000088, aat_contrib:10000131, aat_contrib:10000205, aat_contrib:10000250
skos:scopeNote	aat_scopeNote:119579, aat_scopeNote:119580, aat_scopeNote:34904, aat_scopeNote:77124, aat_scopeNote:83378
skos:inScheme	aat
skos:prefLabel	Rhyta@de, lai t'an chiu pei@zh-latn-wadegile, lai tan jiu bei@zh-latn-pinyin-x-notone, lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu, rhyta@el-latn, rhyta@en, rhytons@es, rhytons@fr, rytons@nl, 萊坦酒杯@zh-hant
skos:altLabel	Rhyton@en, escanciadora@es, lái tǎn jiǔ bēi@zh-latn-pinyin-x-hanyu, rhea (vessels)@en, rheon@en, rheons@en, rhyta@es, rhyton@es, rhyton@en, rhyton@el-latn, rhytons@en, rhǔtón@grc-latn, riton@fr, ritons@fr, ritón@es, ritóns@es, ryton@nl, ῥυτόν@grc, 角杯@zh-hant, 角狀杯@zh-hant
skos:note	aat_scopeNote:34904, aat_scopeNote:77124, aat_scopeNote:83378, aat_scopeNote:119579, aat_scopeNote:119580, aat_rev:5000057716, aat_rev:5001147623, aat_rev:5001147624, aat_rev:5001147625, aat_rev:5001147626, aat_rev:5001147627, aat_rev:5001147628, aat_rev:5001147629, aat_rev:5001504912, aat_rev:5001504913, aat_rev:5001692934, aat_rev:5001693073, aat_rev:5001693074, aat_rev:5001708327, aat_rev:5001708329,

Formats available from vocab.getty.edu

Website View

Research Home ▸ Tools ▸ Art & Architecture Thesaurus ▸ Full Record Display

Art & Architecture Thesaurus® Online
Full Record Display

🔍 New Search   ◀ Previous Page   ❓ Help

Click the 🔝 icon to view the hierarchy.

Semantic View (JSON, RDF, N3/Turtle, N-Triples)   ▪ **Representative Images**:   1 2 3 4 5 6

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)
        (Spanish,AD,U,SN)
    Rhyton (C,U,English,AD,U,SN)
    rhytons (C,U,English,UF,U,N)
        (French-P,D,U,PN)
        (Spanish-P,D,U,PN)
    rhea (vessels) (C,U,English,UF,U,N)
    rheons (C,U,English,UF,U,N)
    rheon (C,U,English,UF,U,N)
    ῥυτόν (C,U,Ancient Greek,UF,U,U)
    rhŭtón (C,U,Ancient Greek (transliterated),UF,U,U)

Full Text Search – Brief Results

Results for **"yute"** (6 of 6)

Subject	Term	Parents	Scope Note	Type
aat:300375512	Hibiscus cannabinus (species)	Hibiscus (genus), Malvaceae (family), ... Agents Facet	Species of fast growing herbaceous annual plant, with stalks growing to 5.5 m (18 feet) in height. It is probably native to southern Asia, though its exact natural origin is unknown. It is widely d...	Concept
aat:300014244	jute board	fiberboard, fiber products, ... Materials Facet	A strong plyboard containing no jute fiber but made typically from sulfate and wastepaper pulp, used especially for shipping containers.	Concept
aat:300014045	jute (fiber)	plant fiber, natural fiber, ... Materials Facet	Bast fiber derived from either of two East Indian plants (Corchorus olitorius and C. capsularis). The pale brown fibers are soft, lustrous, and coarse, ranging in length from 4 to 10 feet. The brit...	Concept
tgn:2786554	Yutes Run	Allegheny, Pennsylvania, ... World		PhysPlaceConcept
tgn:7475035	Yutengping	Miaoli Xian, Chung-hua Min-kuo, ... World		AdminPlaceConcept
tgn:7415324	Yuteriaica, Río	Oaxaca, México, ... World		PhysPlaceConcept

Full Text Search – Full Results

Results for "**yute**" (11 of 11)

Subject	Term	Parents	Scope Note	Type
aat:300375512	Hibiscus cannabinus (species)	Hibiscus (genus), Malvaceae (family), ... Agents Facet	Species of fast growing herbaceous annual plant, with stalks growing to 5.5 m (18 feet) in height. It is probably native to southern Asia, though its exact natural origin is unknown. It is widely d...	Concept
aat:300014076	burlap	canvas, <textile materials by process or technique>, ... Materials Facet	Coarse canvas made of jute, used mainly for sacks and wrapping.	Concept
aat:300014244	jute board	fiberboard, fiber products, ... Materials Facet	A strong plyboard containing no jute fiber but made typically from sulfate and wastepaper pulp, used especially for shipping containers.	Concept
aat:300253474	buckram	<textile materials by finishing process>, <textile materials by process or technique>, ... Materials Facet	Heavy weave cotton, jute, or linen textile stiffened with glue, size, or starch and used for interlinings in garments, box making, bookbinding, etc.	Concept
aat:300015203	oakum	caulking compound, sealing compound, ... Materials Facet	Loosely twisted hemp or jute fiber impregnated with tar or a tar derivative and used in caulking seams, as of wooden ships, and packing joints, as of pipes.	Concept
aat:300014078	canvas	<textile materials by process or technique>, textile materials, ... Materials Facet	Closely woven textile made in various weights, usually of flax, hemp, jute, or cotton, used especially for sails, tarpaulins, awnings, upholstery, and as a support for oil painting. Also used for a...	Concept
aat:300131081	oilcloth	<textile materials by finishing process>, <textile materials by process or technique>, ... Materials Facet	Textile of woven cotton, jute, or hemp, treated with oil and pigment and used as a waterproof covering.	Concept

Getty Vocabularies: LOD   SPARQL   Queries   Any ▾   Search...   Search   Brief ▾

Query:

```
1   select ?Subject ?Term ?Parents ?Descr ?ScopeNote ?Type (coalesce(?Type1,?Type2) as ?ExtraType) {
2     ?Subject luc:term "fishing* AND vessel*"; a ?typ.
3     ?typ rdfs:subClassOf gvp:Subject; rdfs:label ?Type.
4     filter (?typ != gvp:Subject)
5     optional {?Subject gvp:placeTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type1]]}
6     optional {?Subject gvp:agentTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type2]]}
7     optional {?Subject gvp:prefLabelGVP [xl:literalForm ?Term]}
8     optional {?Subject gvp:parentStringAbbrev ?Parents}
9     optional {?Subject foaf:focus/gvp:biographyPreferred/schema:description ?Descr}
10    optional {?Subject skos:scopeNote [dct:language gvp_lang:en; rdf:value ?ScopeNote]}}
```

☑ Include inferred

☐ Expand results over equivalent URIs

Submit

```
OPTIONAL {?parent gvp:broaderPreferred ?grandParent}}
```

2.6   Full Text Search Query

This is the query used for the Full Text Search.

```
select ?Subject ?Term ?Parents ?Descr ?ScopeNote ?Type (coalesce(?Type1,?Type2) as ?ExtraType) {
  ?Subject luc:term "fishing* AND vessel*"; a ?typ.
  ?typ rdfs:subClassOf gvp:Subject; rdfs:label ?Type.
  filter (?typ != gvp:Subject)
  optional {?Subject gvp:placeTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type1]]}
  optional {?Subject gvp:agentTypePreferred [gvp:prefLabelGVP [xl:literalForm ?Type2]]}
  optional {?Subject gvp:prefLabelGVP [xl:literalForm ?Term]}
  optional {?Subject gvp:parentStringAbbrev ?Parents}
  optional {?Subject foaf:focus/gvp:biographyPreferred/schema:description ?Descr}
  optional {?Subject skos:scopeNote [dct:language gvp_lang:en; rdf:value ?ScopeNote]}}
```

· If the user selected **Brief**, we use predicate luc:term (just before the red text), for **Full**, we use predicate luc:text

· If the user selected only one of the vocabularies (e.g. AAT), we add a clause like

```
?subject skos:inScheme aat:
```

The following result columns are included:

· Subject

· GVP preferred Term

· Abbreviated Parent string

Two field pairs that the FTS concatenates (if present):

· Description (ULAN one-line biography) and

What the artists of these works of art have in common?

Robert Macpherson
The Campagna near Rome

Jean-Honoré Fragonard
Ruins of an Imperial Palace, Rome

Joseph Heintz, the elder
The Toilette of Venus

All three were active in Italy but were not Italian.

SPARQL Query

```
select ?x ?name ?bio ?birth {
 {select distinct ?x
  {?x foaf:focus/bio:event/(schema:location|(schema:location/gvp:broaderExtended)) tgn:1000080-place}}
 ?x gvp:prefLabelGVP/xl:literalForm ?name;
   foaf:focus/gvp:biographyPreferred [
     schema:description ?bio;
     gvp:estStart ?birth].
 filter ("1550"^^xsd:gYear <= ?birth && ?birth <= "1900"^^xsd:gYear)
 filter exists {?x gvp:broaderExtended ?facet.
   filter (?facet in (ulan:500000002))}
 filter not exists {
   ?x foaf:focus/(schema:nationality|(schema:nationality/gvp:broaderExtended)) aat:300111198}}
```

> **Participated in an event that took place in Italy**

> **In the Person, Artist Facet**

> **Nationality is NOT Italian**

➡ Just one of the ways to get interesting results using all three vocabularies.

➡ The full URIs are:

- ➡ Italy: http://vocab.getty.edu/tgn/1000080-place

- ➡ Person, Artists facet: http://vocab.getty.edu/ulan/500000002

- ➡ Italian (culture or style): http://vocab.getty.edu/aat/300111198

Query Examples/Exercises

- Keyword phrase search with stemming

- Combination term and scope note search

- Expanded search using term and scope note

- Exact match on term

- Get count of subjects having a Chinese term

- Get count of subjects having a Chinese term in AAT

Registered with Datahub

http://datahub.io/organization/the-getty-trust

Open Data Commons Attribution License

(ODC-By) v1.0

http://opendatacommons.org/licenses/by/1-0/

Linked Open Data Five Star Rating

- Available on the web (whatever format) *but with an open licence, to be Open Data*

- Available as machine-readable structured data (e.g. excel instead of image scan of a table)

- Available as (2) plus non-proprietary format (e.g. CSV instead of excel)

- All the above plus, Use open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff

- All the above, plus: Link your data to other people's data to provide context

Some Useful Resources and Links

- Tim Berners-Lee TED Talk
  - http://www.ted.com/talks/tim_berners_lee_the_year_open_data_went_world_wide.html
- Europeana Video
  - Sometimes a picture is worth a thousand words – in this case, it's a video
  - http://vimeo.com/36752317
- Eero Hyvönen's book
  - *Publishing and Using Cultural Heritage Linked Data on the Semantic Web*
- Linked Open Data in Libraries Archives and Museums (LODLAM)
  - http://lodlam.net/
- Open Memory Project
  - http://summit2015.lodlam.net/2015/04/21/challenge-entry-open-memory-project

Links to the live demo

Developer SPARQL Endpoint

http://vocab.getty.edu

General Information about our LOD project

http://www.getty.edu/research/tools/vocabularies/lod/index.html

About the Getty Vocabularies in general

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

Public Forum

https://groups.google.com/forum/#!forum/gettyvocablod

Examples of ID 300198841

Human readable: http://vocab.getty.edu/page/aat/300198841

Machine readable: http://vocab.getty.edu/aat/300198841