



Semantic Computing Research Group

Building a national Semantic Web infrastructure with applications

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SeCo Mission and Focus

- Mission
 - **Making computers and the Web more intelligent and interoperable!**

- Main focus (thus far)
 - **Semantic Web, Linked Data**
 - **Applied Research**

Personal Background

Some Personal History: TKK

- 1981 TKK Digital Systems Laboratory
 - Graph Grammar's
 - Artificial Intelligence
 - Natural Language Understanding
- 1984
 - Organized First Finnish AI Symposium -> AI Boom
- 1986 TKK Systems Analysis Laboratory
 - Uncertainty in Artificial Intelligence

At VTT

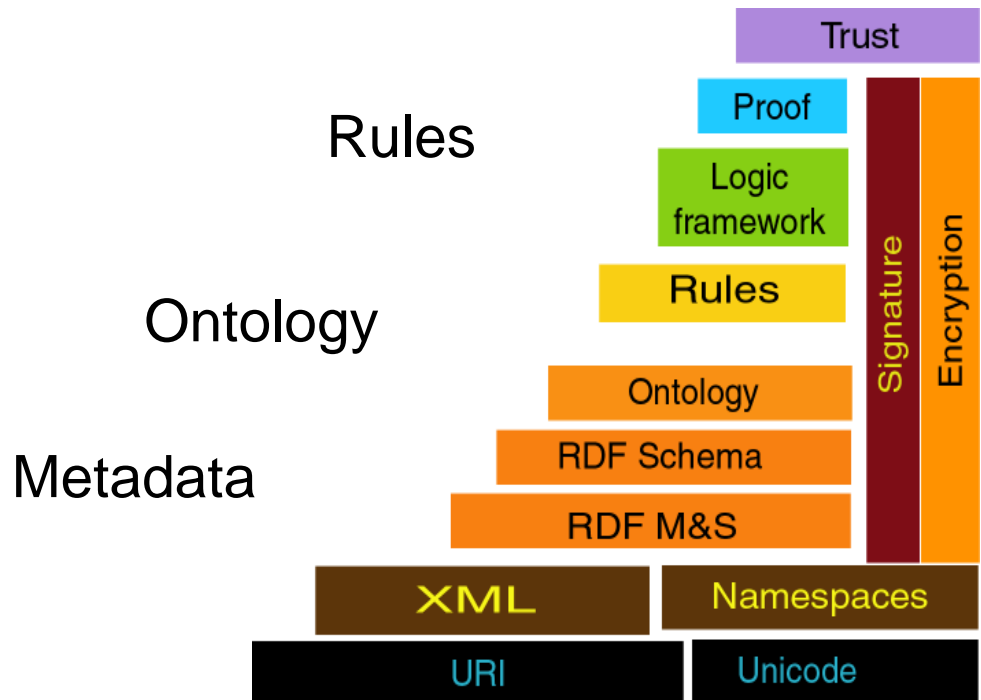
- 1988 VTT Information Technology
 - Knowledge Engineering
 - (Interval) Constraint Satisfaction & Reasoning
- 1989 ETL Japan
- 1997 VTT spin-off company Delisoft Ltd

University of Helsinki, TKK, and Aalto

- 1999 University of Helsinki
 - Prof. of Computer Science
- 2001 Semantic Web Kick-off in Finland -> Semantic Web Boom
 - New directions: Semantic Computing and Web
- 2005 TKK, Laboratory of Media Technology
 - Prof. of Media Technology
- 2010 Aalto University, Dept. of Media Technology
- 2015 Aalto University, Dept. of Computer Science

Semantic Web, Linked (Open) Data

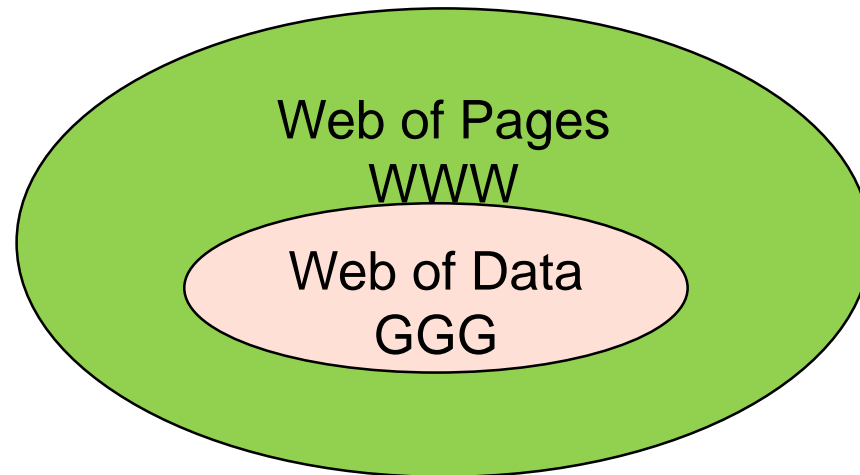
Semantic Web – Megatrend in WWW



(Tim Berners-Lee, initial layer cake model)

Semantic Web = Web of Data + Web of Pages

- Web of Pages (for humans)
 - WWW World Wide Web
- Web of Data (for machines)
 - GGG Giant Global Graph
 - **Google:** "Knowledge Graph"
 - **Microsoft:** "Satori"



RDF(S) Graph Example

S subClassOf (rdfs:subClassOf)
 R domain (rdfs:domain)
 D range (rdfs:range)
 T instanceOf (rdf:type)

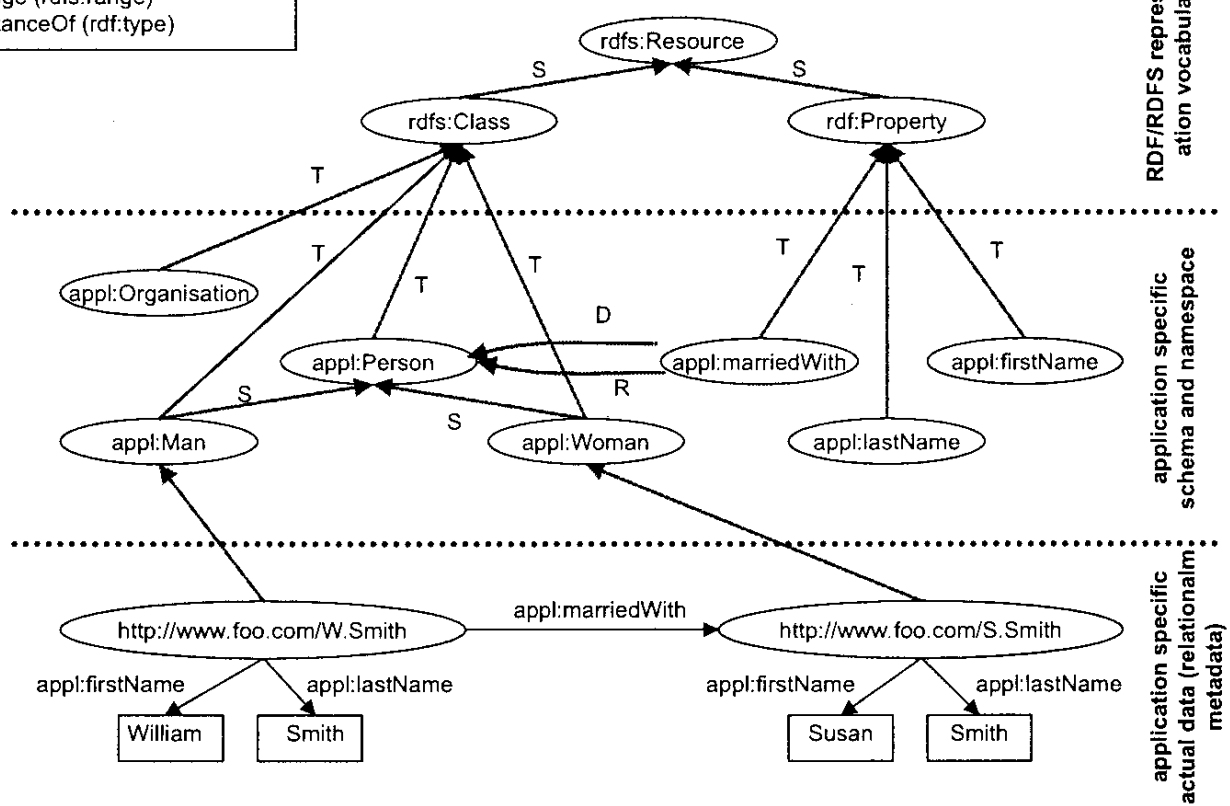
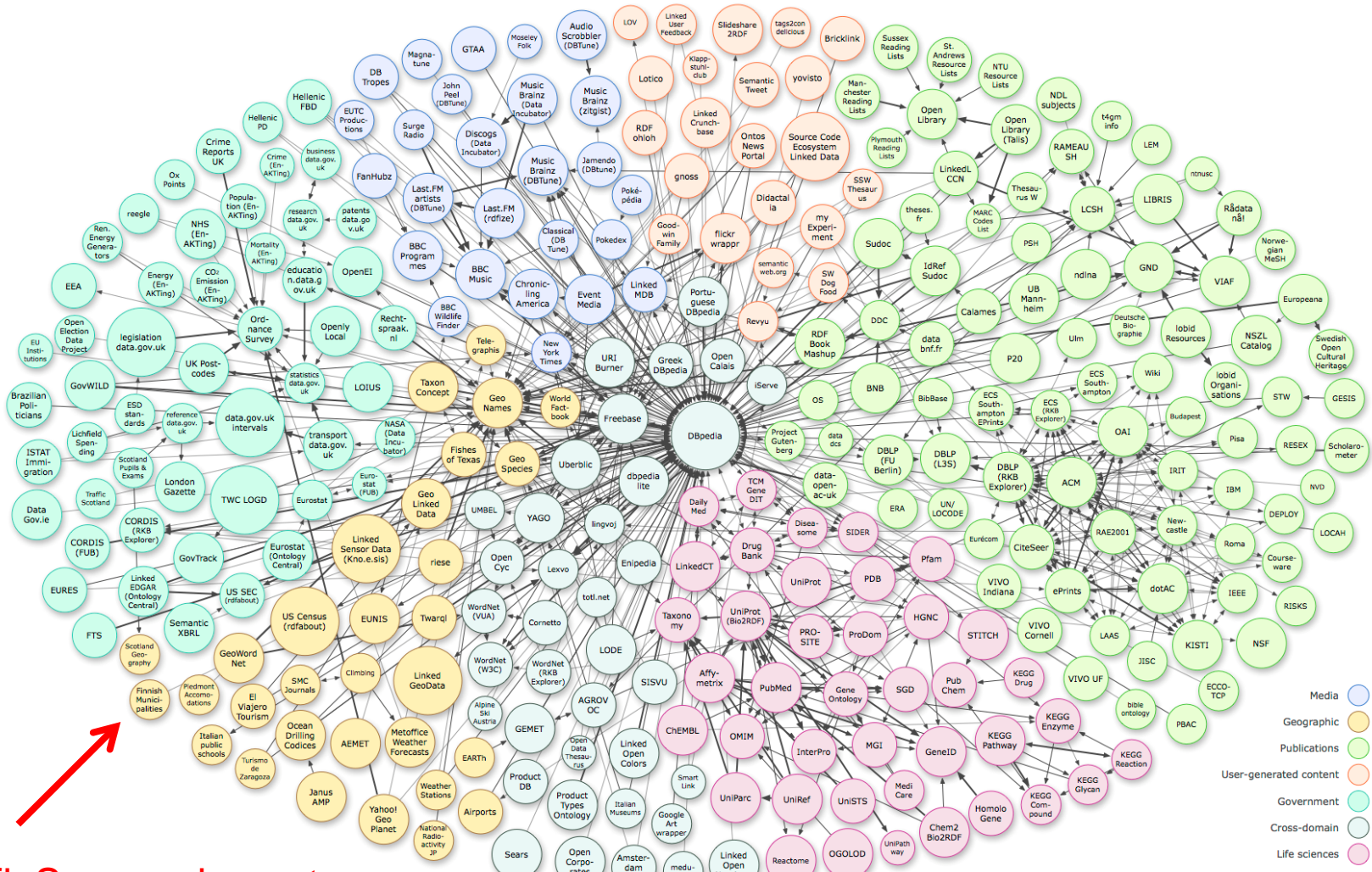


Figure 3.4. An RDF-Schema Example

(Maedche, 2002)

Linked Open Data Cloud 2011:

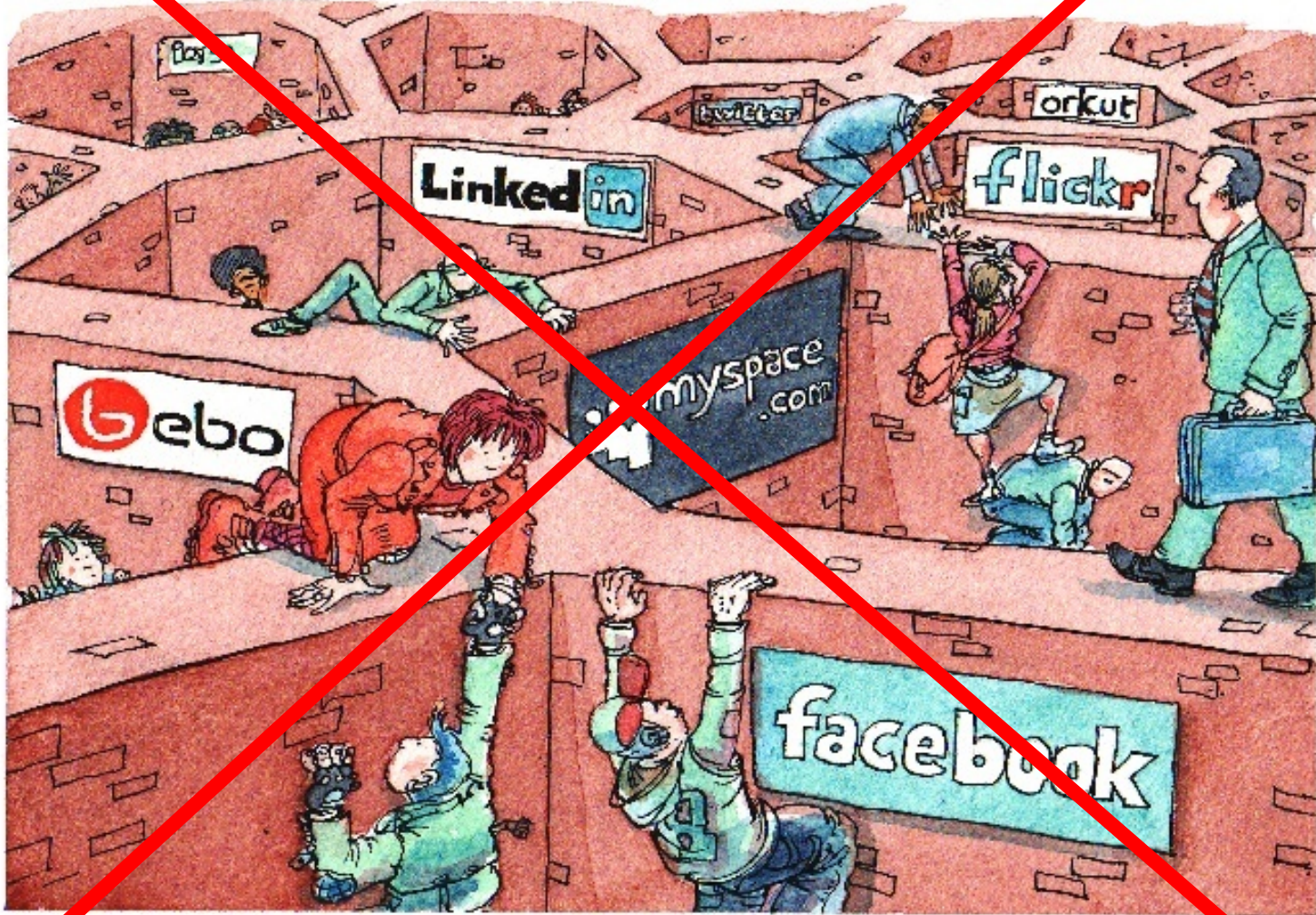
<http://linkeddata.org>



onki.fi: Suomen kunnat

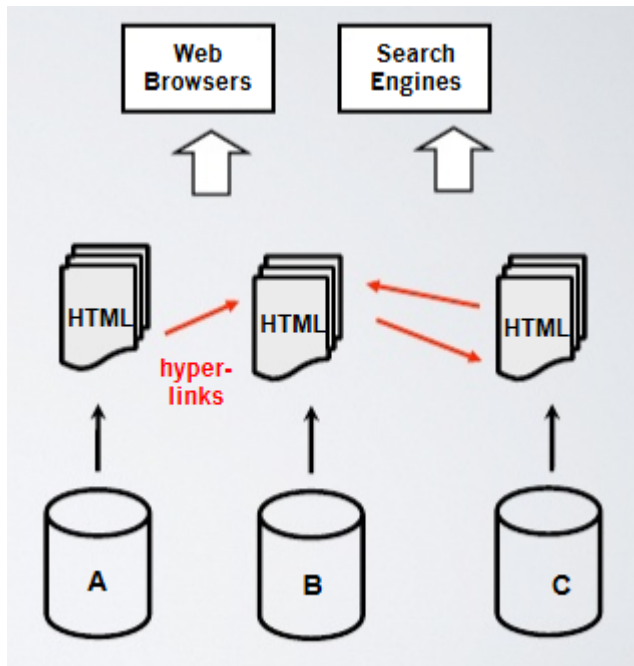


Goals: Interoperability + Intelligent Systems



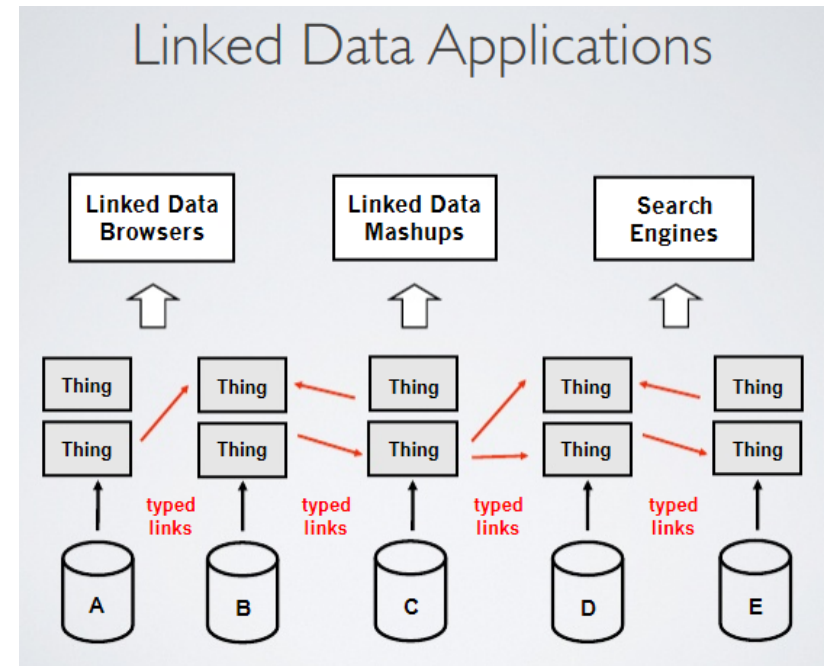
WWW vs. GGG Applications

WWW



(Anja Jentzsch, 2012)

GGG



(Anja Jentzsch, 2012)

- **Linked Open Data**

- "Yhdistetty avoin tieto" (fi)
- Simple/practical web of open data
- Based of W3C standards & practices, especially RDF

- **\supseteq Linked Data = Web of Data**

- Includes also closed data

- **\supseteq Semantic Web**

- Includes complex semantics and artificial intelligence

Trends: Open Data



Trends

Verkkohaku - Hakumäärät: **open data**. Koko maailma, 2004 - nykyhetki.



Tutustu trendeihin

Suosittut haut

Hakutermit

open data

+ Lisää termi

► Muut vertailut

Rajoitus

Verkkohaku

Koko maailma

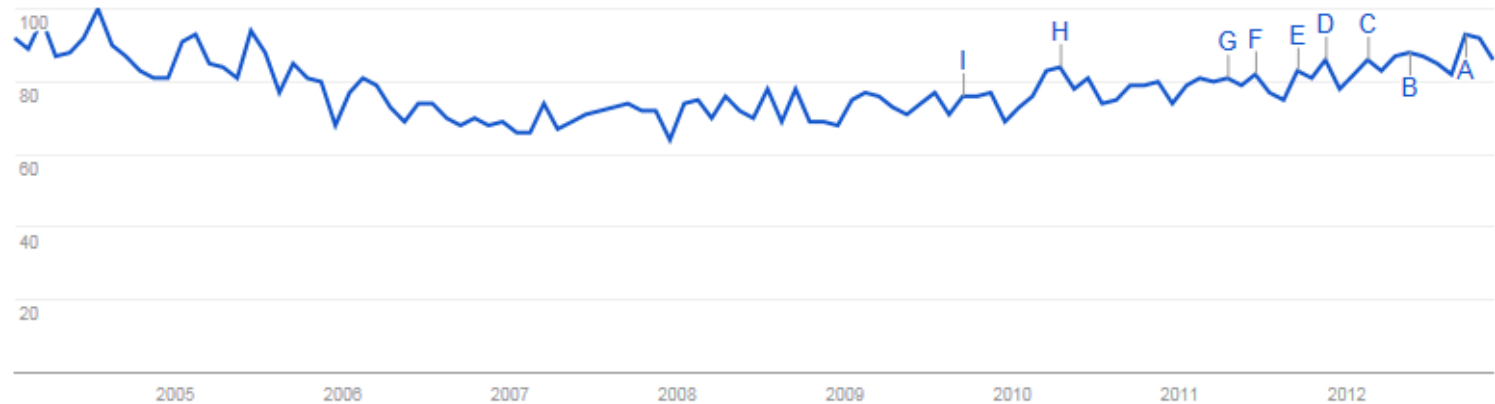
2004 -
nykyhetki

Kaikki luokat

Hakumäärät ajan mittaan

Luku 100 edustaa suurinta hakumäärää

Uutisotsikot Ennuste



Upota

Hakumäärät maantieteellisesti



Aiheeseen liittyvät termit

Suosituim..

Kasuvat

Trends: Linked Open Data



Trends

Verkkohaku - Hakumäärät: **linked open data**. Koko maailma, 2004 - nykyhetki.



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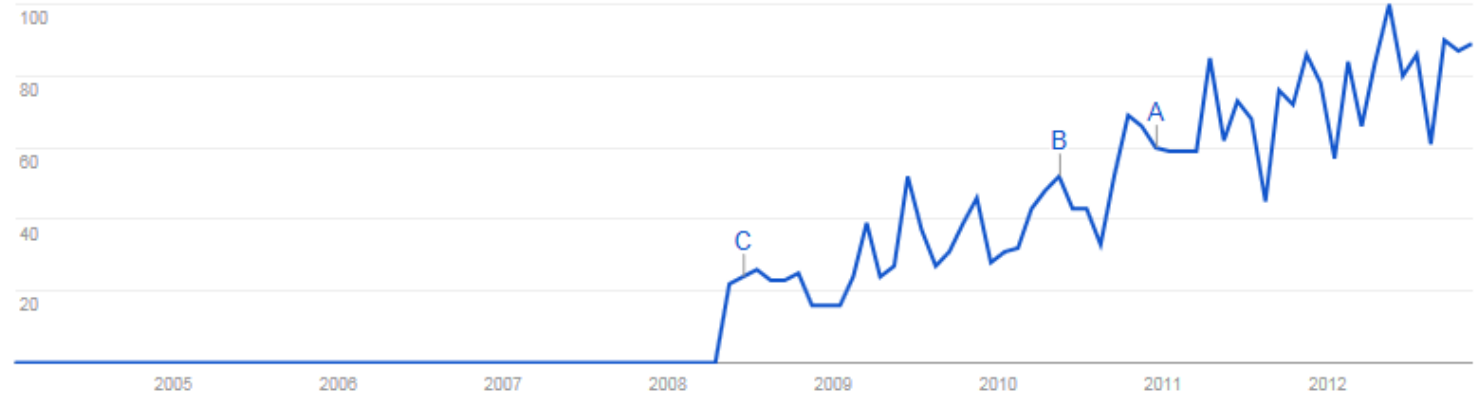
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Suosituim..

Kasvavat

Research and Application Setting

Challenges: Content Complexity & Production

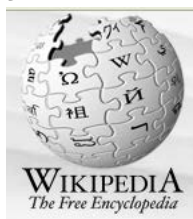
Problem 1: Content Complexity - Heterogenous and Interlinked

Artifacts

Maps

Videos

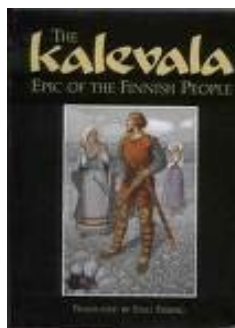
Encyclopedia



Narratives

Literature

Buildings



Music

Cultural sites

Gallen-Kallela, Akseli (1865 - 1931)

taidemaalari



Akseli Gallen-Kallela kuuluu Suo kuvataiteilijoihin. Ennen kaikkea suomalaiskansallisen taiteen ur. kehittäjä; kansallisromantiikkaks tyylil oli ennen kaikkea hänen lu. yleisölle Gallen-Kallela tuli tunne kansallisten merkkiteosten, Kak veljeksen, kuvittajana. Modernir enää 1920-luvulla arvostaneet t myöhemmin on ihailtu erityises monipuolisuuttaan. Hän oli myö taidekäsityön edelläkävijä, joka i



Fine arts

Biographies

Problem 2: Content Production System - Distributed and Independent

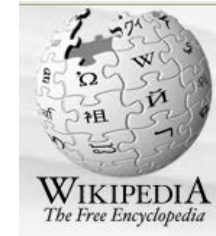
Land survey



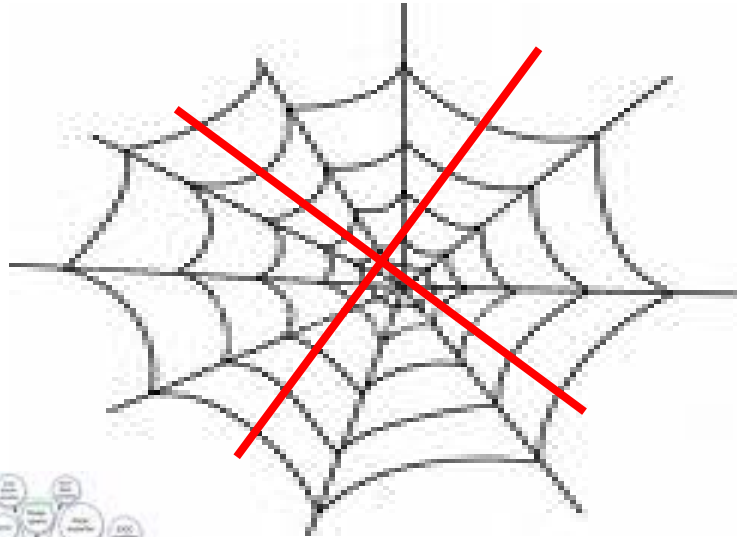
Museums



Web 2.0 sites



Archives



Media



Linked Data



Citizens



Libraries

Solution Approach of SeCo: the Semantic Web 2.0

Semantic Portal

Land survey

Museums

Content Providers

Web 2.0 sites

Semantic Metadata

FinnONTO
Ontology
Infrastructure

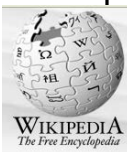
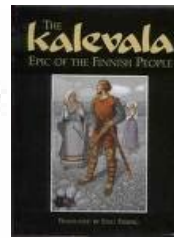
Archives

Media

Linked Data
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Citizens

Libraries
SeCo
SEMANTIC COMPUTING



Local and Global Content Creation

7.2.1 TRANSFORMATION PROCESS

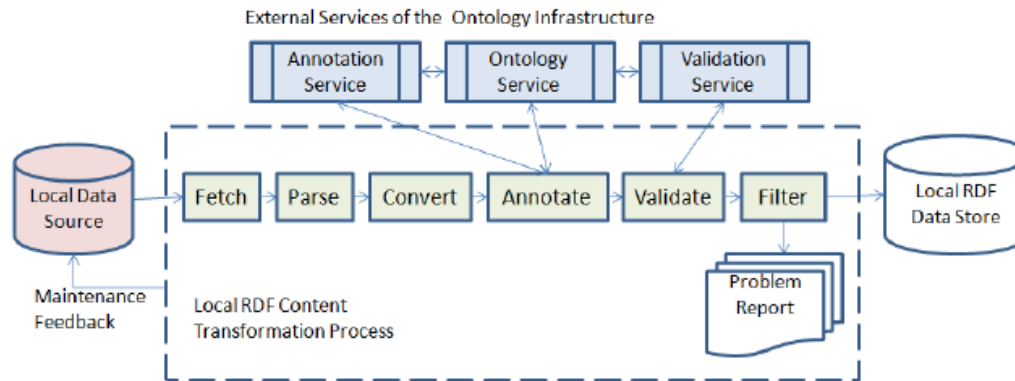


Figure 7.3: RDF content creation process for a local data source.

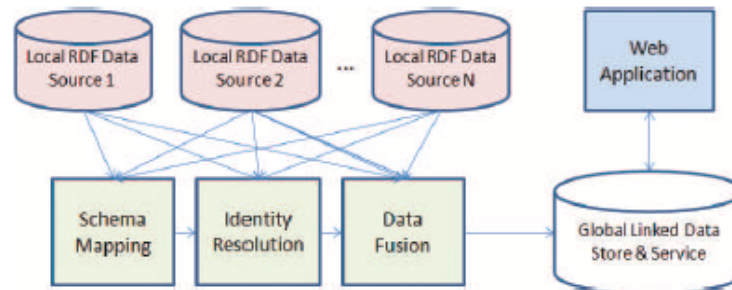


Figure 7.4: Global data aggregation of local RDF data sources.

(Hyvönen, 2012)

2003-2012

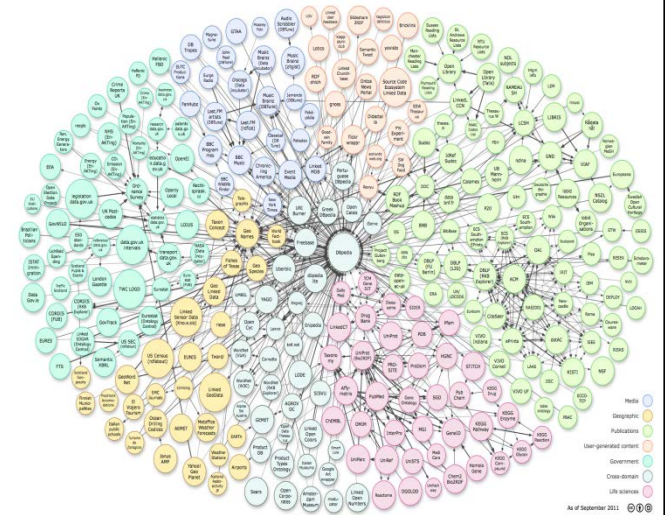


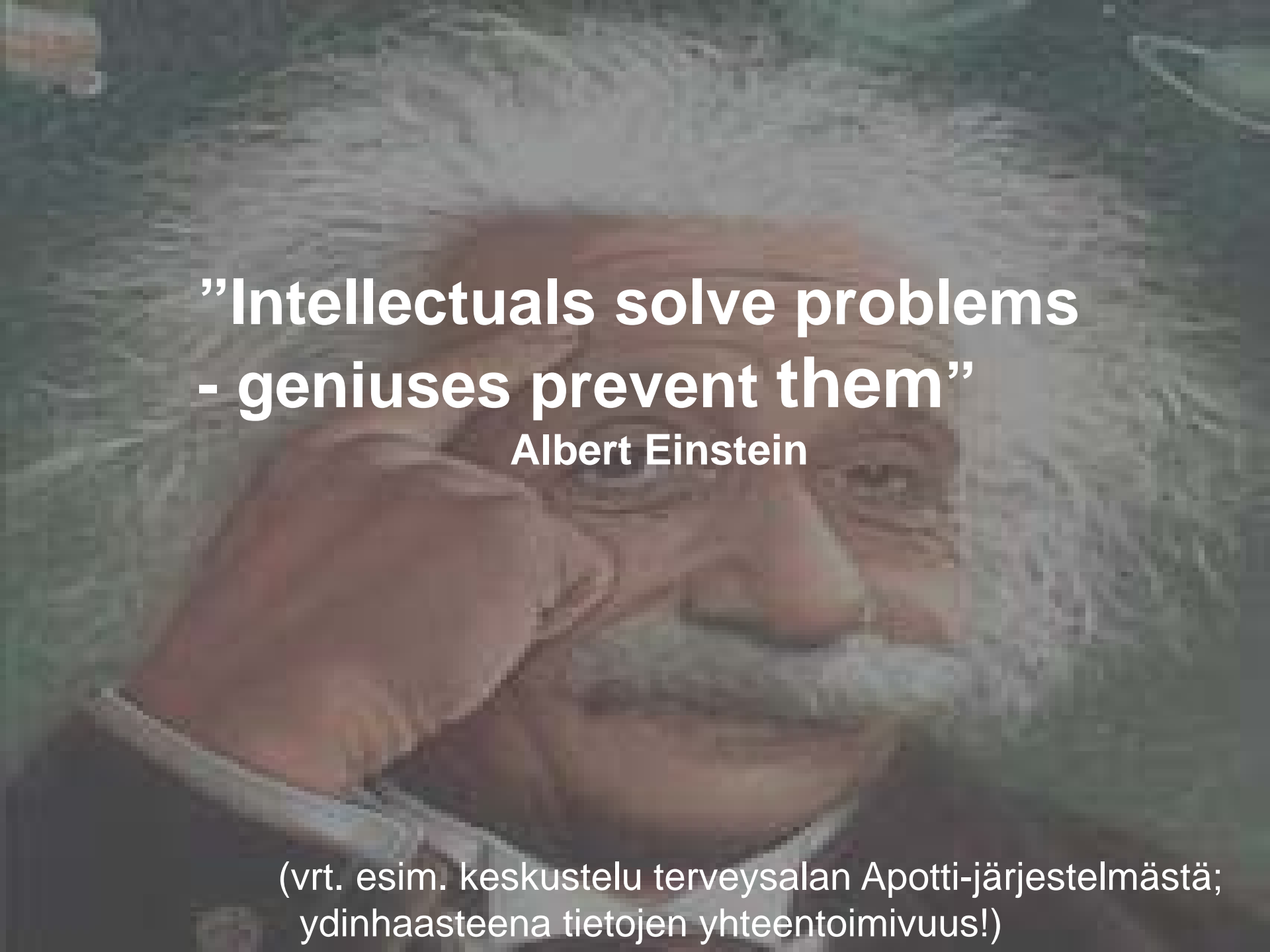
Finland needs a national Semantic Web Infrastructure!

Traditional "network infras" Electricity-, roads, railways, tele



Networks of concepts and data on the Semantic Web





**”Intellectuals solve problems
- geniuses prevent them”**

Albert Einstein

(vrt. esim. keskustelu terveystieteen Apotti-järjestelmästä;
ydinhaasteena tietojen yhteentoimivuus!)

FinnONTO Infrastructure: Prototype of National Ontology System KOKO



Figure 7.2: FinnONTO system of vertical ontologies sharing a horizontal top ontology.

Name of the ontology	Number of concepts	Domain
YSO	24 800	General upper ontology
MAO	6 800	Museum artifacts
MUSO	1 000	Music
TAO	3 000	Design
TERO	6 500	Health
VALO	2 000	Photography
AFO	7 000	Agriculture
JUHO	6 300	Government
KAUNO	5 000	Literature
KTO	900	Linguistics
KITO	850	Literary research
KULO	1 500	Cultural research
LITO	3 000	Economics
MERO	1 300	Seafaring
PUHO	2 000	Military

Table 1. The ontologies comprising the LOO cloud KOKO of FinnONTO

FinnONTO Infrastructure: ONKI Ontology Library Service <http://onki.fi>

- Centralized ontology publication for humans and machines as services

The image shows a composite of two screenshots. The left screenshot is the ONKI website homepage, featuring a navigation menu with 'Ontologies and vocabularies', 'Schema library', and 'Data library'. A central banner reads 'Welcome to the Finnish Ontology Library Service ONKI!' and provides a brief description of the service. Below this, there are sections for 'Ontologies and vocabularies' with a search box and a 'Beta services' section highlighting the 'Data library' and 'Schema library'.

The right screenshot is a browser window titled 'ONKI-Palkka search - Mozilla Firefox' showing a search interface. The search results are displayed in a table with columns for 'name language', 'place type', 'time', and 'area'. A map of Finland is overlaid on the right side of the search results, with a red polygon highlighting a specific region. The map interface includes controls for zooming and switching between 'MAP', 'SATELLITE', and 'HYBRID' views.

name language	place type	time	area
(13)			
pa, Kittilä (rakennus)			
ari (kohouma)			
is (kohouma)			
ari (rakennus)			

Beta services

The following ONKI services have been released, yet their content is being developed mostly during the project following FinnONTO 2.0.

- Data library**: Datasets published by FinnONTO projects in machine-readable formats (RDF and Linked Data) as well as API access using SPARQL.
- Schema library**: Metadata schema documentation as machine-readable schema descriptions for systems created in the FinnONTO projects.

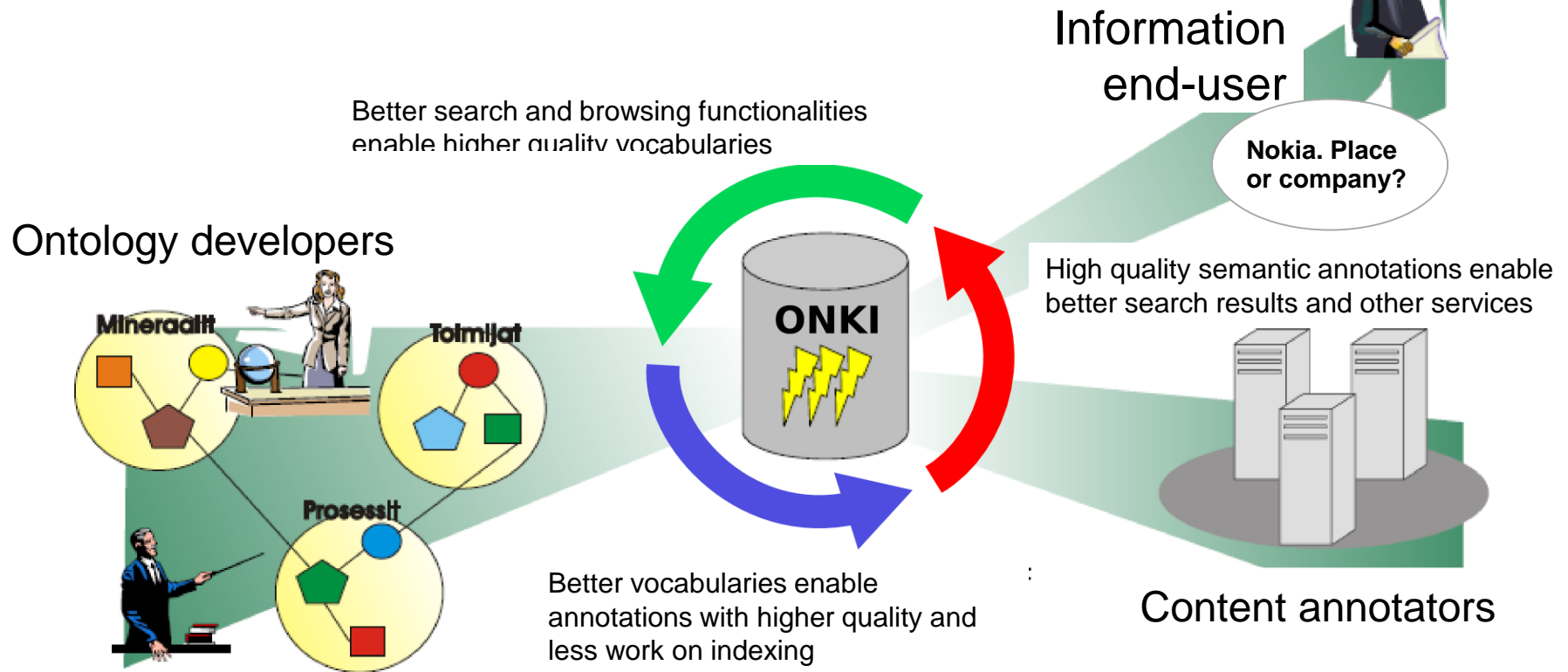
type	
Eriksen 27	Parissaa, Napoleoni (Italian painter, 1854-after 1884)
	Potev (Brazilian engraver, born 1924)
	Prinsok, Giuseppe (Italian photographer, 1851-1927)
	Sarovey, Napoleon (Canadian photographer, 1821-1896, active in Great Britain)

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SeCo
SEMANTIC COMPUTING

What is ONKI?

ONKI Users & Interest Groups



Supporters of the national semantic web infrastructure
Companies, government, EU, ...

Collaborative Ontology Development Process in KOKO

Ontology Integration Phase

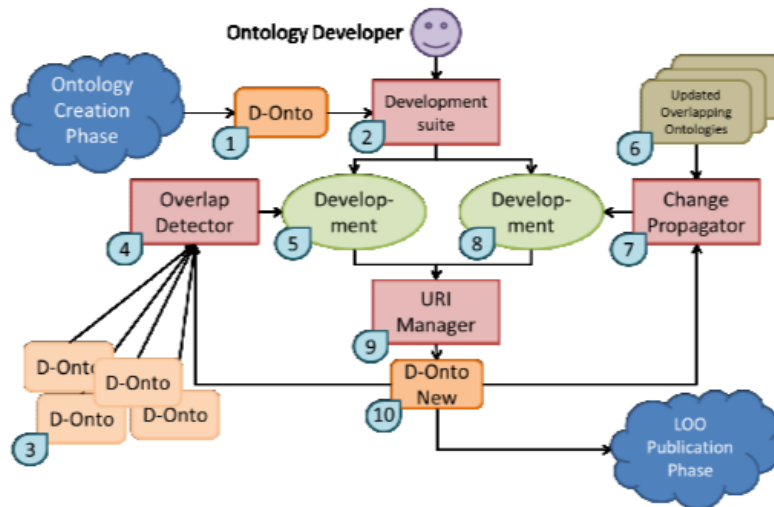


Fig. 1. Cloud Phase

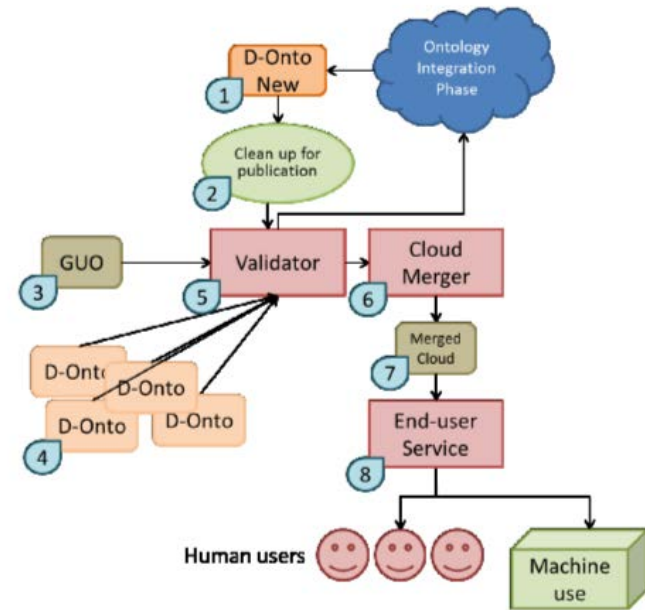
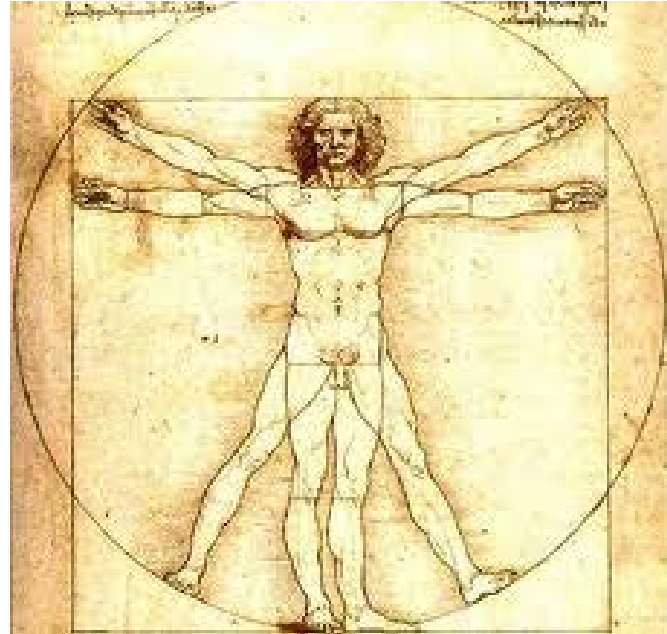


Fig. 2. LOO Publication Phase

(Frosterus et al., 2013)

Application Demonstrator Domains

- Cultural heritage
- Health
- Media
- Government
- Science
- Learning
- Industry
- Defence
- ...



FinnONTO Approach: Preventing Problems in Advance by Collaboration

- Sharing **Ontologies**
 - Creating a Library Service of Mutually Interoperable Vocabularies/Ontologies
- Sharing harmonized **Metadata Schemas**
- Sharing **Linked Open Data**

[Hyvönen et al., ICSC 2007, ESWC 2009, JSW 2010, ...]

Methodology and Examples of Research

Methological Perspectives to SeCo Research: Topics of collaboration?

- Logic and Reasoning
 - Description logics, logic programming, ...
- Ontology Modeling and Engineering
- Uncertainty in Ontologies
 - » Probabilistic methods (e.g., Bayesian nets)
 - » Fuzzy sets and logic
- Spatio-temporal Ontologies
- Interface Design
- Natural Language Processing
 - Automatic annotation: NER, relation extraction, event extraction, ...

- Metadata Models and Schemas
- Data and Ontology Alignment (Linking/Mapping)
- Information Retrieval
 - Semantic search, recommending, query expansion, ...
- Statistics and Machine Learning
 - Latent Semantic Indexing, Automatic Classification, ...
- Knowledge Exploration, Knowledge Discovery, Visualization
 - Structural approach based on semantic nets
- Web technologies
 - HTML, XML, RDF(S), OWL, SPARQL, SWRL, SPIN, ...
 - Web Services, REST, Mash-ups
 - Development frameworks and tools

Logic-based Recommending and Linking



(Viljanen et al.)

```
related_by_event (Subject, Target, Explanation) :-
    isArtifact (Subject),
```

Find all (transitive) item type classes for the subject:

```
rdfl (Subject, ns: '#itemType', SubjectItemtype),
rdfs_transitive_subClassof (SubjectItemtype,
SubClassofSubjectItemtype),
```

Find all life events, e.g. weddings, that the item types above are related to:

```
rdfl (SubClassofSubjectItemtype,
ns: '#relatedToEvent', Event),
```

Find the (transitive) subclasses and the superclasses of the event:

```
{
rdfs_transitive_subClassof (Event, RelatedEvent)
;
rdfs_transitive_subClassof (RelatedEvent, Event)
}
```

Find any potential link target item type, which is related to the sub- or superclass of the event:

```
rdfl (TargetItemtype, ns: '#relatedToEvent',
RelatedEvent),
```

Find all (transitive) subclasses of the target item type found above:

```
rdfs_transitive_subClassof (
SuperClassofTargetItemtype, TargetItemtype),
```

To exclude uninteresting links, check that the subject item type is not the same (transitively) as the target type:

```
SuperClassofTargetItemtype \= SubjectItemtype,
not (rdfs_transitive_subClassof (
SuperClassofTargetItemtype, SubjectItemtype)),
not (rdfs_transitive_subClassof (
SubjectItemtype, SuperClassofTargetItemtype)),
```

Find all the artifact items related to the target type class found above. Check also, that the subject and target items are not equivalent:

```
rdfl (Target, ns: '#itemType',
SuperClassofTargetItemtype),
isArtifact (Target),
subject \= Target,
```

Finally, when a target link has been found, create the explanation based on the common event of the subject and target artifacts:

```
list_labels ([RelatedEvent], RelLabel),
Explanation = [commonResources (RelatedEvent),
label (fi:RelLabel)].
```

* (rule ends)

Examples of Uncertainty in Geo-ontologies

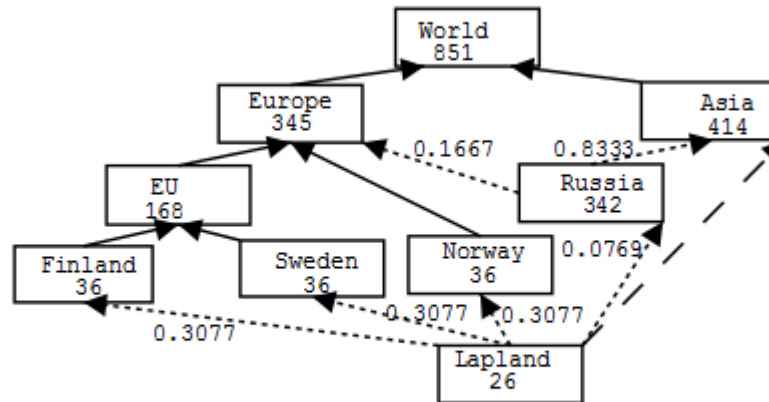
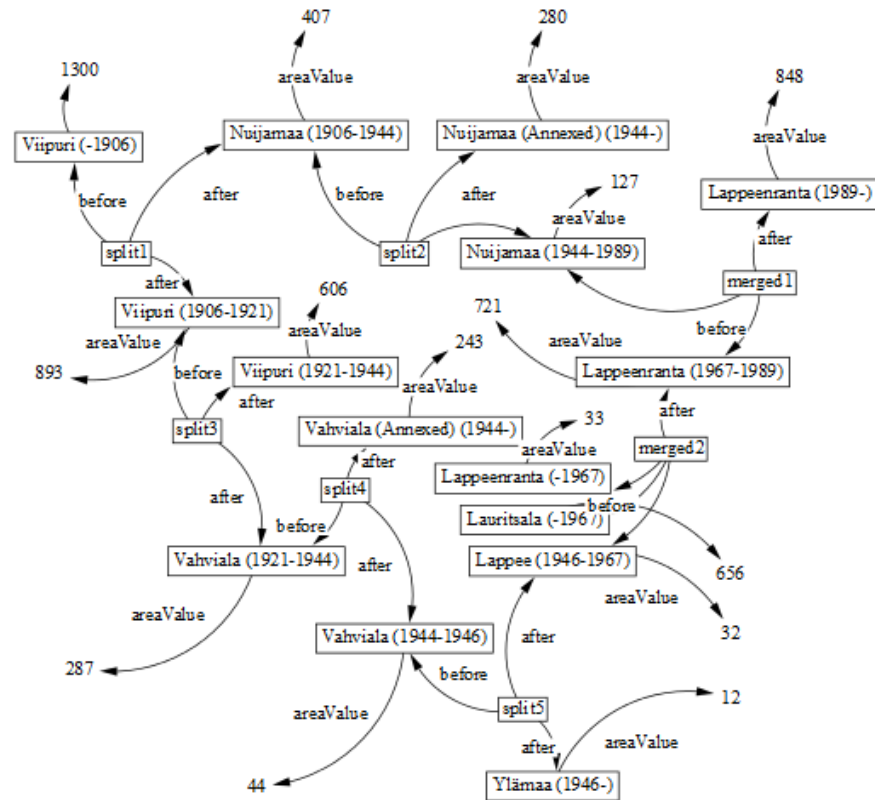
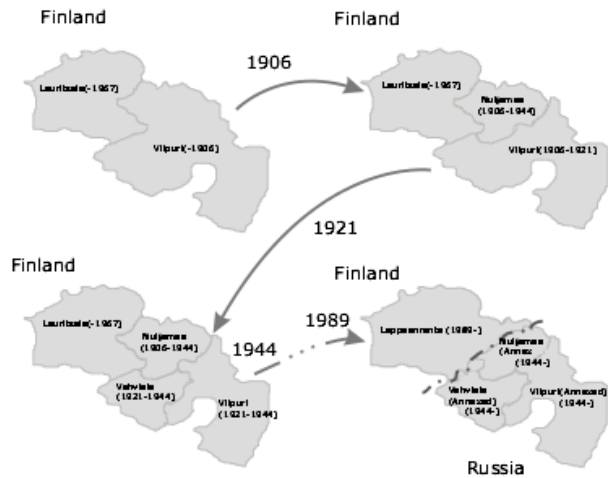


Fig. 4. The taxonomy corresponding to the Venn diagram of Fig. 1.

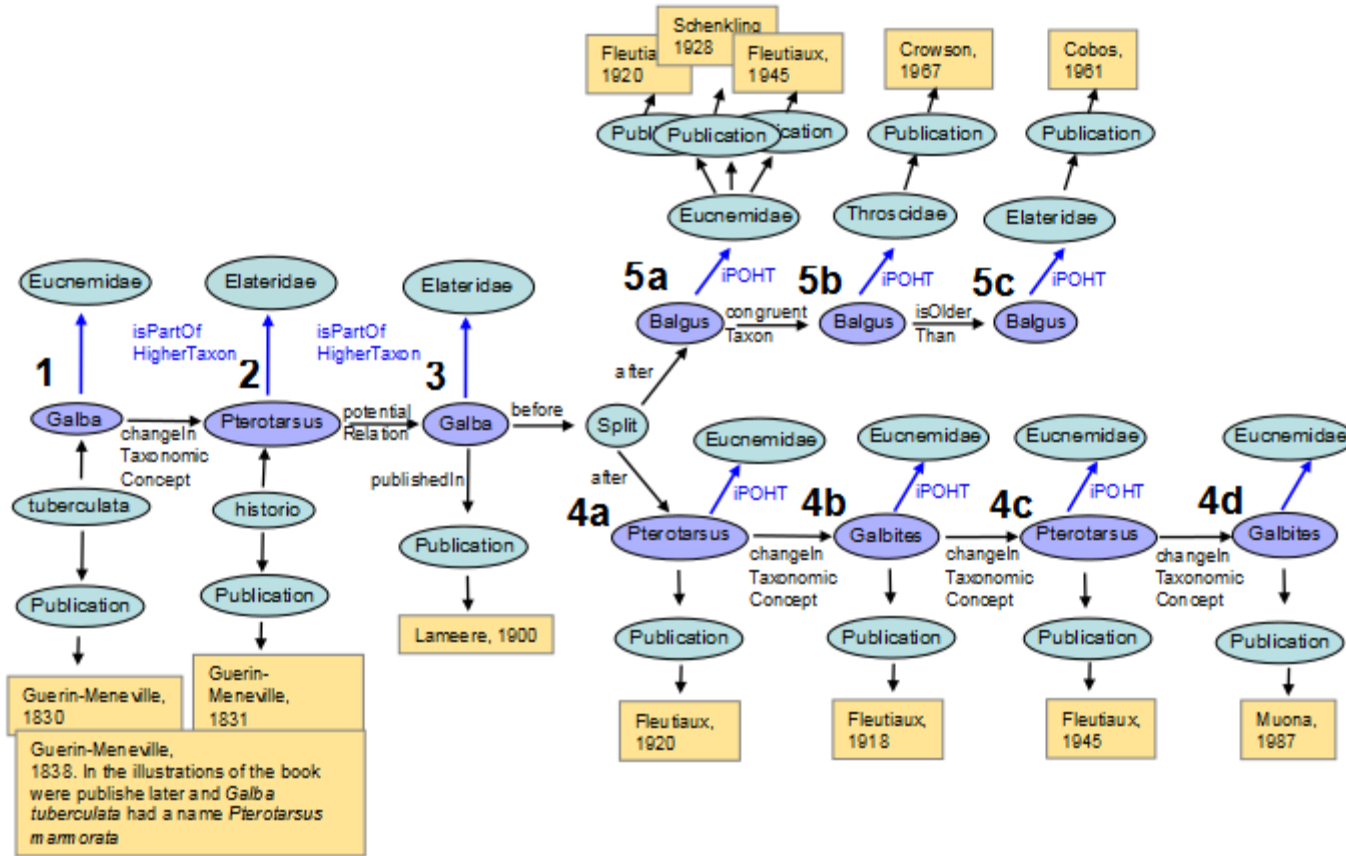
(Holi, Hyvönen)



(Kauppinen, Hyvönen)

Fig. 5. An example of chained change bridges. Each region is associated with a literal value for its area in square kilometers.

Biological Ontology Modeling: TaxMeOn Meta-ontology



(Tuominen et al.)

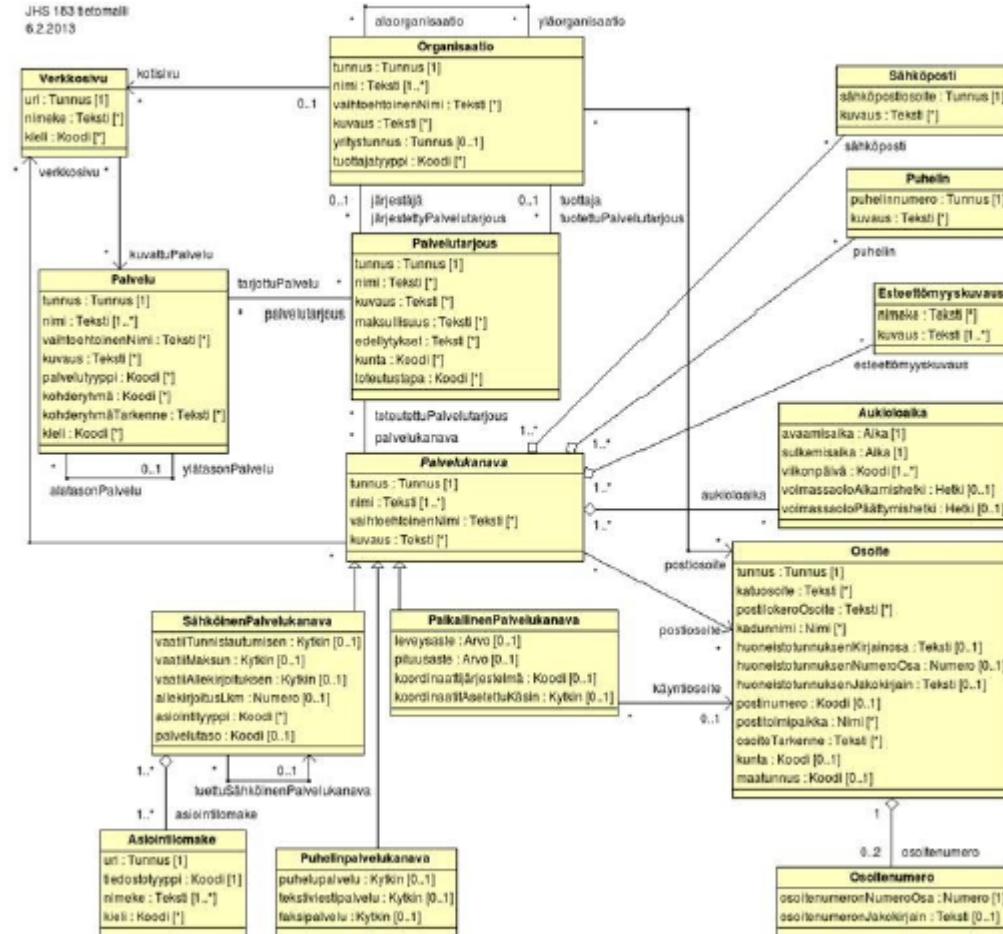


Taxon group	Region	Publ. years	# of taxa
Vascular plants	World	constantly updated	25726
Long-horn beetles (Coleoptera: Cerambycidae)	Scandinavia, Baltic countries	1939, 1960, 1979, 1992, 2004, 2010, 2010	205, 181, 247, 269, 300, 297, 1372
Butterflies and moths (Lepidoptera)	Scandinavia, North-West Russia, Estonia	1962, 1977, 1996, 2002, 2008	313, 256, 265, 4573, 12256, 3244, 3251, 3477
Thrips (Thysanoptera)	Finland	2008	219
Lacewings and scorpionflies (Neuroptera and Mecoptera)	Finland	2008	113
True bugs (Hemiptera)	Finland	2008	2690
Flies (Diptera: Brachycera)	Finland	2008	6373
Parasitic wasps (Hymenoptera: Ichneumoidae)	Finland	1995, 1999, 1999, 2000, 2003	282, 398, 919, 786, 733
Bees and wasps (Hymenoptera: Apoidea)	Finland	2010	1048
Mammals	World	2008	6062
Birds	World	2010	12125
False click beetles (Coleoptera: Eucnemidae)	Afrotropics	–	9 genera

Table 2. Datasets TaxMeOn has been applied to. Vascular plants are included in the name collection, the false click beetles are biological research results, and all other datasets are based on species lists.

Metadata Models: JHS 183 Recommendation for Representing Communal Services

JUHTA - Julkisen hallinnon tietohallinnon neuvottelukunta



Kuva 2 Palvelujen tietomalli

Linked Data Quality: Validating & Correcting SKOS Vocabularies

Name	Version	Publisher	Description	Conc	Coll	CS
STI Subjects	-	NASA	Subject classification of spacefaring terms	88	0	0
NYT Subjects	-	New York Times	Subject descriptors used in NY Times data	498	0	0
GBA Thesaurus	-	Geological Survey Austria	Thesaurus of geological terms	780	0	2
NYT Locations	-	New York Times	Geographical locations used in NY Times data	1920	0	0
IAU Thesaurus 1993 (IAUT93)	-	IVOA	Legacy astronomical thesaurus	2551	0	1
IVOA Thesaurus (IVOAT)	-	IVOA	Astronomical thesaurus	2890	0	1
GEMET	3.0	EIONET	Environmental thesaurus	5208	79	1
STW Thesaurus	8.08	ZBW	Economics thesaurus	6621	0	12
Schools Online Thesaurus (ScOT)	-	Education Services Australia	Terms used in Australian and New Zealand schools	8110	0	1
Medical Subject Headings (MeSH)	2006 [4]	US NLM	Biomedical vocabulary	23514	0	0
Finnish General Thesaurus (YSA)	2012-01-09	National Library of Finland	General thesaurus used in Finnish library catalogs	24206	61	1
SWD subject headings	07/2011	DNB	Subject headings used in German library catalogs	166414	0	0
LCSH	2011-08-11	Library of Congress	Subject headings used in Library of Congress catalog	407908	0	18
DBpedia Categories	3.7	DBpedia project	Categories from Wikipedia	740362	0	0

(Suominen, Hyvönen)

	Valid URIs	Missing Language Tags	Missing Labels	Loose Concepts	Disjoint OWL Classes	Consistent Use of Labels	Consistent Use of Mapping Properties	Consistent Use of Semantic Relations	Missing Language Tags	Missing Labels	Loose Concepts	Disjoint OWL Classes	Ambiguous prefLabel values	Overlap in Disjoint Label Properties	Disjoint Semantic Relations	Cycles in broader Hierarchy	Extra Whitespace
STI Subj.	pass	88	pass	1	pass	pass	pass	pass	3134	0	1	0	0	0	0	0	88
NYT Subj.	pass	0	pass	498	pass	pass	pass	pass	0	1	498	0	0	0	0	0	2
GBA	pass	0	pass	0	pass	pass	pass	pass	0	0	1	0	0	0	0	0	30
NYT Loc.	pass	0	pass	1920	pass	fail	pass	pass	0	1	1920	0	0	0	0	0	0
IAUT93	pass	358	fail	1060	pass	fail	pass	fail	358	1	1060	0	0	1	10	0	40
IVOAT	pass	2890	pass	926	pass	pass	pass	fail	7330	1	926	0	0	0	11	6	0
GEMET	pass	3	fail	109	pass	pass	pass	fail	3	0	109	0	0	0	2	0	0
STW	pass	2	fail	0	pass	pass	pass	fail	2	0	0	0	0	0	7	0	2
ScOT	pass	0	pass	0	pass	fail	pass	fail	0	0	0	0	0	1	26	0	1
MeSH	pass	0	pass	189	pass	pass	pass	fail	0	0	189	0	0	0	383	12	22610
YSA	pass	0	fail	8614	fail	pass	pass	fail	0	0	8614	61	0	0	58	6	0
SWD									0	0	65363	0	2	127	108	2	42
LCSH									0	0	423010	0	0	18	200	0	0
DBpedia									0	0	90822	0	0	0	10100	6168	0

Faceted User Interfaces

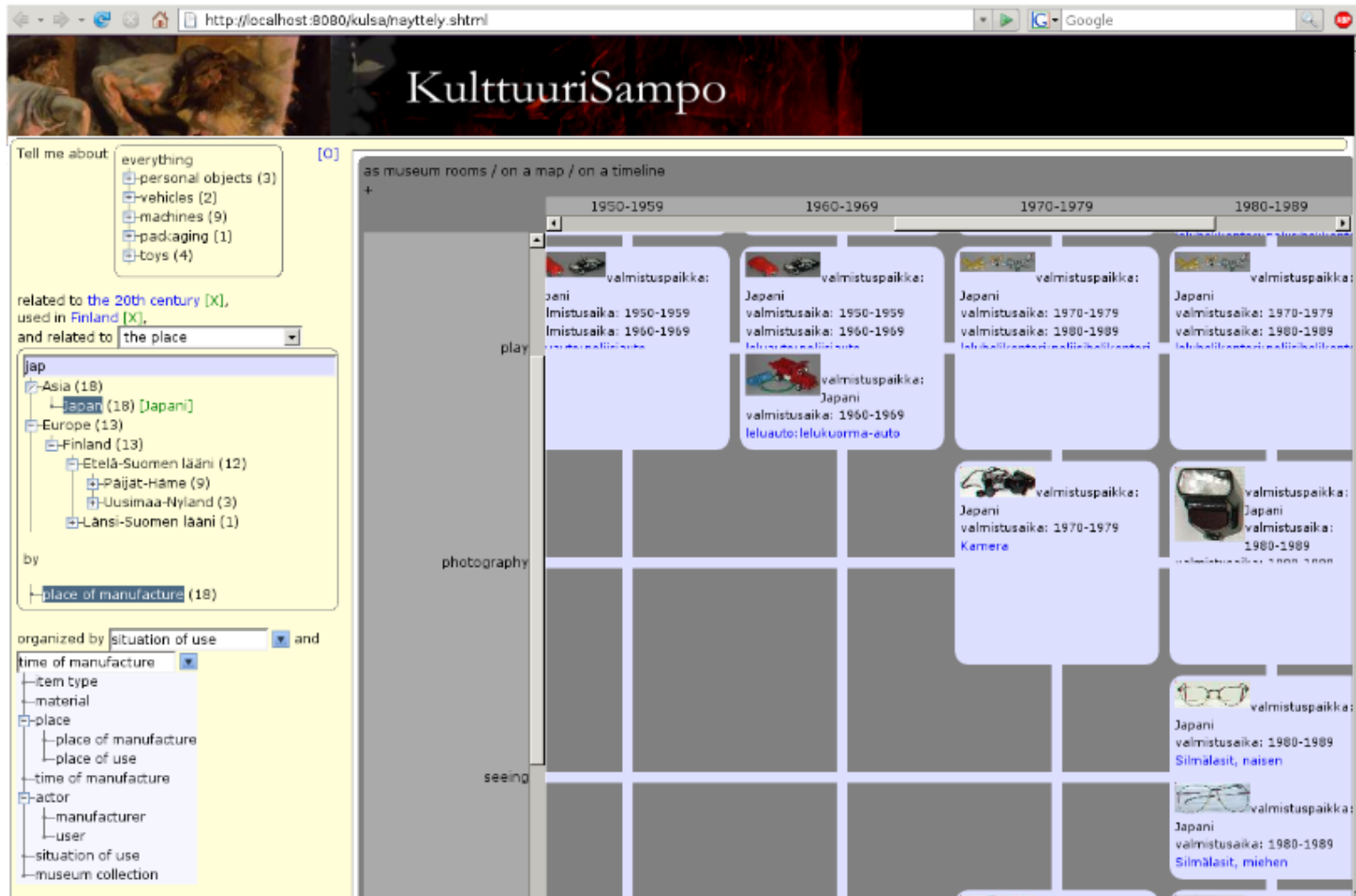


Fig. 1. The CultureSampo user interface, with important elements manually translated into English. The exhibition specification interface is located on the left, while the exhibition itself is visualized on the right. Showing is an exhibition on the types of items Japan exported to Finland in different parts of the 20th century.

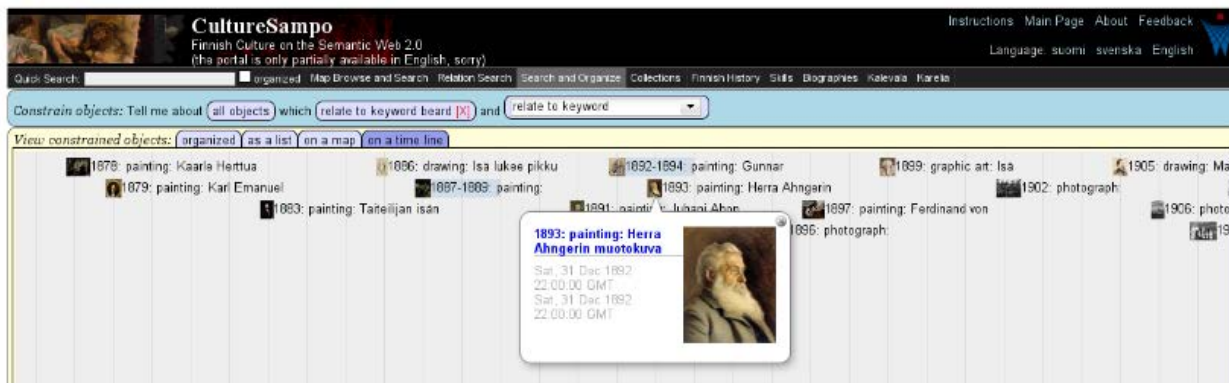
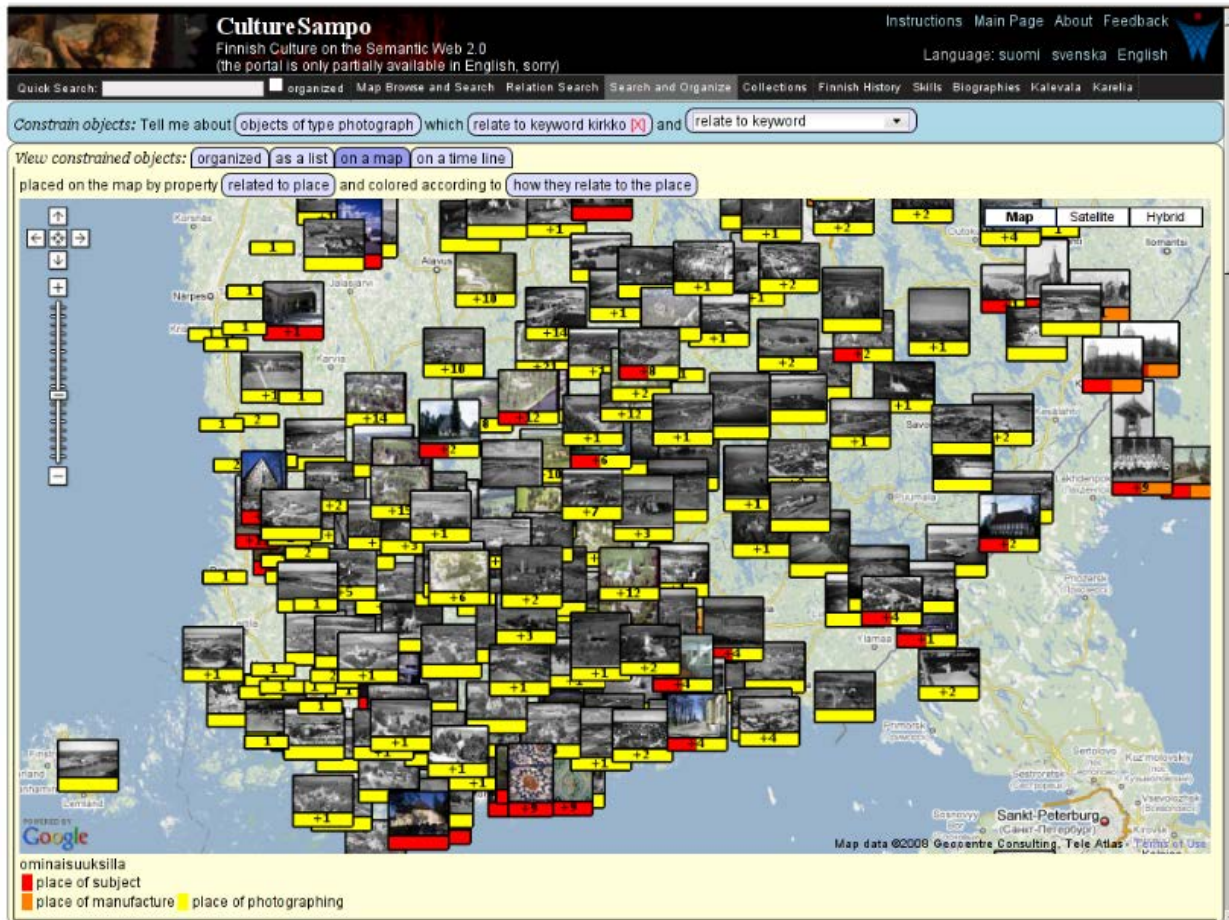


Fig. 3. Timeline visualization in CultureSampo



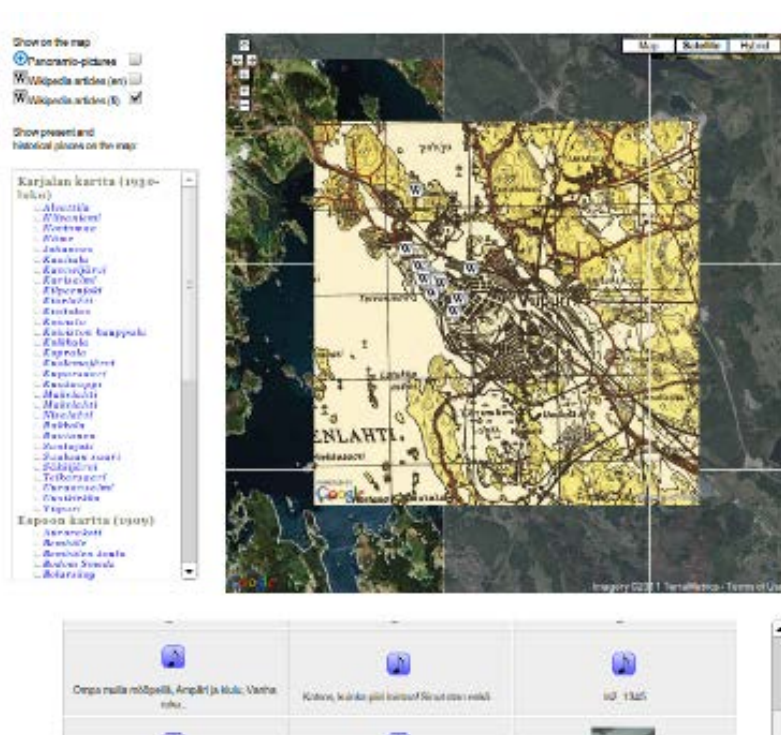


Fig. 5. Historical maps as viewed in CultureSampo

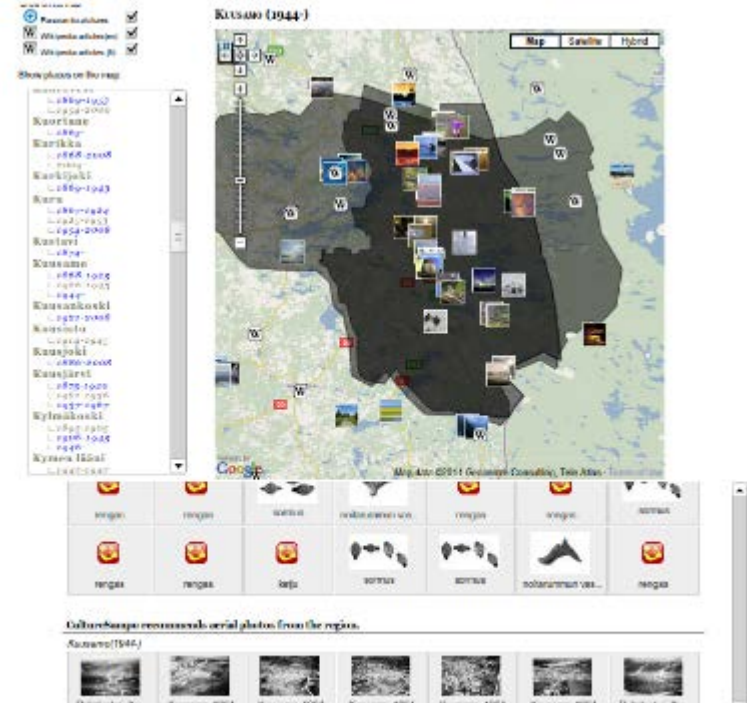
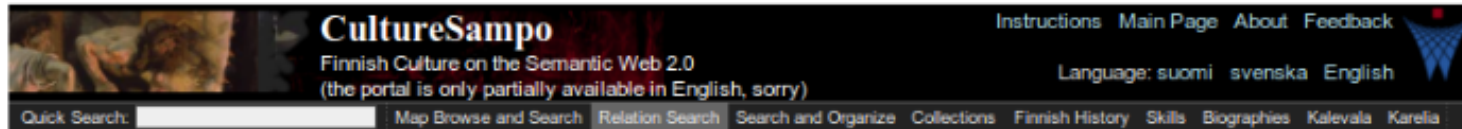


Fig. 6. Historical borders as viewed in CultureSampo



SEARCH FOR CONNECTIONS BETWEEN PEOPLE

CultureSampo finds a connection between the chosen people. Input names (eg. *Akseli Gallen-Kallela* and *Napoleon I*). While you are writing a list of available people is shown. The search is initiated automatically when both text fields are filled.

Person 1

Person 2

Gallen-Kallela, Akseli (Finnish painter and graphic artist, 1865-1931)
student of
Becker, Adolf von (Finnish painter, 1831-1909)
teacher of
Berndtson, Gunnar (Finnish painter and illustrator, 1854-1895)
student of
Gérôme, Jean-Léon (French painter and sculptor, 1824-1904)
teacher of
Burnand, Eugène (Swiss painter and illustrator, 1850-1921)
student of
Menn, Barthélemy (Swiss painter and teacher, 1815-1893)
student of
Ingres, Jean-Auguste-Dominique (French painter and draftsman, 1780-1867)
patron was
Napoleon I, Emperor of the French (French ruler, patron, and collector, 1769-1821)



Fig. 7. Answering the question of how Napoleon I, the French emperor is related to Akseli Gallen-Kallela by relational search in CultureSampo

A Bit of SeCo History

Semantic Web Activity at W3C Starts 2001

SCIENTIFIC AMERICAN™

SEARCH 

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[Feature Articles](#) |



The Semantic Web

A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities

By [Tim Berners-Lee](#), [James Hendler](#) and [Ora Lassila](#) | [May 17, 2001](#) | [10](#)

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Happy 20th Birthday, World Wide Web

CERN on March 13 celebrates the 20th anniversary of a proposal entitled, "Information Management: A Proposal," by Tim Berners-Lee, which would become the blueprint for the World Wide Web »

[March 12, 2009](#)





UNIVERSITY OF HELSINKI

Department of Computer Science
Faculty of Science

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2001

Department of Computer Science

Department information

Homepage

News and events

Research

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Helsingin yliopisto - Tietojenkäsittelytieteen laitos

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[Uutiset ja tapahtumat](#)

SEMANTIC WEB KICK- OFF IN FINLAND - ÄLYKÄS WWW SUOMESSA



Helsingin yliopisto, Porthania, sali P3

Perjantai 2.11.2001, klo 9:00-16:30



UNIVERSITY OF HELSINKI



SeCo
SEMANTIC COMPUTING

2002 SeCo is Born



2003

FinnONTO starts



VISION:

**Finland needs a semantic data infrastructure on the Web!
(Like railroads, electricity network, telephone network,...)**

Carrier Projects: FinnONTO & SUBI & LDF Industrial & Public Organization Consortium

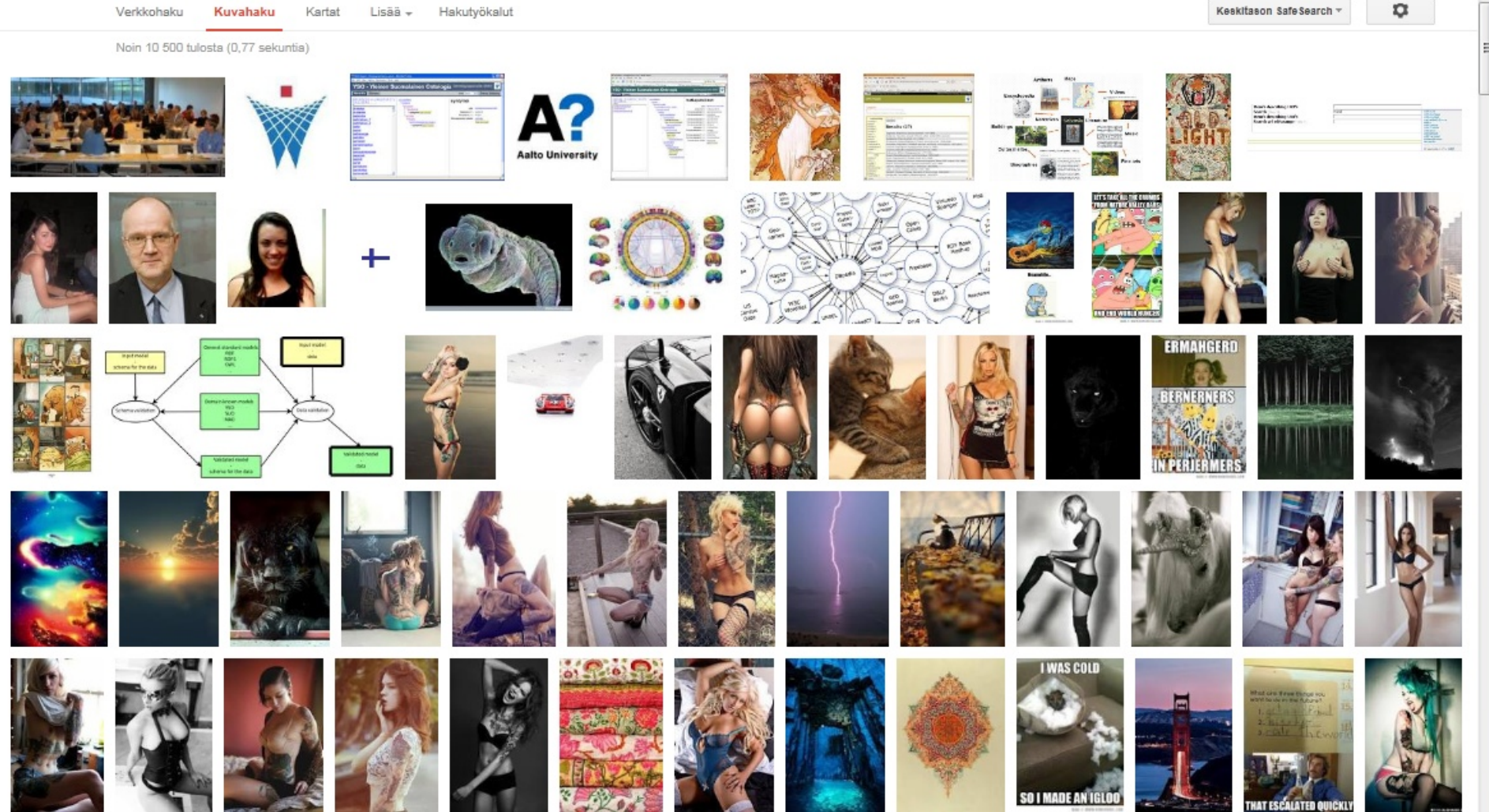
- **FinnONTO**
 - 2003-2004 14 funding organizations
 - 2004-2005 16 funding organizations
 - 2005-2006 30 funding organizations
 - 2006-2007 37 funding organizations
- **FinnONTO 2.0**
 - 2008-2010 38 funding organizations

FinnONTO 2.0
35 funding org., 2010-2012
1,52MEUR

Semantic UBICOM-services (SUBI)
17 funding org., 2010-2012
0,55MEUR

Linked Data Finland (LDF)
19 funding org., 2012-2013
0,49 MEUR

Evaluating Visibility in 2013: "FinnONTO" – Google Image Search



New Try in 2014: "FinnONTO" – Google Image Search

Browser address bar: https://www.google.fi/search?q=FinnONTO&hl=fi&rlz=1T4GGNI_fIF504EE505&source=lnms&tbm=isch&sa=X&ei=fqQVVKm7K6mBywPv54LgAg&ved=0CAkQ_AUoAg&biw=1358&bih=664#hl=fi&tbm=isch&q=FinnONTO&nfpr=1

Search bar: **Google** FinnONTO

Navigation: Verkkojaku, Kartat, **Kuvahaku**, Videot, Lisää, Hakutyökalut

Tarkoititko: [FintOTO](#)

Search results grid:

- Image 1: A group of people in a meeting room.
- Image 2: A presentation slide titled "FinnONTO:n datapilvi" showing a network diagram.
- Image 3: A presentation slide titled "Tutkimushankkeesta kansalliseksi ontologiapalveluksi" with the date "2012-11-26".
- Image 4: A presentation slide titled "Tutkimushankkeesta kansalliseksi ontologiapalveluksi" with the date "2012-11-26".
- Image 5: A presentation slide titled "FinnONTO:n datapilvi".
- Image 6: A presentation slide titled "Päätöksenteko kansallisesta ontologiapalvelusta" with bullet points.
- Image 7: A presentation slide titled "National Finnish Ontology Project FinnONTO 2003-2007" with contact information for Prof. Eero Hyvönen.
- Image 8: A presentation slide titled "Ontological terminology work" with text about EOP and Nordman workshops.
- Image 9: A presentation slide titled "Tutkimushankkeesta kansalliseksi ontologiapalveluksi" with the date "2012-11-26".
- Image 10: A presentation slide titled "YSO - Yleinen Suomalainen Ontologia" showing a hierarchical tree structure.
- Image 11: A presentation slide titled "FinnONTO" with a logo.
- Image 12: A presentation slide titled "FinnONTO" with a logo.
- Image 13: A presentation slide titled "FinnONTO" with a logo.
- Image 14: A presentation slide titled "FinnONTO" with a logo.
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- Image 100: A presentation slide titled "FinnONTO" with a logo.

Logos at the bottom: UNIVERSITY OF HELSINKI, HELSINKI UNIVERSITY OF TECHNOLOGY Laboratory of Media Technology, Aalto University

Page footer: http://www.google.fi/imgres?imgurl=http://farm9.staticflickr.com/8342/8223295277_a5a2d523c3_b.jpg&imgrefurl=http://beta.infocrea.fi/blogi/2012/11/finnontosta-kuvia-aanella-ja-ilman/&h=607&w=1024&tbid=SRVaJYS8LLkkM:&zoom=1&docid=pOIFWfHqWzZM&itq=1&hl=fi&ei=paQVVKtqH8nXyQP 125%

Current Research/Application Topics at SeCo

- Research topics
 - Metadata creation
 - Metadata quality
 - Data and ontology alignment
- Application domains
 - Linked cultural heritage data
 - » War history, biographies, correspondencies, books
 - Finnish legislation as a Linked Data service (Ministry of Justice)
 - Historical geo-ontologies
 - Linked Data MOOC
 - Contextual, personalized mobile services (Suomenlinna)

PhD Thesis Topics in SeCo Research

Tuukka Ruotsalo	Methods and Applications for Ontology-Based Recommender Systems
Markus Holi	Crisp, Fuzzy, and Probabilistic Faceted Semantic Search
Tomi Kauppinen	Methods for Creating and Using Geospatio-temporal Semantic Web
Eetu Mäkelä	View-Based User Interfaces for the Semantic Web
Suvi Kettula (at UH)	Developing a Semantic Web Textile Ontology for Museum Cataloging Systems
Osma Suominen	Methods for Building Semantic Portals
Kim Viljanen	Distributed Content Services for the Semantic Web (pend.)
Jouni Tuominen	Ontology Services for Vocabulary Publishing, Content Indexing, and Search
Matias Frosterus	Aligning Vocabularies and Metadata for Semantic Interoperability
Miika Alonen	Linked Data Quality Assessment and Knowledge Exploration
Juha Törnroos	Representing History on the Semantic Web



Conference Activities

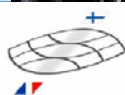
SECO'S SEMANTIC WEB SEMINARS IN FINLAND

1. 2001 Semantic Web Kick-off in Finland
2. 2002 Towards the Semantic Web and Web Services
3. 2004 Web Intelligence – älyä verkossa
4. 2005 FinnONTO - kohti suomalaista semanttista webiä
5. 2008 Semanttinen web kansalliseksi voimavaraksi
6. 2008 TerveSuomi - terveystieto semanttisessa webissä
7. 2008 Kulttuurisampo - suomalainen kulttuuri semanttisessa webissä
8. 2008 Kansallinen ontologiapalvelu ONKI
9. 2010 Yhteisöllinen semanttinen web 2.0
10. 2010 Yhdistetty avoin tieto Suomessa – Linked Open Data in Finland
11. 2011 Avoin tieto ja World Wide Web tietoyhteiskunnan palveluksessa
12. 2012 World Wide Web oli – Linked Open Data tuli
13. 2014 Linked Open Data Finland

Conference Activities Abroad

- [User Interaction Built on Library Linked Data \(UILLD 2013\)](#), Singapore, August 16, 2013.
- [The 6th IEEE International Conference on Semantic Computing \(ICSC 2012\)](#), Palermo, Italy, Sept 19 - 21, 2012.
- [The 18th International Conference on Knowledge Engineering and Knowledge Management \(EKAW 2012\)](#), Galway, Ireland, Oct 8 - 12, 2012.
- [DC-2012, DCMI Conference on Dublin Core and Metadata Applications](#), Kuching, Sarawak, Malaysia, Sept 3 - 7, 2012.
- [The 9th Extended Semantic Web Conference \(ESWC 2012\)](#), Crete, Greece, May 27 - 31, 2012.
- [The 2nd International Workshop on Usage Analysis and the Web of Data \(USEWOD 2012\), at the 21st World Wide Web Conference 2012](#), Lyon, France, April 17th, 2012.
- [The 21st World Wide Web Conference 2012 \(WWW 2012\), demo track](#), Lyon, France, April 16 - 20, 2012.
- [The 10th International Semantic Web Conference \(ISWC 2011\)](#), Bonn, Germany, Oct 23-26, 2011.
- [The DCMI Conference of Dublin Core and Metadata Applications \(DC 2011\)](#), The Hague, Netherlands, Sept 21-23, 2011.



 **Digital Semantic Content across Cultures**
Paris, the Louvre
May 4-5, 2006

- [The 21st World Wide Web Conference 2010](#), Pittsburgh, PA, May 16-20, 2010.
- [The 4th International Semantic Web Conference \(ISWC 2010\)](#), Bonn, Germany, Oct 23-26, 2010.
- [The 6th International Semantic Web Conference \(ISWC 2009\)](#), Los Angeles, USA, July 7, 2009.
- [The 5th Workshop on Scripting and Development for the Semantic Web](#), at ESCW-2008, Crete, Greece, June 1, 2009.
- [The 6th European Semantic Web Conference \(ESWC 2009\) 2009](#), Crete, Greece, May 31 - June 2, 2009.
- [The 18th International World Wide Web Conference \(WWW 2009\)](#), Semantic / Data Web, Madrid, Spain, April 20-24, 2009
- [The Second IEEE International Conference on Semantic Computing](#), Santa Clara, CA, USA - August 4-7, 2008.
- [The 3rd Asian Semantic Web Conference \(ASWC 2008\)](#) Pathumthami, Thailand, Dec 8-11, 2008.
- [The 2nd International OPAALS Conference on Digital Ecosystems 2008, Tampere, Finland, Oct. 7-8, 2008.](#)
- [The First Workshop on Semantic Interoperability in the European Digital Library \(SIEDL 2008\)](#), at ESWC-2008, Tenerife, Spain, June 1, 2008.
- [The 4th Workshop on Scripting for the Semantic Web \(SFSW 2008\)](#), at ESWC-2008, Tenerife, Spain, June 1, 2008.
- [The 5th European Semantic Web Conference ESWC 2008](#), Tenerife, Spain, June 1-5, 2008.
- [The 10th Scandinavian Artificial Intelligence Conference SCAI 2008](#), Stockholm, Sweden, May 26-28, 2008.
- [The First International Workshop on Cultural Heritage on the Semantic Web](#), Busan, Korea, Nov 12, 2007.
- [The 6th International Semantic Web Conference \(ISWC 2007\) and the 2nd Asian Sermantic Web Conference \(ASWC 2007\)](#),

The 19th International Conference on Knowledge Engineering and Knowledge Management 2014



EKAU 2014 Bid – Linköping, Sweden

Patrick Lambrix, Linköping University, Sweden

Eero Hyvönen, Aalto University, Finland

EKAU for the first time in Scandinavia!



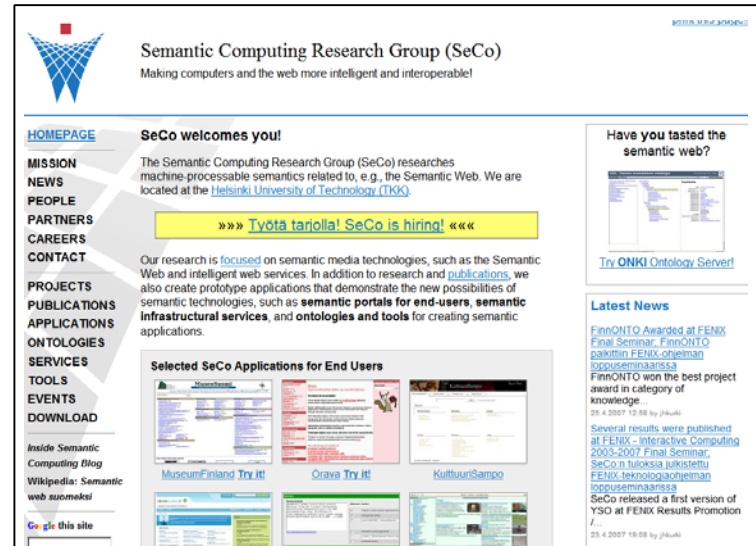
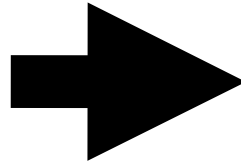
Research Awards to SeCo



International Collaboration Network

- Researcher Exchanges
 - VU University, Amsterdam
 - University of Milano
 - University of Colorado
 - University of California, Berkeley
 - Stanford University
 - Oxford University
- Journal Editorial Boards
 - Int. J. of Metadata, Semantic & Ontologies (IJMSO)
 - Int. J. of Semantic Computing (IJSC)
 - Semantic Web Journal (SWJ)
 - Int. Journal on Semantic Web and Information Systems (IJSWIS)
- International Scientific Advisory Boards

Questions



The screenshot shows the homepage of the Semantic Computing Research Group (SeCo). The header includes the group's name and tagline: "Making computers and the web more intelligent and interoperable!". A navigation menu on the left lists categories like MISSION, NEWS, PEOPLE, PARTNERS, CAREERS, CONTACT, PROJECTS, PUBLICATIONS, APPLICATIONS, ONTOLOGIES, SERVICES, TOOLS, EVENTS, and DOWNLOAD. The main content area features a "SeCo welcomes you!" message, a yellow hiring notice "Työtä tarjolla! SeCo is hiring!", and a section for "Selected SeCo Applications for End Users" with thumbnails for MuseumFinland Try It!, Crave Try It!, and Kulttuurisampo. A "Latest News" section on the right reports on awards and publications.

<http://www.seco.tkk.fi/>