



***Creating interfaces for
emerging information technology
and
developing information technology
for tasks that do not yet exist***

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Interactive Information Access

http://www.cwi.nl/interactive_information_access

More...is better?

- Users
- Data
- Applications

Network effect

- Web
 - Mosaic was the first “good enough” browser
- Mobile text messaging
 - interface was “good enough”

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What is the problem?

- We didn’t see the web coming
- We didn’t see text messaging coming
- The linked data web is closer than you think...
- So what do we need to do?
 - create novel applications
 - for large amounts of data
 - for many different users

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Outline of talk

- Reflect on how long it takes for a culture to develop a medium
- Reflect on different roles in (information) applications
 - computing scientists create technology
 - everyone else uses it, and/or studies its use
- Describe development of three applications
 - data driven
 - existing user task
 - “new” user task

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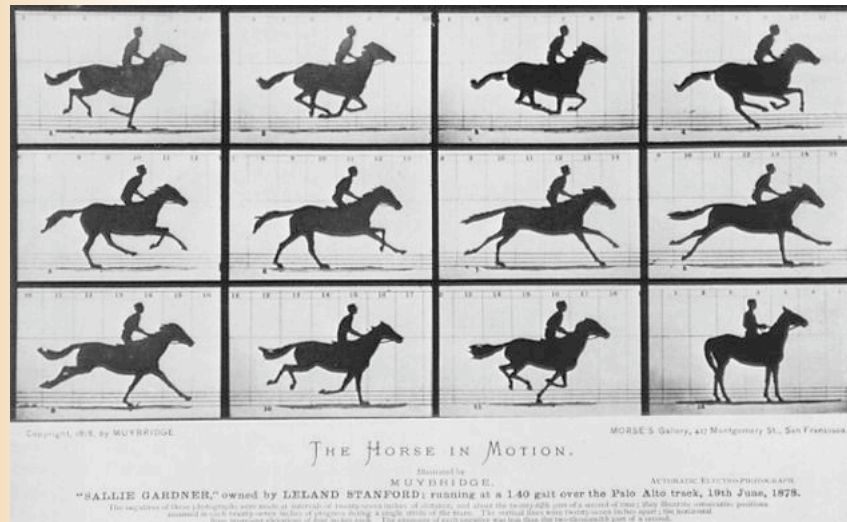
We had images



Cave Chauvet-Pont-D'Arc
© Jean Clottes

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Visual (moving images)



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Visual (moving images)



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Application “generations”

- Personal computers
 - spreadsheet
 - word processor
- Web
 - browser
 - “Google”
 - link-based search algorithms
- Web 2.0
 - blogs
 - facebook
 - (linked data)

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Why can't “we” design new technology?

- users
 - unable to see beyond current technology
- technologists
 - busy developing incremental, complex technology
 - new technology enables new/unpredictable functionality
 - don't know how to talk users about their real needs
- interface designers
 - new solutions close to existing solutions
- (new media) artists
 - “random” exploration of interaction space – driven by novel/creative but not “useful”

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What is the Web of Data?


- linked data – data from your database(s)
- URIs, possibly identifying media fragments
- + annotations (tags)
- + links among fragments & annotations

E-Culture MultimedialN cultural heritage search

search annotate login English

local view display cell format

Geisha uit het Gion-district
http://e-culture.multimedialn.nl/mw/1160



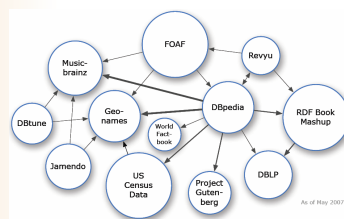
Een geisha houdt bij het lopen haar lange kimono iets op om deze minder over de grond te laten slapen. De grijze overkimono heeft een patroon van rozen in het water waarop pijlbomen en kersebloemen groeien en is afgezet met een brede zoom waarop gestileerde bloemmotieven zijn ingeweven. Deze wordt bijengehouden door een brede zwarte obi met een ingeweven motief van kersebloemen. Zoals bij geisha uit Gion - het district waar ook Sesshu werkzaam was - is het gezicht van de geisha geheel niet gebakkerd. De lichte plompe figuur stemt overeen met het Kamigata-schoonheidsideaal.

| Property | Value | Source |
|----------|--|---|
| Date | • begin 19e eeuw | • rmy.objects.rdf |
| Location | • Rijksmuseum_Volkenkunde • Kyoto.Fu | • rmy.objects.rdf • rmy.saxon.annotations.rdf |
| Material | • zijde, ink en pigmenten | • rmy.links.material.rdf |
| Subject | • schilderkunst | • rmy.saxon.annotations.rdf |
| Title | • Geisha uit het Gion-district | • rmy.objects.rdf |
| Type | • netschilderingen • netschildering: kakigiku | • rmy.saxon.annotations.rdf • rmy.links.object.rdf |

links
• full view
• annotate

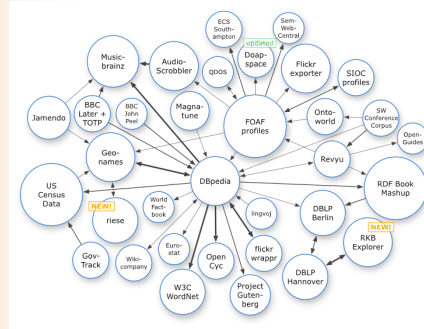
How much linked data is there?

May 2007



Credit: Chris Bizer

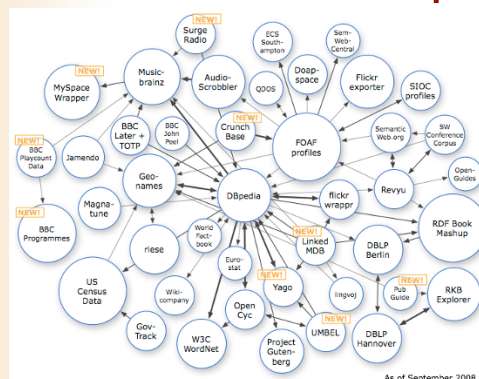
Linked data cloud March 2008



Credit: Richard Cyganiak

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Linked data cloud September 2008

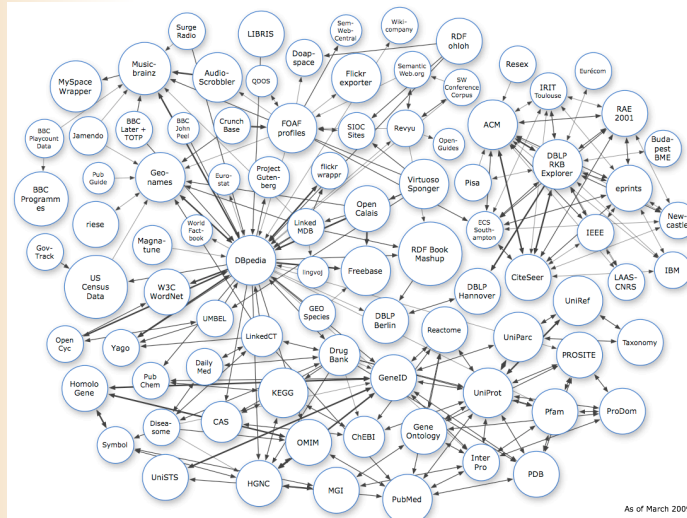


As of September 2008

http://www4.wiwiw.fu-berlin.de/bizer/pub/lod-datasets_2008-09-18.png

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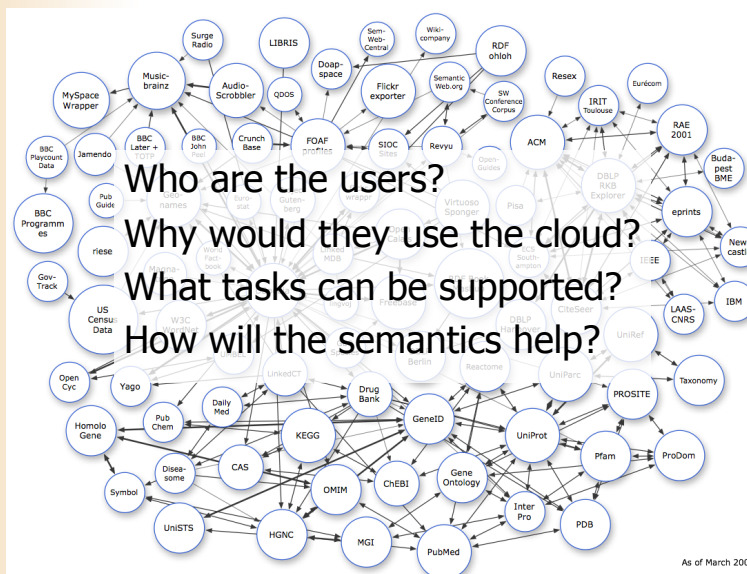
Linked data cloud March 2009



> 4.5 billion RDF triples, interlinked by around 180 million RDF links

http://www4.wiwiss.fu-berlin.de/bizer/pub/lod-datasets_2009-03-05.png

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Who are the users?

Why would they use the cloud?

What tasks can be supported?

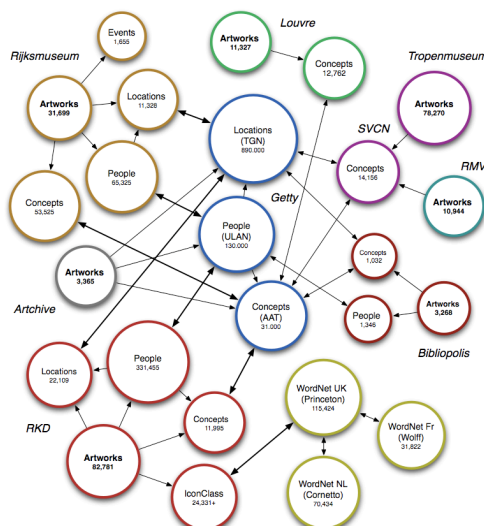
How will the semantics help?

How can semantics help with interactive information access?

- Query construction
 - disambiguate input
 - selection of available terms
- (Semantic) search algorithm
 - graph traversal
 - query expansion
 - RDFS/OWL reasoning
- Presentation of search results
 - grouping by property
 - visualization on timeline, map

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Data sets in E-Culture demo



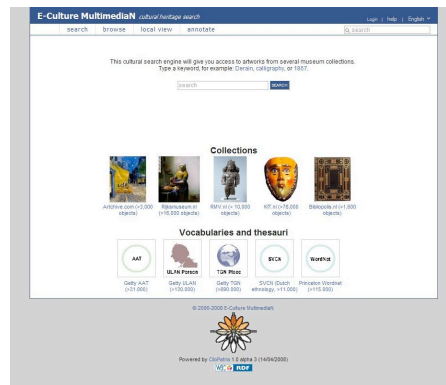
<http://e-culture.multimedien.nl/resources/datacloud/>

© Michael Hildebrand
<http://e-culture.multimedien.nl/>

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Browsing annotated collections of cultural heritage artefacts

- Who: Those interested in cultural heritage
- Why: Exploring artefacts available in repository
- What: Search combined collections
- How: autocompletion to suggest topics, organise results



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Use of linked data in E-Culture demo

- Query construction
 - auto-completion uses strings found in “data” and “concepts”
 - suggestions are grouped and ordered using links among items
- Result set
 - uses empirical balance between “closeness” to search string and non-intuitive path
- Result presentation
 - uses grouping of result set to show breadth of results
 - uses no particular ordering within each group

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Subject Annotation

The execution of Johan van Oldenbarnevelt



RP-P-OB-77.320

A print that depicts the beheading of

Who: Professional annotators
 Why: Subject matter annotation of 700.000 prints
 What: Search in multiple thesauri for annotation terms
 How: Autocompletion on who/what/where/when

Who Historical persons

 Oldenbarnevelt, Johan van x

What Iconclass/WordNet (en), events (nl)

 beheading x

Where Name of place or region

 Den Haag x

When Date, year or period

E-Culture Multimedial Rijksmuseum PrentenKabinet Online Login | help | English

search browse local view **annotate**

annotate: Veroordeling van Johan van Oldenbarnevelt



RP-P-OB-77.320

Blad met een voorstelling van de onthoofding van Johan van Oldenbarnevelt op het Binnenhof te 's-Gravenhage op 13 mei 1619. Gezicht op het plein met alle omringende gebouwen en het verzamelde publiek. In de toren linksboven het hof van prins Maurits. Om de voorstelling van de onthoofding staan de portretten van de zes andere veroordeelden, een scène met de kist van Van Ledenberg aan de galg en een gezicht op het kasteel Loevestein.

Who Historical persons
person

What Iconclass (en), WordNet (en), events (nl)
(mythological) concept, object or event

Where Name of place or region
geographical place

When Date, year or period
enter date

done | cancel

<http://e-culture.multimedial.nl/pk/annotate>

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Use of linked data in annotation task

- Query construction
 - auto-completion compares string in query with terms in thesauri
- Result set (the set of terms used to construct the menu)
 - terms that contain the string
- Result presentation (in the selection menu)
 - uses grouping of results depending on entry field
 - ordering also dependent on entry field
 - presentation of additional information differs per thesaurus and annotation field

Michiel Hildebrand, Jacco van Ossenbruggen, Lynda Hardman and Geertje Jacobs. Supporting subject matter annotation using heterogeneous thesauri, a user study in web data reuse. IJHCS in print.

<http://ftp.cwi.nl/CWIreports/INS/INS-E0902.pdf>

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Study of information use by cultural heritage experts

Understand the cultural heritage experts' information seeking needs.

- Why do cultural heritage expert search?
- What are the typical experts' search task?
- What sources do they use?

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Why do CH experts search?

- **Object handling:** restoration, acquisition, or loan
- **Exhibition:** finding themes, comparison studies
- **Publication:** for peers or for general public
- **Managing collections' documentation:** updating records
- **Building thesauri:** used for annotation and search

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Key Findings

1. Information gathering as primary task
2. Searching in multiple sources
3. Communication with other experts
4. Provenance and trust

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Prototype comparison search – bar chart

The screenshot displays the LISA e-culture multimedion.nl search interface. The top navigation bar includes the LISA logo, the URL 'e-culture.multimedion.nl', and links for 'SEARCH, SELECT, COMPARE', 'HOME', 'TUTORIAL', and 'FEEDBACK'.

SEARCH SECTION:

- Search for: ☒ object ☐ person ☐ all
- Filter by: collection subject
- SEARCH button

SEARCH RESULT SECTION:

- 15 objects found in 2 categories from 1 collections. [select all](#)
- Drag an entry or a category to the selection areas (either Set A or Set B).
- Three object thumbnails are shown: 'Brandmeiders...' (2644-12), 'masker voor leeuw...' (3909-2A), and 'Masker met balspel...' (4658-1).

COMPARE SECTION:

- Navigation: LIST | BAR | GRAPH | MAP
- Bar chart visualization showing counts for various materials: bamboo (5), feather (10), horn (13), leather (7), leaves (6), paper (11), wood (17), and bamboo (5), feather (7), horn (6), leather (4), leaves (16), paper (9), wood (8).
- Navigation tabs: culture, date creation, **material**, location, subject

OPTION SECTION:

- SET A | SET B | PAIR
- PROPERTY | **VALUE**
- Property: location
- Location list: Europe, The Netherlands (Amsterdam, Utrecht, Maastricht, Den Haag), France (Paris, Strassburg), Germany (Berlin, Bonn, Frankfurt)

SET A and SET B:

- SET A (4 objects): Mask costume... (2652-10), Wooden mask worn... (1772-2315), Wooden mask worn... (137-607)
- SET B (6 objects): Brandmeiders... (2644-12), masker voor leeuw... (3909-2A), Masker met balspel... (4658-1)

<http://e-culture.multimedion.nl/lisa/session/compsearch/tutorial>

Prototype comparison search - map

The screenshot displays the LISA eCulture multimedia application interface. The top navigation bar includes the LISA logo, the URL 'eculture.multimedia.nl', and links for 'SEARCH, SELECT, COMPARE', 'HOME', 'TUTORIAL', and 'FEEDBACK'.

SEARCH SECTION:

- Search for object, person or anything. Select property and specify value. Add more filter by clicking the [+] icon.
- Search for: ☒ object ☐ person ☐ all
- Filter by: collection subject

SEARCH RESULT:

16 objects found in 2 categories from 1 collections.

Drag an entry or a category to the selection areas (either Set A or Set B).

COMPARE SECTION:

A world map shows the geographical distribution of objects. Below the map, two selection areas are shown:

- SET A (4 objects):**
 - Mask costume... 2662-10
 - Wooden mask worn... 1772-2315
 - Wooden mask worn... 137-657
- SET B (6 objects):**
 - Brandmeiders... 2644-12
 - masker voor leeuw... 3909-2A
 - Masker met balspel... 4565-1

Conclusions

- Build specific application
- Determine information need
- Select data sources for task
- Ensure access to provenance information without being intrusive
 - remember hyperlink markers 20 years ago?
- Investigating re-usable interface components
 - autocompletion

What does this mean?

- Are there new tasks?
- What kind of new?
- Can we identify them before they emerge?
- Can we help to form them, by helping users think out of the box in (higher-level) tasks they *really* want to carry out
 - Alia Amin et al., Interact 2009 ""Fancy a drink in Canary Wharf?": a user study on location-based mobile search"

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Overall conclusions

- Linked data is already here
- Be aware of the context in which the technology or interface is being developed
- Remember that users are human
 - but that computers aren't ☺
- Watch Kevin Kelly:

http://www.ted.com/index.php/talks/kevin_kelly_on_the_next_5_000_days_of_the_web.html

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What next?

- Identify user tasks
 - work with Frank & Abdo on communicating experiences on mobile devices
 - (Vanessa) (methods to identify tasks)
- Understand more about data
 - Explore “semantic gap” with Cees Snoek (what do we want to extract from images/videos)
- Develop HCI methods to inform direction of technology development

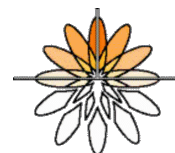
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<http://e-culture.multimedien.nl/>



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