

“New Dimensions in KOS”

CENDI/NKOS Workshop

September 11, 2008
Washington, DC, USA

SKOS: New Dimensions in Interoperability

Ed Summers

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*An international conference to share and advance knowledge and experience about standards;
the technologies that build upon them, and implementation experiences.*

What is it?

Simple Knowledge Organisation System(s)

- SKOS is ...
- for ***declaring*** and ***publishing taxonomies, thesauri or classification schemes***, for use in a distributed, decentralised information system (I.e. a semantic web).
- for **describing Concepts** and **creating relationships between Concepts and Terms**
- A practical application of **RDF**
- the application of library science to the semantic web.
 - SKOS provides a **formal language** for representing **controlled, structured vocabularies**



The SKOS data model

...views a knowledge organization system as a **concept scheme** comprising a set of **conceptual resources** (*concepts*).

- These concept schemes and conceptual resources are identified by URIs.
- The model is multilingual and extensible

Concepts can be...

labeled with any number of strings. One label, in any given language, can be indicated as the "preferred" label for that language, and all others as "alternate" labels, "hidden" labels, or using a notation:

- **skos:prefLabel**
- **skos:altLabel**
- **skos:hiddenLabel**
- **skos:notation**

Concepts can be...

documented with any number of notes of various types. This is intended to provide an extensible framework for more specific types of notes:

- **skos:note**
- **skos:changeNote**
- **skos:definition**
- **skos:editorialNote**
- **skos:example**
- **skos:historyNote**
- **skos:scopeNote**

Concepts can be...

linked to one or more concept schemes.

- **skos:inScheme**, a property of a concept
- **skos:hasTopConcept**, a property of a ***concept scheme***. (replaces skos:topConcept, a property of a ***concept***)

Concepts can be...

linked to other concepts within the same concept scheme.

- Hierarchical links:
 - **skos:broader** and **skos:narrower**
 - **skos:broaderTransitive** and **skos:narrowerTransitive**
- Associative links:
 - **skos:related**

Concepts can be...

grouped into collections, which can be labeled and/or ordered.

- **skos: Collection**
- **skos: OrderedCollection**
- **skos: member**
- **skos: memberList**

Concepts can be...

mapped to other concepts in *different* concept schemes.

- Hierarchical mapping:

- **skos:broadMatch**
- **skos:narrowMatch**

- Associative mapping:

- **skos:relatedMatch**
- **skos:closeMatch**
- **skos:exactMatch**

skosxl...

allows labels to be resources:

skosxl:Label	The skosxl:Label Class
skosxl:literalForm	The skosxl:Label Class
skosxl:prefLabel	Preferred skosxl:Label
skosxl:altLabel	Alternate skosxl:Label
skosxl:hiddenLabel	Hidden skosxl:Label
skosxl:labelRelation	Links Between skosxl:Labels

Going, going...

- Symbols:
 - **skos:prefSymbol**
 - **skos:altSymbol**
- Subject Indexing:
 - **skos:subject**
 - **skos:isSubjectOf**
 - **skos:primarySubject**
 - **skos:isPrimarySubjectOf**
 - **skos:subjectIndicator**





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LC Control No.: 00039593

LCCN Permalink: <http://lcn.loc.gov/00039593>

Type of Material: Book (Print, Microform, Electronic, etc.)

Personal Name: [Berners-Lee, Tim.](#)

Main Title: Weaving the Web : the original design and ultimate destiny of the World Wide Web by its inventor / Tim Berners-Lee with Mark Fischetti ; [foreword by Michael Dertouzos].

Edition Information: 1st pbk. ed.

Published/Created: New York : HarperCollins Publishers, 2000.

Description: ix, 246 p. : ill. ; 21 cm.

ISBN: 006251587X (pbk.)

CALL NUMBER: TK5105 .B89 .D46 2000



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SOURCE OF HEADINGS: Library of Congress Online Catalog
INFORMATION FOR: World Wide Web.

Please note: Broader Terms are not currently available

Select a Link Below to Continue...

[Authority Record](#)

Narrower Term: [Mashups \(World Wide Web\)](#)

Narrower Term: [Semantic Web.](#)

Narrower Term: [Web 2.0.](#)

Narrower Term: [WebDAV \(Standard\)](#)

Narrower Term: [WebTV \(Trademark\)](#)

See Also: [Internet.](#)

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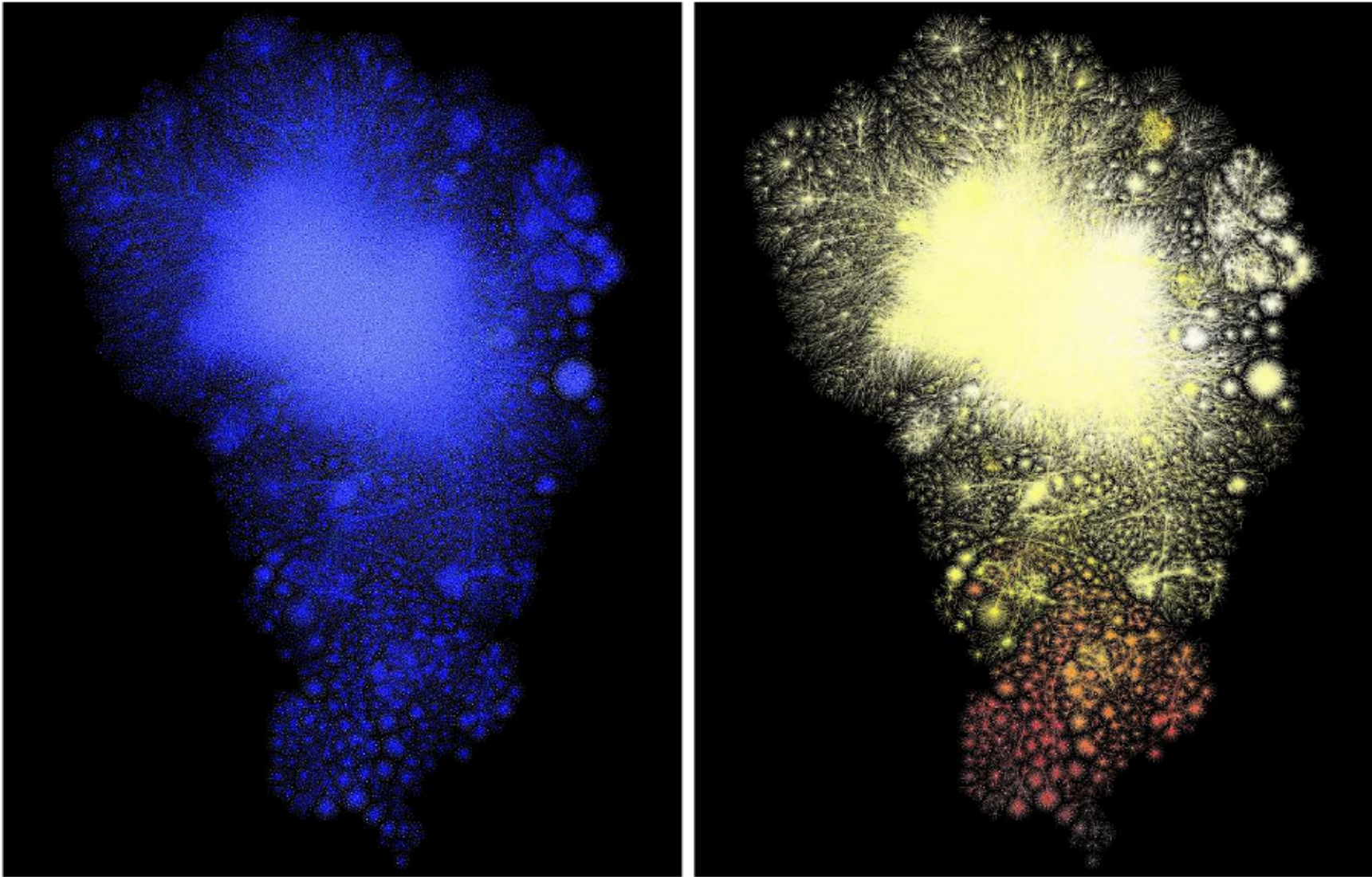


Figure 3.2: The layout computed by the `lgl` program shows more tangible structure. The colors of the left figure are drawn as in figure 3.1, whereas the edges in the right figures are drawn based on the distance from the root of the spanning tree used for the layout. Yellow indicates an edge close to the root and red indicates an edge far from the root. This figure shows the tree-like structure and a core-region of the LCSH graph.


```

01671cz a2200337n 450000100080000000500170000800800410002503500210006603500170
00870350021001040350016001259060018001410100017001590400018001760530034001940530
04200228150001900270450002400289450002500313450005500338450002500393550002500418
55000260044355000130046967002700048267002570075267001200100967001570112967500320
1286953001501318^^4865449^^20011001235750.0^^950125|| anannbabn la ana
^^ ^_a(DLC)sh 95000541^^ ^_a(DLC)5086766^^ ^_a(DLC)sp 95000541^^ ^_a(DL
C)258303^^ ^_t0019^_ute07^_v0^^ ^_ash 95000541 ^^ ^_aDLC^_cDLC^_dDLC^^ 0^_aTK
5105.888^_cTelecommunication^^ 0^_aZA4195^_bZA4235^_cInformation resources^^ ^_
aWorld Wide Web^^ ^_aW3 (World Wide Web)^^ ^_aWeb (World Wide Web)^^ ^_wnne^_
aWorld Wide Web (Information retrieval system)^^ ^_aWWW (World Wide Web)^^ ^_w
g^_aHypertext systems^^ ^_wg^_aMultimedia systems^^ ^_aInternet^^ ^_aWork cat
.: 94067520: December, J. The World Wide Web Unleashed, c1994^_b(WWW, the Web, a
distributed hypermedia system, a collection of interconnected hardware, softwar
e, and networked systems, it is a concept, not a program, system, or protocol, i
t is an interface)^^ ^_a94234135: Brown, S. The Internet via Mosaic and World W
ide Web, c1994^_b(WWW, the Web) p. 35 (Although the WWW is primarily used on a g
lobal scale as a part of the Internet, it is feasible for a two-machine network
to run the WWW client/server software)^^ ^_aInternet publishing handbook, c1995
:^_bp. 15 (World-Wide Web system is known by its various names: WWW, W3, and Web
)^^ ^_aMAGS, Dec. 8, 1995:^_barticle by Robert M. Metcalfe (first generation of
WWW based on Hypertext Transfer Protocol and Hypertext Transfer Markup Language
)^^ ^_aASTI;^_aEngr. index;^_aWeb. 3^^ ^_ajf08^_bta25^^]

```

~

<http://lcsb.info/sh95000541#concept>



World Wide Web

Use For: W3 (World Wide Web), WWW (World Wide Web), Web (World Wide Web), World Wide Web (Information retrieval system),

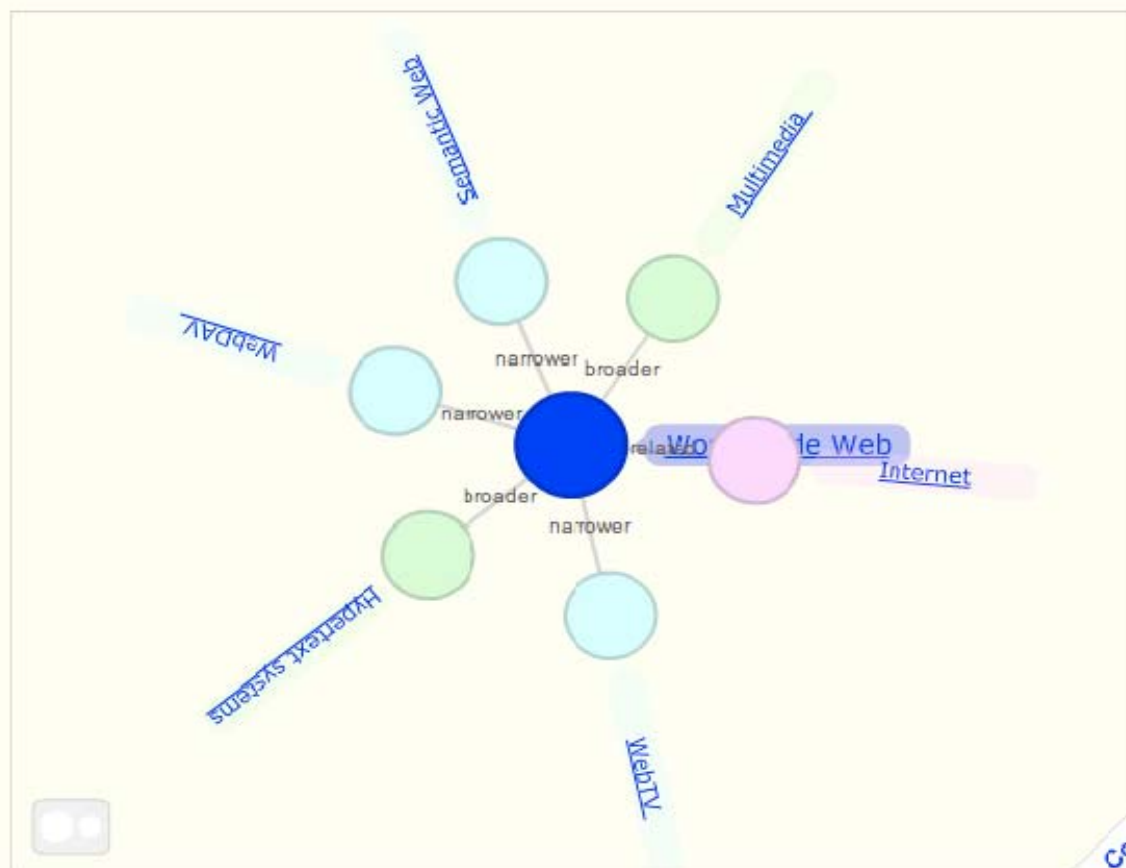
Broader Terms: Hypertext systems, Multimedia systems,

Narrower Terms: Semantic Web, WebDAV (Standard), WebTV (Trademark),

Related Terms: Internet,

Editorial Notes:

- 94234135: Brown, S. The Internet via Mosaic and World Wide Web, c1994 (WWW, the Web) p. 35 (Although the WWW is primarily used on a global scale as a part of the Internet, it is feasible for a two-machine network to run the WWW client/server software)
- ASTI; Engr. index; Web. 3
- Internet publishing handbook, c1995: p. 15 (World-Wide Web system is known by



http://lcsch.info/sh95000541#concept

Google

World Wide Web

Use For: W3 (World Wide Web), WWW (World Wide Web), Web (World Wide Web), World Wide Web (Information retrieval system),

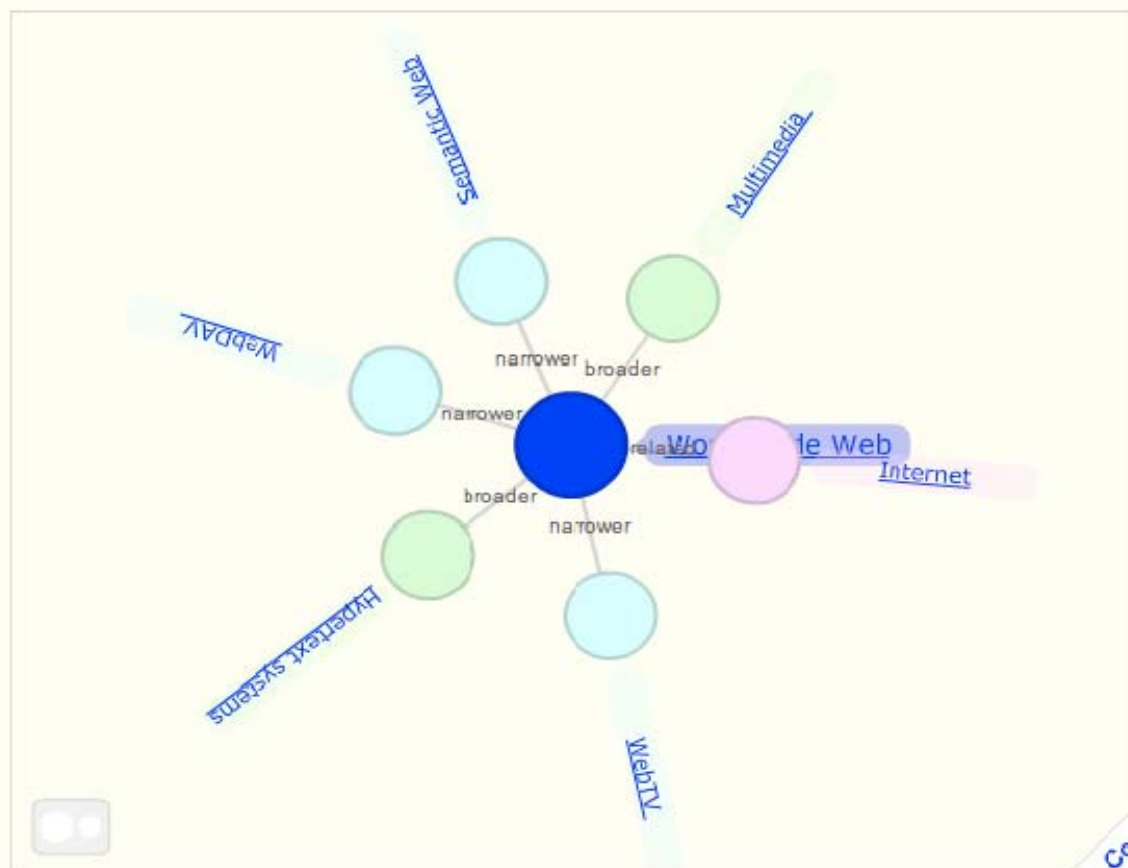
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- Internet publishing handbook, c1995: p. 15 (World-Wide Web system is known by




```
<rdf:RDF
```

```
  xmlns:dcterms="http://purl.org/dc/terms/"
```

```
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
```

```
  xmlns:skos="http://www.w3.org/2004/02/skos/core#"
```

```
>
```

```
<rdf:Description rdf:about="http://lcsh.info/sh95000541#concept">
```

```
  <rdf:type rdf:resource="http://www.w3.org/2004/02/skos/core#Concept"/>
```

```
  <skos:broader rdf:resource="http://lcsh.info/sh88002671#concept"/>
```

```
  <skos:broader rdf:resource="http://lcsh.info/sh92002381#concept"/>
```

```
  <skos:prefLabel xml:lang="en">World Wide Web</skos:prefLabel>
```

```
  <skos:related rdf:resource="http://lcsh.info/sh92002816#concept"/>
```

```
  <skos:narrower rdf:resource="http://lcsh.info/sh2002000569#concept"/>
```

```
  <skos:narrower rdf:resource="http://lcsh.info/sh97003254#concept"/>
```

```
  <skos:narrower rdf:resource="http://lcsh.info/sh2003001415#concept"/>
```

```
  <dcterms:created rdf:datatype="http://www.w3.org/2001/XMLSchema#date">2000-04-28</dcterms:created>
```

```
  <dcterms:modified rdf:datatype="http://www.w3.org/2001/XMLSchema#dateTime">2001-10-01T09:56:06</dcterms:modified>
```

```
  <skos:inScheme rdf:resource="http://lcsh.info/" />
```

```
  <skos:altLabel xml:lang="en">World Wide Web (Information retrieval system)</skos:altLabel>
```

```
  <skos:altLabel xml:lang="en">WWW (World Wide Web)</skos:altLabel>
```

```
  <skos:altLabel xml:lang="en">W3 (World Wide Web)</skos:altLabel>
```



```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
```

```
@prefix dcterms: <http://purl.org/dc/terms/> .
```

```
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
```

```
<http://lcsh.info/sh95000541#concept>
```

```
  dcterms:created "2000-04-28"^^<http://www.w3.org/2001/XMLSchema#date> ;
```

```
  dcterms:modified "2001-10-01T09:56:06"^^<http://www.w3.org/2001/XMLSchema#dateTime> ;
```

```
  a skos:Concept ;
```

```
  skos:altLabel "W3 (World Wide Web)"@en, "WWW (World Wide Web)"@en, "Web (World Wide Web)"@en, "World Wide Web (Information retrieval system)"@en ;
```

```
  skos:broader <http://lcsh.info/sh88002671#concept>, <http://lcsh.info/sh92002381#concept> ;
```

```
  skos:inScheme <http://lcsh.info/> ;
```

```
  skos:narrower <http://lcsh.info/sh2002000569#concept>, <http://lcsh.info/sh2003001415#concept>, <http://lcsh.info/sh97003254#concept> ;
```

```
  skos:prefLabel "World Wide Web"@en ;
```

```
  skos:related <http://lcsh.info/sh92002816#concept> .
```

```
~  
~  
~  
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```

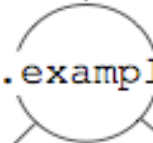
`http://www.example.com/about#alice`



Automatic truncation of fragment



`http://www.example.com/about`



application/rdf+xml wins

content negotiation

text/html wins



Content-Location:

`http://www.example.com/about.rdf`

Content-Location:

`http://www.example.com/about.html`



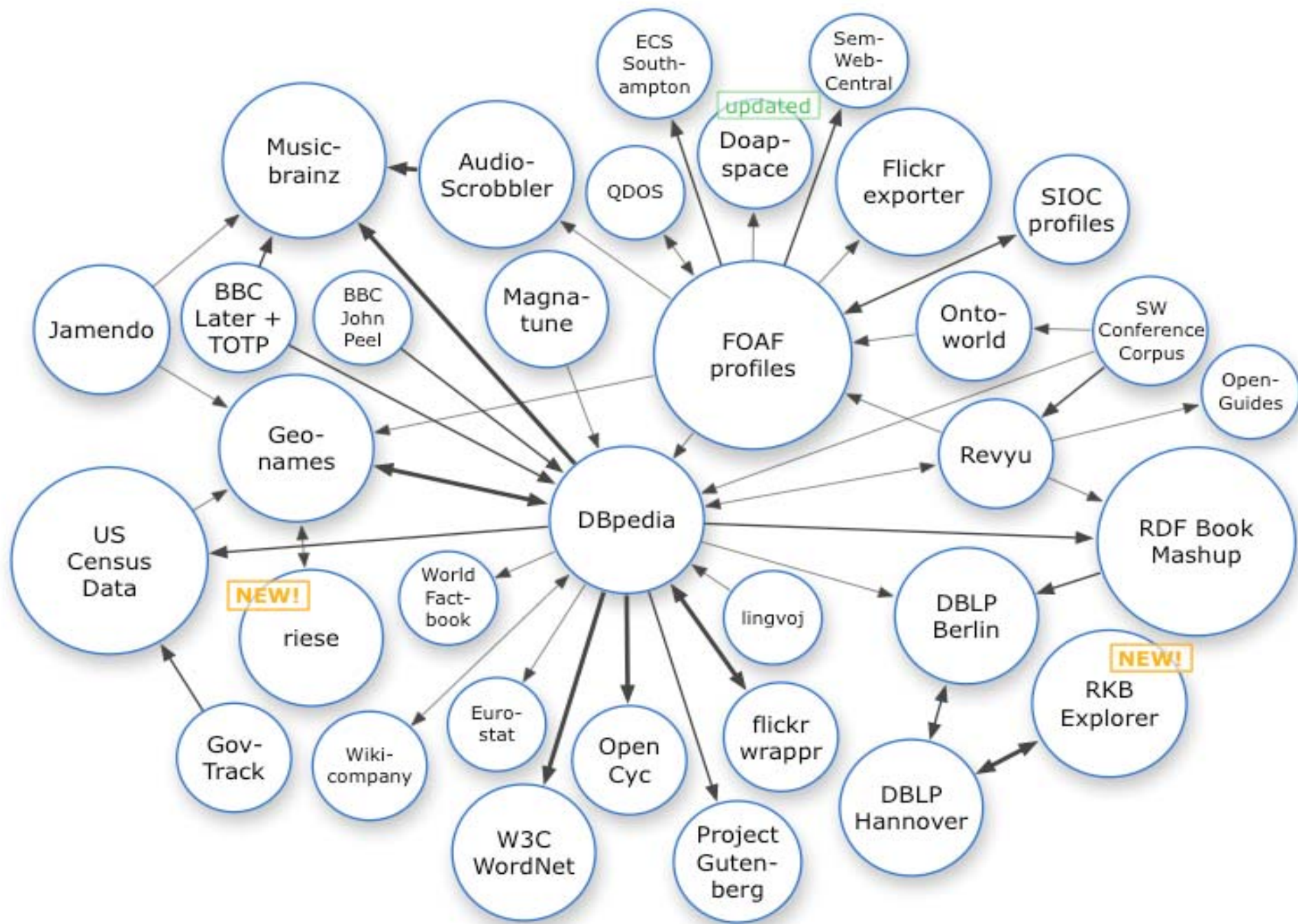
Cool URIs for the Semantic Web

<http://www.w3.org/TR/cooluris/>

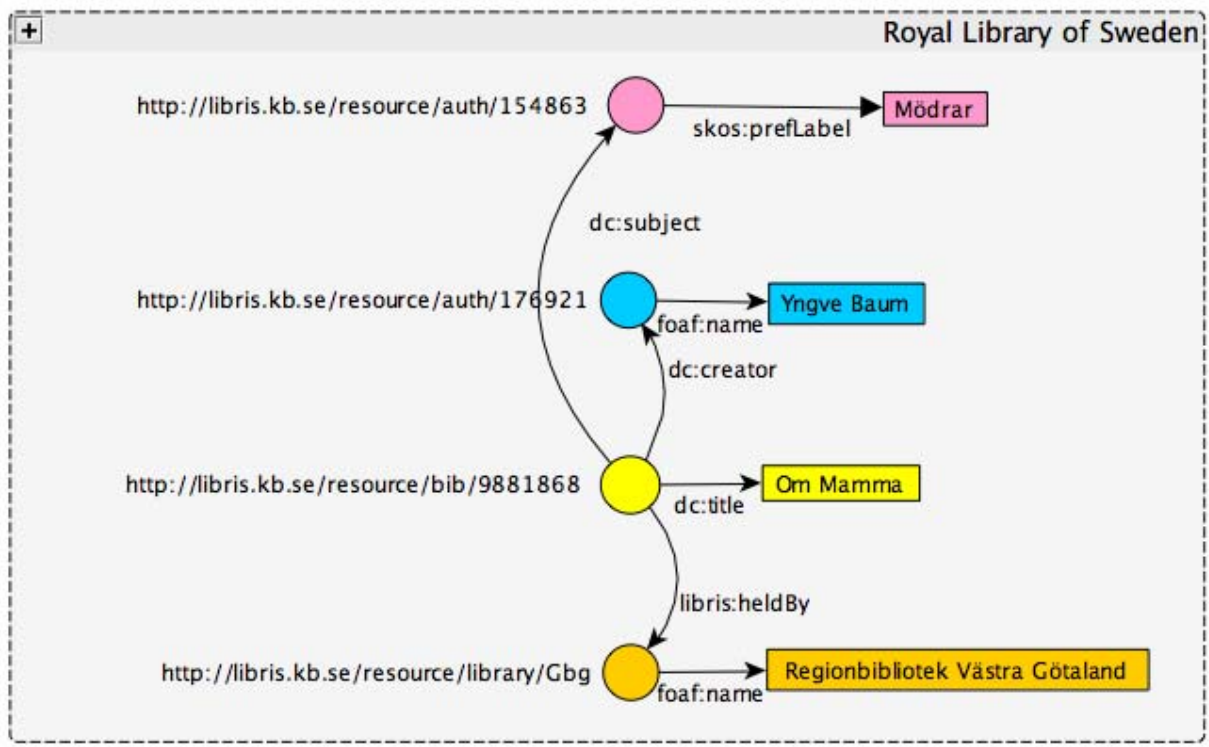


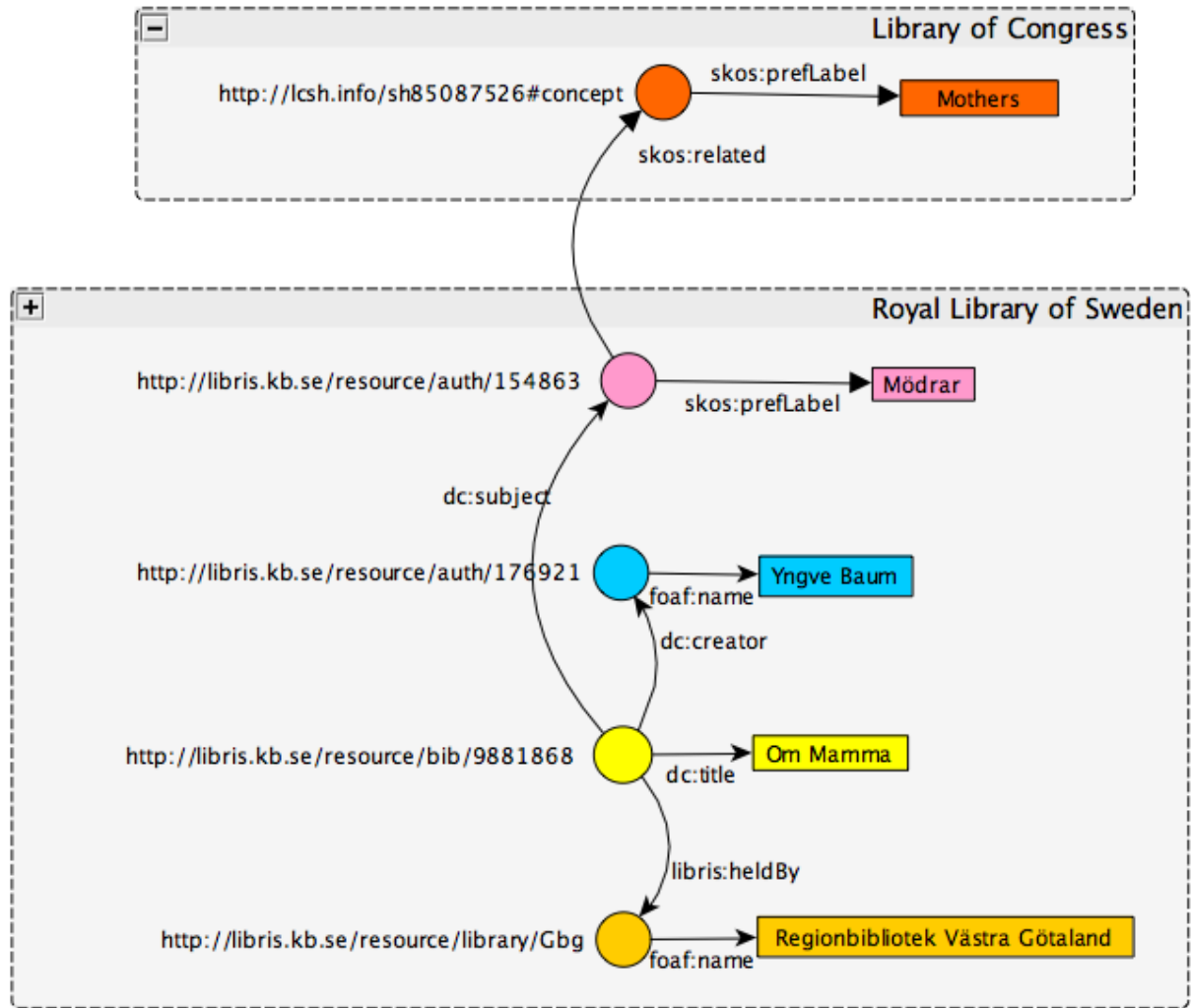
Yeah, but so what ...











SKOS Documentation

- **W3C Semantic Web Deployment Working Group**
 - W3C Recommendation Track
<http://www.w3.org/2006/07/SWD/>
- **SKOS Use Cases and Requirements**
 - First Working Draft Published (2007-05-16)
<http://www.w3.org/TR/skos-ucr/>
- **SKOS Reference and Primer**
 - Last Call Working Draft published August 2008
<http://www.w3.org/TR/2008/WD-skos-reference-20080125/>
<http://www.w3.org/TR/2008/WD-skos-primer-20080221/>
 - W3C Recommendation by December 31, 2008
- **SKOS Web Site**
 - <http://www.w3.org/2004/02/skos/>
 - LCSH, SKOS and Linked data
<http://arxiv.org/abs/0805.2855>

Links

SKOS Homepage

<http://www.w3.org/2004/02/skos/>

SKOS Primer

<http://www.w3.org/TR/2008/WD-skos-primer-20080221/>

SKOS Reference

<http://www.w3.org/TR/2008/WD-skos-reference-20080125>

SWD-WG Home Page

<http://www.w3.org/2006/07/SWD/>

SWD-WG Mailing list

<mailto:public-swd-wg@w3.org>

<http://lists.w3.org/Archives/Public/public-swd-wg/>

NSDL Metadata Registry

<http://metadataregistry.org>

Jon Phipps

<mailto:jphipps@madcreek.com>

Thanks for listening ☺