SeCo
semantic computing

OntoViews – Semantic Portal Creation Tool

Eetu Mäkelä

16.11.2005

Semantic Computing Research Group
http://www.cs.helsinki.fi/group/seco/

HELSINKI INSTITUTE FOR INFORMATION TECHNOLOGY
UNIVERSITY OF HELSINKI
HELSINKI UNIVERSITY OF TECHNOLOGY

OntoViews

- Core Functionality:
  - Semantic view-hierarchy –based searching and view projection
  - Lateral semantic collection browsing
  - Semantic text autocompletion
- Features:
  - Data-independent, has been applied to **8** vastly different datasets
  - Modifiable, has been used to create **5** differing user-interface families
  - Extensible, based on modular components

Contents

- What is OntoViews?
- Portals created with OntoViews
- A demonstration
- From ontologies to views
- Main components

OntoViews applications

- **MuseumFinland**
  - Semantic Virtual Museum combining material from three museums. Semantic Web Challenge Award, Prime Minister's award for most technologically innovative web application
- **Orava**
  - Search index for learning video material from YLE
- **SW-Suomi.Fi**
  - Semantic version of the Suomi.Fi portal
- **Veturi**
  - Semantic Yellow Pages service discovery

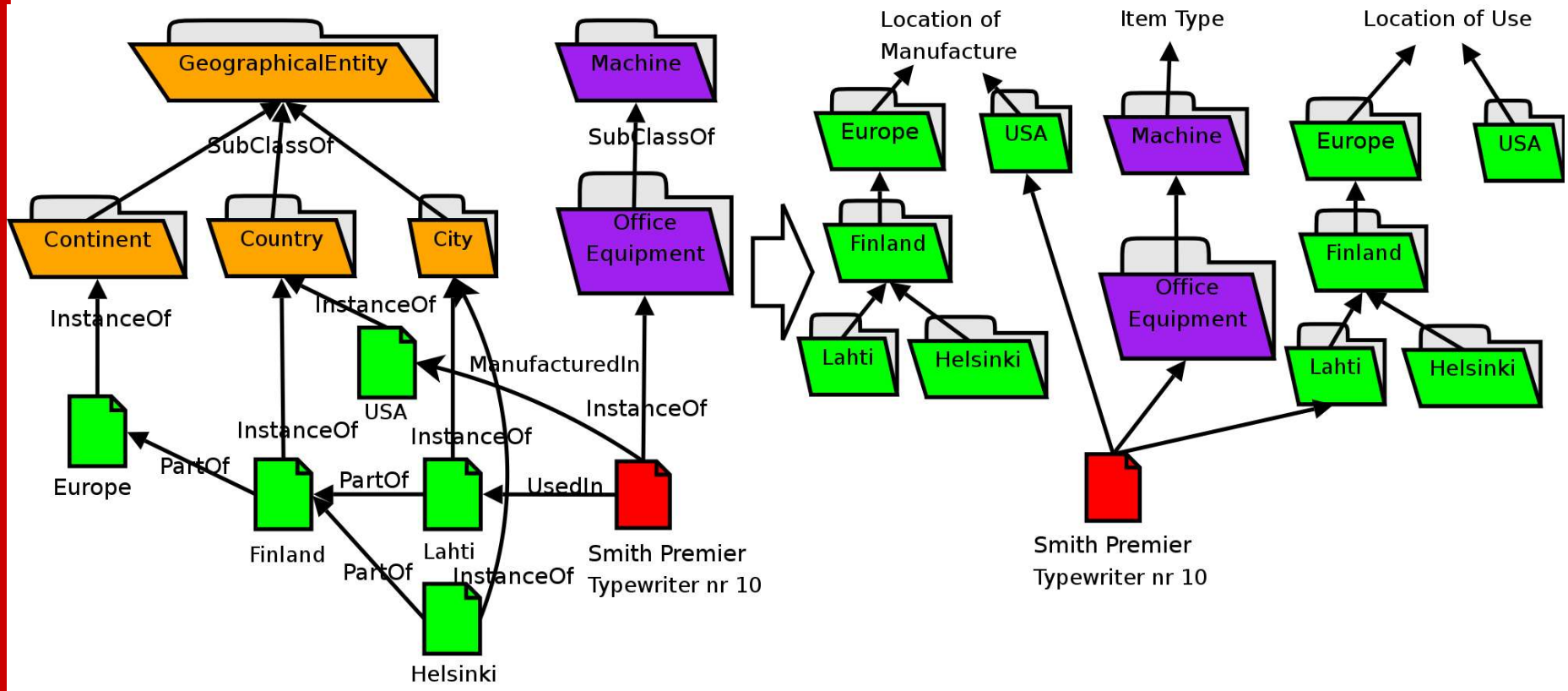
OntoViews tests

- **Open Directory Project-test**
  - Directory of 2.2 million web site descriptions
- **ONKI-test**
  - General ontology browsing
- **Promoottori-test**
  - University promotion material
- **CultureSampo**
  - MuseumFinland successor under development

OntoViews demonstration

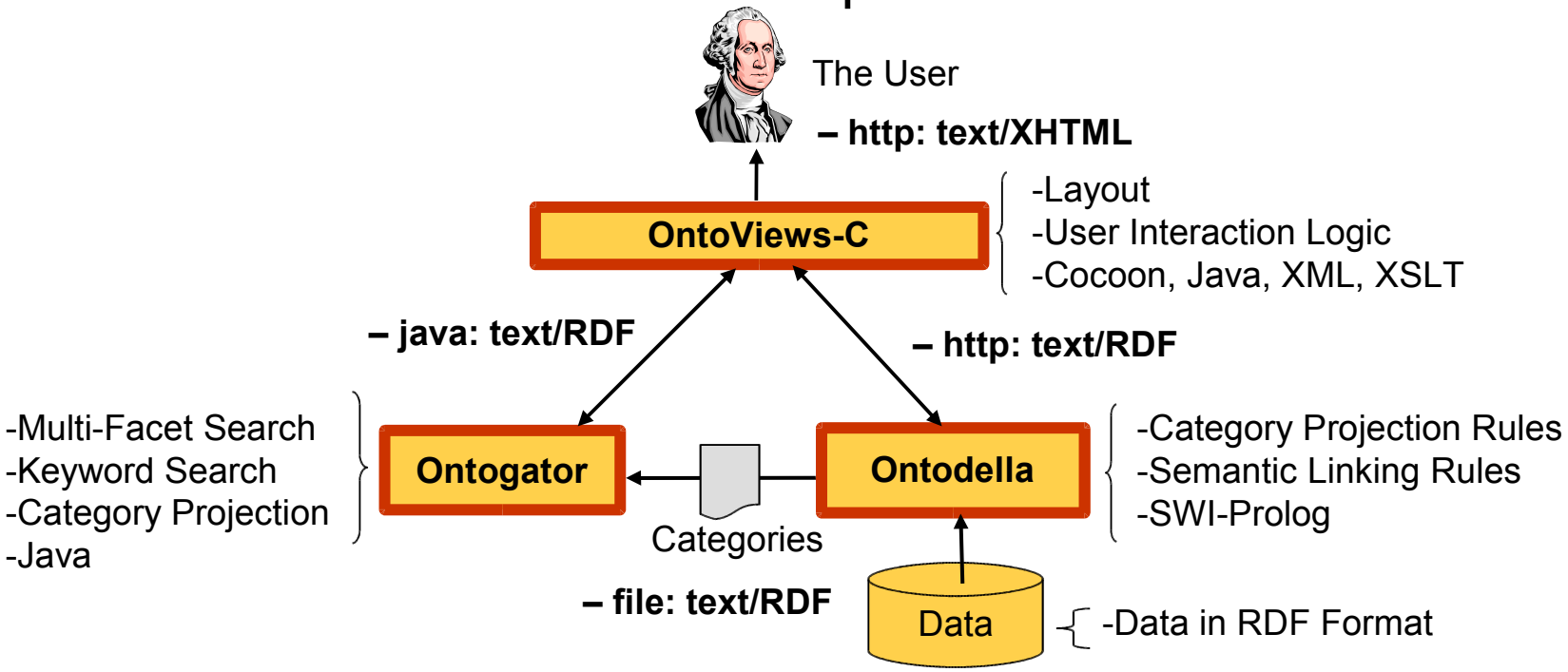
- http://www.museosuomi.fi/

View Projection from Ontologies



The Main Components of OntoViews

- Ontodella, a prolog-based logic server
- Ontogator, a java-based multi-facet search engine
- OntoViews-C, the main Apache Cocoon -based interaction and control component



The Logic Server Ontodella

- Projects view-facets from the data to be used in search
- Semantically links individual items to each other
- Utilizes defined logic rules for both functionalities

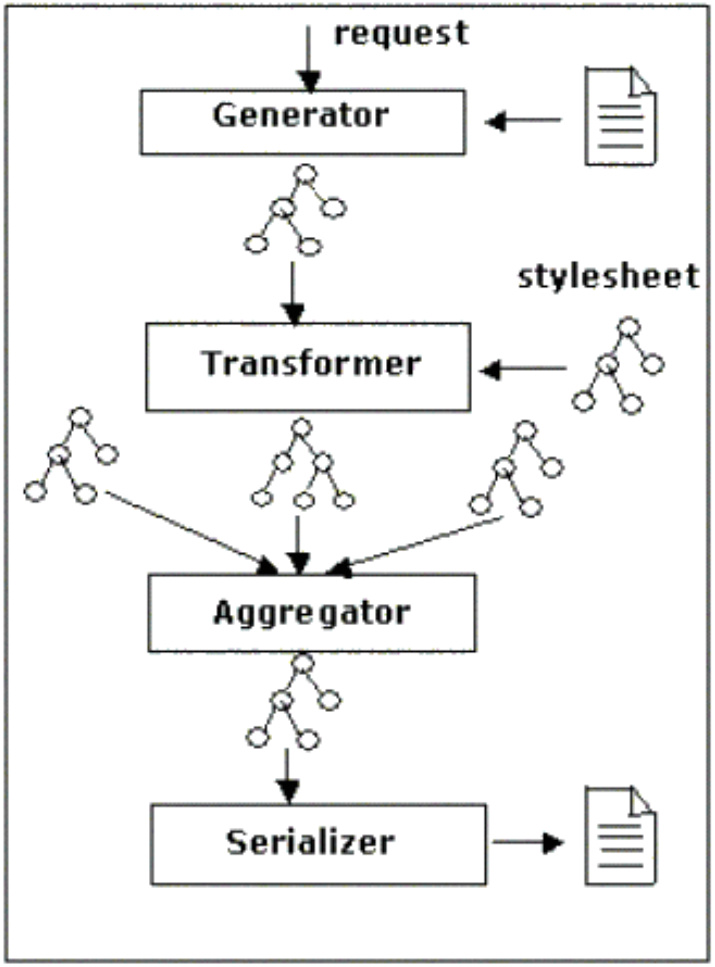
The Multi-Facet Search Engine Ontogator

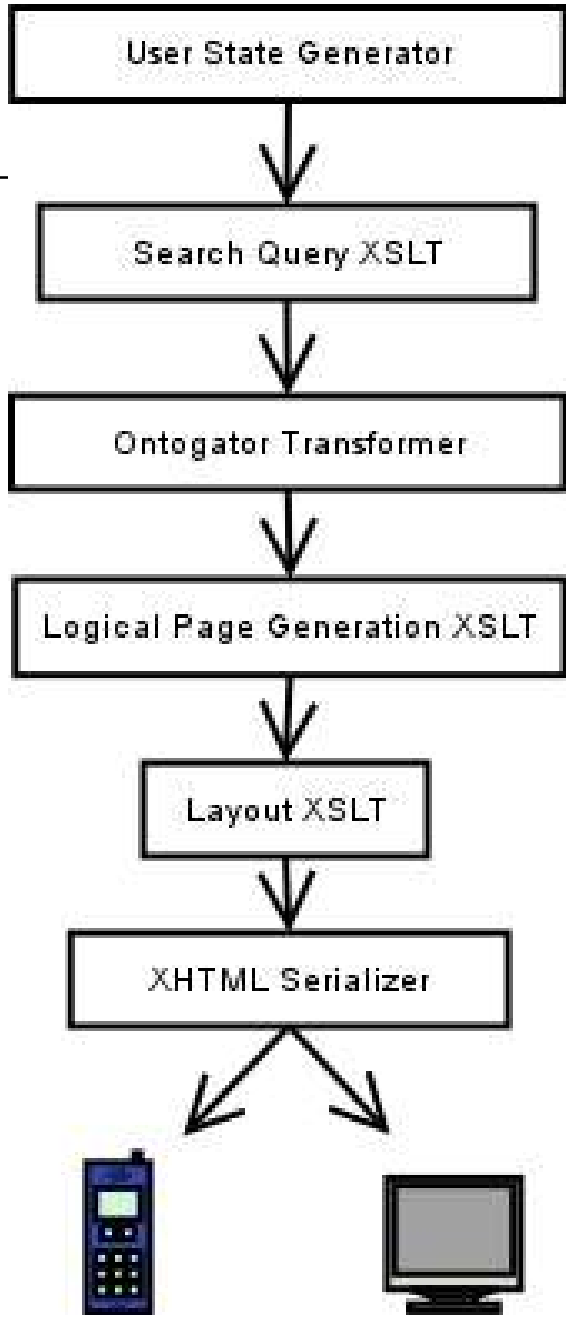
- Is a generic view-based RDF search engine
  - Defines and implements an RDF-based query interface defined as an OWL ontology
  - Replies to queries in RDF/XML that has a fixed structure
  - Extendable projection and query selector interfaces
- Has been tested with dmoz.org data to scale to up to 2.3 million items and 275.000 categories with search times of about 5 seconds.
- Future work: Does not yet scale well to accommodate multiple simultaneous users

The Interaction and Control Component OntoViews-C

- Built on top of the Apache Cocoon architecture
  - The Cocoon architecture is based upon the concept of pipelines, comprised of modular components (generators, transformers and serializers) that consume and/or produce XML
  - This forces a modular, reusable and extendable design
- In OntoViews, all components produce not only XML, but valid RDF/XML. This, along with a generator for handling HTTP requests, allows for the exposition of all parts of the system as Web Services

OntoViews Pipeline Structure





Summary – OntoViews is:

- **A search engine based on the semantics of the content:** Concept-based Multi-Facet and keyword search
- **Browsing functionality based on the semantic relations in the underlying knowledge base:** Classification tree view, explicit semantic links in item view
- **Usable for an end-user: Developed interfaces based on UI research**
- **Easily integrated and extended with additional functionality:** Seamless integration in the user interface of keyword and other searches, the search architecture allows for extensions, and the Cocoon control architecture forces a modular, reusable and extendable design. All components operate independently, consuming and/or producing RDF/XML.
- **Usable with a variety of different devices:** Different user interfaces and functionality for different devices
- **Adaptable to a wide variety of semantic data:** Facet hierarchy projection and semantic link generation are based on extendable logic rules. The projection rules have been tested with three different data sets.
- **Scalable to accommodate large amounts of data:** OntoViews has been tested with dmoz.org data to scale to up to 2.3 million items and 275.000 categories with search times of about 5 seconds.
- **Able to provide its functionality also to other programs as Semantic Web Services:** All subparts of the system are available to be used via Web Services
- **Future work:** Ideas about dynamic facet creation, further optimizations to improve scalability

View-Hierarchy -Based Browsing Interface: MuseumFinland virtual museum

- Every choice presents the user a visual view of possibly interesting targets, also giving ideas for additional search restrictions
- Once a target is found, the interface moves on to semantic browsing
- The goal is as fluid a browsing experience as possible, where even a user not familiar with the collection continually finds somethng interesting to pursue further
- At the same time, the content of the collection and way of indexing become familiar to the user
- Keyword search over categories provides a quick shortcut for those knowing precisely what they seek

View-Hierarchy -Based Quick Search Interface: The Veturi Yellow Pages Service Portal

- Keyword search provides a familiar basis for the user
- The user gains a sense of security from seeing the semantic categories matched in their contexts
- At the same time again, the user gets an overview on how the content is indexed
- Semantic disambiguation can be done only as needed
- Still, the search is firmly semantically defined