

探索圖書館文獻數據 與 非圖書館開放關聯數據的 聯結點

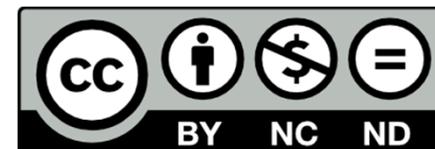
Exploring the connections between library bibliographic data and the Linked Open Data (LOD)

Marcia Lei Zeng 曾蕾
Kent State University
USA

2012年8月3日

e-Research: 圖書館創新服務研討會

國立台灣大學圖書館



大纲：12345

第一部份：理解關聯數據

- 1個目的
- 2種要回答的問題
- 3段式 triples
- 4項基本原則
- 5星排行

第二部份：介紹一個研究案例

1

1個目的：關聯



1個目的：關聯

將數據從silos中解放出來，通過關聯得到最大利用，再利用，產生新的數據、信息、知識



2

需要回答的2種問題

這個thing是什麼？
(屬性 - 值)



這個thing和別的
thing有什麼關係？

3

這2種問題的答案

這個thing是什麼?
(屬性 - 值)

都可以用3段式 (triples) 來描述

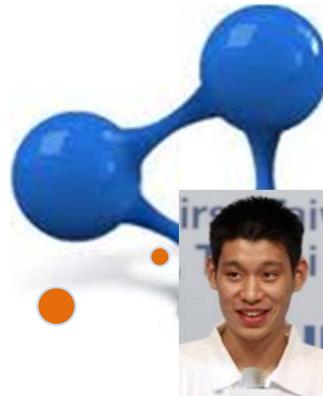


[屬性]	[值]
名字:	林書豪@zh
名字:	Jeremy Shu-How Lin@en
出生日期:	1988-08-23
身高:	1.91 m
效力球队:	紐約尼克隊
效力球队:	休斯顿火箭
出身地:	洛杉磯
別名:	Lin Dynasty Linsanity Lintastic Super Lintendo
身價:	US\$ 600,000 (2012)

RDF triples:

主体-谓词-客体 (subject-predicate-object) 结构

這裡面有多少
是獨立的thing?
(有自己的屬性)



這個thing和別的
thing有什麼關係?

[屬性]	[值]
名字:	林書豪@zh
名字:	Jeremy Shu-How Lin@en
出生日期:	1988-08-23
身高:	1.91 m
效力球隊:	紐約尼克
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身價:	US\$ 600,000 (2012)

這裡面有多少
是獨立的thing?
(有自己的屬性)



ex:JeremyLin

這個thing和別的
thing有什麼關係?

[屬性]	[值]
名字:	林書豪@zh
名字:	Jeremy Shu-How Lin@en
出生日期:	1988-08-23
身高:	1.91 m
效力球隊:	ex: nyknicks
效力球隊:	ex: shshark
出身地:	ex: Los Angeles
別名:	Lin Dynasty Linsanity Lintastic Super Lintendo
身價:	US\$ 600,000 (2012)

如果我們將能獨立的thing都用特定的ID來表示，就可以產生無歧義的3段式

ex:JeremyLin

label: 林書豪

ex:JeremyLin

draftTeam: ex:htrockets

ex:JeremyLin

birthPlace: ex:Los Angeles



[屬性]

名字:

名字:

出生日期:

身高:

效力球队:

效力球队:

出身地:

別名:

身價:

[值]

林書豪@zh

Jeremy Shu-How
Lin@en

1988-08-23

1 91 m

ex: nyknicks

htrockets

ex:Los Angeles

Lin Dynasty

Linsanity

Lintastic

Super Lintendo

US\$ 600,000 (2012)

RDF triples: 主体-谓词-客体 (subject-predicate-object) 结构

一個3段式能回答什麼問題？

ex:JeremyLin

label:

???

这个人叫什么名字？

ex:JeremyLin

???

ex:htrockets

这个人與休斯頓火箭隊是什麼關係？

???

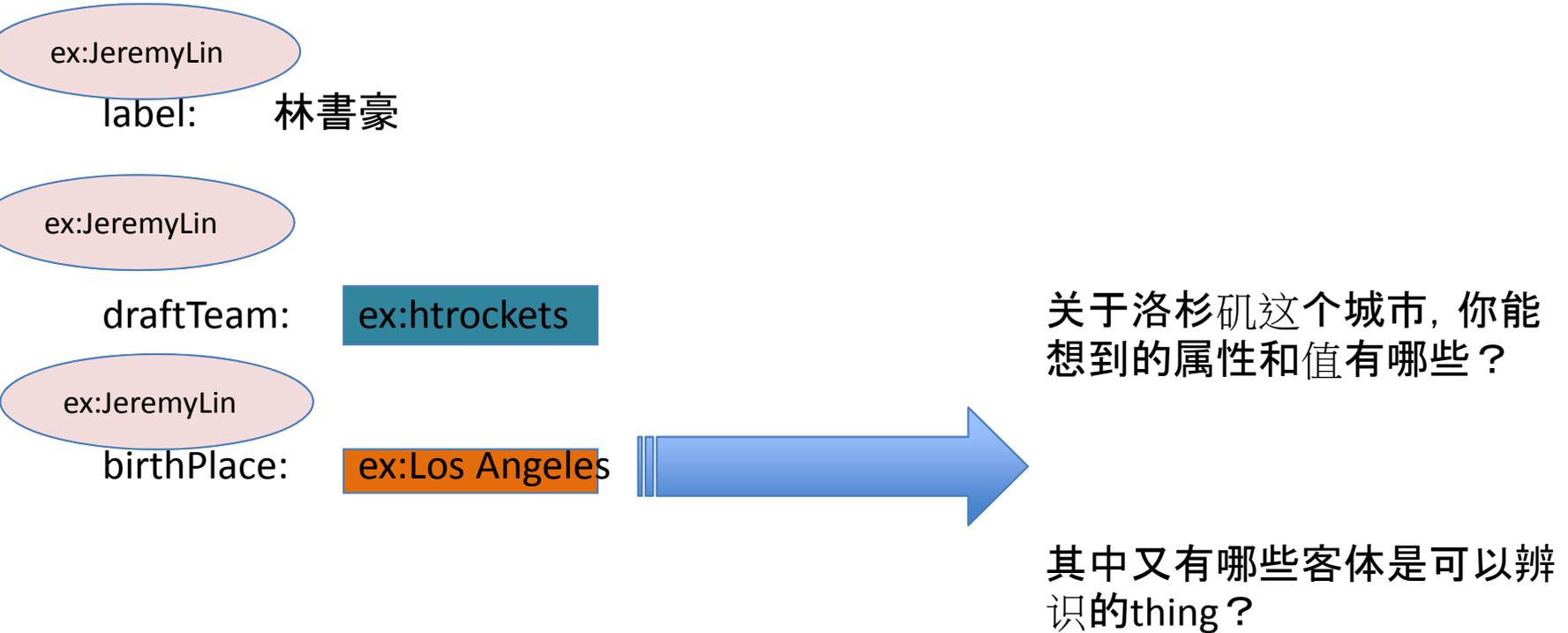
birthPlace:

ex:Los Angeles

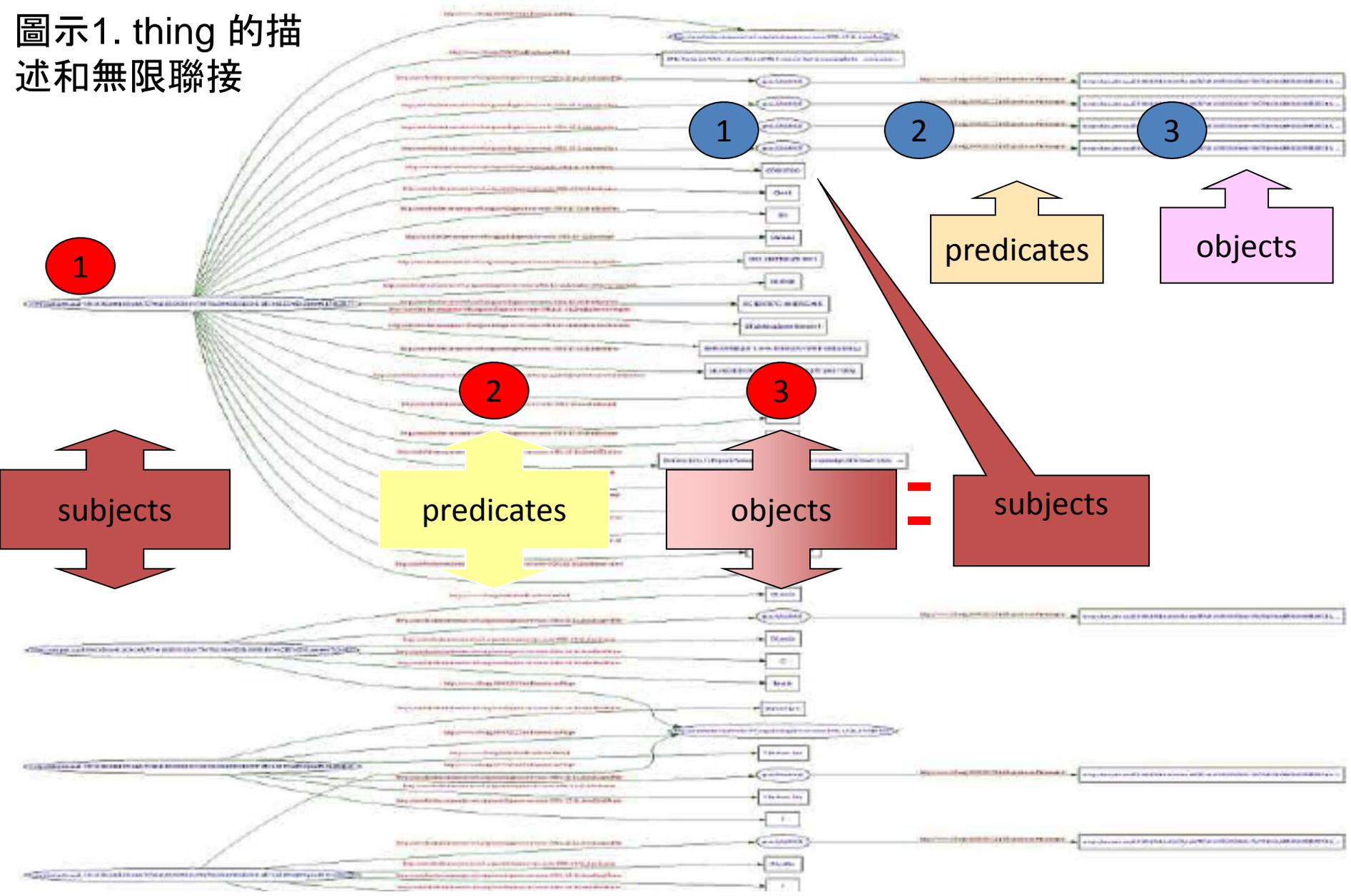
洛杉磯是哪些[名]人的出身地？

3段式中的客體部分 也能變為主體麼？

能由之再產生新的3段式麼？

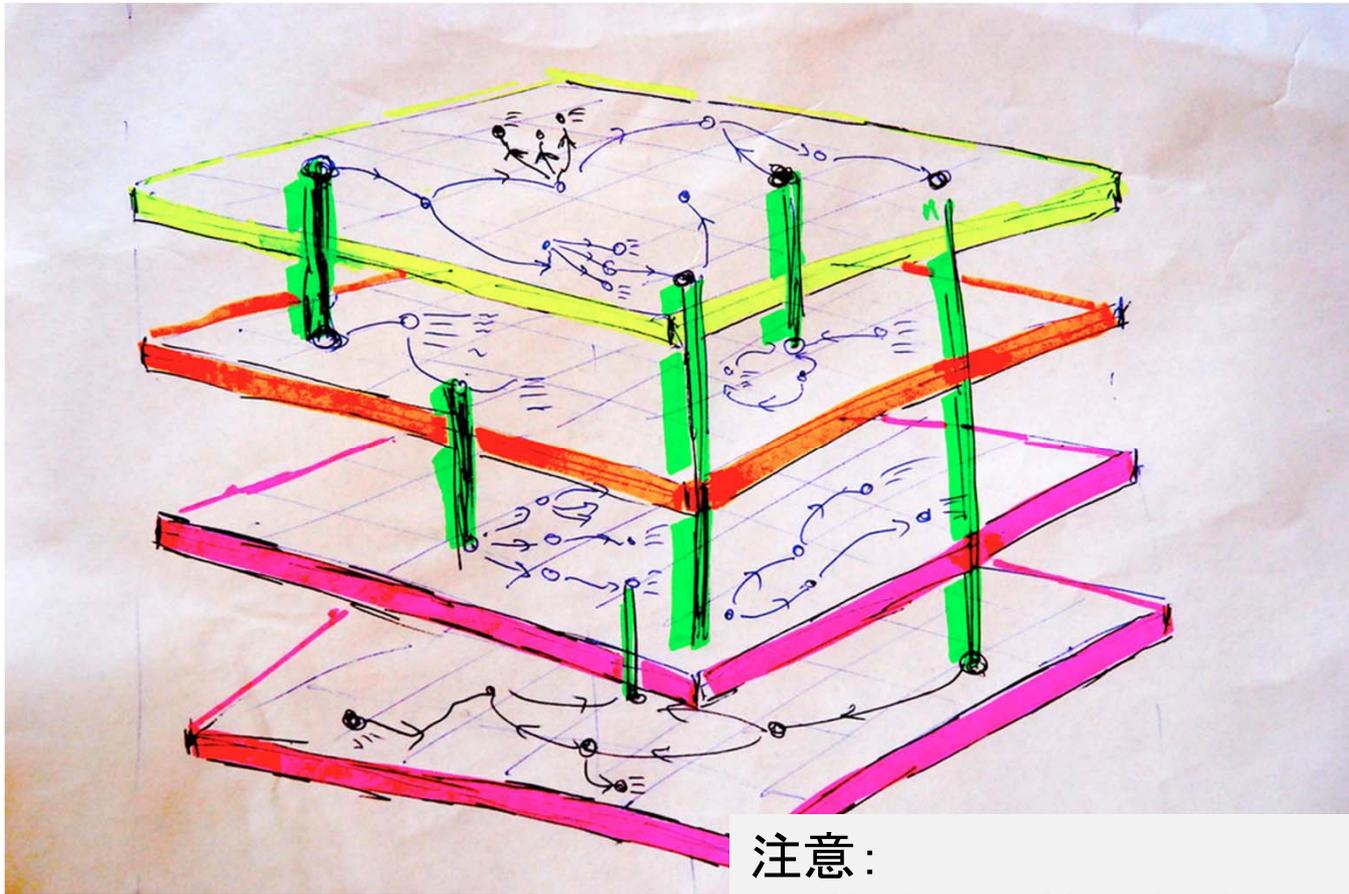


圖示1. thing 的描述和無限聯接



Background image borrowed from Andrea Kosavic: The Semantic Web, (some of) what you need to know. OLA Superconference 2009.01.30. Compiled by mzenq 2009-03-06.

圖示2. 聯接的內容是來自不同資源的



注意：

- 是格式化數據的相聯，不是文本的相聯；
- 是機器可理解和可處理的數據；
- 是對現有數據的再利用；
- 產生新的資源；其又被利用、再利用
- 可無限擴展下去

Image source: Dan Brickley

<http://farm4.static.flickr.com/3613/33845>

92836_b.jpg

4

4項基本原則

將這個實例放到4項基本原則來看

4項基本原則：

1. 使用URI作為任何事物的標識名稱
Use URIs as names for things
2. 使用HTTP URI使任何人都可以訪問名稱
Use HTTP URIs so that people can look up those names
3. 當有人訪問名稱時，提供有用的[rdf]信息
When someone looks up a name, provide useful information
4. 盡可能提供相關的URI以使人們發現更多的信息
Include links to other URIs so that they can discover more things

<http://www.w3.org/DesignIssues/LinkedData.html>

Translated by Liu Wei, 2008 12

About: Jeremy Lin

An Entity of Type : [Athlete](#), from Named Graph : <http://live.dbpedia.org>, within Data Space : [liv](#)

Jeremy Shu-How Lin (born August 23, 1988) is an American professional basketball player for the Houston Rockets of the National Basketball Association (NBA). After receiving no athletic scholarship offers out of high school and being undrafted out of college, the 2010 Harvard University graduate reached a partially guaranteed contract deal later that year with his hometown Golden State Warriors.

Property	Value
dbpedia-owl:abstract	<ul style="list-style-type: none"> Jeremy Shu-How Lin (born August 23, 1988) is an American professional basketball player for the Houston Rockets of the National Basketball Association (NBA). After receiving no athletic scholarship offers out of high school and being undrafted out of college, the 2010 Harvard University graduate reached a partially guaranteed contract deal later that year with his hometown Golden State Warriors. Lin seldom played in his rookie season and was assigned to the NBA Development League's Golden State Warriors before joining the New York Knicks in 2011. He was assigned to the D-League and continued to play sparingly. In February 2012, he was being promoted to the starting lineup, which generated a global following known as "The Linsanity". This led to a new era in NBA history, and the first American of Chinese or Taiwanese descent to play in the league. He is known for his public expression of the Christian faith.
dbpedia-owl:activeYearsStartYear	<ul style="list-style-type: none"> 2010-01-01 00:00:00 (xsd:date)
dbpedia-owl:birthDate	<ul style="list-style-type: none"> 1988-08-23 (xsd:date)
dbpedia-owl:birthPlace	<ul style="list-style-type: none"> dbpedia:Los_Angeles dbpedia:Los_Angeles,_California dbpedia:California
dbpedia-owl:college	<ul style="list-style-type: none"> dbpedia:Harvard_University dbpedia:Harvard_Crimson#Men's_basketball
dbpedia-owl:draftYear	<ul style="list-style-type: none"> 2010-01-01 00:00:00 (xsd:date)
dbpedia-owl:height	<ul style="list-style-type: none"> 1.91 m (6 ft 3 in) 2.01 m (6 ft 7 in)
dbpedia-owl:nationality	<ul style="list-style-type: none"> dbpedia:United_States_of_America
dbpedia-owl:number	<ul style="list-style-type: none"> 15
dbpedia-owl:position	<ul style="list-style-type: none"> Point guard
dbpedia-owl:team	<ul style="list-style-type: none"> dbpedia:Golden_State_Warriors dbpedia:Houston_Rockets dbpedia:New_York_Knicks

1. 使用URI作為任何事物的標識名稱
2. 使用HTTP URI使任何人都可以訪問名稱

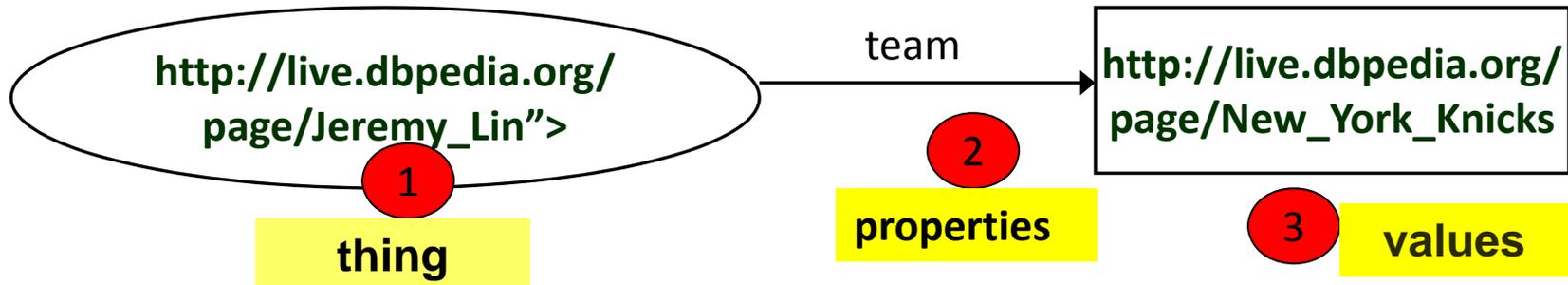
3. 當有人訪問名稱時，提供有用的[rdf]信息

4. 盡可能提供相關的URI以使人們發現更多的信息

is dbpedia-owl:wikiPageRedirects of	<ul style="list-style-type: none"> dbpedia:Lín_Shūháo dbpedia:林書豪 dbpedia:林书豪 dbpedia:Lin_Shuhao dbpedia:Linsanity dbpedia:Jeremy_Shu-How_Lin dbpedia:Lin-sanity dbpedia:JLin
is dbpprop:caption of	<ul style="list-style-type: none"> dbpedia:New_York_Knicks
is dbpprop:name of	<ul style="list-style-type: none"> dbpedia:List_of_Harvard_University_people
is dbpprop:title of	<ul style="list-style-type: none"> dbpedia:Blow_Your_Pants_Off
is foaf:primaryTopic of	<ul style="list-style-type: none"> http://en.wikipedia.org/wiki/Jeremy_Lin

RDF triples

取出其中一截，其結構是：



<RDF:RDF>

<RDF:Description RDF:Href=" http://live.dbpedia.org/page/Jeremy_Lin">

2 < dbpedia-owl:team

rdf:resource= "http://live.dbpedia.org/page/New_York_Knicks">

</RDF:Description>

</RDF:RDF>

機器可理解、可處理

隻要遵循有URI命名，HTTP途徑，凡是有可能的地方對聯接的properties合理管理，則可以被考慮為關聯數據。

- 這是一種為Web所用的含義更豐富的聯結方式，使我們從超文本鏈接（文獻到文獻）發展到超數據的聯結（文獻中所討論的內容資源（thing）的聯結）；
- 人們可以通過HTTP/URI機制，直接獲得數字資源(Thing)。

Tim Burners-Lee: <http://www.w3.org/DesignIssues/LinkedData.html>

参考刘炜2008-12的翻译

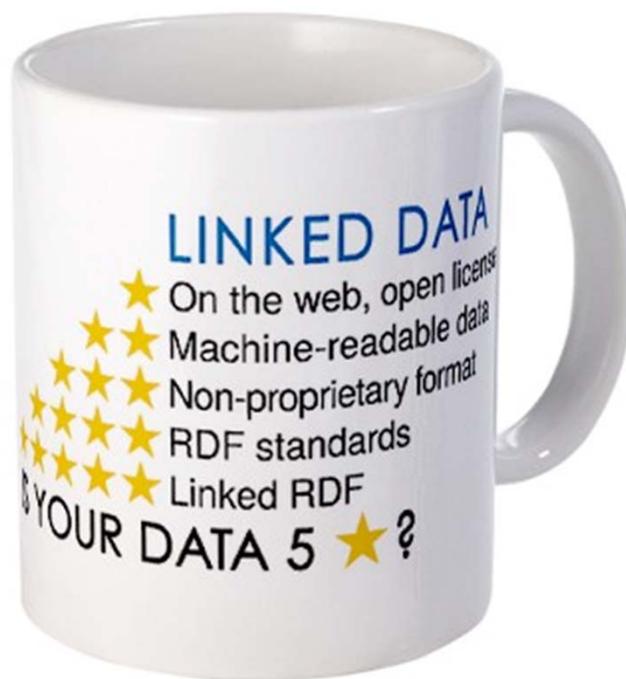
相對於傳統的圖書館數據來說， 關聯的圖書館數據有如下優點

- Shareable 可分享
 - 不管誰都能解析的唯一標識－URI
 - 可信賴的數據和元數據供大家使用
- Extensible 可無限伸展
 - “無邊無際的世界”－沒有什麼描述是完成了的，任何人都可以從他自己發布的空間添加描述信息
- Re-usable 可再利用
 - 各種來源的描述談的是同樣的 thing
 - 完善、加注、等等
- Internationalizable 國際化
 - 多語種、翻譯等都沒有問題
 - 自然語言詞串(strings)不被用來指代things。

This slide is based on a summary prepared by Antoine Isaac, for *Talis Linked Data and Libraries day, London, July 14th 2011*;
built on the *W3C Library Linked Data Incubator Group Final Report, draft*

5

5星排行表



用五星排行表理解 與LAM有關的資源

網上有很多數據資源和知識組織系統

- ✓ 網上開放 ★
- ✓ 機器可讀 ★★
- ✓ 非專屬權格式 (html, xml) ★★★

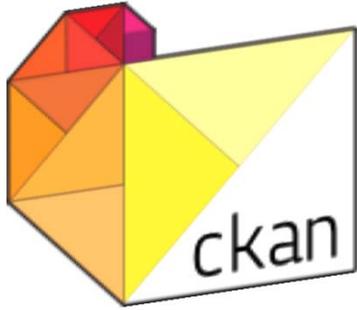
越來越多4星級的數據集和知識組織系統

- ✓ 採用RDF標準 ★★★★★
 - 用URI指代名稱
 - 數據用三段式triples發布



其中僅有一部分達到5
星

- ✓ 關聯的RDF
★★★★★



關聯數據注冊站
The Data Hub
— 3880 datasets

當前主要關聯數據資源 (根據2012年7月16日數據)

越來越多4星級的數據集和知識組織系統

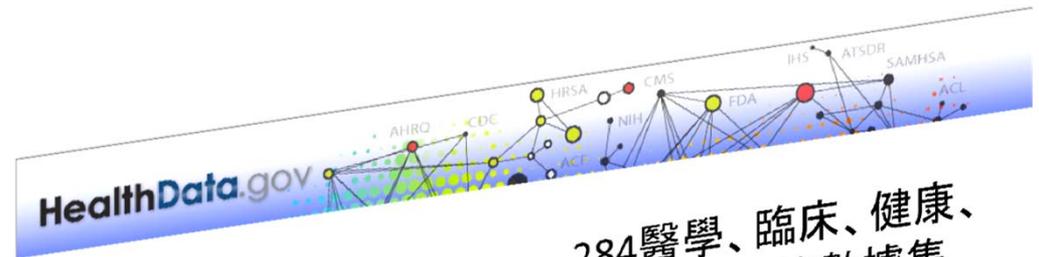
✓ 採用RDF標準



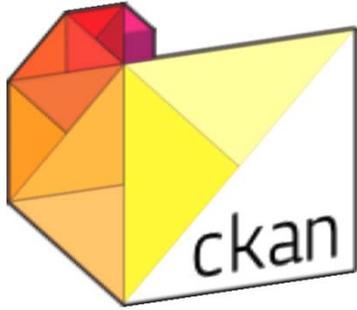
- 用URI指代名稱
- 數據用三段式triples發布



420,894 原始raw 和地理數據集
1,279 政府開發的應用軟件 apps
236 公民開發的應用軟件 apps
103 移動應用軟件 apps
172 機構和分屬機構參與



284 醫學、臨床、健康、
安全、費用等數據集



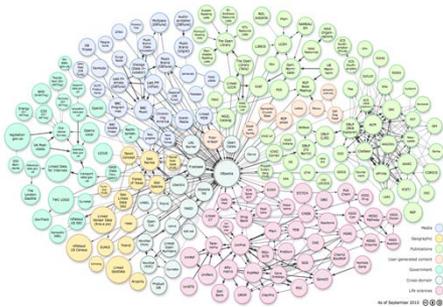
关联数据注册站
The Data Hub
— 3880 datasets

CKAN關聯數據中心 CKAN - the Data Hub (共有3880 datasets)

• 其中最有名的一個組是關聯的開放數據LOD雲組，雲圖中現含295個數據集 <http://ckan.net/group/lodcloud> 實際上該組已有327個。

• 其它幾十個組見: <http://ckan.net/group>. 一個數據集可以注册到多個組，其中有些數據集也上了LOD雲。

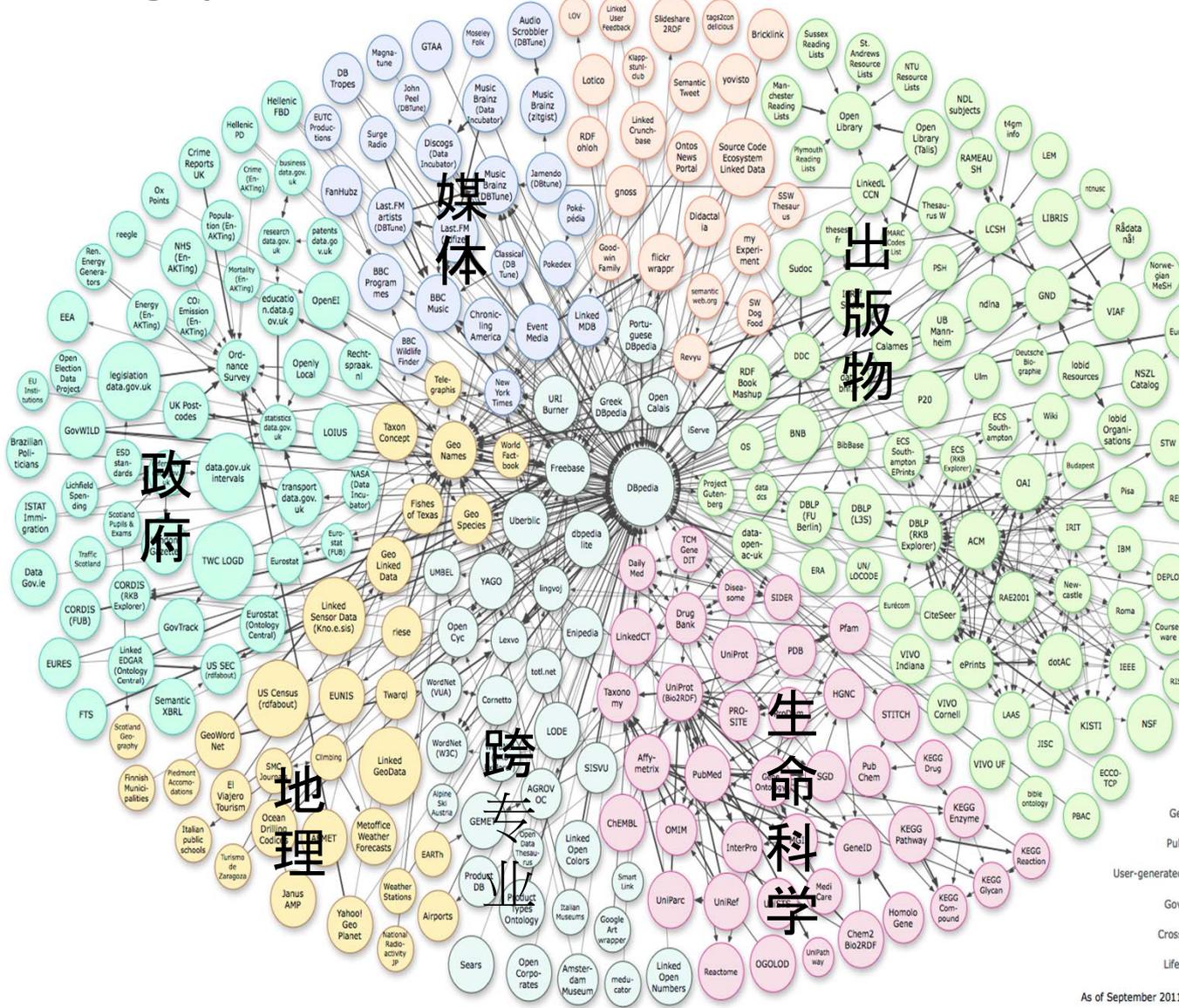
- 圖書館關聯數據組 <http://ckan.net/group/lld> (現含57個數據集，大多數聯接都是與非圖書館數據的聯接)
- 文獻書目數據組: (現含77個數據集)
- 藝術、氣象數據、實驗數據、考古、經濟、能源數據、地理、語言、國際發展數據、政府數據(加拿大、澳大利亞、英國等)。有些在試驗階段，有些還不開放。



LOD Cloud group
327 datasets

數據集的發行格式(可獲取格式): CSV | RDF | XML | XBRL | SDMX | HTML+RDFa | 其它

Linking Open Data (LOD) 數據集雲圖 (as of 2011-09, dataset: 295); 實際組裡已有327。



入雲要求:

- 可解的http URIs
- 數據可解為常用RDF格式(RDFa, RDF/XML, Turtle, N-Triples).
- 至少有1000條triples (所以你的FOAF文檔不行)
- 必須通過RDF與本圖中一個數據集相聯(含其它數據集來的URIs, 反之亦然。至少50條聯接)
- 必須能通過RDF crawling, RDF dump, 或 SPARQL endpoint 得到整個數據集的數據

As of September 2011 © 1 0

Linking Open Data cloud diagram by Richard Cyganiak and Anja Jentzsch. <http://lod-cloud.net/>

几个关联实例

Xu Bing

Scroll to:

Person

Award Winner

Visual Artist



Xu Bing (Chinese: 徐冰 b. 1955) is a Chinese-born artist who has lived in the United States since 1990. He currently resides in Beijing. He serves as the vice-president of the Central Academy of Fine Arts. He is most known for his printmaking skills and installations pieces, as well as his creative artistic use of language, words, and text and how they have affected our understanding of the world. Born in Chongqing in 1955, Xu grew up in Beijing.... [More](#)

[Read article at Wikipedia](#)

Date of birth: 1955 (age 57 years)

Profession: [Printmaker](#), [Calligrapher](#), [Artist](#)

Country of nationality: [United States of America](#), [China](#)

根據多種屬性（謂詞）將個人的有關信息進行顯示

根據所獲獎勵這個屬性顯示其他獲獎者

Place of birth: [Chongqing, China](#)

Gender: [Male](#)

Places lived: [Chongqing](#)

Award Winner

Awards Won:

Year	Award	Winning work
Jul 1999	MacArthur Fellowship	Crafts and Design

MacArthur Fellowship Winners

Jul 1999			
Berners-Lee	Benjamin D. Santer	Xu Bing	Peter Shor

由此可關聯歷年所有獲獎者

[View all MacArthur Fellowship Winners »](#)

例: Freebase MacArthur 獎獲得者

Freebase Find topics... Data Schema Apps Docs Sign In or Sign Up

MacArthur Fellowship: Award Winner

MacArthur Fellowship
The MacArthur Fellows Program or MacArthur Fellowship (nicknamed the Genius Grant) Foundation each year to typically 20 to 40 United States citizens or residents, of any age, who have shown exceptional promise...

About 1,000 Award Winner topics [Filter this Collection](#)

Summary Table Gallery Map Timeline

Robert Penn Warren
Robert Penn Warren (April 24, 1905 – September 15, 1989) was an American poet, novelist, and literary critic and was one of the founders of New Criticism. He was also a charter member of the Fellowship of Southern Writers. He founded the influential...
Awards Won: Pulitzer Prize for the Novel, MacArthur Fellowship, Bollingen Prize

Person
an American short story writer and essayist. He has been a recipient of a Guggenheim Fellowship and a MacArthur Fellowship. McPherson is a member of the permanent faculty of the Iowa Writers'...
Awards Won: Pulitzer Prize for Fiction, MacArthur Fellowship, Lannan Literary Fellowship

根據多種屬性（謂詞）對獲獎者有選擇性的顯示

獲獎者概況統一顯示

獲獎者概況表格形式顯示

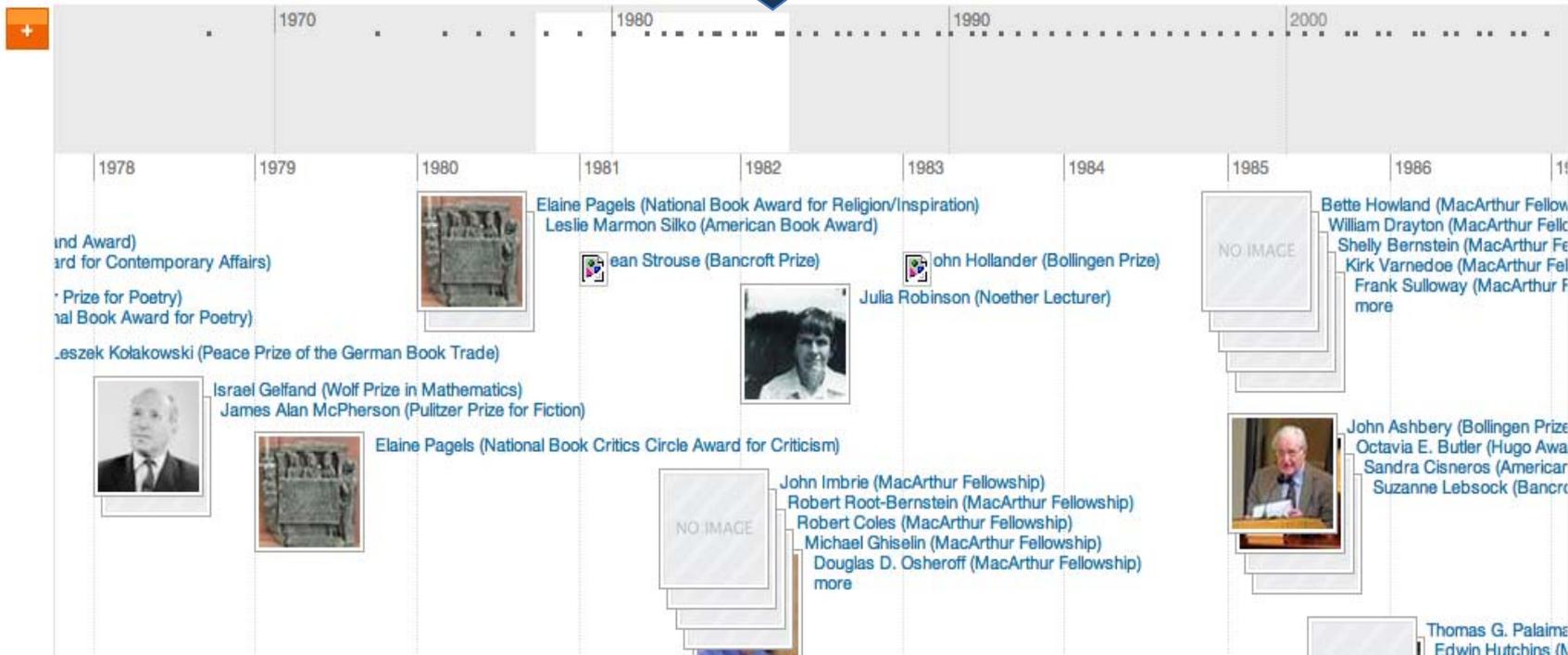
Showing 1 - 60 next

Name	Article	Year	Award	Award Winner	Winning Work	Ceremony	Notes/Description
Robert Penn Warren	Robert Penn Warren (April 24, 1905 – September 15, 1989) was an American poet, novelist, and literary critic and was one of the founders of New Criticism. He was also	1947	Pulitzer Prize for the Novel		All the King's Men		
		Jul 1981	MacArthur Fellowship		Poetry		
		1967	Bollingen Prize				
		1958	National Book Award for Poetry		Promises: Poems, 1954-1956		

獲獎者概況的時間隧道形式顯示

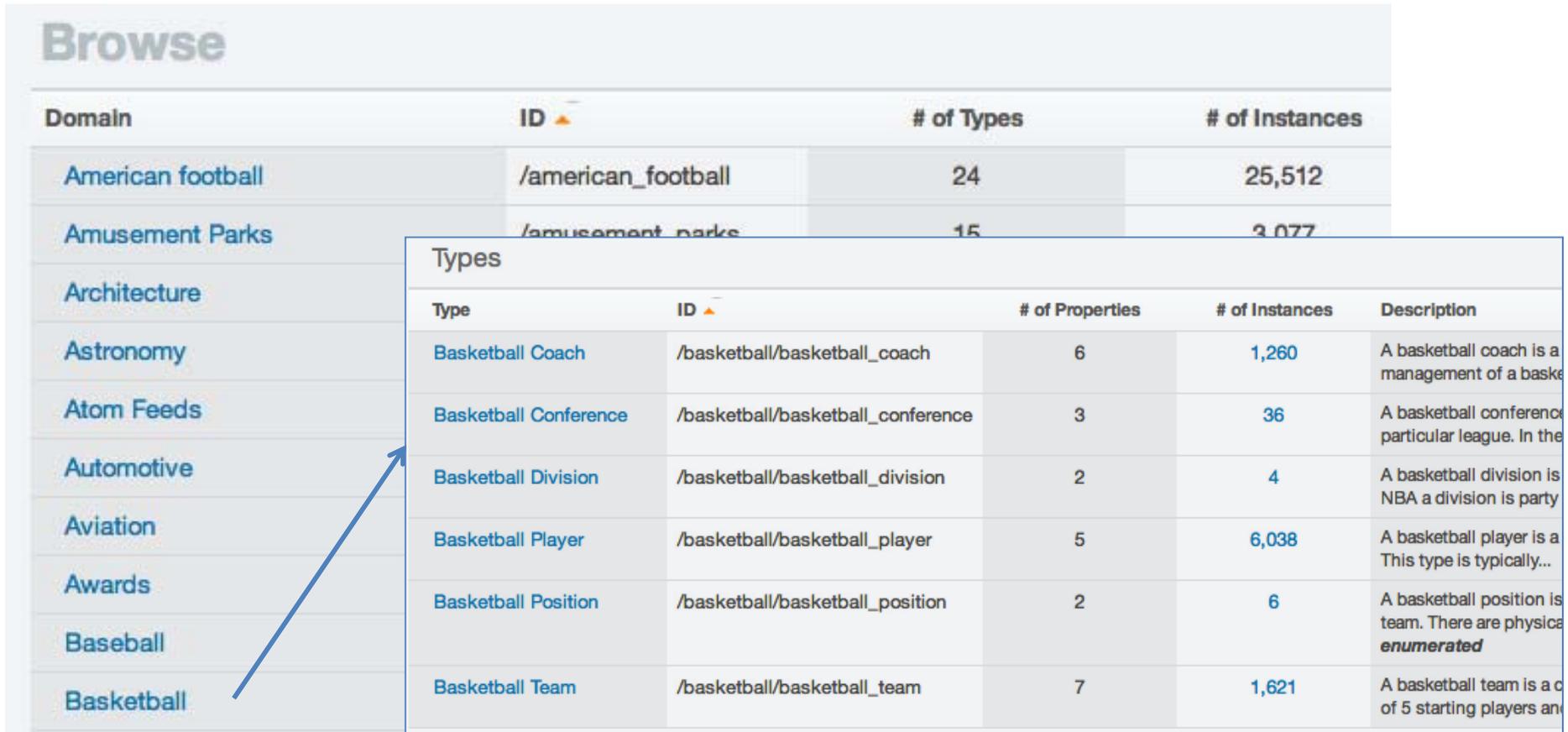
Plot Points: Awards Won: Year

Showing 476 topics. 1 could not be plotted.



案例1方法小结

- 定义本体(schema.org 前身)
- 从维基百科抓取结构化数据
- 发动群众(注册了的机构和个人)完善数据
- 通过各种界面显示数据



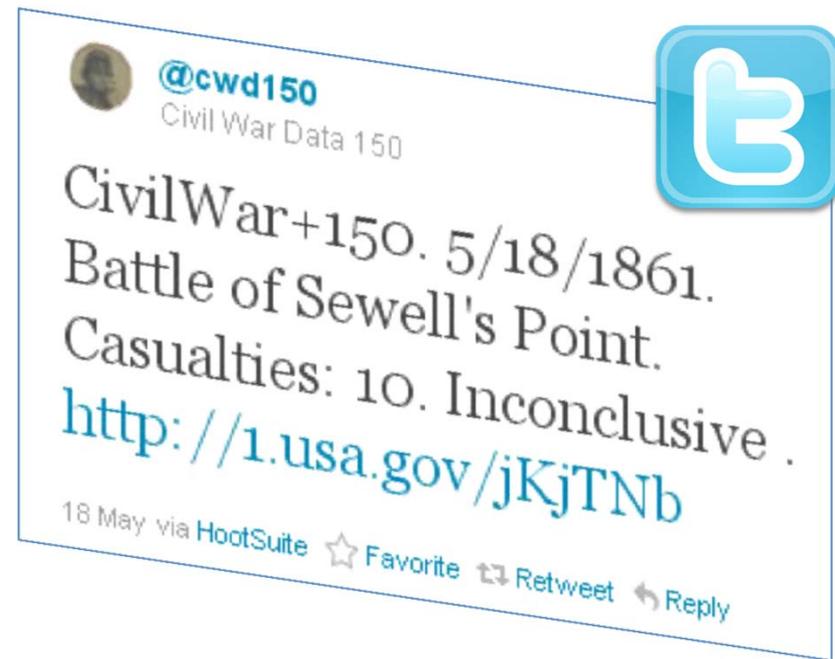
The image shows a 'Browse' page with a table of domains and a detailed view of the 'Basketball' domain. A blue arrow points from the 'Basketball' link in the domain list to the detailed view.

Domain	ID	# of Types	# of Instances
American football	/american_football	24	25,512
Amusement Parks	/amusement_parks	15	3,077
Architecture			
Astronomy			
Atom Feeds			
Automotive			
Aviation			
Awards			
Baseball			
Basketball			

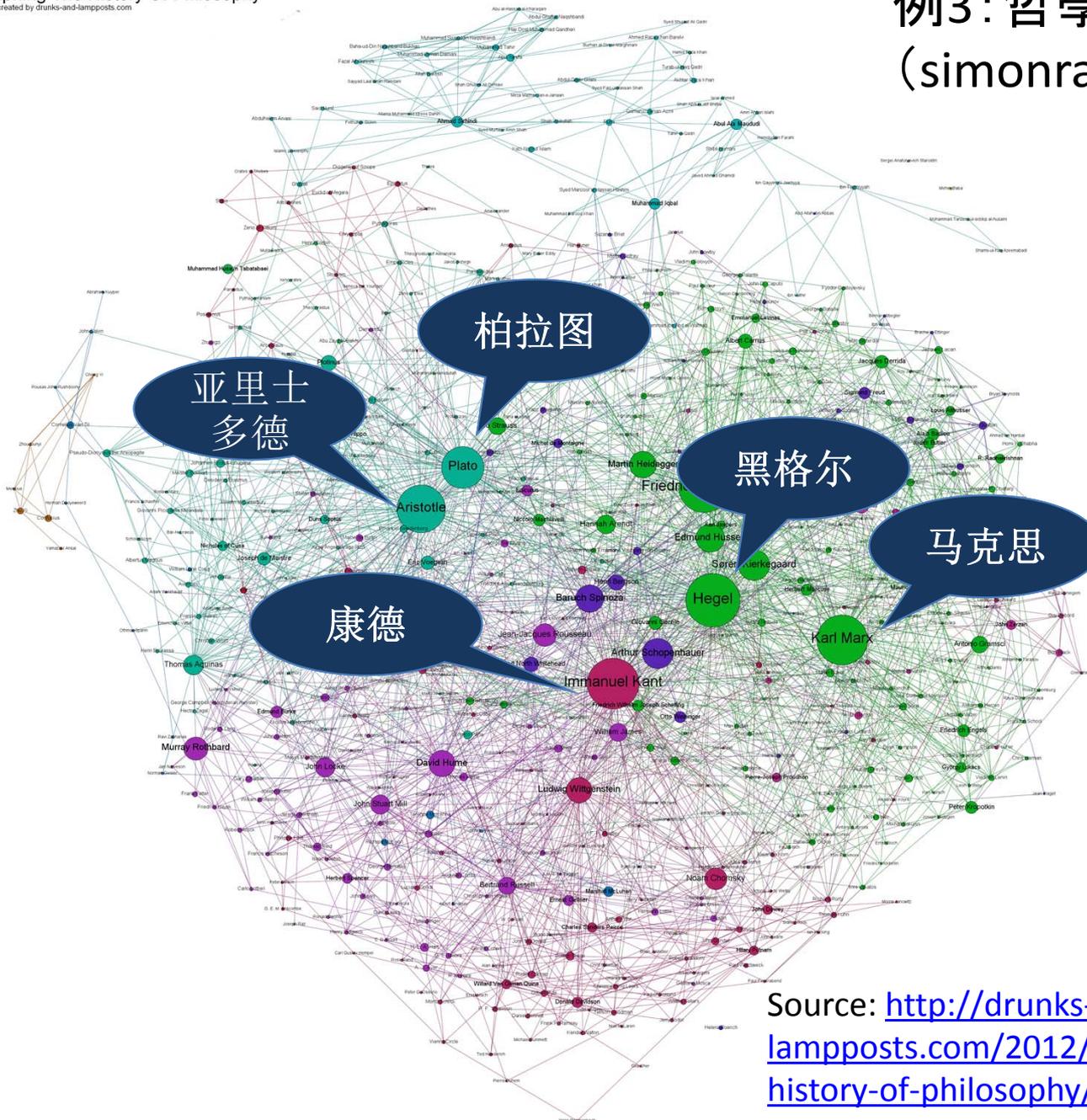
Types				
Type	ID	# of Properties	# of Instances	Description
Basketball Coach	/basketball/basketball_coach	6	1,260	A basketball coach is a management of a basket
Basketball Conference	/basketball/basketball_conference	3	36	A basketball conference particular league. In the
Basketball Division	/basketball/basketball_division	2	4	A basketball division is NBA a division is party
Basketball Player	/basketball/basketball_player	5	6,038	A basketball player is a This type is typically...
Basketball Position	/basketball/basketball_position	2	6	A basketball position is team. There are physical enumerated
Basketball Team	/basketball/basketball_team	7	1,621	A basketball team is a c of 5 starting players and

案例2方法小結

- 搜集原始資料(來源於聯邦、州、地方LAM、政府機構、開放數字化學術著作、多種媒體等), 做成結構化數據
- 利用dbpedia等資源, 集中一些數據
- 定義本體(類, 子類, 以及各類的屬性)
- 在已有資源基礎上完善名稱和主題規範詞匯
- 通過關聯數據來組織這些過去分散的研究和歷史資料。
- 對數據進行組織、利用
(例如, 自動tweet 戰役和傷亡)



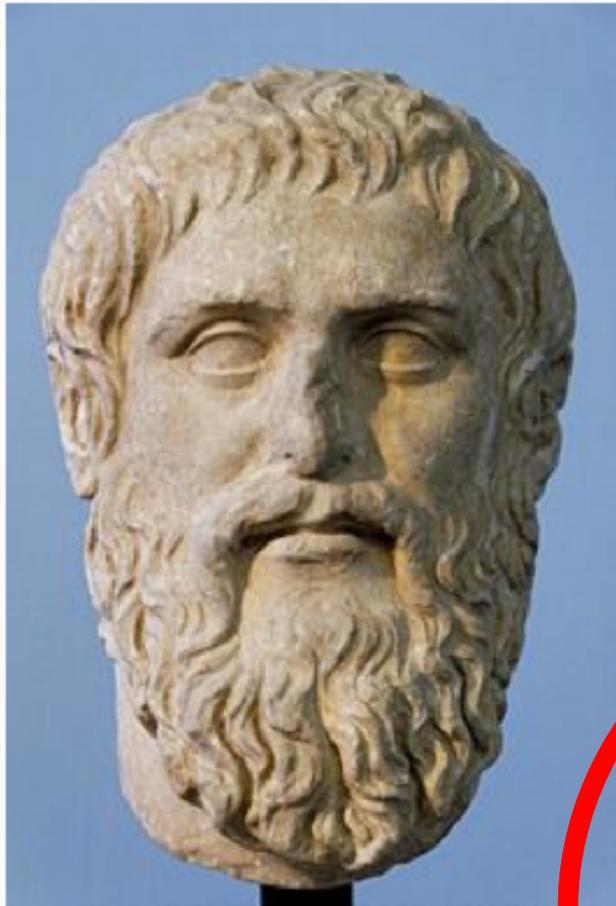
例3: 哲學史圖示 (simonraper 6月13日貼)



圍繞歷代哲學家間的影響、傳承、學派為線索而展開

Source: <http://drunks-and-lampposts.com/2012/06/13/graphing-the-history-of-philosophy/>

Plato (Πλάτων)



Plato: copy of portrait bust by Silanion

Born c. 428–427 BC^[1]
Athens

Died c. 348–347 BC (age approx 80)

Died c. 348–347 BC (age approx 80)
Athens

Nationality Greek

Era Ancient philosophy

Region Western philosophy

School Platonism

Main interests Rhetoric, art, literature, epistemology, justice, virtue, politics, education, family, [Platonism](#)

Notable ideas [Platonic realism](#)

Influenced by [Socrates](#), [Homer](#), [Hesiod](#), [Aristophanes](#), [Aesop](#), [Protagoras](#), [Parmenides](#), [Pythagoras](#), [Heraclitus](#), [Orphism](#)

Influenced Most of subsequent western philosophy, including [Aristotle](#), [Augustine](#), [Neoplatonism](#), [Cicero](#), [Plutarch](#), [Stoicism](#), [Anselm](#), [Machiavelli](#), [Descartes](#), [Hobbes](#), [Leibniz](#), [Mill](#), [Schopenhauer](#), [Kierkegaard](#), [Nietzsche](#), [Heidegger](#), [Arendt](#), [Gadamer](#), [Imam Khomeini](#), [Russell](#) and countless other philosophers and theologians

例：關於柏拉圖的維基百科條目

屬性：
受誰影響
Influenced By

影響了誰
Influenced

值：
各哲學家的條目

About: Plato

An Entity of Type : [Philosopher](#), from Named Graph : <http://live.dbpedia.org>, within Data Space : live.dbpedia.org



Plato was a Classical Greek philosopher, mathematician, student of Socrates at the Platonic Academy in Athens, the first institution of higher learning in the Western world, and one of the founders of Western philosophy and science. In the words of

Property	Value
----------	-------

dbpedia-owl:influenced

- dbpedia:Friedrich_Nietzsche
- dbpedia:Cicero
- dbpedia:Aristotle
- dbpedia:Philosopher
- dbpedia:Arthur_Schopenhauer
- dbpedia:Augustine_of_Hippo
- dbpedia:Bertrand_Russell
- dbpedia:Machiavelli
- dbpedia:Gottfried_Leibniz
- dbpedia:Hans-Georg_Gadamer
- dbpedia:John_Stuart_Mill
- dbpedia:Thomas_Hobbes
- dbpedia:Plutarch
- dbpedia:René_Descartes
- dbpedia:Martin_Heidegger
- dbpedia:Anselm_of_Canterbury
- dbpedia:Hannah_Arendt
- dbpedia:Western_philosophy
- dbpedia:Theologian
- dbpedia:Neoplatonism
- dbpedia:Stoicism
- dbpedia:Imam_Khomeini

dbpedia-owl:influencedBy

- dbpedia:Aristophanes
- dbpedia:Pythagoras
- dbpedia:Homer
- dbpedia:Hesiod
- dbpedia:Heraclitus
- dbpedia:Parmenides
- dbpedia:Protagoras
- dbpedia:Socrates

dbpedia 已經將這些
關係都做成RDF了

到dbpedia的檢索界面輸入檢索提問

http://dbpedia.org/snorql/

Most Visited wiki [DCMI-NKO... Log on to the Bl... Analytics Settin... Twitter / Home Google+

SPARQL Explorer for http://dbpedia.org/sparql

SPARQL:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX : <http://dbpedia.org/resource/>
PREFIX dbpedia2: <http://dbpedia.org/property/>
PREFIX dbpedia: <http://dbpedia.org/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
```

```
SELECT *
WHERE {
  ?p a
  <http://dbpedia.org/ontology/Philosopher> .
  ?p <http://dbpedia.org/ontology/influenced> ?influenced.
}
```

Results:

- Browse
- as JSON
- as XML
- as XML+XSLT

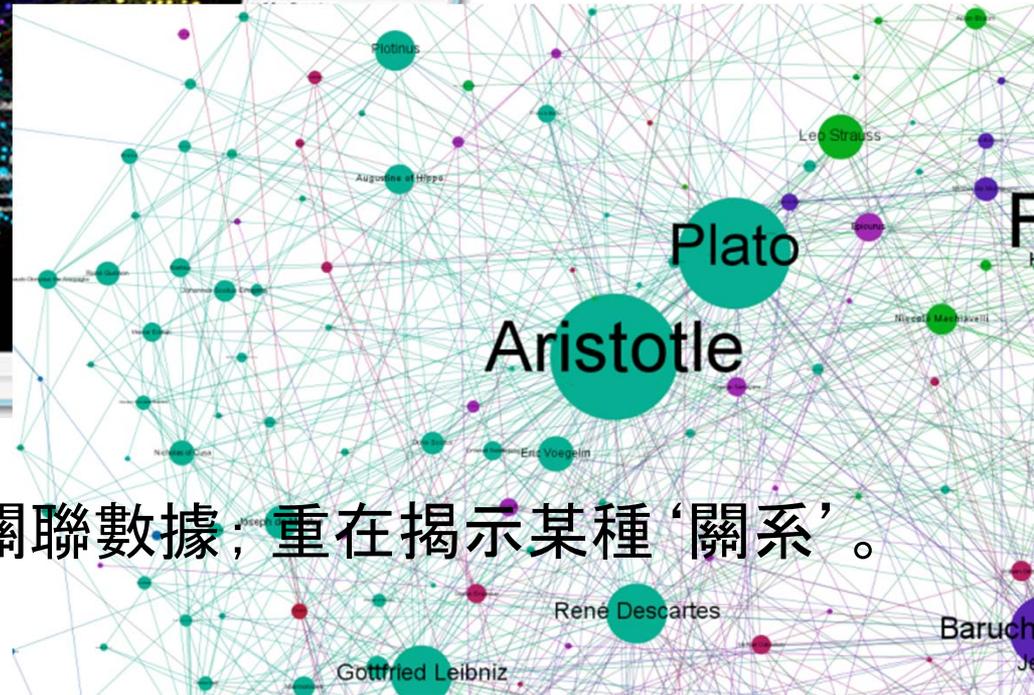
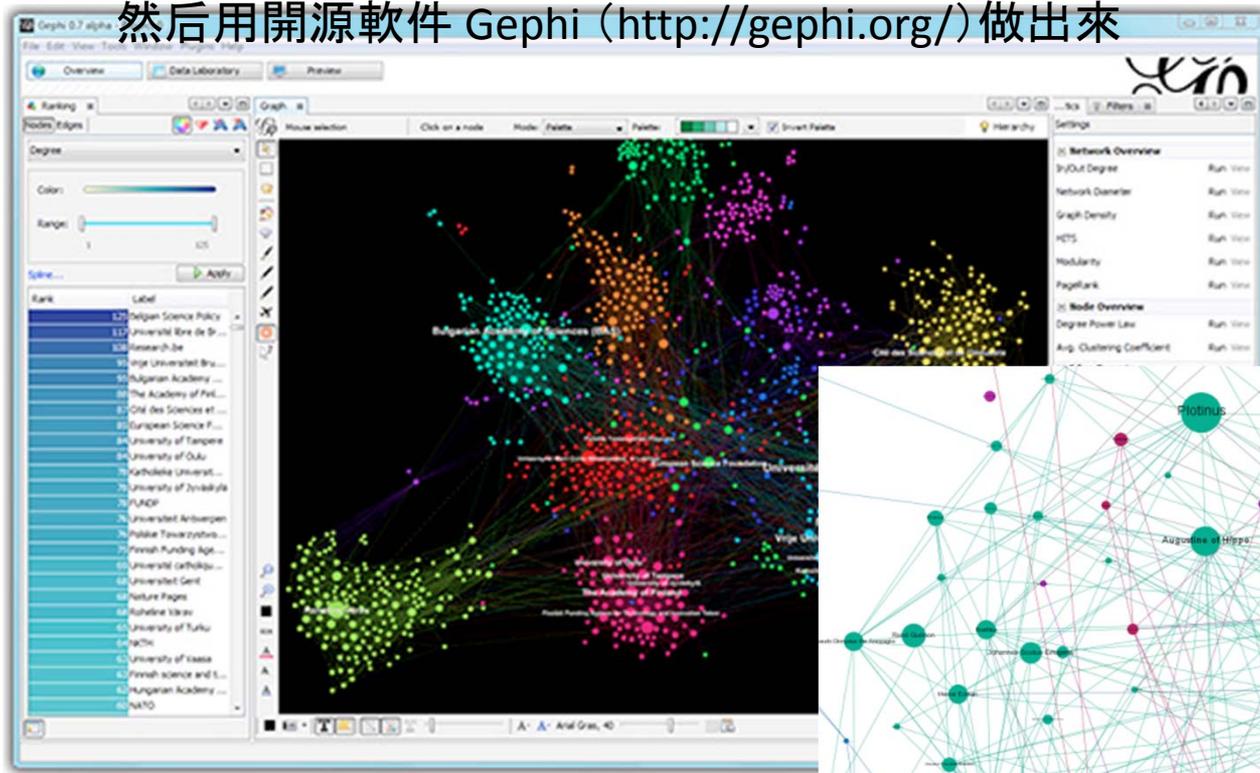
Powered by [OpenLink Virtuoso](#) and [dbpedia](#)

找出凡是在‘哲學家’類有‘影響過’的所有受影響者。
（‘哲學家’是dbpedia本體定義的；屬性（謂詞）為‘influenced’）。

得到數據后，裝到Spreadsheet 裡，分三欄：

| Philosopher A | Philosopher B |
Weight |

然后用開源軟件 Gephi (<http://gephi.org/>) 做出來



案例3特點：完全是利用已有關聯數據；重在揭示某種‘關係’。

啟示：LAM在關聯數據浪潮中屬於什麼角色？

- 作為關聯數據的提供者
 - 書目資源、受控名稱規范文檔、詞表類表、本體
 - 可供別人使用；直接利用規範成果
- 作為關聯數據的消費者
 - 最起碼的：將外面的URI請進來，或讓自己資源的URI被外面拿去聯接
 - 利用已有資源，擴充知識組織系統，充實元數據
 - 將各類文獻目錄和元數據變為知識服務的新起點，而不光是提供查到、拿到文獻的工具
 - 充分利用各種發布的關聯數據資源去生產新的知識

第二部份：介紹一個研究案例

连接

图书馆数据

skos:narrower

与外界的LOD资源

- 图书馆**马克**记录
- **数字**图书馆和**数字**化特藏的元数据
- 规范数据
- 值词汇

Rational

Library data have been limited to serve the *find, identify, select, and obtain* functions.

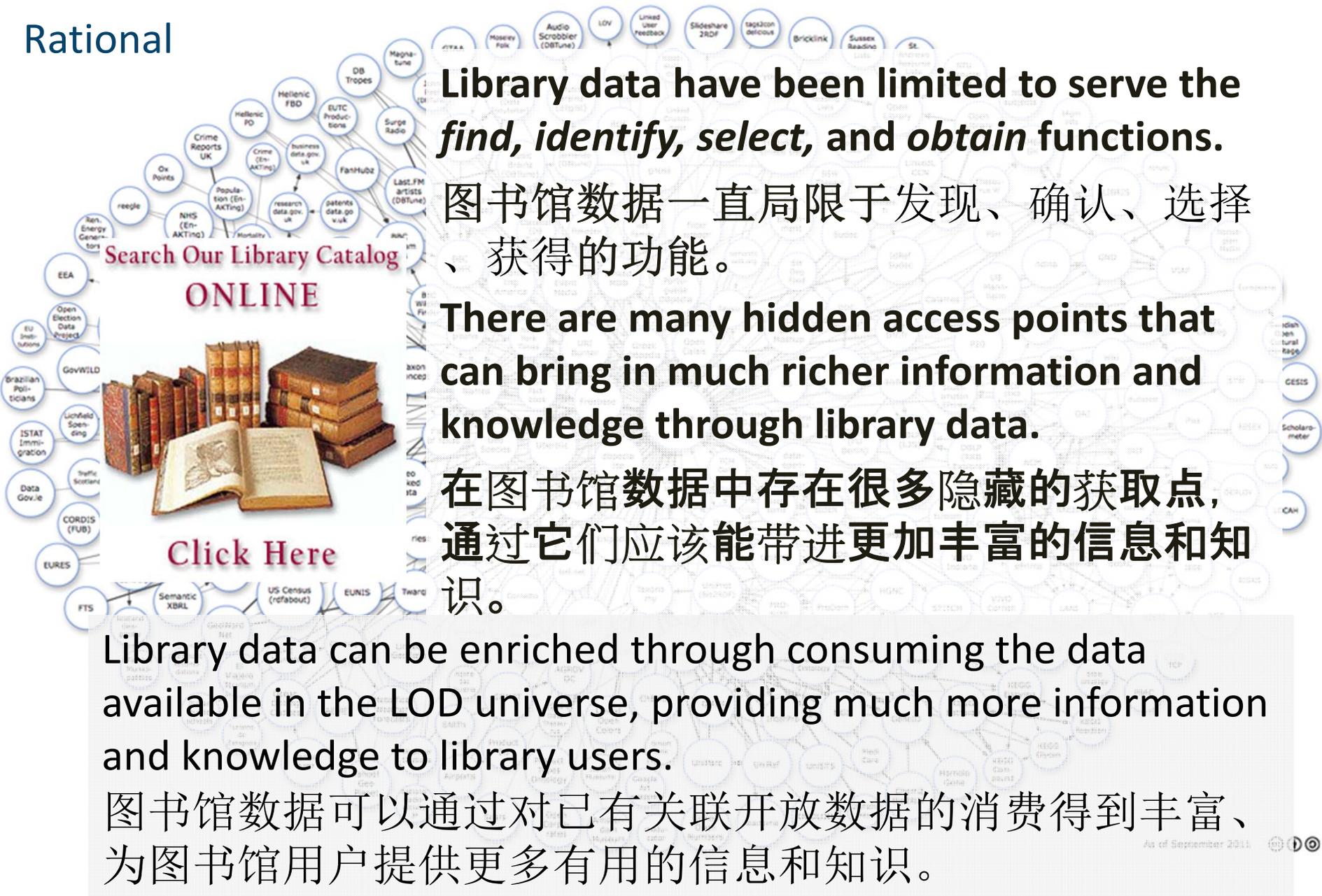
图书馆数据一直局限于发现、确认、选择、获得的功能。

There are many hidden access points that can bring in much richer information and knowledge through library data.

在图书馆数据中存在很多隐藏的获取点，通过它们应该能带进更加丰富的信息和知识。

Library data can be enriched through consuming the data available in the LOD universe, providing much more information and knowledge to library users.

图书馆数据可以通过对已有关联开放数据的消费得到丰富、为图书馆用户提供更多有用的信息和知识。



Metadata Vocabulary Junction Project

元数据词汇枢纽站项目



INSTITUTE of
Museum and Library
SERVICES


KENT STATE
UNIVERSITY

National Leadership Grants support projects that address challenges faced by the museum, library, and/or archive fields and that have the potential to advance practice in those fields.

thedatahub.org



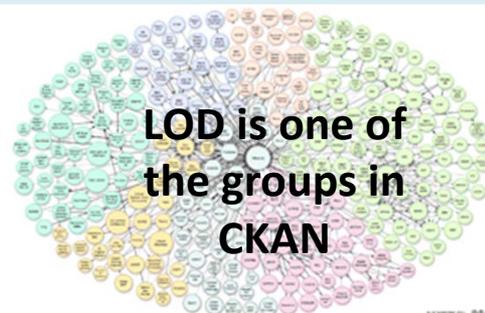
the Data Hub — The easy way to get, use and share data

[Search](#) [Groups](#) [About](#)

3865 datasets
(as of July 3, 2012)

项目目的:

连接图书馆、档案馆、博物馆（
LAM）数据与CKAN数据中心的开放
关联数据资源



例：音乐相关的数据（2） 在图书馆数据这边的分析：



图书馆数据

1. 图书馆马克记录

- 古典音乐／器乐
- 爵士乐
- 音乐剧、歌剧
- Pop／摇滚乐
- Soundtrack

2. WorldCat记录的 schema置标

3. 数字图书馆和数字化特 藏的元数据

- 20 个数字化特藏

分析其元数据

- 哪些常见元素
- 哪些相关节点可能与LOD属性词汇联接
 - 主要获取途径
 - 隐藏着的可获取途径

节选：MARC字段、数字元素、音乐本体、相关属性匹配表

Responsible Body

MARC Fields	MARC Subfields	MARC Relator Codes	Digital Collections Field	Music-related Classes	Class Mapping	Music-related Properties	Property Mapping
100	\$a	arr, com, cmp, lib, lyr	Creator, Composer, Lyricist	mo:MusicArtist	B	foaf:name mo:composer schema:author	N B N
		cnd, itr, mus, prf, sng	Performer	mo:MusicArtist	B	mo:conductor mo:performer mo:singer	B B B
110	\$a	cmp, prf	Creator Performer Composer	mo:MusicGroup	B	mo:performer	B
						mo:singer	B
						mo:composer	B
						mo:conductor	B
						foaf:name schema:author	N N
245	\$c	cmp, prf	Creator Performer Composer	mo:MusicArtist	B	mo:performer	B
				mo:MusicGroup	B	mo:singer	B
						mo:composer	B
						mo:conductor	B
						foaf:name	N

link to the full [table](#)

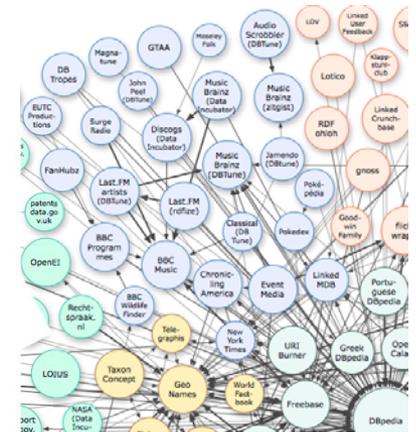
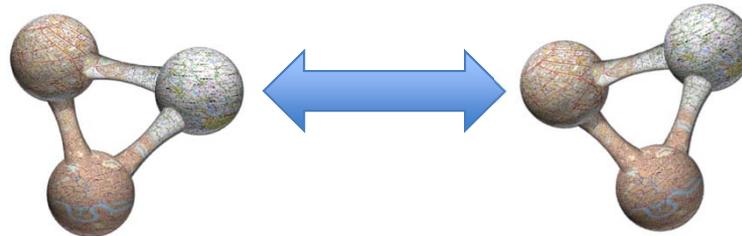
计划: 将LAM数据与LOD数据结果相比较、匹配

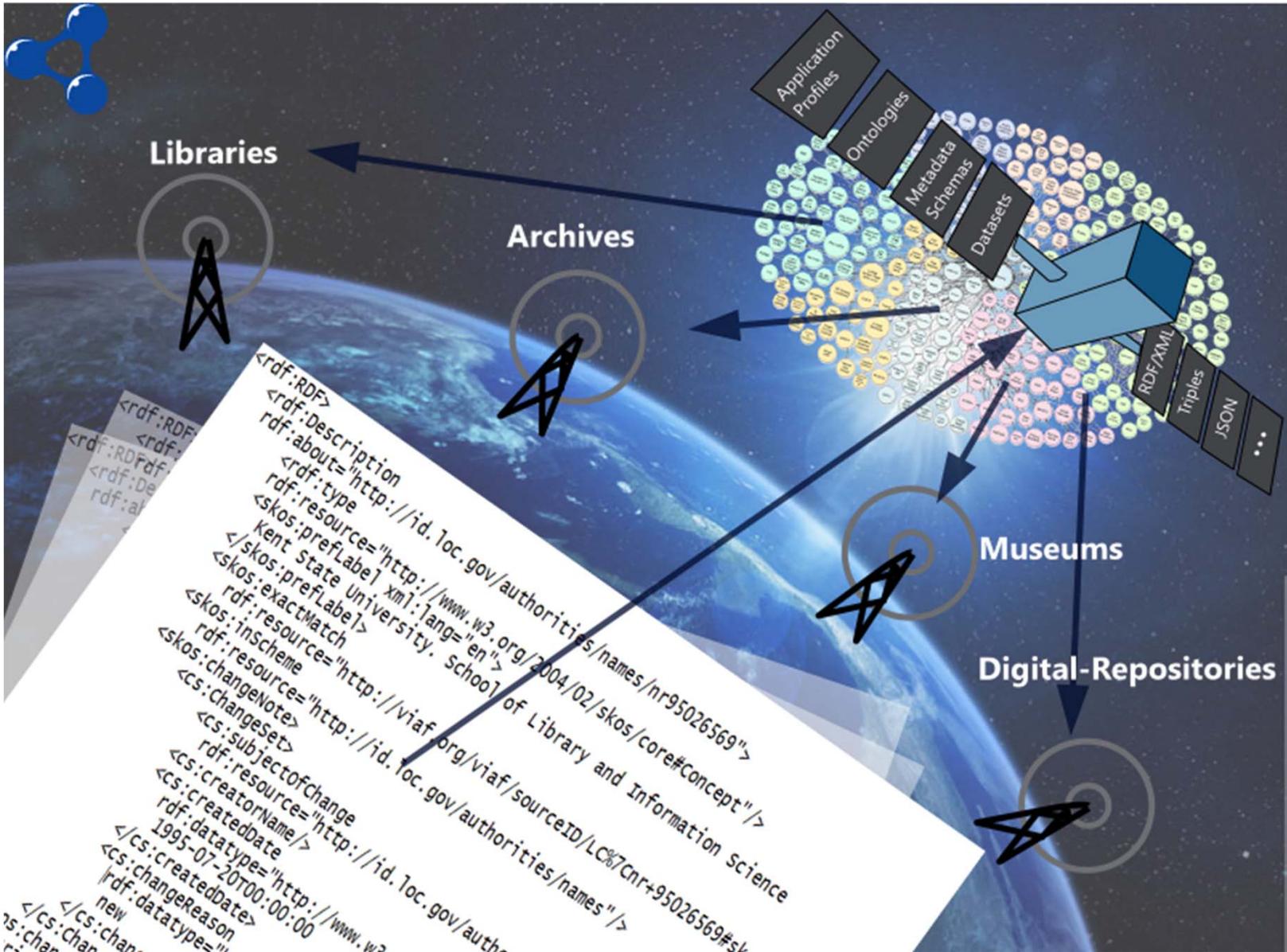
LAM data: 图情档博数据:

- 图书馆文献数据
 - 马克记录
 - schema置标
- 数字特藏 / 数字图书馆元数据
 - 基于DC的
 - 其它本地格式
- 档案描述
 - EAD, MARC, other
- 博物馆实物描述
 - VRA Core, other

LOD Datasets: LOD数据集

- 本体
- 元数据应用纲要
- XML/RDF 样本数据格式
- 相关文献





```

<rdf:RDF>
  <rdf:Description
    rdf:about="http://id.loc.gov/authorities/names/nr95026569">
    <rdf:type
      <skos:resource="http://www.w3.org/2004/02/skos/core#concept"/>
      </skos:resource>
      <skos:prefLabel xml:lang="en">
        Kent State University School of Library and Information Science
      </skos:prefLabel>
      <skos:exactMatch
        rdf:resource="http://viaf.org/viaf/sourceID/LC%7Cnr+95026569#sk
        </skos:exactMatch>
      <skos:inScheme
        rdf:resource="http://id.loc.gov/authorities/names"/>
      </skos:inScheme>
      <skos:changeNote
        <cs:changeSet
          rdf:subjectOfChange
            <cs:resource="http://id.loc.gov/authorities/names"/>
            </cs:resource>
            <cs:creatorName/
              <cs:createdDate
                rdf:dateTime="http://www.w3
                1995-07-20T00:00:00
              </cs:createdDate>
              <cs:changeReason
                <rdf:dateTime="
                new
              </cs:chan
            </cs:chan
  </rdf:Description>
</rdf:RDF>

```

<http://lod-lam.slis.kent.edu/>

Conclusions 结语

当前技术已经为图书馆及用户受益于关联数据奠定了基础

- **目前需要的是：**

- 精神上的准备：怎样合理有效发现和再利用
- 实际可用的工具

- **我们可以做的事：**

- 以现有图书馆数据为桥梁来增强图书馆信息机构的信息与知识服务机制



The Three Hares

589-618 AD (Sui dynasty)

Cave 407, Mogao Caves, China

UNESCO World Heritage Site

三兔图

隋代（公元589—618）

敦煌莫高窟第407窟藻井

UNESCO世界遗产名录

INSPIRING CONCEPTS: sharing; interoperability; linking

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Team:

- Co-P.I. Karen Gracy, Ph.D.
Research Assistants
- Laurence Skirvin, M.L.S.
- Sammy Davidson, M.L.S.
- Shadi Shakeri
- Riley Stoermer, M.L.S.

<http://lod-lam.slis.kent.edu/>