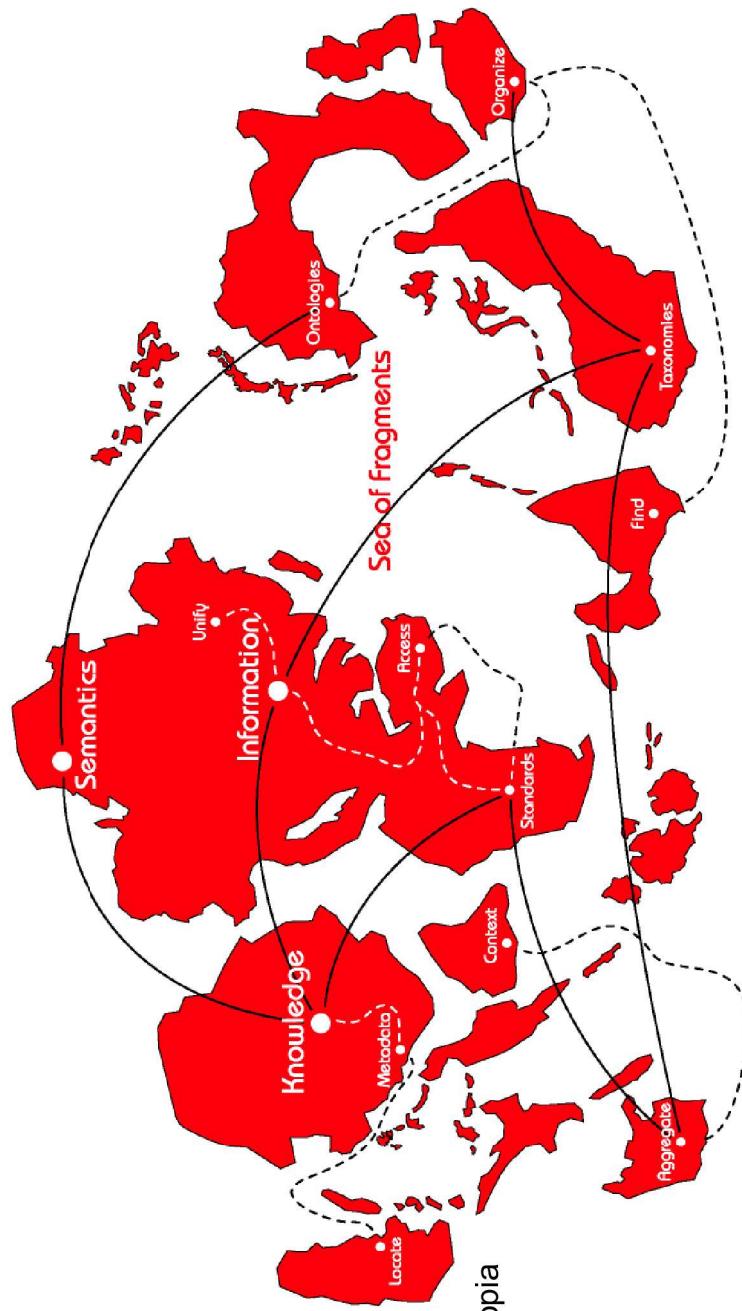


BrainBank

Concept-based Learning with Topic Maps



Lars Marius Garshol

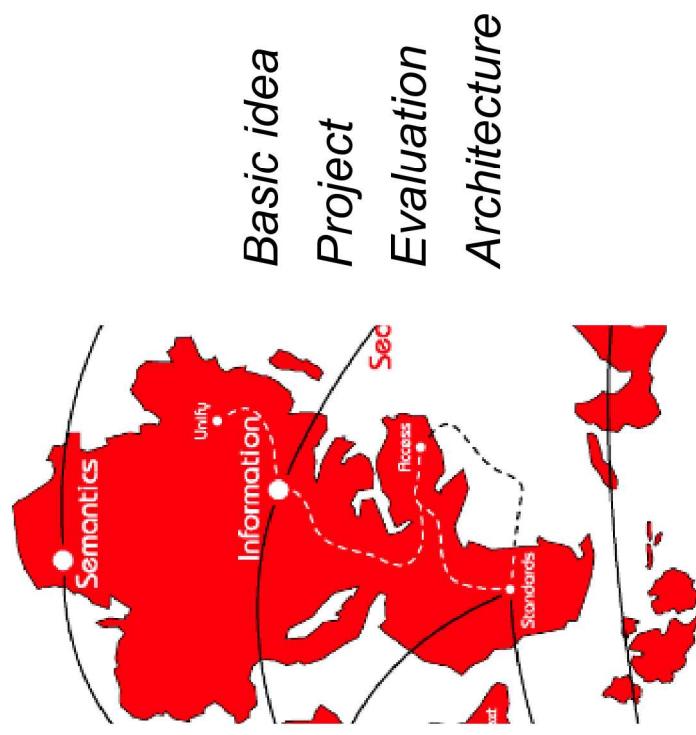
Development Manager, Ontopia
<larsga@ontopia.net>

Presented at ISWC 2004
2004-11-08

Who is talking?

- **Lars Marius Garshol**
 - Development manager at and co-founder of Ontopia
 - Co-author of the new ISO 13250 Topic Maps, parts 2 and 3
 - Co-editor of ISO 18048 Topic Map Query Language (TMQL)
 - Responsible for the Unicode support in the Opera web browser
 - Active open source developer in the XML community
 - Wrote “*Definitive XML Application Development*”, published by Prentice-Hall in 2002
- **Ontopia**
 - the leading topic map software vendor
 - Norwegian company headquartered in Oslo
 - Main product: Ontopia Knowledge Suite (OKS)

BrainBank



Basic idea

- Concept-based, constructivist approach to learning
- Students attend normal teaching, as in any other school
- Then, after the teaching, they are given time with BrainBank where they
 - identify the main concepts they have learned,
 - name the concepts,
 - describe the concepts (with text),
 - create typed associations to other concepts
 - attach local and remote resources to concepts
- There is one account per user
 - each user has a separate BrainBank, divided by course
- Teachers can review the students' BrainBanks and comment on them
 - comments turn into discussions, but there is one "forum" per topic, and none that are not attached to topics

User interface



Assosiasjoner (7) Ressurser (4) Kommentarer (1)

består av blant annet

[lysavhengig del](#)

[lysavhengig del](#)

ble oppdaget ved

[forsøk](#)

forbruker

[co2](#)

fåregår i

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[plankton](#)

produserer

[oksygen](#)

<http://www.ontc.no>



Brukere: Bio Tester
Rolle: Elev

Kurs: Demokurs
Fag: Demofag

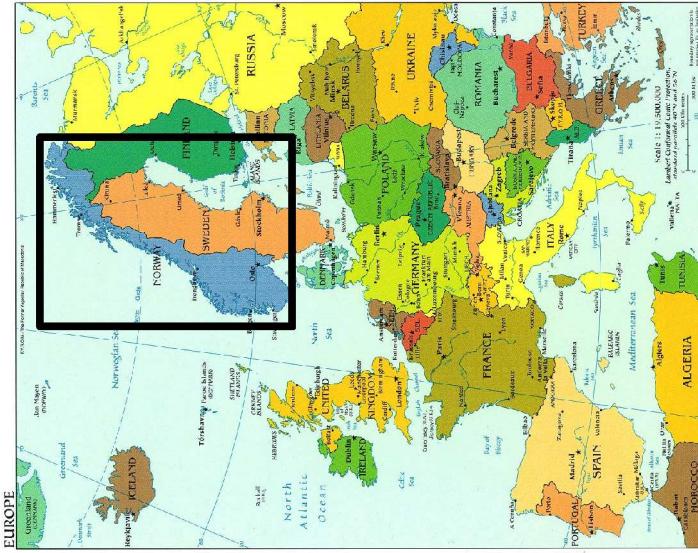
Skole: Demonstrasjonskole

The project players

- **Cerpus, a Norwegian e-learning company**
 - concept and design; project owner
 - initial idea due to Tommy W. Nordeng
- **Ontopia**
 - developed BrainBank, using the Ontopia Knowledge Suite (OKS)
- **Alsvåg primary and secondary school**
 - use and testing
- **Program for learning and pedagogy (PLP), University of Tromsø**
 - evaluation (we will return to this)
 - performed by Kristin Emilie Bjørndal, PhD student

Cutting edge technology...

...from the edge of civilization



Quotes from the evaluation

“...one of the most surprising findings is that BrainBank has proven to be a very flexible tool, applicable individually as well as in group work and projects.”

“There were 7 pupils in particular who expressed that BrainBank helped them remembering what they had learned. According to these pupils BrainBank was mainly a help in remembering because it was easy to go back and take a look at what one had previously entered of keywords and relations. The same pupils also said that they regularly used to read through all they had entered in BrainBank, either home or at school.”

“It seems that as the pupils got more keywords into the database, they experienced that BrainBank gave them a better overview over their own knowledge, and that pre-acquired knowledge easily can be related to new knowledge.”

Student: *“You become more aware of what you read when writing keywords. You pay more attention. When I do my homework I do it more carefully, because I’m going to find keywords.”*

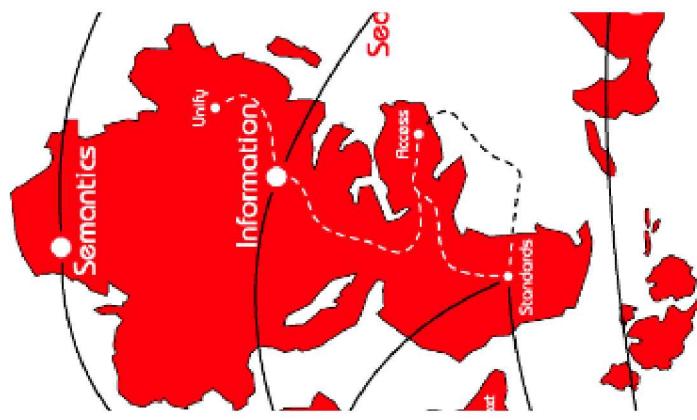
What the students thought



Architecture

- **Web-based application**
 - important: no software for schools to install; only a web browser
 - mainly HTML, a little JavaScript in places
- **Based on Ontopia Knowledge Suite**
 - written in Java Server Pages, using OKS tag libraries
 - tolog query language used to build application logic
- **All information represented using topic maps**
 - concepts, relations, and attached resources
 - courses, students, passwords, schools
 - ...

Topic maps



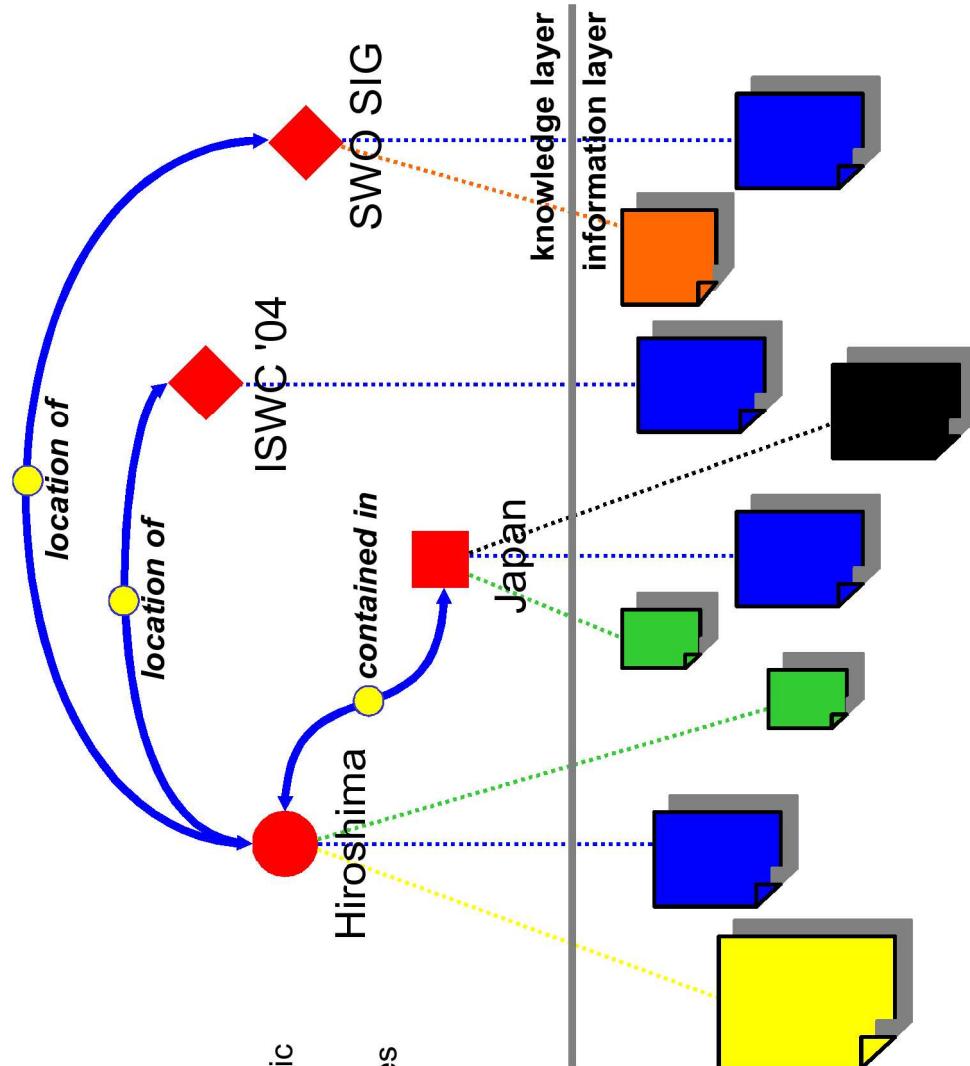
What are topic maps?
Why topic maps for BrainBank?
Topic maps in education

What are topic maps?

- An ISO standard for information retrieval and knowledge representation
 - ISO 13250:2003: Topic Maps
- Related technologies
 - XML Topic Maps: XML interchange format for topic maps
 - ISO 18048 TMQL: query language for topic maps (under development)
 - ISO 19756 TMCL: constraint language for topic maps (under development)

Topic maps on one slide

- **Topics**
 - represent concepts
 - have types and names
- **Associations**
 - represent relationships
 - typed, with roles for each topic
- **Occurrences**
 - relevant information resources
- **Also other features, beyond what is found in RDF**



Why topic maps for BrainBank

- **Very close match between BrainBank concepts and TM concepts**
 - concept = topic, relation = association, resources = occurrences, ...
- **Existing software made the application easy to build**
 - already trained local consultants available
- **Existing software added additional features**
 - graphic visualization of knowledge networks
 - export of student data to standardized format (XTM)
- **It's a standard**
 - student data not locked in to a particular vendor
 - potential for interaction with other players using same technology

Topic maps in education

- Interest in topic maps in the e-learning field is growing rapidly
- The Norwegian Ministry of Education is debating whether to express the new learning plans as topic maps
 - this can be used to connect learning goals with resources from publishers as well as with student concepts
 - e-portfolios...
- IMS is looking into using topic maps for learning designs
 - meeting in Oslo in January

Thank you!

- **The slides from this talk**
 - <http://www.ontopia.net/topicmaps/materials/iswc-2004-el.pdf>
- **Cerpus**
 - <http://www.cerpus.com>
- **About topic maps**
 - <http://www.topicmap.com> (English)
 - <http://www.knowledge-synergy.com> (Japanese)
- **About topic maps in e-learning**
 - <http://topicmaps.estandard.no> (English)
- **Topic maps standardization**
 - <http://www.isotopicmaps.org>
- **About RDF and topic maps**
 - <http://www.ontopia.net/topicmaps/materials/tmrdf.html>
- **Questions**
 - <larsga@ontopia.net> (English), <motom@green.ocn.ne.jp> (Japanese)