

# Linked Data



**Dave Clarke**  
Synaptica CEO



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# The World is Your Database

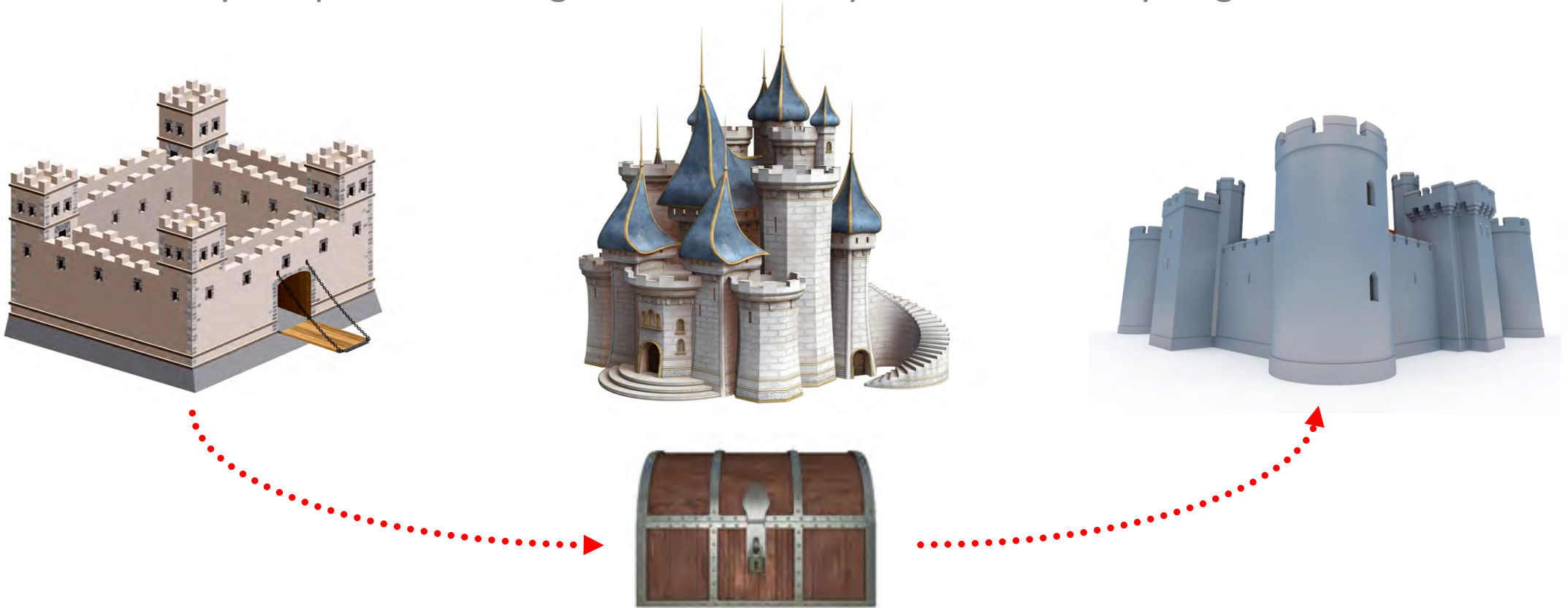
# Agenda



1. What is Linked Data, and why is it good for you (15 mins)
2. How it works (tech talk) (15 mins)
3. How you can get started (5 mins)
4. Discussion and Q&A (5-10 mins)

# What is Linked Data

**Before Linked Data:** Information was locked inside proprietary databases, each of which used custom database schema and every database record was accessed by identifiers that were only unique and intelligible within the system where they originated.



The guardians of these data ‘fortresses’ didn’t like sharing data. If it had to be done at all then data was extracted and delivered under lock and key with cryptic instructions on how to use it.

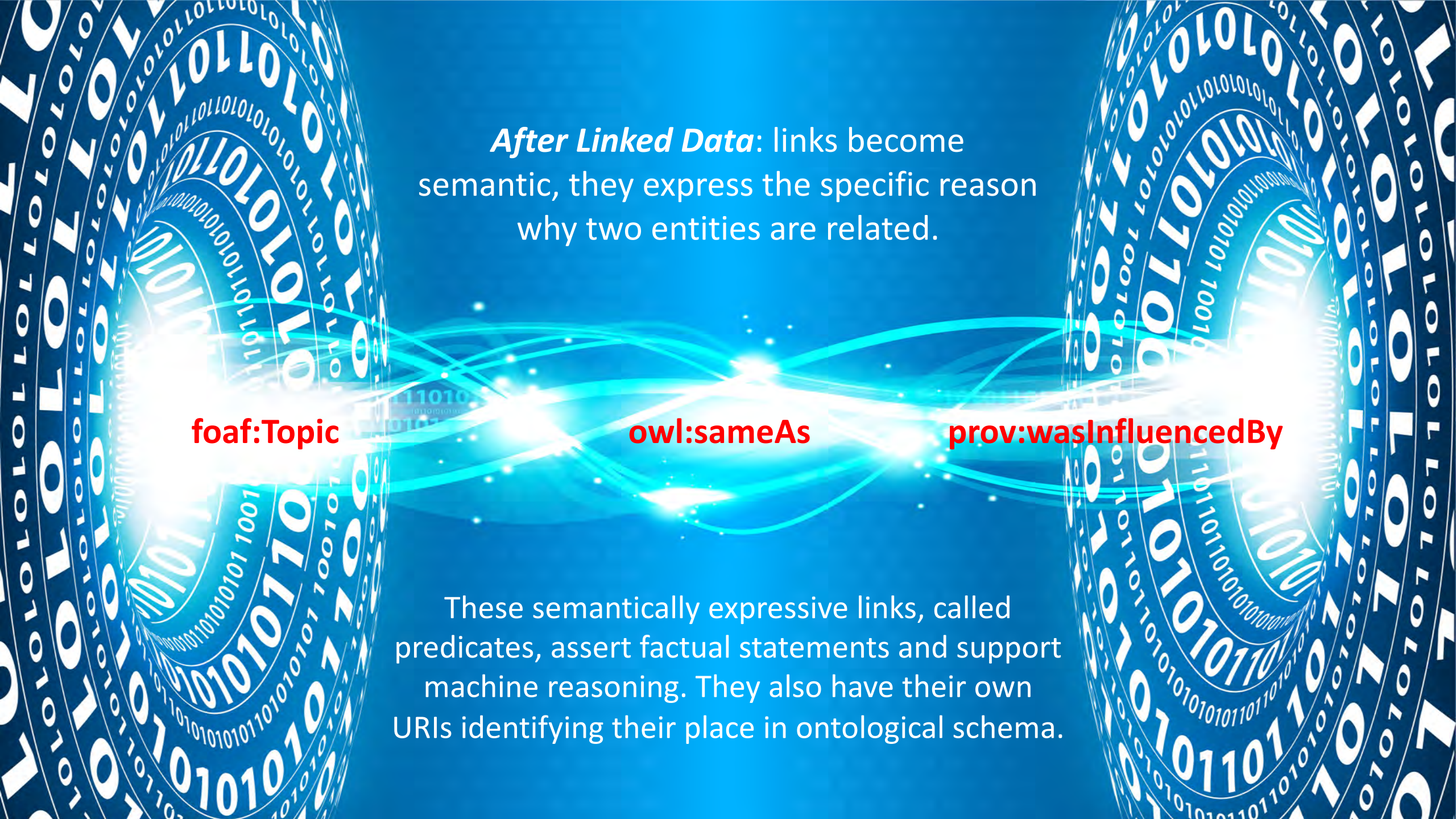
**After Linked Data:** every resource (concept, name, database record, etc.) has a globally Unique Resource Identifier (URI) that is intelligible to anyone else on the planet.



**World Wide ~~Web~~ Database**

*Before Linked Data:* web hyperlinks were mere sign posts to other web pages.



The background features a blue gradient with two large, stylized circular structures on the left and right, composed of concentric rings of white binary code (0s and 1s). In the center, several bright, glowing blue and white lines intersect, creating a sense of dynamic energy and connectivity.

*After Linked Data:* links become semantic, they express the specific reason why two entities are related.

**foaf:Topic**

**owl:sameAs**

**prov:wasInfluencedBy**

These semantically expressive links, called predicates, assert factual statements and support machine reasoning. They also have their own URIs identifying their place in ontological schema.

If I create Linked Data is it automatically exposed to the public?



all Linked Data is *capable*  
of being shared

**no**  
*open is  
optional*



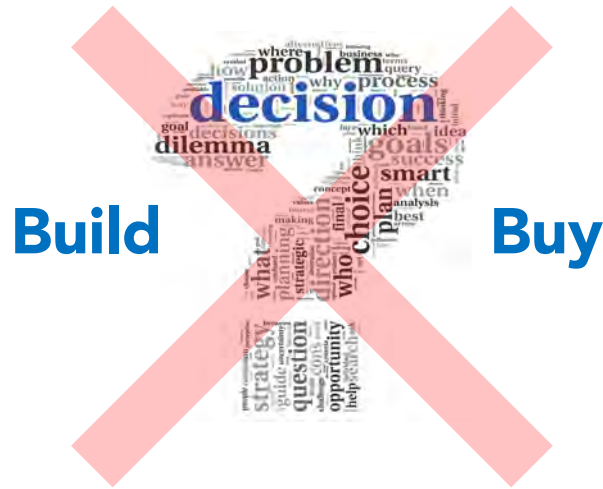
but Linked Data can also  
reside behind the firewall

## **Why it is good for you**

1. Adopting and re-using Linked Open Data taxonomies
2. Semantic Enrichment

# **Example 1: Adopting and re-using Linked Open Data Taxonomies**





*New mantra for taxonomy projects:*

**ADOPT** first

**ADAPT** second

**CREATE** third



Corporate & Enterprise  
Taxonomies

Products & Services  
Commodities  
Finance  
Legal & Regulatory

STEMs: Science, Technology,  
Engineering & Mathematics  
HCLS: Health Care & Life Sciences  
Cultural Heritage  
News Media  
Geospatial  
Person Names





dave, you are currently accessing [Administrative Taskview]

## Featured Annotated Images



**The Ambassadors**

This painting memorialises two wealthy, educated and powerful young men. On the left is Jean de Dinteville, aged 29, French ambassador to England in 1533. To the right stands his friend, Georges de Selve, aged 25, bishop of Lavaur, who acted on several occasions as ambassador to the Emperor, the ...



**The Birth of Venus**

The painting was commissioned by Lorenzo di Pierfrancesco de'Medici, a cousin of Lorenzo the Magnificent. The theme was probably suggested by the humanist Poliziano. It depicts Venus born from the sea foam, blown by the west wind, Zephyr, and the nymph, Chloris, towards one of the Horai, who prepares to ...



**Bacchus and Ariadne**

An allegorical oil painting depicting a subject from classical mythology in which Bacchus, the god of wine, falls in love with Ariadne, the daughter of King Minos of Crete. It is one of a cycle of paintings on mythological subjects produced for Alfonso I d'Este, Duke of Ferrara, for the ...



**The Garden of Earthly Delights**

The Garden of Earthly Delights is the modern title given to a triptych painted by Hieronymus Bosch. The three scenes of the inner triptych are probably (but not necessarily) intended to be read chronologically from left to right. The left panel depicts God presenting Eve to Adam, the central panel ...



**The Tower of Babel**

The Tower of Babel, 1563, is one of two surviving paintings by Bruegel of that subject. The oil on panel painting is 114cm x 155cm; it is located in the Kunsthistorisches Museum, Vienna. The painting's biblical allusions reference the Book of Genesis in which humans attempt to build a city ...



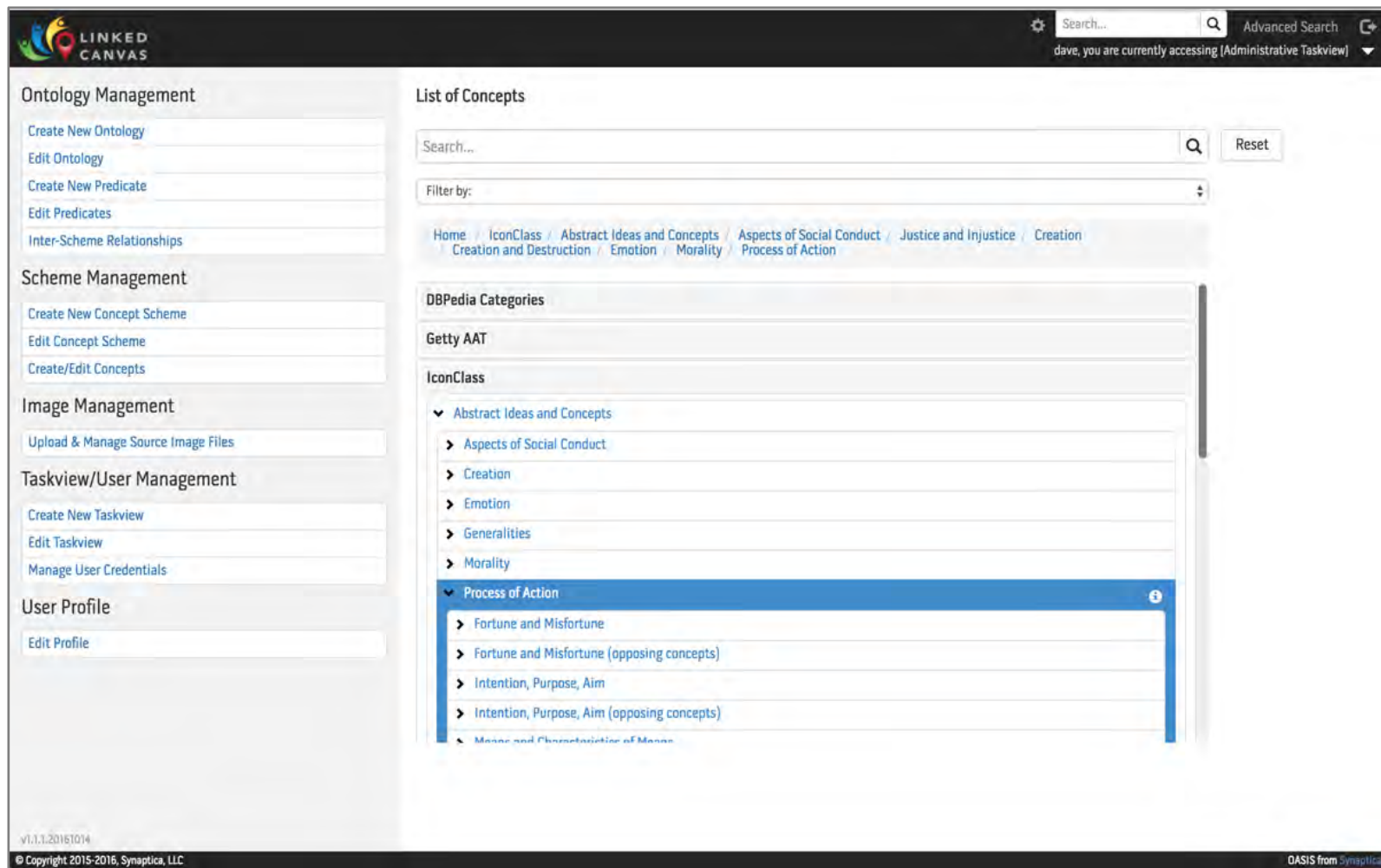



Carousel

v1.1.0.20161001

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OASIS from Synaptica



The screenshot displays the Synaptica Linked Canvas interface. On the left, there are four main menu sections: **Ontology Management** (with options like Create New Ontology, Edit Ontology, Create New Predicate, Edit Predicates, and Inter-Scheme Relationships), **Scheme Management** (with options like Create New Concept Scheme, Edit Concept Scheme, and Create/Edit Concepts), **Image Management** (with an option to Upload & Manage Source Image Files), and **Taskview/User Management** (with options like Create New Taskview, Edit Taskview, and Manage User Credentials). Below these is a **User Profile** section with an Edit Profile option.

The main content area is titled **List of Concepts** and includes a search bar, a filter dropdown, and a breadcrumb trail: **Home / IconClass / Abstract Ideas and Concepts / Aspects of Social Conduct / Justice and Injustice / Creation**. Below the breadcrumb trail, there are sections for **DBpedia Categories**, **Getty AAT**, and **IconClass**. The **IconClass** section is expanded, showing a hierarchical list of concepts under **Abstract Ideas and Concepts**, including **Aspects of Social Conduct**, **Creation**, **Emotion**, **Generalities**, **Morality**, and **Process of Action**. The **Process of Action** category is further expanded, showing sub-concepts like **Fortune and Misfortune**, **Fortune and Misfortune (opposing concepts)**, **Intention, Purpose, Aim**, and **Intention, Purpose, Aim (opposing concepts)**.

At the bottom left, the version number **v1.1.1.20161014** and copyright notice **© Copyright 2015-2016, Synaptica, LLC** are visible. At the bottom right, the text **OASIS from Synaptica** is displayed.

## DBpedia

- 1.3M primary resources
- 31M relationships & properties

## Getty AAT

- 42K primary resources
- 14.7M relationships & properties

## IconClass

- 40K primary resources
- 3.4M relationships & properties

## LCNAF

- 9.5M primary resources
- 80M relationships & properties

## LCSH

- 419K primary resources
- 3.9M relationships & properties

## Total in this system

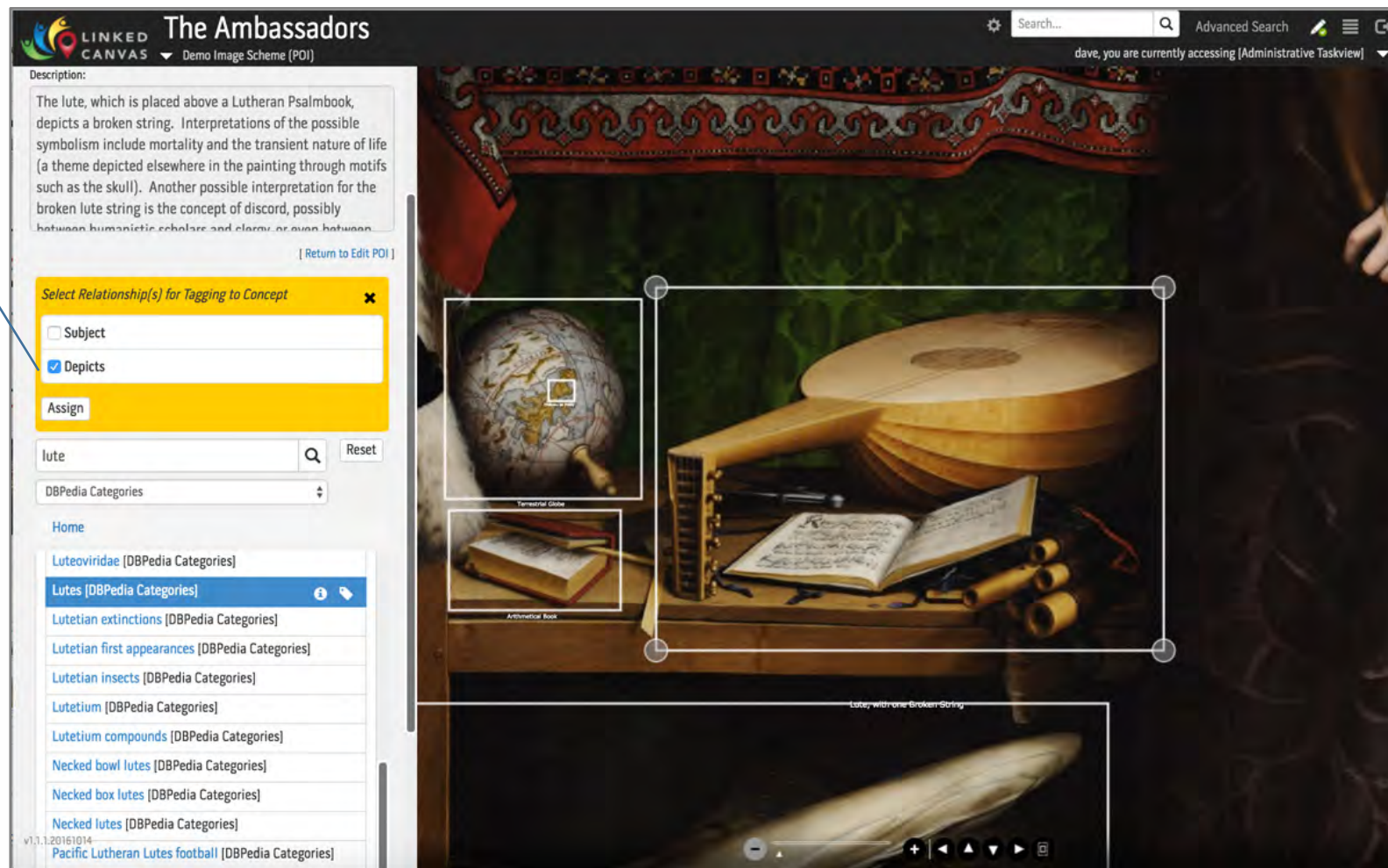
- 11.3M primary resources
- 133M relationships & properties

Process of indexing a visual detail  
inside a painting to the DBpedia  
category resource for *Lutes*

<http://dbpedia.org/resource/Category:Lutes>

via the FOAF predicate  
*Depicts*

foaf:depicts



The screenshot shows the 'The Ambassadors' Linked Canvas interface. The main area displays a painting of a lute with a broken string. A search bar at the top right contains the text 'dave, you are currently accessing [Administrative Taskview]'. On the left, a sidebar titled 'The Ambassadors' shows a description of the lute and a list of DBpedia categories. A yellow box highlights the 'Select Relationship(s) for Tagging to Concept' section, which includes a 'Depicts' checkbox and an 'Assign' button. Below this, a search bar contains the text 'lute' and a 'Reset' button. The list of DBpedia categories includes 'Luteoviridae', 'Lutes', 'Lutetian extinctions', 'Lutetian first appearances', 'Lutetian insects', 'Lutetium', 'Lutetium compounds', 'Necked bowl lutes', 'Necked box lutes', 'Necked lutes', and 'Pacific Lutheran Lutes football'.


**Linked Canvas**

**Bacchus and Ariadne**

Demo Image Scheme (POI)

[Image](#)
[POIs](#)
[Tours](#)
[Concepts](#)
[Search](#)
[Declutter](#)
[Captions](#)

Points of Interest within this Image

[List](#)
[Hierarchy](#)
[In View](#)
[View All](#)

|                  |   |
|------------------|---|
| Ariadne          | 5 |
| Bacchus          | 5 |
| Cheetahs         | 0 |
| Corona Borealis  | 3 |
| Satyr with Snake | 0 |
| Signature on Urn | 0 |

POI Details

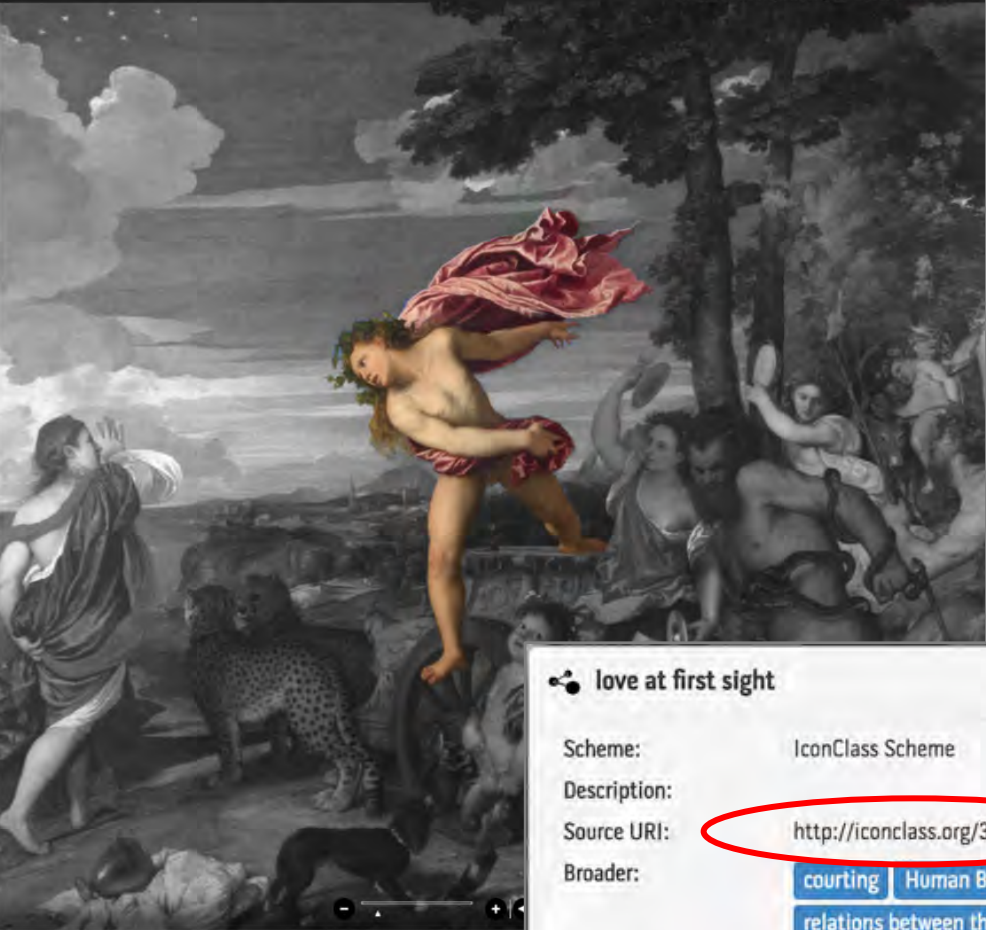
URI: <https://demo.linkedcanvas.com/poi/tze617119gv>

Label: Bacchus

Description: Bacchus (Greek: Διονυσιος, Dionysos; Latin: Bacchus) is the god of the grape harvest, winemaking and wine, of ritual madness, fertility, theatre and religious ecstasy in Greek mythology. Falling in love with Ariadne on first sight, Bacchus leaps from his chariot, drawn by two cheetahs, towards her. Ariadne had been abandoned on the Greek island of Naxos by Theseus, whose ship is shown in the distance. The picture shows her initial fear of Bacchus, but he raised her to heaven and turned her into a constellation, represented by the stars above her head.

Subject:

- present (IconClass)
- love at first sight (IconClass)
- (Feeling of) Attraction (IconClass)
- Bacchus finds Ariadne on Naxos (IconClass)
- love (Getty AAT)




**love at first sight**

Scheme:

IconClass Scheme

Description:

Source URI:

<http://iconclass.org/33C211>

Broader:

courting

Human Being, Man in General

lovers; courting, flirting

relations between individual persons

relations between the sexes

Narrower:

watching the beloved asleep

Related Images and Points of Interest:

Bacchus and Ariadne

- Bacchus

## Example 1: Linked Open Data – a World Wide Database



For image attributions please visit  
[www.linkedcanvas.org](http://www.linkedcanvas.org)

## **Example 2: Mapping to Linked Open Data resources for Semantic Enrichment**

### Item Summary

**Descriptor** Barack Obama  
**Object** Person Names  
**Categories**  
**Status** Active; Candidate; Preferred; Unlocked  
**UID** 19865056  
**Created** dclarke 10/14/2016 4:31:14 AM  
**Modified** dclarke 10/14/2016 4:40:45 AM

### Sub-Elements

**\*Last Name:**   
**First Name:**   
**Bio Notes:**

### Administrative Attributes:

**Approval:**    
**Workflow:**    
**Language:**    
**Locked:**    
**BLAT:**    
**BTN:**

### Relationships

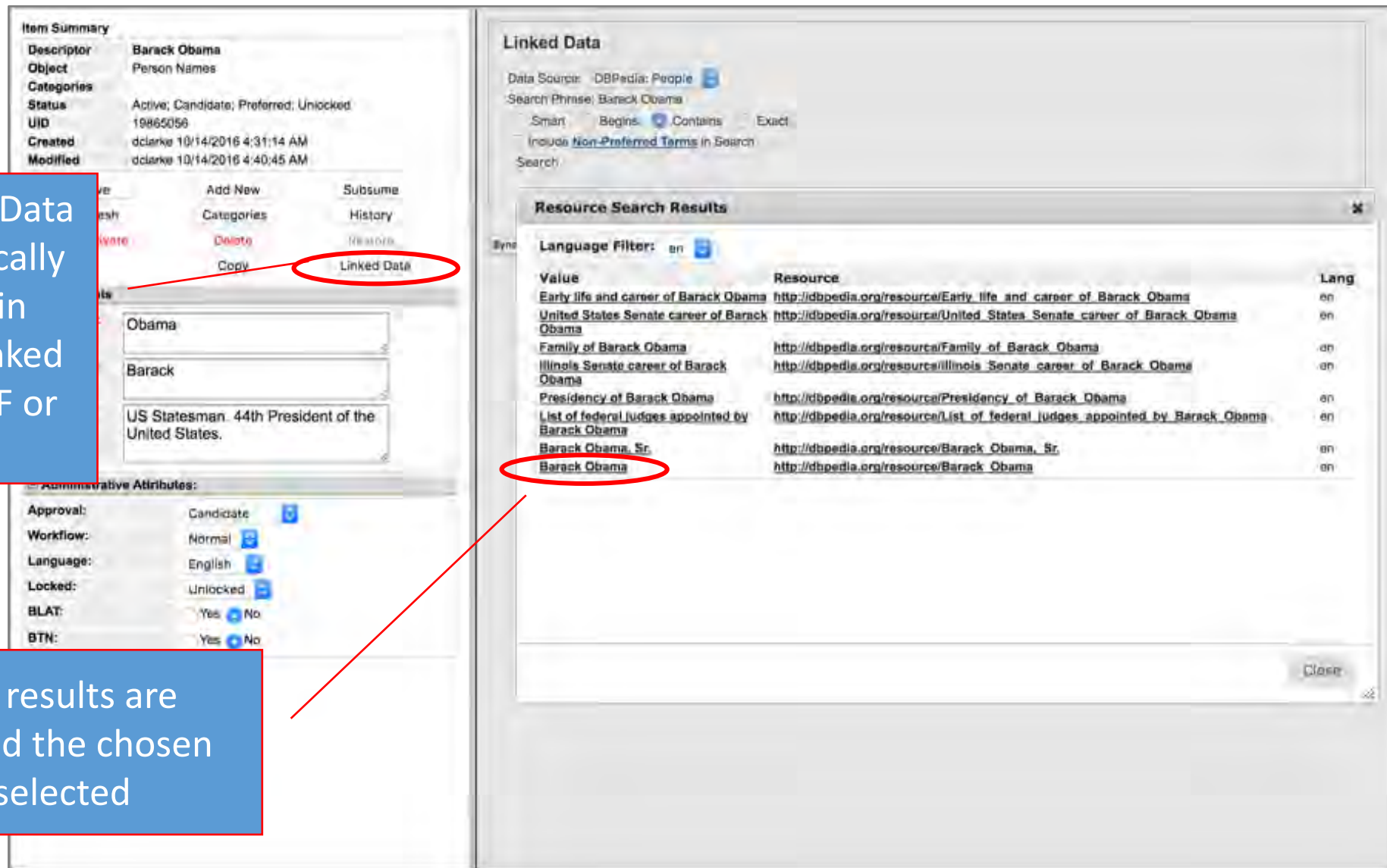
Barack Obama

**Top Level Parents**  
**Parents**  
**Children**  
**Associations**  
**Variants**

Use Case  
 An internal taxonomy of person names stores only minimal information: First Name, Last Name and a field for Biographic Notes

By clicking on the Linked Data button we can automatically search for our person in DBpedia or any other Linked Data source such as VIAF or LCNAB

Matching results are returned and the chosen entity selected



**Item Summary**

Descriptor: Barack Obama  
 Object: Person Names  
 Categories: Active; Candidate; Preferred; Unlocked  
 Status: 19865056  
 UID: dclarke 10/14/2016 4:31:14 AM  
 Created: dclarke 10/14/2016 4:40:45 AM  
 Modified:

Buttons: Add New, Subsume, Categories, History, Delete, Restore, Copy, **Linked Data**

Text input: Obama, Barack, US Statesman. 44th President of the United States.

**Administrative Attributes:**

Approval: Candidate  
 Workflow: Normal  
 Language: English  
 Locked: Unlocked  
 BLAT: Yes No  
 BTN: Yes No

**Linked Data**

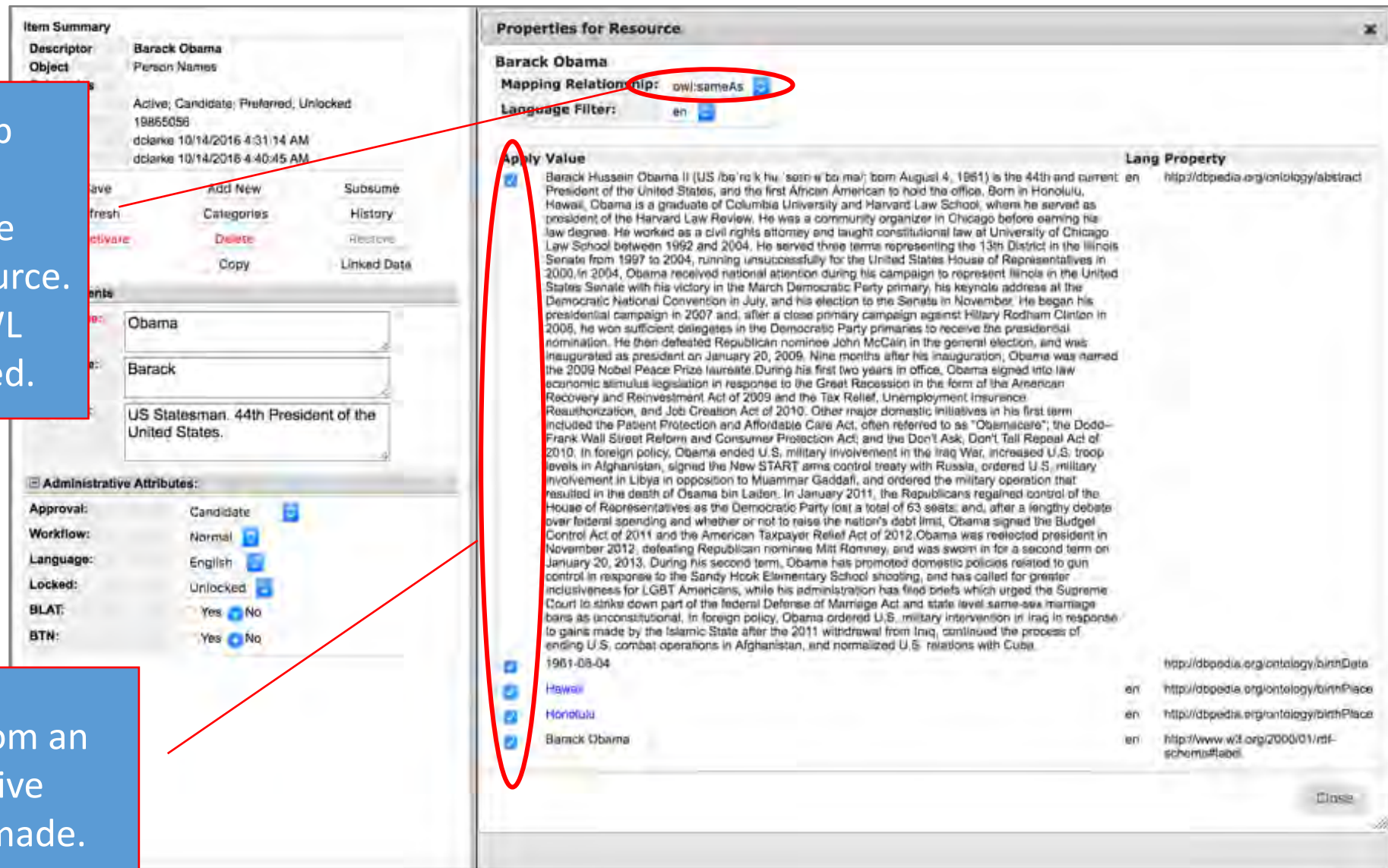
Data Source: DBpedia: People  
 Search Phrase: Barack Obama  
 Smart Begins Contains Exact  
 Include Non-Preferred Terms in Search  
 Search:

**Resource Search Results**

| Value                                            | Resource                                                                                                                                                                | Lang |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Early life and career of Barack Obama            | <a href="http://dbpedia.org/resource/Early_life_and_career_of_Barack_Obama">http://dbpedia.org/resource/Early_life_and_career_of_Barack_Obama</a>                       | en   |
| United States Senate career of Barack Obama      | <a href="http://dbpedia.org/resource/United_States_Senate_career_of_Barack_Obama">http://dbpedia.org/resource/United_States_Senate_career_of_Barack_Obama</a>           | en   |
| Family of Barack Obama                           | <a href="http://dbpedia.org/resource/Family_of_Barack_Obama">http://dbpedia.org/resource/Family_of_Barack_Obama</a>                                                     | en   |
| Illinois Senate career of Barack Obama           | <a href="http://dbpedia.org/resource/Illinois_Senate_career_of_Barack_Obama">http://dbpedia.org/resource/Illinois_Senate_career_of_Barack_Obama</a>                     | en   |
| Presidency of Barack Obama                       | <a href="http://dbpedia.org/resource/Presidency_of_Barack_Obama">http://dbpedia.org/resource/Presidency_of_Barack_Obama</a>                                             | en   |
| List of federal judges appointed by Barack Obama | <a href="http://dbpedia.org/resource/List_of_federal_judges_appointed_by_Barack_Obama">http://dbpedia.org/resource/List_of_federal_judges_appointed_by_Barack_Obama</a> | en   |
| Barack Obama, Sr.                                | <a href="http://dbpedia.org/resource/Barack_Obama,_Sr.">http://dbpedia.org/resource/Barack_Obama,_Sr.</a>                                                               | en   |
| <b>Barack Obama</b>                              | <a href="http://dbpedia.org/resource/Barack_Obama">http://dbpedia.org/resource/Barack_Obama</a>                                                                         | en   |

A mapping relationship connects the internal taxonomy record to the external Linked Data resource. In this instance the OWL predicate *sameAs* is used.

Lastly selections from an array of descriptive properties can be made.



**Item Summary**

Descriptor: Barack Obama  
Object: Person Names

Active; Candidate; Preferred; Unlocked  
19865056  
dclarke 10/14/2016 4:31:14 AM  
dclarke 10/14/2016 4:40:45 AM

Save Add New Subsume  
Refresh Categories History  
Deactivate Delete Restore  
Copy Linked Data

Obama  
Barack  
US Statesman. 44th President of the United States.

**Administrative Attributes:**

Approval: Candidate  
Workflow: Normal  
Language: English  
Locked: Unlocked  
BLAT: Yes No  
BTN: Yes No

**Properties for Resource**

Barack Obama  
Mapping Relationship: owl:sameAs  
Language Filter: en

**Apply Value**

Barack Hussein Obama II (US /bəˈnɒk huːˈsoʊn əˈbɑːmə/; born August 4, 1961) is the 44th and current President of the United States, and the first African American to hold the office. Born in Honolulu, Hawaii, Obama is a graduate of Columbia University and Harvard Law School, where he served as president of the Harvard Law Review. He was a community organizer in Chicago before earning his law degree. He worked as a civil rights attorney and taught constitutional law at University of Chicago Law School between 1992 and 2004. He served three terms representing the 13th District in the Illinois Senate from 1997 to 2004, running unsuccessfully for the United States House of Representatives in 2000. In 2004, Obama received national attention during his campaign to represent Illinois in the United States Senate with his victory in the March Democratic Party primary, his keynote address at the Democratic National Convention in July, and his election to the Senate in November. He began his presidential campaign in 2007 and, after a close primary campaign against Hillary Rodham Clinton in 2008, he won sufficient delegates in the Democratic Party primaries to receive the presidential nomination. He then defeated Republican nominee John McCain in the general election, and was inaugurated as president on January 20, 2009. Nine months after his inauguration, Obama was named the 2009 Nobel Peace Prize laureate. During his first two years in office, Obama signed into law economic stimulus legislation in response to the Great Recession in the form of the American Recovery and Reinvestment Act of 2009 and the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010. Other major domestic initiatives in his first term included the Patient Protection and Affordable Care Act, often referred to as "Obamacare", the Dodd-Frank Wall Street Reform and Consumer Protection Act, and the Don't Ask, Don't Tell Repeal Act of 2010. In foreign policy, Obama ended U.S. military involvement in the Iraq War, increased U.S. troop levels in Afghanistan, signed the New START arms control treaty with Russia, ordered U.S. military involvement in Libya in opposition to Muammar Gaddafi, and ordered the military operation that resulted in the death of Osama bin Laden. In January 2011, the Republicans regained control of the House of Representatives as the Democratic Party lost a total of 63 seats; and, after a lengthy debate over federal spending and whether or not to raise the nation's debt limit, Obama signed the Budget Control Act of 2011 and the American Taxpayer Relief Act of 2012. Obama was reelected president in November 2012, defeating Republican nominee Mitt Romney, and was sworn in for a second term on January 20, 2013. During his second term, Obama has promoted domestic policies related to gun control in response to the Sandy Hook Elementary School shooting, and has called for greater inclusiveness for LGBT Americans, while his administration has filed briefs which urged the Supreme Court to strike down part of the federal Defense of Marriage Act and state level same-sex marriage bans as unconstitutional. In foreign policy, Obama ordered U.S. military intervention in Iraq in response to gains made by the Islamic State after the 2011 withdrawal from Iraq, continued the process of ending U.S. combat operations in Afghanistan, and normalized U.S. relations with Cuba.

1961-08-04  
Hawaii  
Honolulu  
Barack Obama

http://dbpedia.org/ontology/birthDate  
en http://dbpedia.org/ontology/birthPlace  
en http://dbpedia.org/ontology/birthPlace  
en http://www.w3.org/2000/01/rdf-schema#label

Close

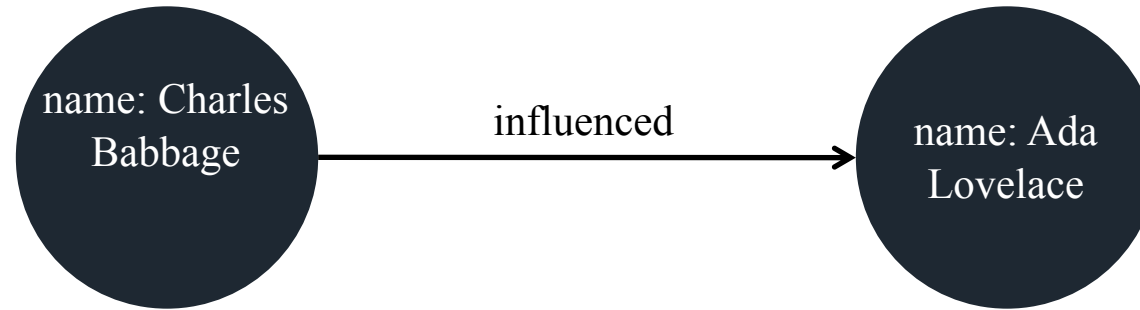
1. Before semantic enrichment we had only our name and some brief biographic notes.
2. After semantic enrichment we had these plus an authoritative name, a detailed biographic abstract, birth date, birth place.
3. The new data can be seamlessly blended with internal data for presentation in screens, reports and export files.
4. URI links are stored in the background to provide authoritative provenance information on where this data came from and when.

**How it works (tech talk)**



*Semantic Web,  
RDF, Triples,  
URIs, SPARQL*

How is Linked Data  
different from other  
data and traditional  
relational  
databases?

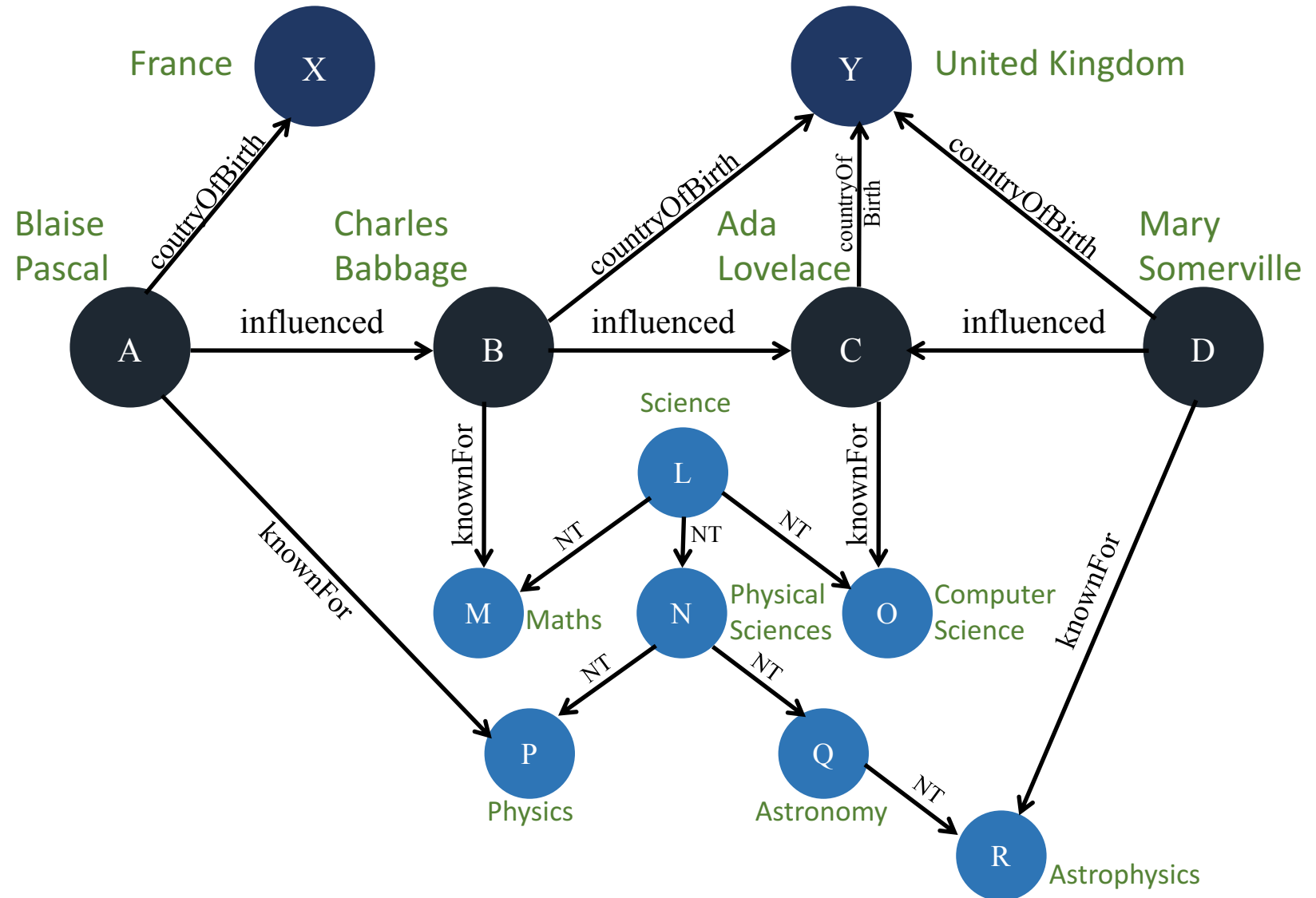


| Subject                                         | Predicate       | Object                                          |
|-------------------------------------------------|-----------------|-------------------------------------------------|
| <http://id.loc.gov/authorities/names/n50031102> | prov:influenced | <http://id.loc.gov/authorities/names/n78030997> |
| <http://id.loc.gov/authorities/names/n50031102> | foaf:name       | "Charles Babbage"                               |
| <http://id.loc.gov/authorities/names/n78030997> | foaf:name       | "Ada Lovelace"                                  |

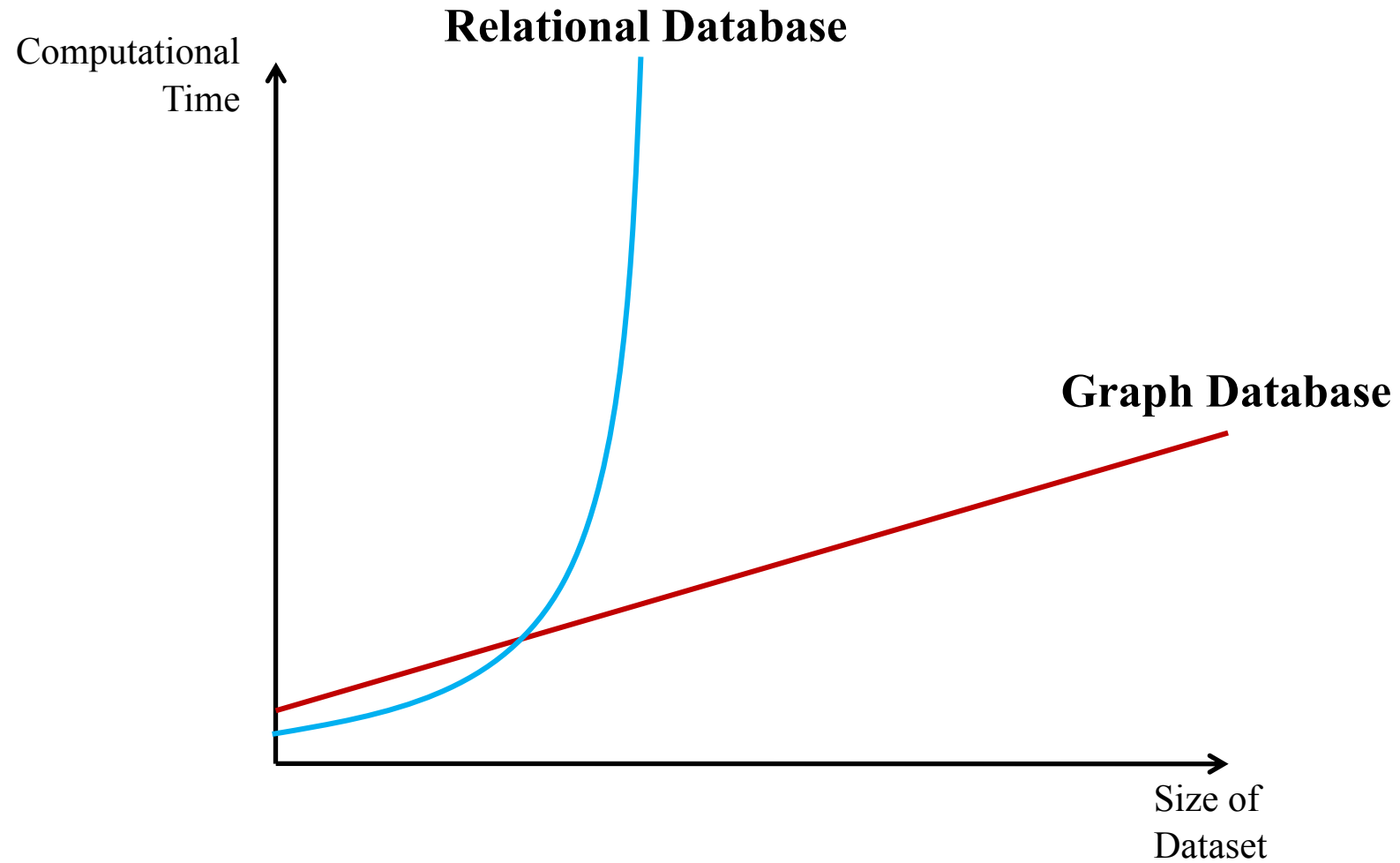
GeoNames

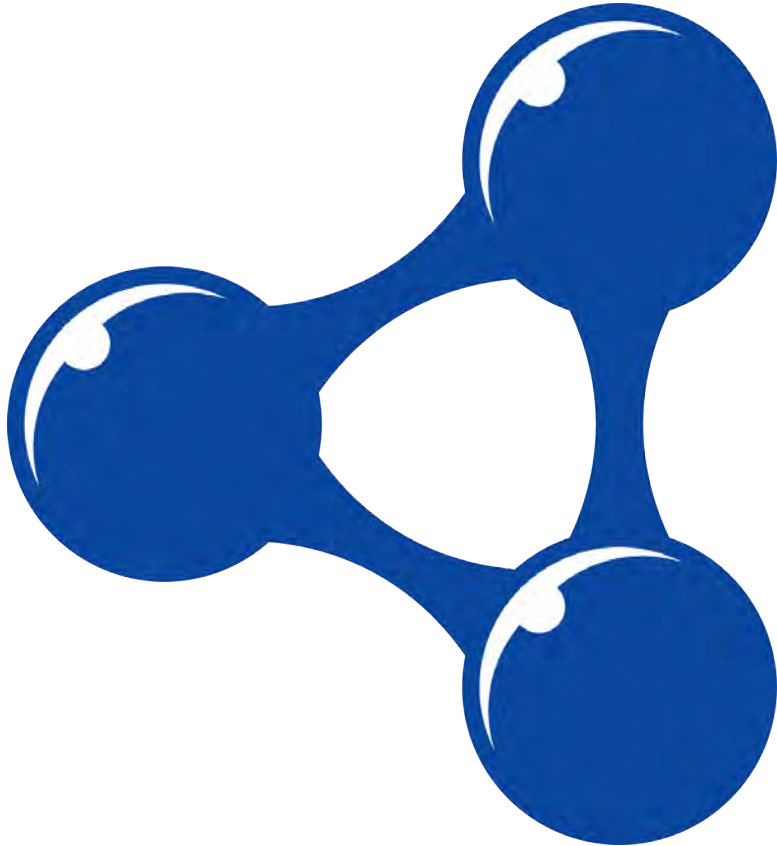
LC Name Authority File

LC Subject Headings



# Pattern Matching and Nested Queries with Triplestores





RDF/XML

JSON-LD

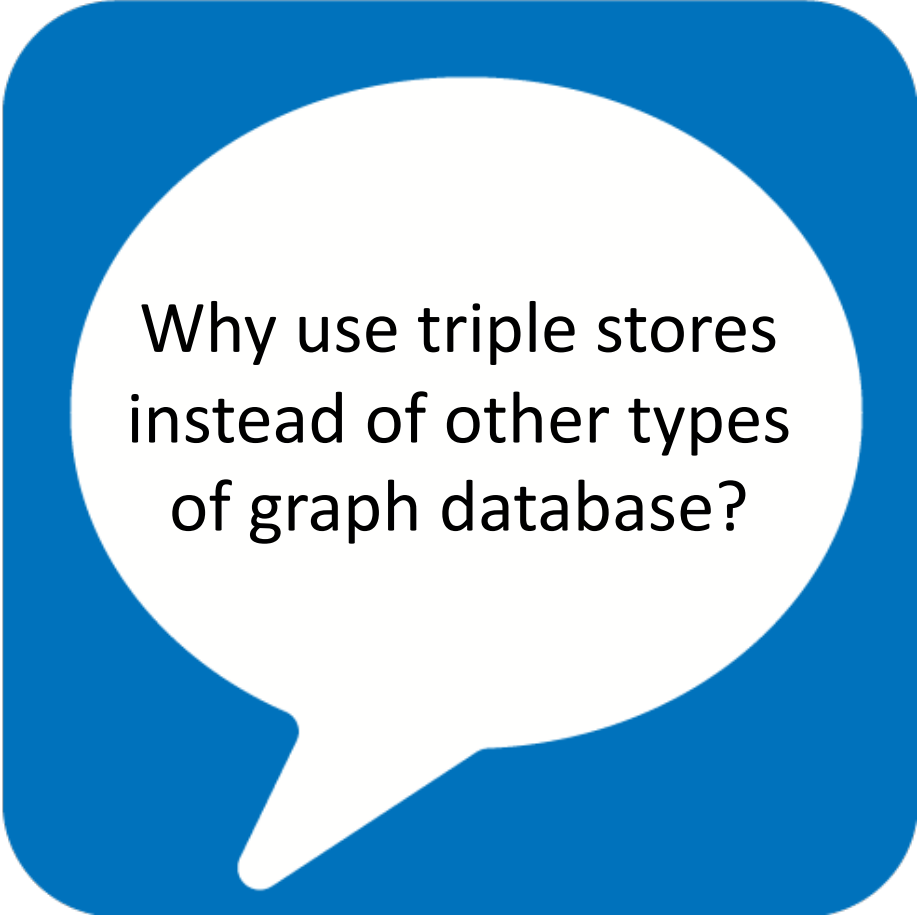
N-Triples

N-Quads

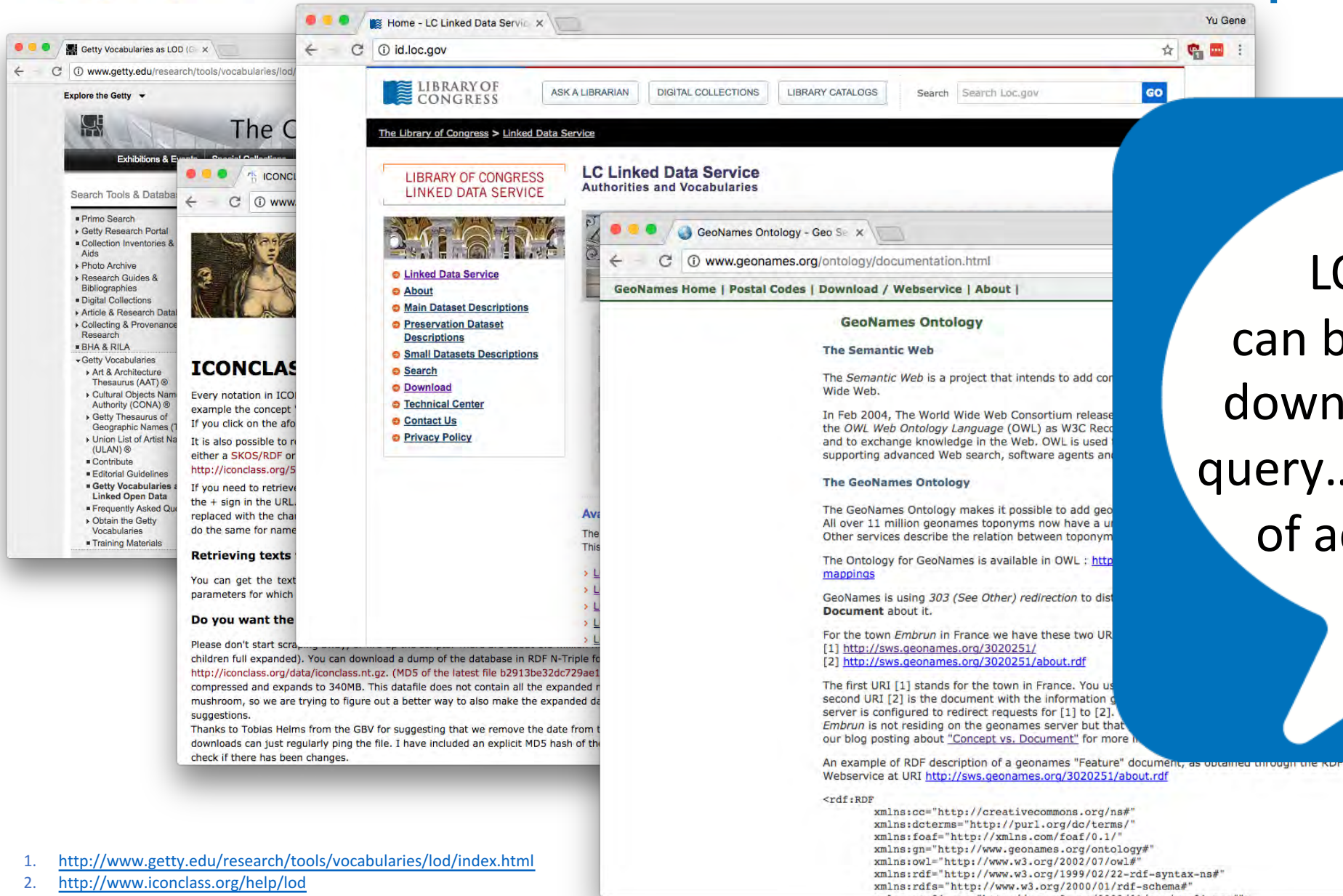
Turtle

TriG

N3



Why use triple stores  
instead of other types  
of graph database?



The image displays four browser windows illustrating Linked Open Data (LOD) sources:

- Getty Vocabularies as LOD:** Shows the Getty Research Portal with a sidebar menu for 'Explore the Getty' and a main content area for 'The Getty Vocabularies'.
- Library of Congress Linked Data Service:** Shows the 'LIBRARY OF CONGRESS LINKED DATA SERVICE' page with a navigation menu and a list of links including 'Linked Data Service', 'About', 'Main Dataset Descriptions', 'Preservation Dataset Descriptions', 'Small Datasets Descriptions', 'Search', 'Download', 'Technical Center', 'Contact Us', and 'Privacy Policy'.
- GeoNames Ontology:** Shows the 'GeoNames Ontology' page with a navigation menu and a list of links including 'GeoNames Home', 'Postal Codes', 'Download / Webservice', and 'About'.
- ID Loc Gov:** Shows the 'id.loc.gov' page with a navigation menu and a list of links including 'Library of Congress', 'Digital Collections', 'Library Catalogs', 'Search', and 'Search Loc.gov'.

LOD sources  
can be available for  
download or for live  
query... which method  
of access is best?

1. <http://www.getty.edu/research/tools/vocabularies/lod/index.html>
2. <http://www.iconclass.org/help/lod>
3. <http://www.geonames.org/ontology/documentation.html>
4. <http://id.loc.gov/>

```
curl -H Content-type:text/turtle -upload-file  
./authoritiesnames.nt  
http://localhost:1234/repositories/linkedcanvas?graph=graphName
```

```
curl -X GET -H Accept:application/x-trig  
http://localhost:1234/repositories/linkedcanvas
```



## The Ambassadors

Demo Image Scheme (POI)

Image POIs Tours Concepts Search
Declutter Captions

Image Description and Metadata

Describe in ▼

**IIIF URI:** <https://demo.linkedcanvas.com/loris/odydcz1635.jpg/full/0/default.jpg>

**Title:** The Ambassadors

**Description:** This painting memorialises two wealthy, educated and powerful young men. On the left is Jean de Dinteville, aged 29, French ambassador to England in 1533. To the right stands his friend, Georges de Selve, aged 25, bishop of Lavaur, who acted on several occasions as ambassador to the Emperor, the Venetian Republic and the Holy See. The picture records a secret visit paid by De Selve to de Dinteville. 'The Ambassadors' is unusual and intriguing. The two men are shown full-length, a format usually reserved by Holbein for royal portraits. Carefully selected objects are displayed on the shelves. The distorted image of a skull slashes across the foreground, both linking and dividing the friends.

**Creator:**

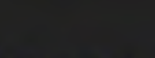
- Hans Holbein the Younger

**Date Created:**

- 1533



v1.1.2.20161101



## The Ambassadors

Demo Image Scheme (POI)

Image POIs Tours Concepts Search
Declutter Captions

Image Description and Metadata

Describe in ▼

**IIIF URI:** <https://demo.linkedcanvas.com/loris/odydcz1635.jpg/full/0/default.jpg>

**Title:** The Ambassadors

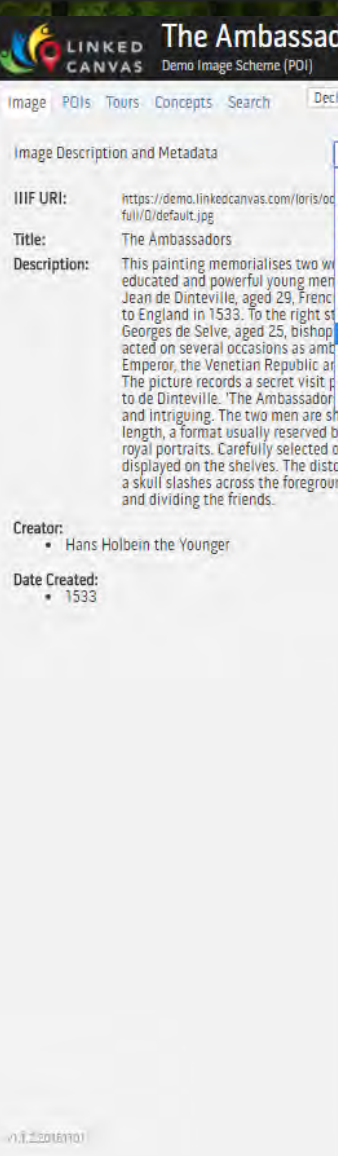
**Description:** This painting memorialises two wealthy, educated and powerful young men. On the left is Jean de Dinteville, aged 29, French ambassador to England in 1533. To the right stands his friend, Georges de Selve, aged 25, bishop of Lavaur, who acted on several occasions as ambassador to the Emperor, the Venetian Republic and the Holy See. The picture records a secret visit paid by De Selve to de Dinteville. 'The Ambassadors' is unusual and intriguing. The two men are shown full-length, a format usually reserved by Holbein for royal portraits. Carefully selected objects are displayed on the shelves. The distorted image of a skull slashes across the foreground, both linking and dividing the friends.

**Creator:**

- Hans Holbein the Younger

**Date Created:**

- 1533



v1.1.2.20161101

## Describe "The Ambassadors" in Turtle

```

@prefix oasis: <http://schema.synaptica.com/oasis#> .
@prefix oa: <http://www.w3.org/ns/oa#> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix sesame: <http://www.openrdf.org/schema/sesame#> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix fn: <http://www.w3.org/2005/xpath-functions#> .

<https://demo.linkedcanvas.com/annotated_image/index/itgn221h1ory8> a oa:Annotation ,
oasis:AnnotatedImage ;
  oa:hasBody <https://demo.linkedcanvas.com/annotated_image/index/itgn221h1ory8#bodyTag> ,
  <https://demo.linkedcanvas.com/annotated_image/index/itgn221h1ory8#bodyLabel> ,
  <https://demo.linkedcanvas.com/annotated_image/index/itgn221h1ory8#bodyDescription> ;
  skos:inScheme <https://demo.linkedcanvas.com/concept_scheme/itfmg0jt3iut8> ;
  skos:topConceptOf <https://demo.linkedcanvas.com/concept_scheme/itfmg0jt3iut8> ;
  oa:hasTarget <https://demo.linkedcanvas.com/annotated_image/index/itgn221h1ory8#target> ;
  oasis:hasAnnotation <https://demo.linkedcanvas.com/poi/itit5qfptr3> ,
  <https://demo.linkedcanvas.com/poi/itit7vcql24> , <https://demo.linkedcanvas.com/poi/ititcoeh84d> ,
  <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyTag> ,
  <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyLabel> ,
  <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyDescription> ;
  skos:inScheme <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  skos:topConceptOf <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  oa:hasTarget <https://demo.linkedcanvas.com/poi/itit5qfptr3#target> .

<https://demo.linkedcanvas.com/poi/itit5qfptr3> a oa:Annotation , oasis:AnnotatedImagePoi ;
  oa:hasBody <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyTag> ,
  <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyLabel> ,
  <https://demo.linkedcanvas.com/poi/itit5qfptr3#bodyDescription> ;
  skos:inScheme <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  skos:topConceptOf <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  oa:hasTarget <https://demo.linkedcanvas.com/poi/itit5qfptr3#target> .

<https://demo.linkedcanvas.com/poi/itit7vcql24> a oa:Annotation , oasis:AnnotatedImagePoi ;
  oa:hasBody <https://demo.linkedcanvas.com/poi/itit7vcql24#bodyTag> ,
  <https://demo.linkedcanvas.com/poi/itit7vcql24#bodyLabel> ,
  <https://demo.linkedcanvas.com/poi/itit7vcql24#bodyDescription> ;
  skos:inScheme <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  skos:topConceptOf <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  oa:hasTarget <https://demo.linkedcanvas.com/poi/itit7vcql24#target> .

<https://demo.linkedcanvas.com/poi/ititcoeh84d> a oa:Annotation , oasis:AnnotatedImagePoi ;
  oa:hasBody <https://demo.linkedcanvas.com/poi/ititcoeh84d#bodyTag> ,
  <https://demo.linkedcanvas.com/poi/ititcoeh84d#bodyLabel> ,
  <https://demo.linkedcanvas.com/poi/ititcoeh84d#bodyDescription> ;
  skos:inScheme <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  skos:topConceptOf <https://demo.linkedcanvas.com/concept_scheme/itfmg12216b7m> ;
  oa:hasTarget <https://demo.linkedcanvas.com/poi/ititcoeh84d#target> .

```

Download

Query:

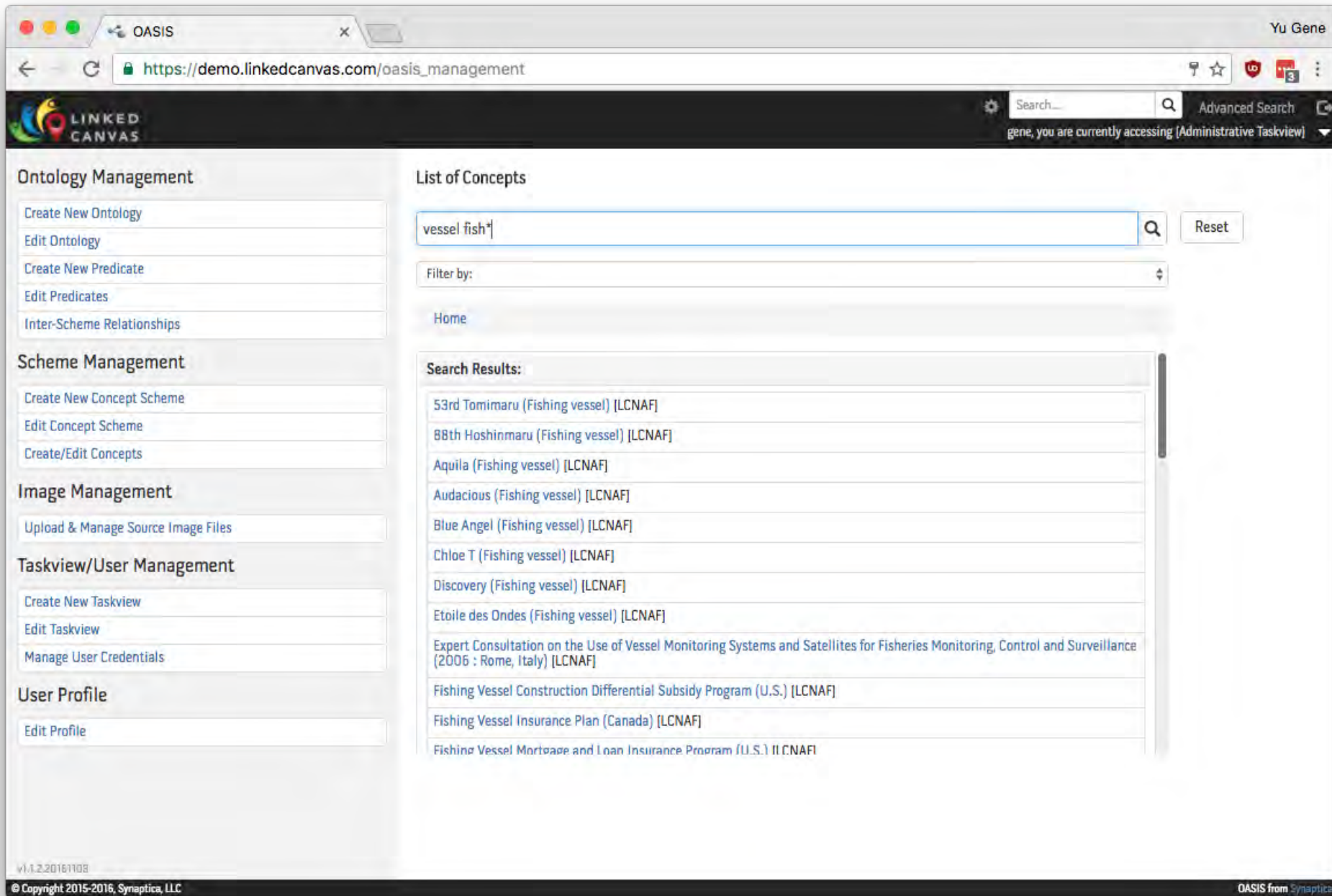
```

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

```

Graph databases  
aren't suppose to work  
that well with free text  
search... how can this  
be overcome?

1. [http://vocab.getty.edu/queries#Full\\_Text\\_Search\\_Query](http://vocab.getty.edu/queries#Full_Text_Search_Query)



The screenshot shows the OASIS web application interface. The browser address bar displays `https://demo.linkedcanvas.com/oasis_management`. The user is logged in as 'Yu Gene'. The interface is divided into a left sidebar with navigation menus and a main content area.

**Left Sidebar Menus:**

- Ontology Management**
  - Create New Ontology
  - Edit Ontology
  - Create New Predicate
  - Edit Predicates
  - Inter-Scheme Relationships
- Scheme Management**
  - Create New Concept Scheme
  - Edit Concept Scheme
  - Create/Edit Concepts
- Image Management**
  - Upload & Manage Source Image Files
- Taskview/User Management**
  - Create New Taskview
  - Edit Taskview
  - Manage User Credentials
- User Profile**
  - Edit Profile

**Main Content Area:**

**List of Concepts**

Search input: `vessel fish` [Search] [Reset]

Filter by: [Dropdown]

Home

**Search Results:**

|                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 53rd Tomimaru (Fishing vessel) [LCNAF]                                                                                                                     |
| 88th Hoshinmaru (Fishing vessel) [LCNAF]                                                                                                                   |
| Aquila (Fishing vessel) [LCNAF]                                                                                                                            |
| Audacious (Fishing vessel) [LCNAF]                                                                                                                         |
| Blue Angel (Fishing vessel) [LCNAF]                                                                                                                        |
| Chloe T (Fishing vessel) [LCNAF]                                                                                                                           |
| Discovery (Fishing vessel) [LCNAF]                                                                                                                         |
| Etoile des Ondes (Fishing vessel) [LCNAF]                                                                                                                  |
| Expert Consultation on the Use of Vessel Monitoring Systems and Satellites for Fisheries Monitoring, Control and Surveillance (2006 : Rome, Italy) [LCNAF] |
| Fishing Vessel Construction Differential Subsidy Program (U.S.) [LCNAF]                                                                                    |
| Fishing Vessel Insurance Plan (Canada) [LCNAF]                                                                                                             |
| Fishing Vessel Mortgage and Loan Insurance Program (U.S.) [LCNAF]                                                                                          |

Version: v1.1.2.20161108  
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OASIS from Synaptica

Graph Store HTTP

SPARQL endpoint

Static files in RDF formats

**How to get started**

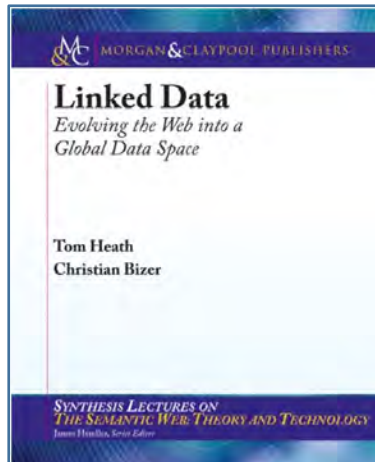
# Option 1: Get an Open Source Triple Store and Some Good Reads



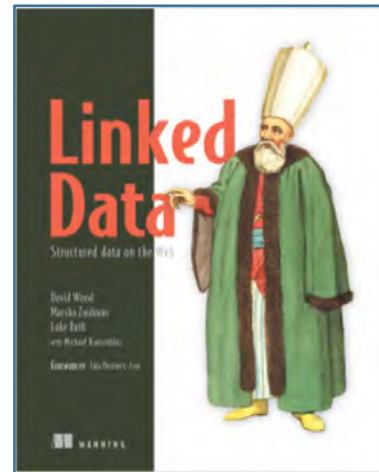
<http://graphdb.ontotext.com/>



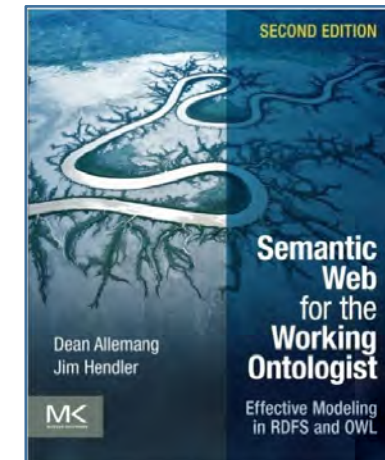
<https://www.blazegraph.com/>



Heath & Bizer  
Morgan & Claypool (pub.)



Ruth, Wood & Zaidman  
Manning (pub.)



Allemang & Hendler  
Morgan Kaufman (pub.)

## Option 2: Adopt, Adapt and Create Linked Data as part of your Taxonomy Management



### Ontology Management

- Create New Ontology
- Edit Ontology
- Create New Predicate
- Edit Predicates
- Inter-Scheme Relationships

### Scheme Management

- Create New Concept Scheme
- Edit Concept Scheme
- Create/Edit Concepts

### Image Management

- Upload & Manage Source Image Files

### Taskview/User Management

- Create New Taskview
- Edit Taskview
- Manage User Credentials

### User Profile

- Edit Profile

### List of Ontologies

|           |                                                                                     |
|-----------|-------------------------------------------------------------------------------------|
| CIDOC CRM |  |
| DBO       |  |
| DCT       |  |
| FOAF      |  |
| GEO       |  |
| NEOO      |  |
| OASIS     |  |
| OWL       |                                                                                     |
| PROV      |                                                                                     |
| RDFS      |                                                                                     |
| SKOS      |                                                                                     |

### Edit Ontology

Ontology URI

http://xmlns.com/foaf/0.1/

Ontology Label

FOAF

Custom URI

http://xmlns.com/foaf/0.1/

Description

FOAF is a project devoted to linking people and information using the Web. Regardless of whether information is in people's heads, in physical or digital documents, or in the form of factual data, it can be linked.

☒ Active Ontology 

Save

Cancel

Delete

 **My first concept** - ×

 <https://demo.linkedcanvas.com/concept/iug5q9mcsut2>

Label

My first concept

Concept Scheme

My Taxonomy

All

Properties

Related Concepts

Hierarchical Concepts

Alternative Label

Alternative Label

+

Scope Note

Scope Note

+

Date Created

Date Created

+

Source

Source

+

Abstract

Abstract

+

Save

Delete

# Linked Data

1. A way to jump-start taxonomy projects and reduce costs
2. A way to tap into external knowledge that can help answer your business questions
3. A powerful tool for performing complex searches and building smart applications

# Linked Data

## The World is Your Database



**Dave Clarke**  
Synaptica CEO



*Thank you!*



**Gene Loh**  
Synaptica Software Architect

*Visit us at Booth 201*