A Semantic Multimedia Web: Create, Annotate, Present and Share your Media

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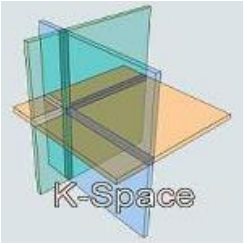
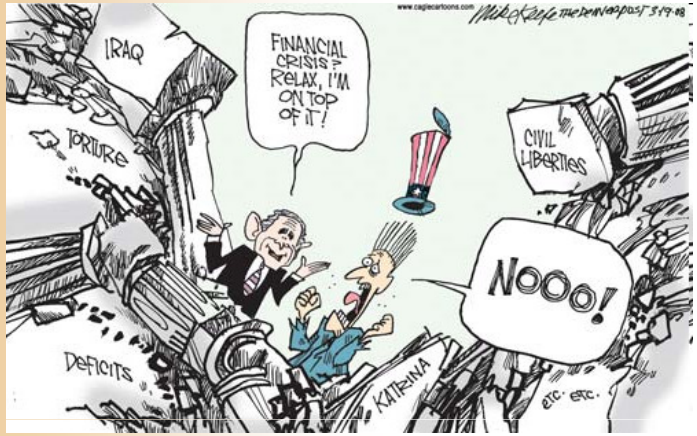
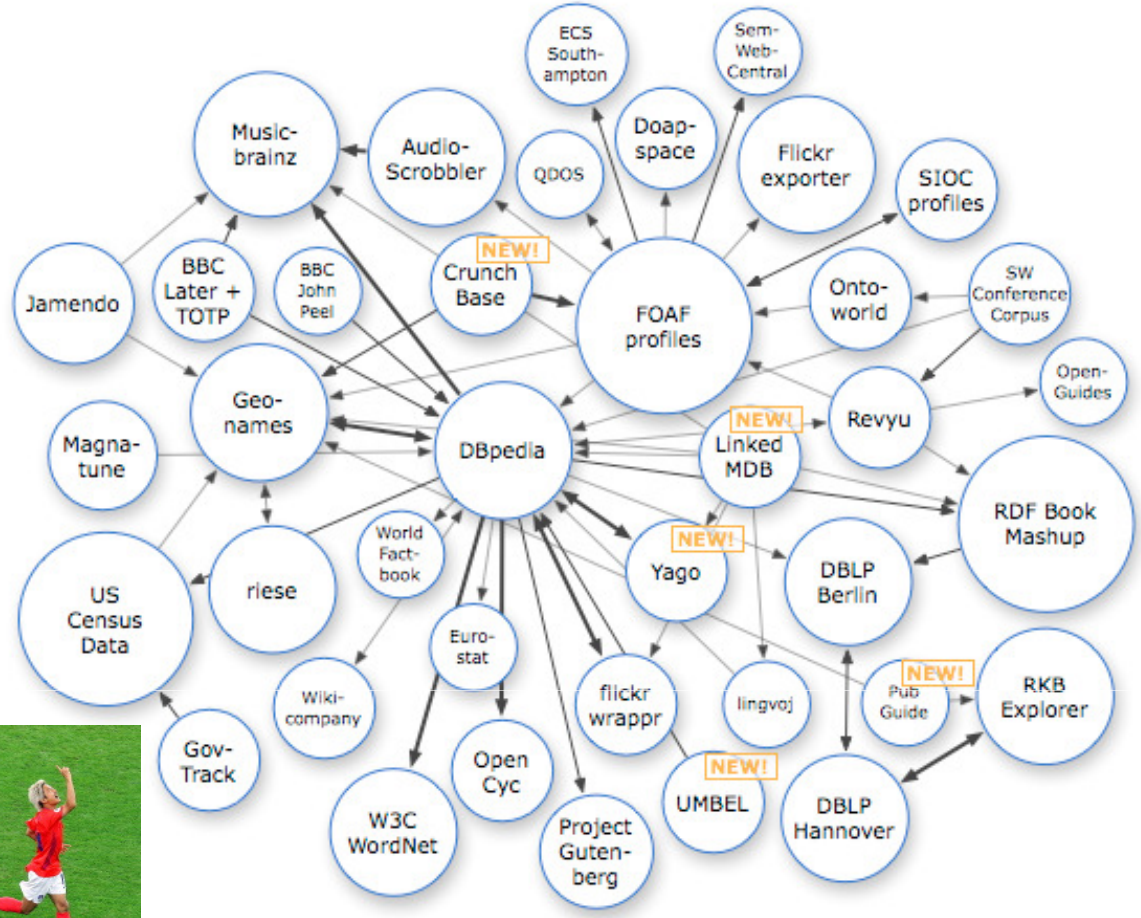
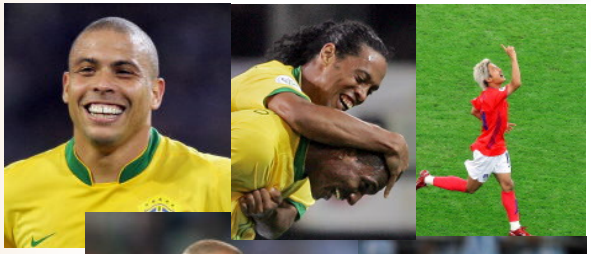
CWI, Semantic Media Interfaces



Motivation


IRAQ
FINANCIAL CRISIS? RELAX, I'M ON TOP OF IT!
TORTURE
CIVIL LIBERTIES
NOOO!
DEFICITS
KATRINA
etc. etc.


ECS South-ampton
Sem-Web-Central
Music-brainz
Audio-Scrobbler
Doap-space
Flickr exporter
SIOC profiles
QDOS
NEW!
Crunch Base
FOAF profiles
Onto-world
SW Conference Corpus
Jamendo
BBC Later + TOTP
BBC John Peel
Geo-names
DBpedia
Revyu
Open-Guides
Magna-tune
NEW!
Linked MDB
RDF Book Mashup
World Fact-book
NEW!
Yago
DBLP Berlin
US Census Data
riese
Euro-stat
NEW!
Pub Guide
RKB Explorer
Wiki-company
flickr wrappr
lingvoj
Gov-Track
Open Cyc
NEW!
UMBEL
DBLP Hannover
W3C WordNet
Project Guten-berg

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Learning Objectives

- Understand multimedia applications workflow
  - Take the canonical processes of media production model
- Explore various multimedia metadata formats
  - Be aware of the advantages and limitations of various models
  - Know the interoperability issues and understand COMM, a Core Ontology for Multimedia
- Discuss exploratory interfaces based on rich multimedia metadata semantics
  - Know how to link and expose your data on the web
  - See various multimedia presentation interfaces

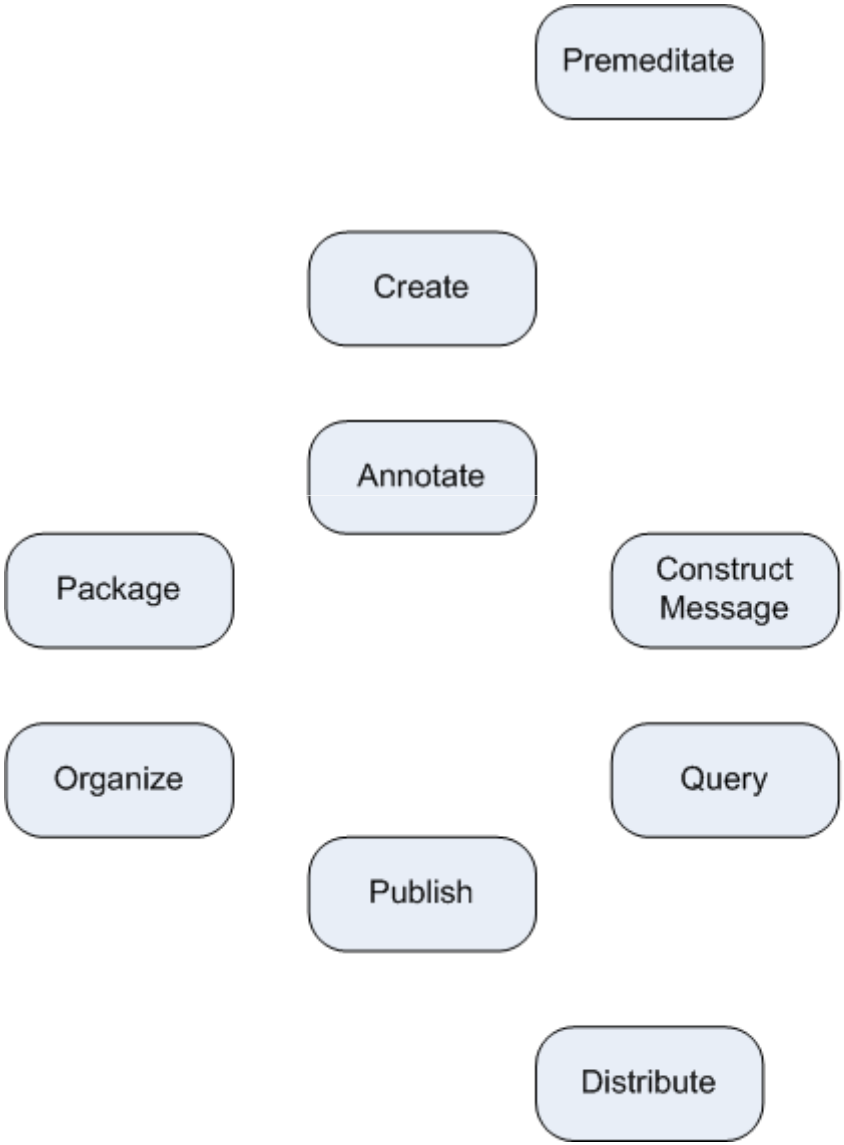
Agenda

1. Understanding Multimedia Applications Workflow
   - CeWe Color Photo Book creation application
   - Vox Populi argumentation-based video sequences generation
   - *Canonical Processes of Media Production*
2. Semantic Annotation of Multimedia Content
   - Multimedia metadata formats: use cases and requirements
   - Multimedia metadata interoperability issues
   - MPEG-7 based ontologies
   - *COMM: A Core Ontology for MultiMedia*
3. Semantic Search and Presentation of Multimedia Content
   - Link your data!
   - *Searching and Browsing Multimedia Semantic Datasets with Cliopatria*

Understanding Multimedia Applications Workflow

- Identify and define a number of canonical processes of media production
- Community effort
  - 2005: Dagstuhl seminar
  - 2005: ACM MM Workshop on *Multimedia for Human Communication*
  - 2008: Multimedia Systems Journal Special Issue (core model and companion system papers)
    editors: Frank Nack, Zeljko Obrenovic and Lynda Hardman

Overview of Canonical Processes



Example 1: CeWe Color PhotoBook

- Application for authoring digital photo books
- Automatic selection, sorting and ordering of photos
  - Context analysis methods: timestamp, annotation, etc.
  - Content analysis methods: color histograms, edge detection, etc.
- Customized layout and background
- Print by the European leader photo finisher company

http://www.cewe-photobook.com

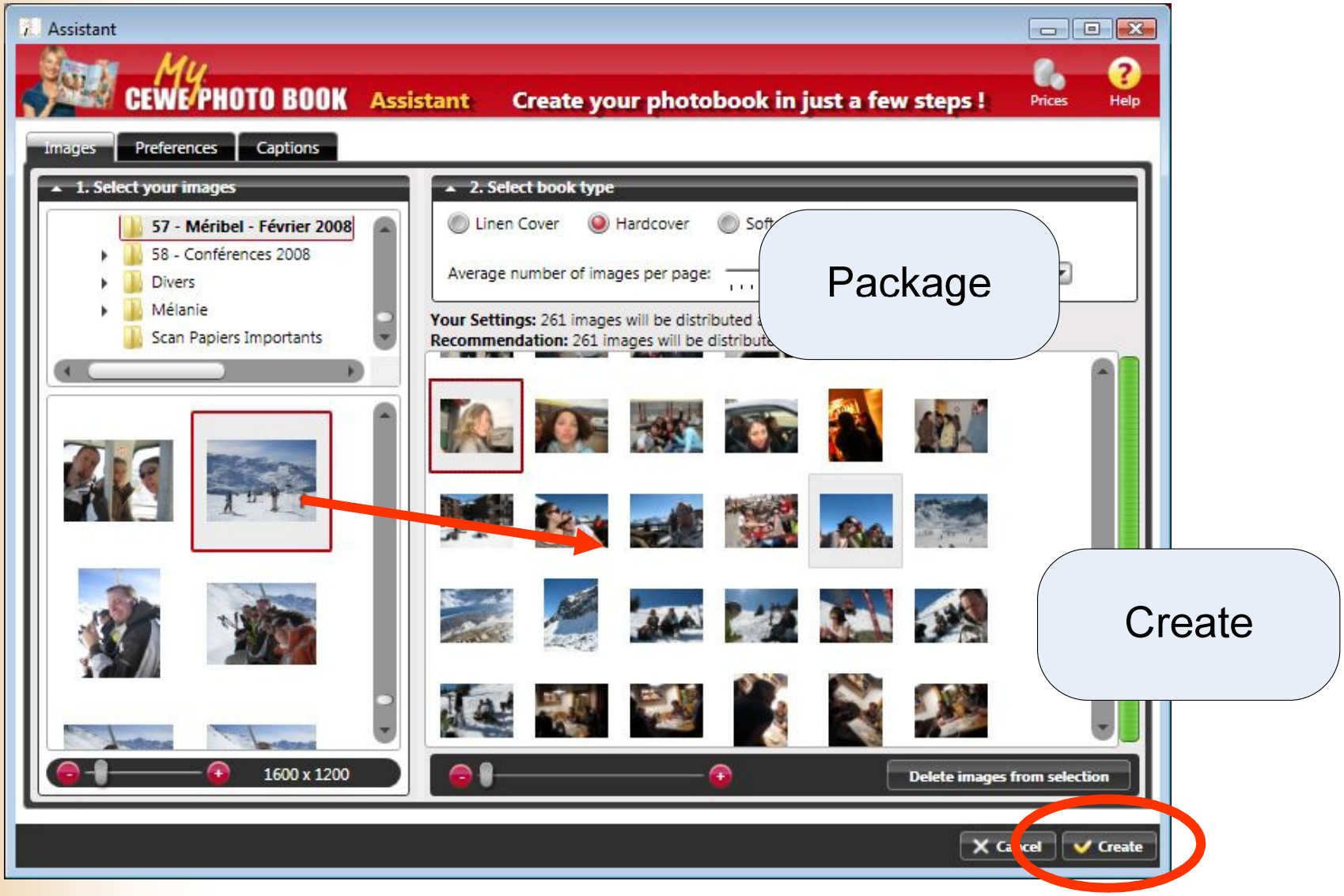
CeWe Color PhotoBook Processes

- My winter ski holidays with my friends
- 

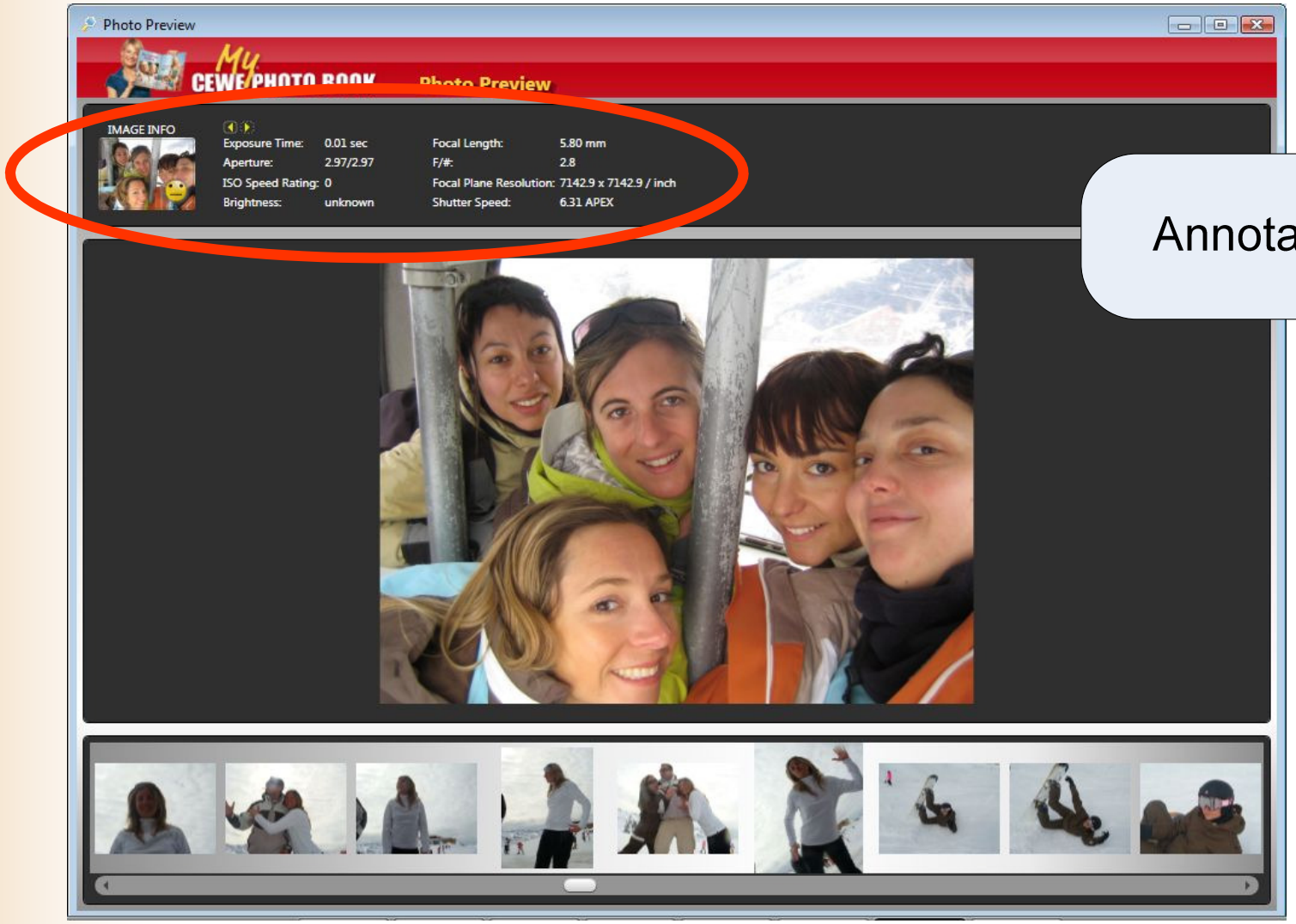
Premeditate

Construct Message

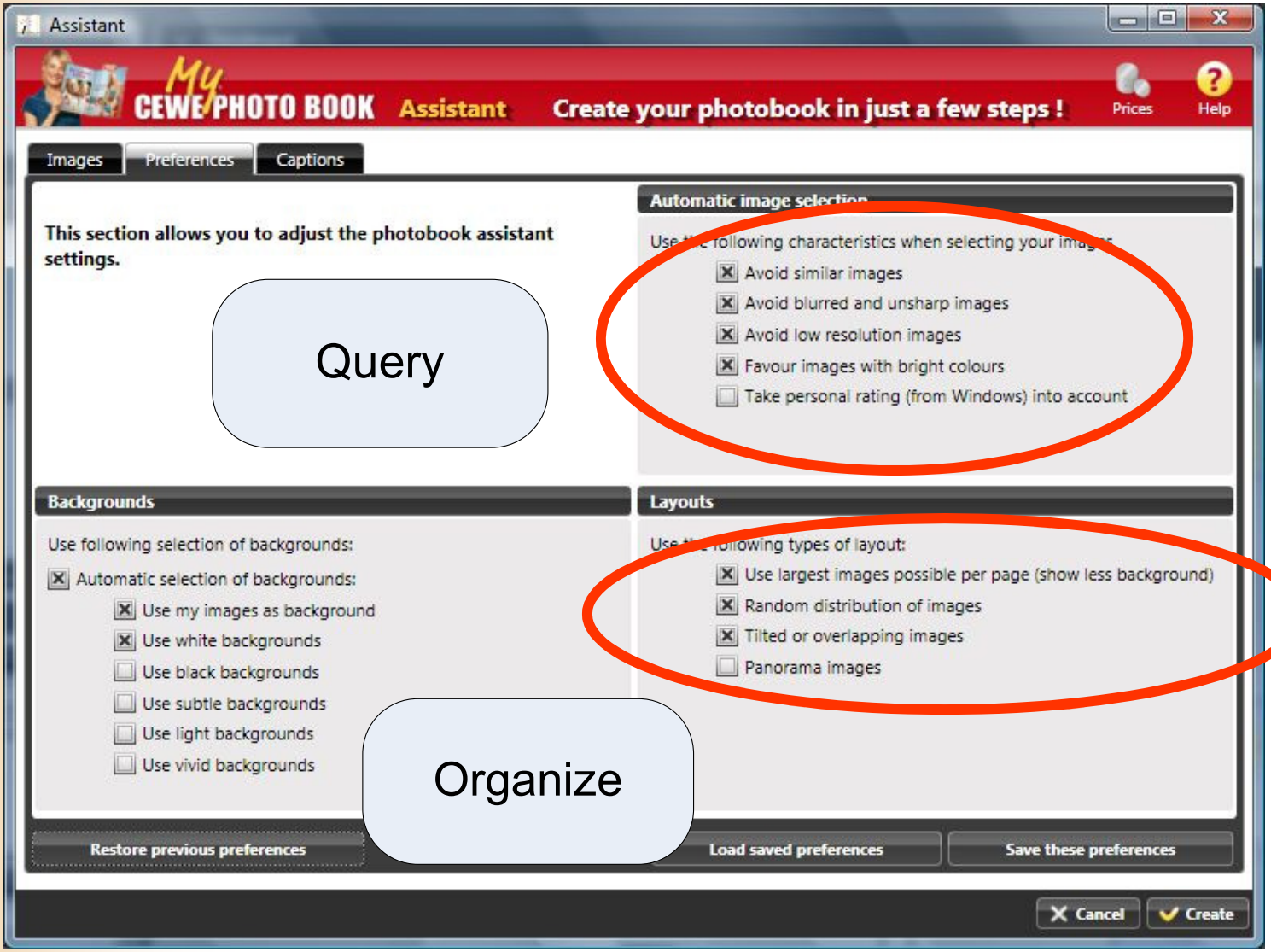
CeWe Color PhotoBook Processes

- 

CeWe Color PhotoBook Processes

- 

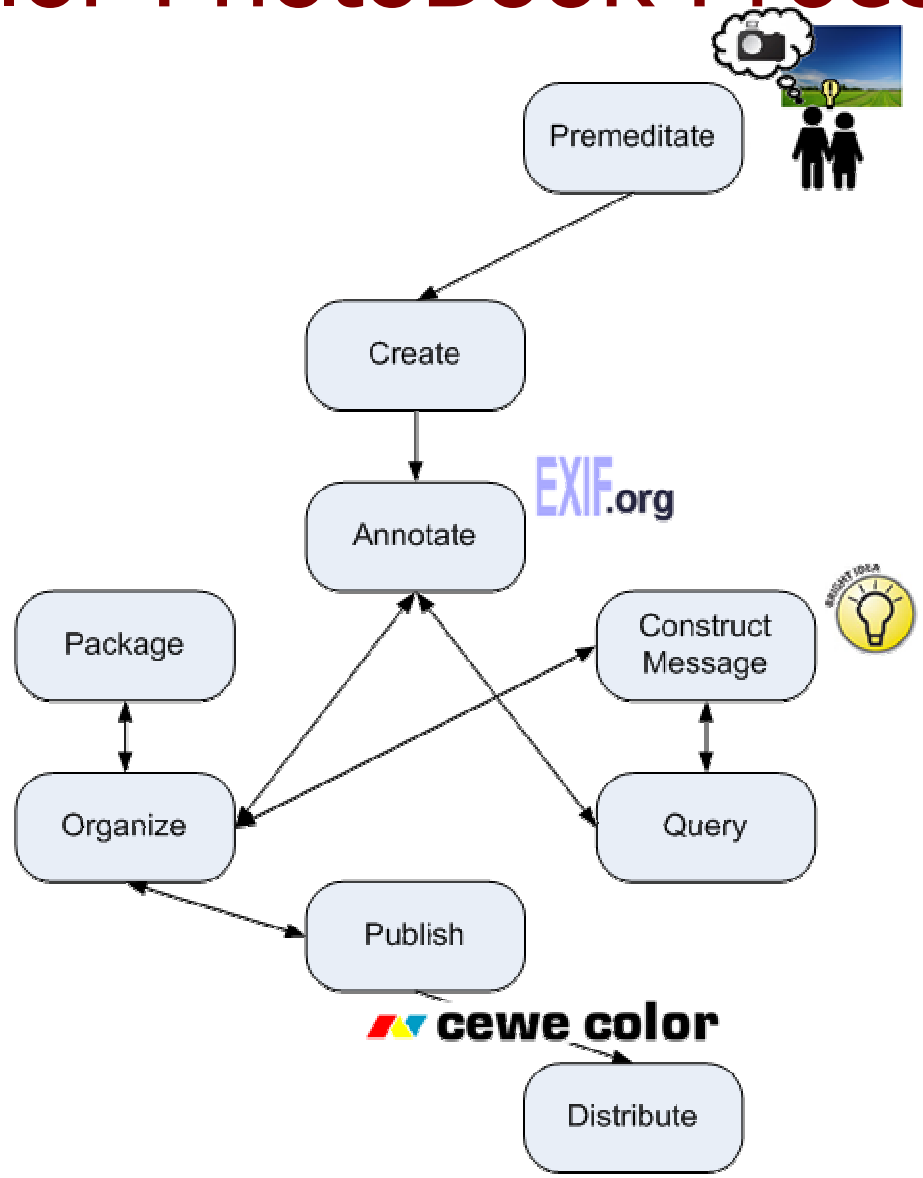
CeWe Color PhotoBook Processes

- 

CeWe Color PhotoBook Processes

- 

CeWe Color PhotoBook Processes



Example 2: Vox Populi Video Sequences Generation

Stefano Bocconi, Frank Nack

- **Interview with America**
  video footage with interviews and background material about the opinion of American people after 9-11
  http://www.interviewwithamerica.com
- Example question:
  What do you think of the war in Afghanistan?

"I am never a fan of military action, in the big picture I don't think it is ever a good thing, but I think there are circumstances in which I certainly can't think of a more effective way to counter this sort of thing…"

Vox Populi Premeditate Process

- Analogous to the pre-production process in the film industry
  - *Static* versus *dynamic* video artifact
- Output
  - Script, planning of the videos to be captured
  - Questions to the interviewee prepared
  - Profiles of the people interviewed: education, age, gender, race
  - Locations where the interviews take place

Premeditate

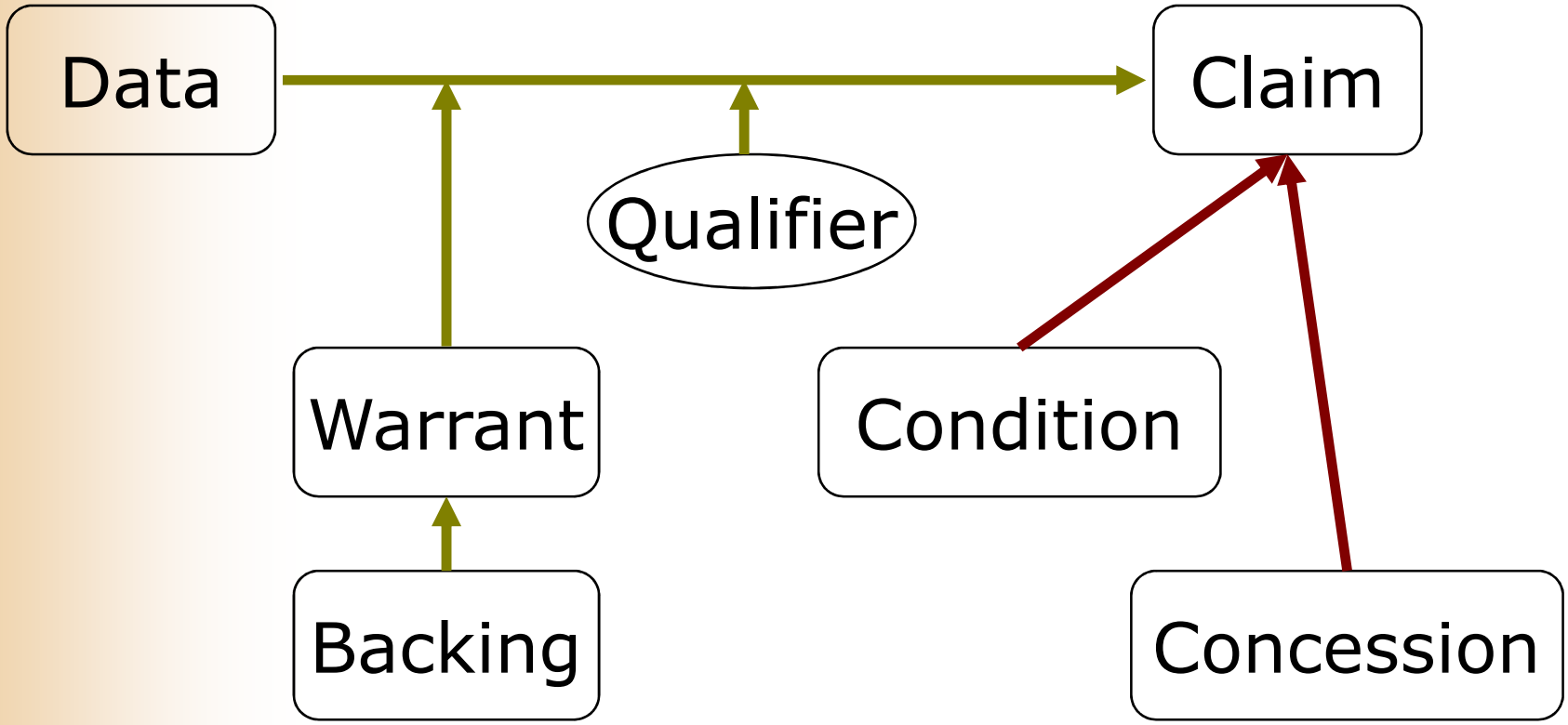
Vox Populi Annotations

- Contextual
  - Interviewee (social), locations
- Descriptive
  - Question asked and transcription of the answers
  - Filmic continuity, examples:
    - gaze direction of speaker (left, centre, right)
    - framing (close-up, medium shot, long shot)
- Rhetorical
  - Rhetorical Statement
  - Argumentation model: Toulmin model

Vox Populi Statement Annotations

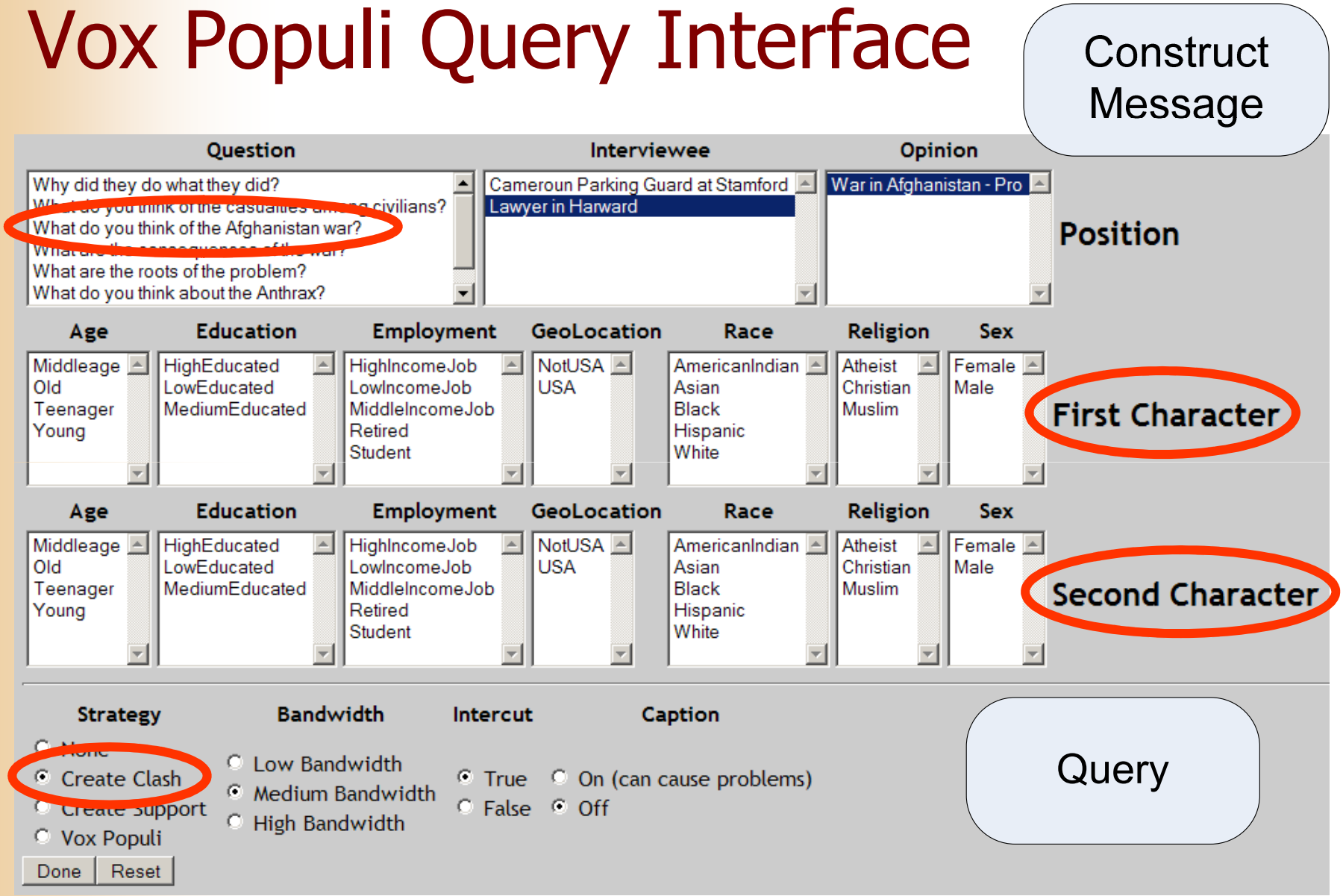
- Statement formally annotated:
  - <subject> <modifier> <predicate>
  - E.g. "**war best solution**"
- A thesaurus containing:
  - Terms on the topics discussed (155)
  - Relations between terms: *similar* (72), *opposite* (108), *generalization* (10), *specialization* (10)
  - E.g. **war** *opposite* **diplomacy**

Toulmin Model



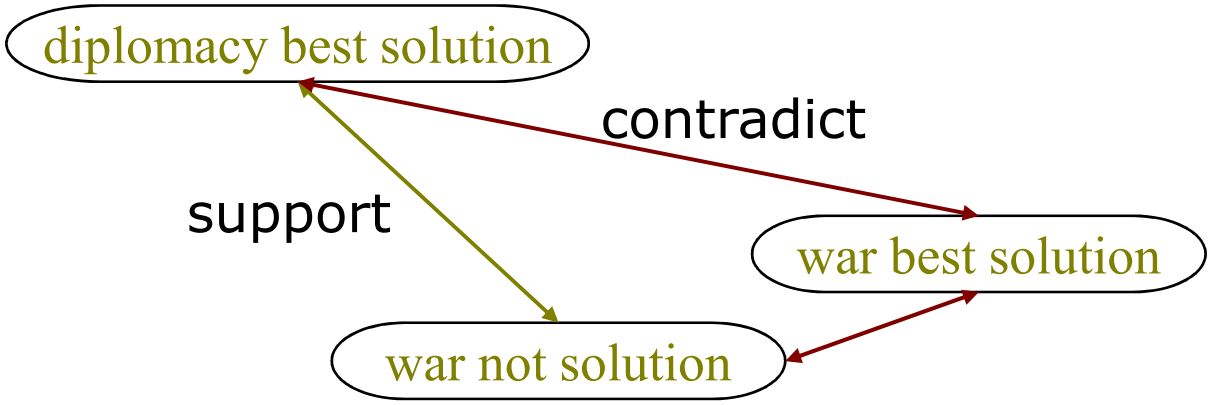
57 Claims, 16 Data, 4 Concessions,
3 Warrants, 1 Condition

Vox Populi Query Interface



Vox Populi Organize Process

- Using the thesaurus, create a graph of related statements
  - nodes are the statements (corresponding to video segments)
    "*war best solution*",
    "*diplomacy best solution*",
    "*war not solution*"
  - edges are either *support* or *contradict*



Result of Vox Populi Query

I am not a fan of military actions

I cannot think of a more effective solution

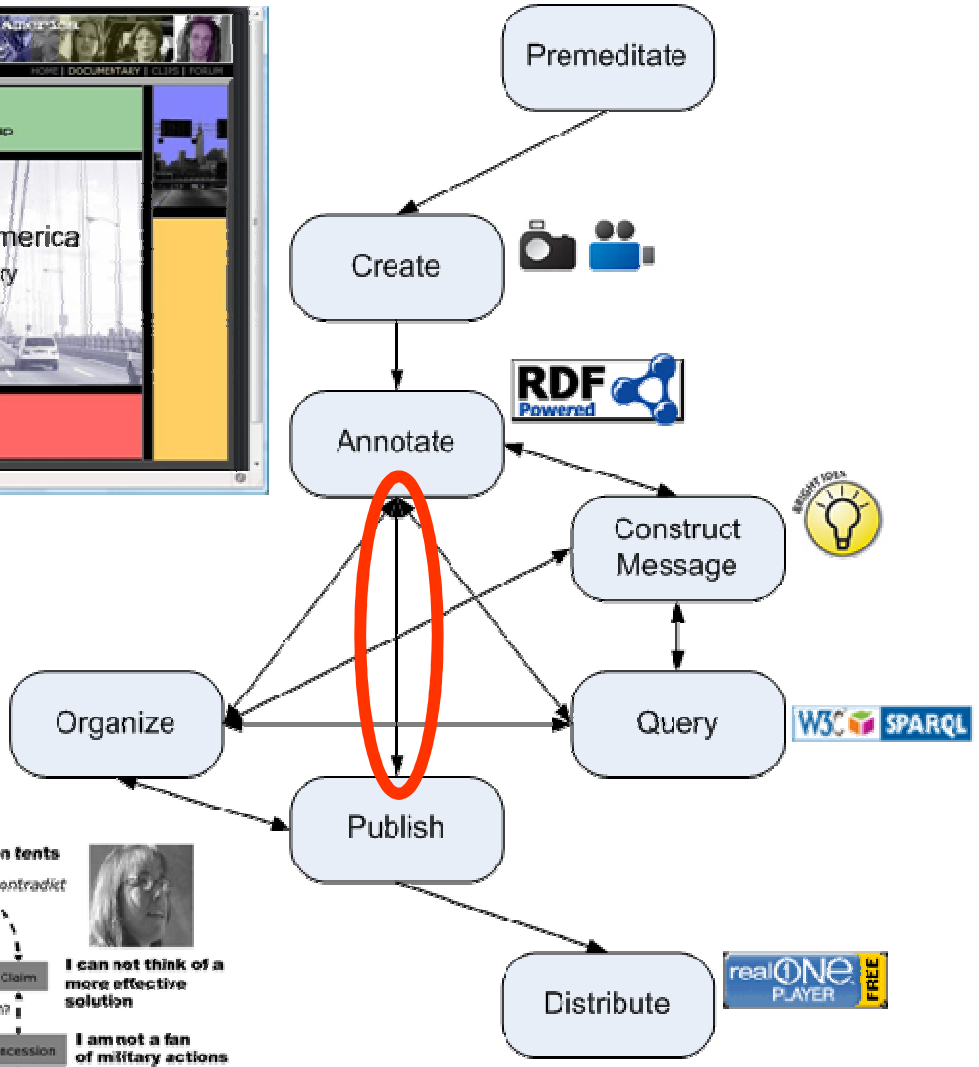
Publish

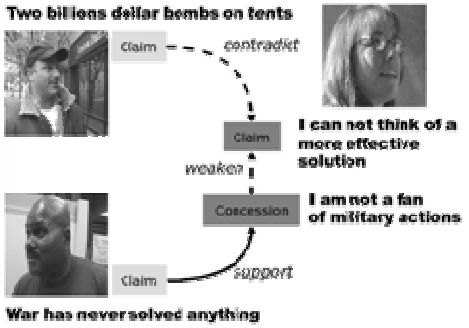
War has never solved anything

Two billions dollar bombs on tents

Distribute

Vox Populi Processes





Canonical Processes 101

- Canonical: reduced to the simplest and most significant form possible without loss of generality
- Each process
  - short description
  - illustrated with use cases
  - input(s), actor(s) & output(s)
- Formalization of processes in UML diagrams in paper (see literature list)

Premeditate

- Establish initial ideas about media production
  - *Design a photo book of my last holidays for my family*
  - *Create argument-based sequences of videos of interviews after September 11*
- Inputs: ideas, inspirations from human experience
- Actors:
  - camera owner
  - group of friends
- Outputs:
  - decision to take camera onto ski-slope
  - structured set of questions and locations for interviews

Create Media Asset

- Media assets are captured, generated or transformed
  - Photos taken at unspecified moments at holiday locations
  - Synchronized audio video of interviewees responding to fixed questions at many locations
- Inputs:
  - decision to take camera onto ski-slope;
  - structured set of questions and locations for interviews
- Actors:
  - (video) camera, editing suite
- Outputs:
  - images, videos

Annotate

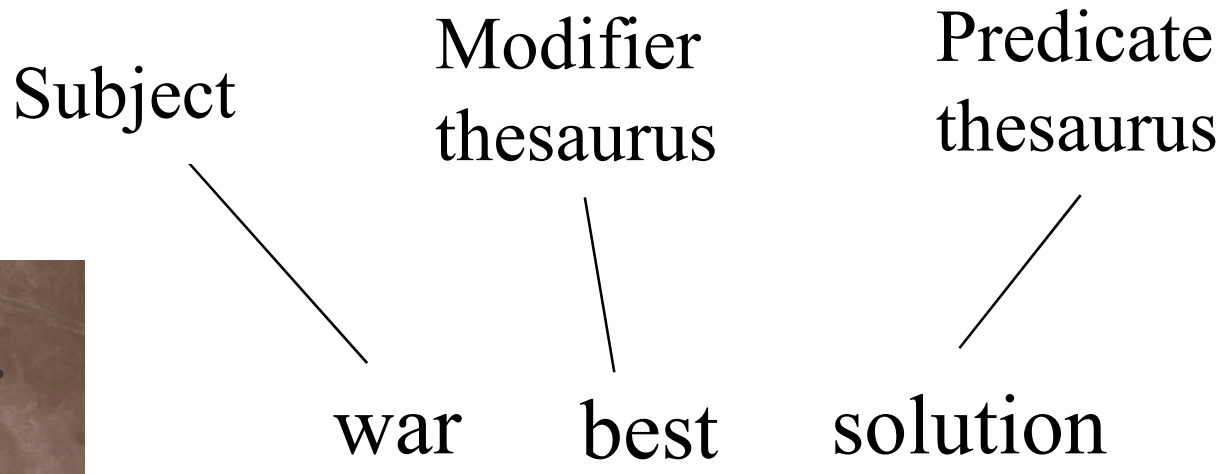
- Annotation is associated with asset
- Inputs:
  - photo, video, existing annotation
  - optional thesaurus of terms
- Actors:
  - human, feature analysis program
- Outputs:
  - Complex structure associating annotations with images, videos

Q: "What do you think of the Afghanistan war?"

Speaker: Female, Caucasian…

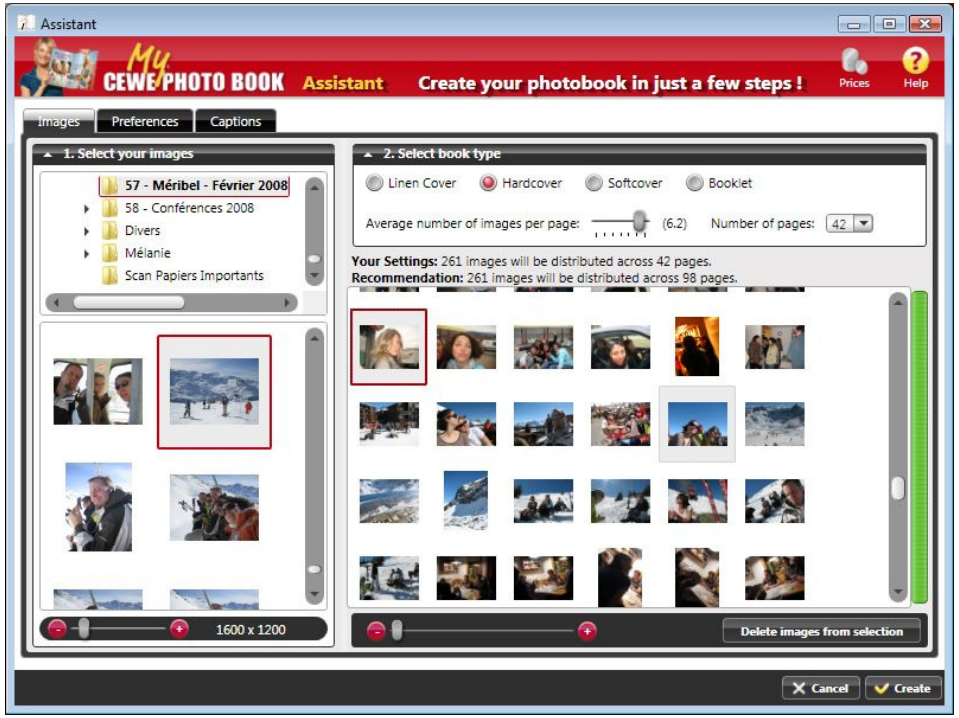
Semantic Annotate

- Annotation uses existing controlled vocabularies
  - *Subject matter annotations of your photos (COMM, XMP)*
  - *Rhetorical annotations in Vox Populi*



Package

- Process artifacts are packed logically or physically
- Useful for storing collections of media after capturing…
- … before selecting subset for further stages



Query

- User retrieves a set of process artifacts based on a user-specified query
- Inputs:
  - user query, in terms of annotations or by example
  - collection(s) of assets
- Actors:
  - human
- Output:
  - subset of assets plus annotations (in no order)

Construct Message

- Author specifies the message they wish to convey
  - *Our holiday was sporty, great weather and fun*
  - *Create clash about whether war is a good thing*
- Inputs: ideas, decisions, available assets
- Actors:
  - author
- Outputs:
  - the message that should be conveyed by the assets

Organize

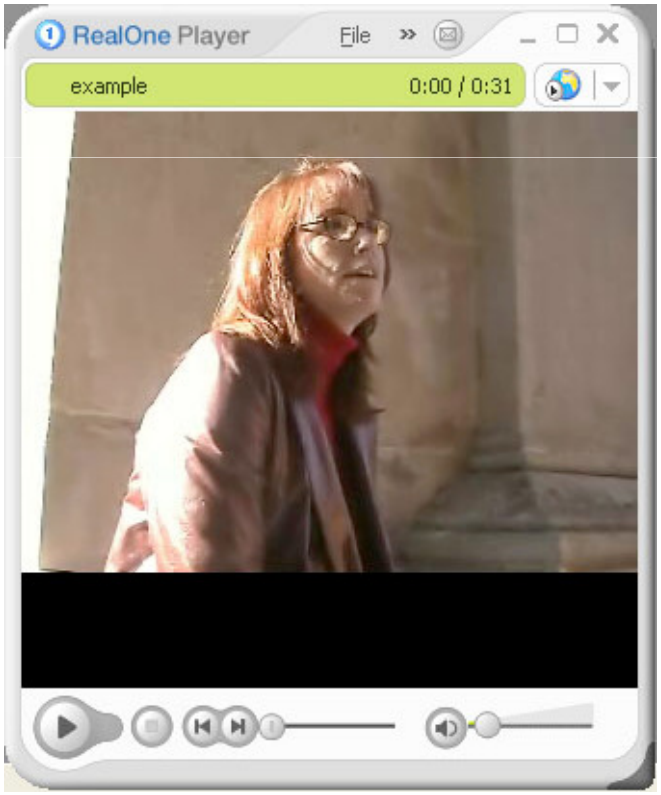
- Process where process artifacts are organized according to the message
  - *Organize a number of 2-page layouts in photobook*
  - *Use semantic graph to select related video clips to form linear presentation of parts of argument structure*
- Inputs: set of assets and annotations (e.g. output from query process)
- Actors: human or machine
- Outputs: document structure with recommended groupings and orderings for assets

Publish

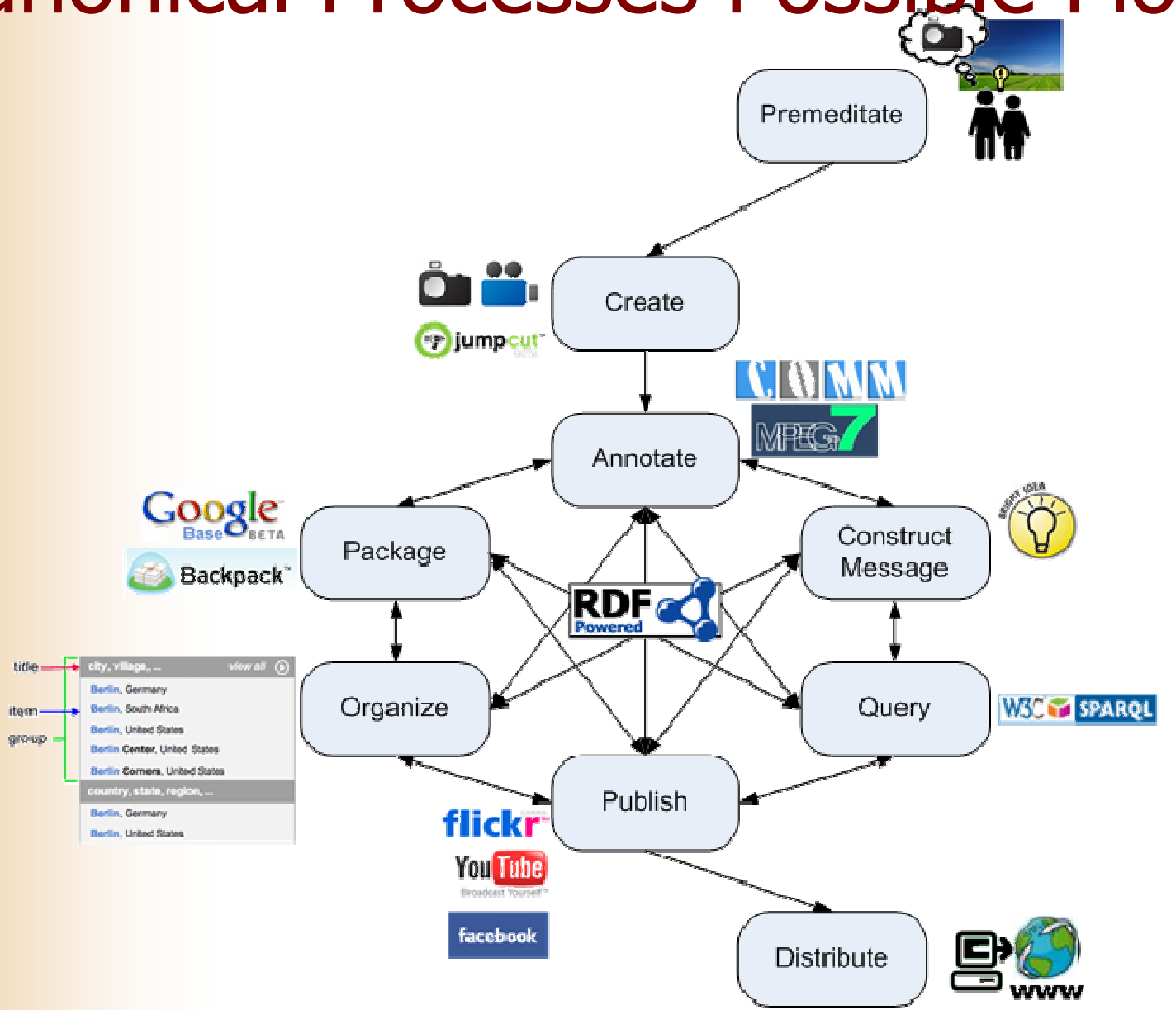
- Presentation is created
  - associated annotations may be removed
  - *create proprietary format of photobook for upload*
  - *create SMIL file containing videos and timing information*
- Inputs: set of assets and annotations (e.g. output from organize process)
- Actors: human or machine
- Outputs:
  - final presentation in specific document format, such as html, smil or pdf

Distribute

- Presentation is transported to end user, end-user can view and interact with it
  - *photobook uploaded to printer, printed then posted to user*
  - *SMIL file is downloaded to client and played*
- Inputs: published document (output from publish process)
- Actors: distribution hardware and software
- Outputs:
  - media assets presented on user's device



Canonical Processes Possible Flow



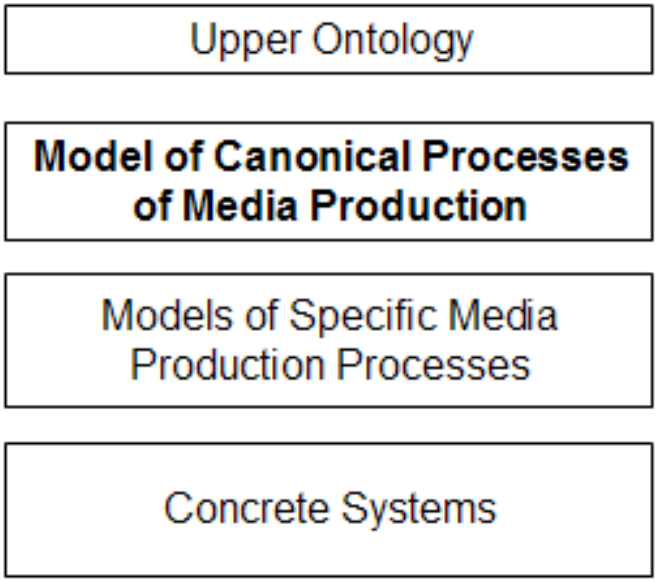
Sum Up

- Community agreement, not "yet another model"
- Large proportion of the functionality provided by multimedia applications can be described in terms of this model
- Initial step towards the definition of open web-based data structures for describing and sharing semantically annotated media assets

Discussion

- Frequently asked questions
  - Complex processes
  - Interaction
  - Complex artifacts and annotations can be annotated

- Towards a more rigorous formalization of model
  - Relationship to foundational ontologies
  - Semantics of Annotations



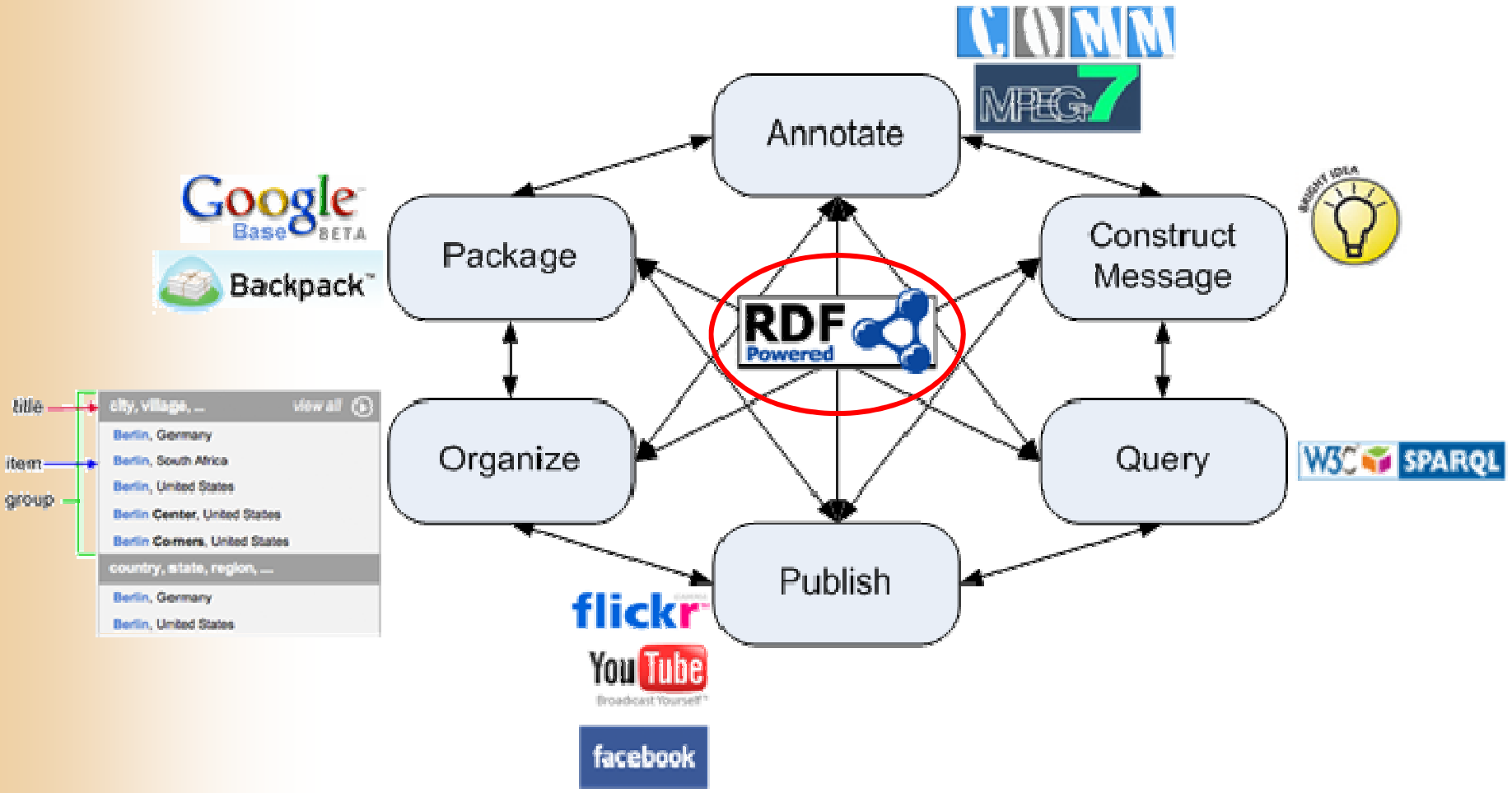
Literature

- Lynda Hardman: *Canonical Processes of Media Production*. In Proceedings of the ACM Workshop on Multimedia for Human Communication - From Capture to Convey (MHC 05), November 2005.
- Special Issue on Canonical Processes of Media Production http://www.springerlink.com/content/j0l4g337581652t1/ http://www.cwi.nl/~media/projects/canonical/
- Lynda Hardman, Zeljko Obrenovic, Frank Nack, Brigitte Kerhervé and Kurt Piersol: *Canonical Processes of Semantically Annotated Media Production*. In Multimedia Systems Journal, 2008 (*to appear*)
- Philipp Sandhaus, Sabine Thieme and Susanne Boll: *Canonical Processes in Photo Book Production*. In Multimedia Systems Journal, 2008 (*to appear*)
- Stefano Bocconi, Frank Nack and Lynda Hardman: *Automatic generation of matter-of-opinion video documentaries*. In Journal of Web Semantics, 6(2), p139-150, 2008.

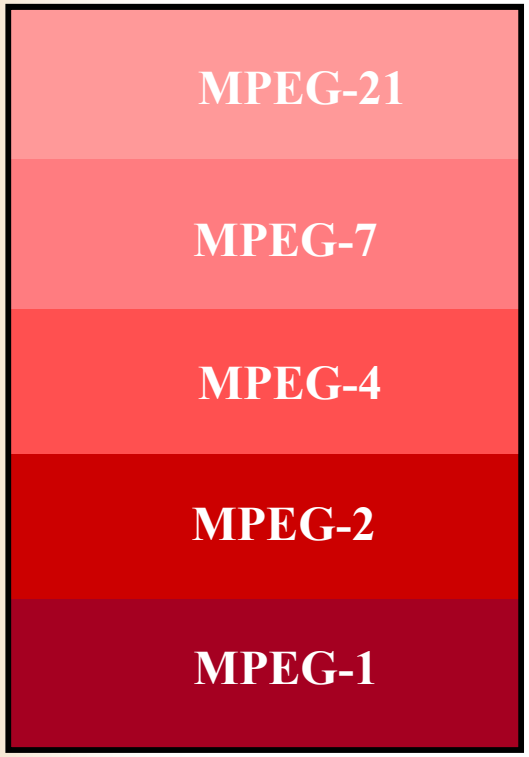
Agenda

1. Understanding Multimedia Applications Workflow
   - CeWe Color Photo Book creation application
   - Vox Populi argumentative video sequences generation system
   - *The Canonical Processes of Media Production*
2. Semantic Annotation of Multimedia Content
   - Multimedia metadata formats: use cases and requirements
   - Multimedia metadata interoperability issues
   - MPEG-7 based ontologies
   - *COMM: A Core Ontology for MultiMedia*
3. Semantic Search and Presentation of Multimedia Content
   - Link your data!
   - *Searching and Browsing Multimedia Semantic Datasets with Cliopatria*

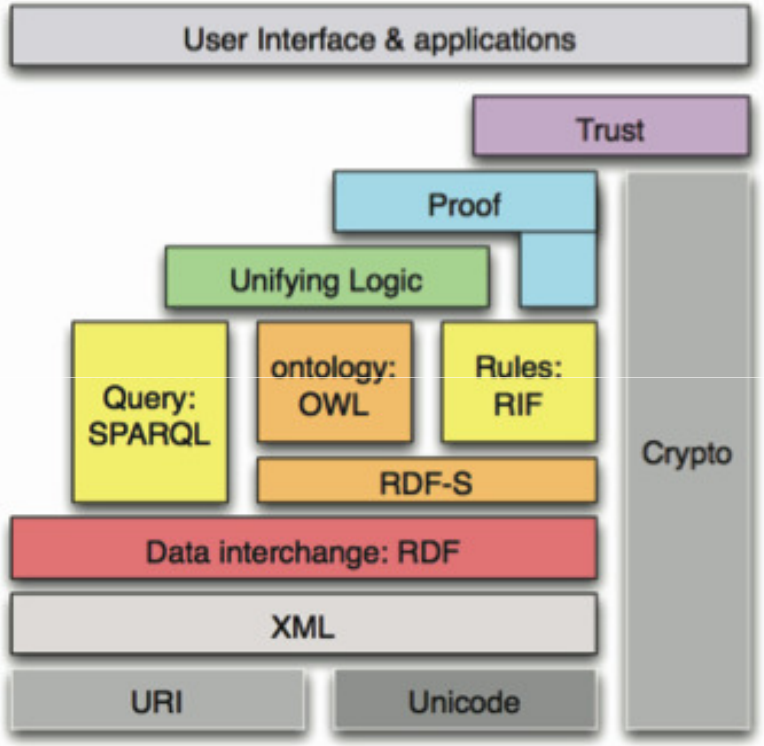
The Importance of the Annotations



Multimedia: Description methods



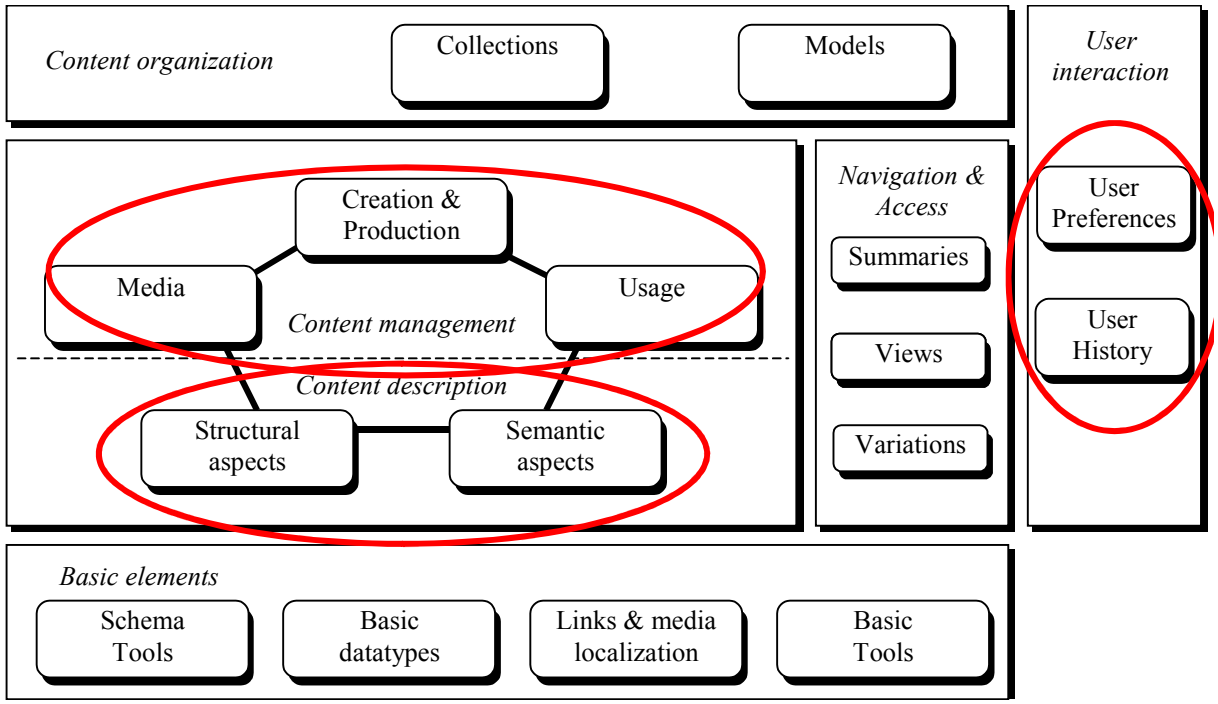
ISO



W3C

MPEG-7: a multimedia description language?

- ISO standard since December of 2001
- Main components:
  - Descriptors (Ds) and Description Schemes (DSs)
  - DDL (XML Schema + extensions)
- Concern all types of media



Part 5 – MDS
Multimedia Description Schemes

MPEG-7 and the Semantic Web

- MDS Upper Layer represented in RDFS
  - 2001: Hunter
  - Later on: link to the ABC upper ontology
- MDS fully represented in OWL-DL
  - 2004: Tsinaraki et al., DS-MIRF model
- MPEG-7 fully represented in OWL-DL
  - 2005: Garcia and Celma, Rhizomik model
  - Fully automatic translation of the whole standard
- MDS and Visual parts represented in OWL-DL
  - 2007: Arndt et al., COMM model
  - Re-engineering MPEG-7 using DOLCE design patterns

Requirements [aceMedia, MMSEM XG]

- MPEG-7 compliance
  - Support most descriptors (decomposition, visual, audio)
- Syntactic and Semantic interoperability
  - Shared and formal semantics represented in a Web language (OWL, RDF/XML, RDFa, etc.)
- Separation of concerns
  - Domain knowledge versus multimedia specific information
- Modularity
  - Enable customization of multimedia ontology
- Extensibility
  - Enable inclusion of further descriptors (non MPEG-7)

MPEG-7 Based Ontologies

	Hunter	DS-MIRF	Rhizomik	COMM
Foundational Ontologies	ABC	None	None	DOLCE
Complexity	OWL-Full	OWL-DL	OWL-DL	OWL-DL
Coverage	MDS+Visual	MDS+CS	All	MDS+Visual
Applications	Digital Libraries	Digital Libraries	Digital Rights	MM Analysis

Common Scenario

The "Big Three" at the Yalta Conference (Wikipedia)

Common Scenario: Tagging Approach

Reg1

The "Big Three" at the Yalta Conference (Wikipedia)

- Localize a region
  - Draw a bounding box, a circle around a shape
- Annotate the content
  - Interpret the content
  - Tag: Winston Churchill, UK Prime Minister, Allied Forces, WWII

Common Scenario: SW Approach

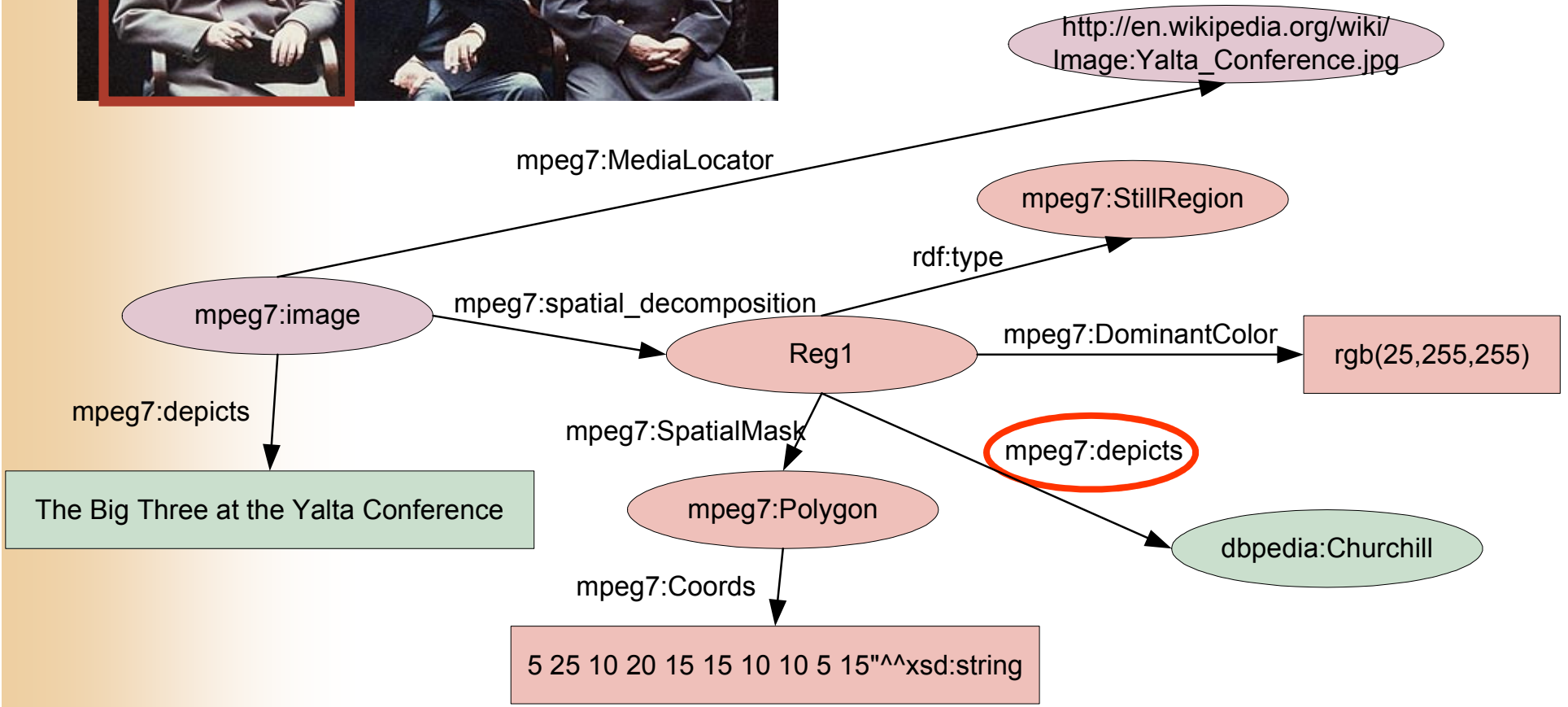
Reg1

The "Big Three" at the Yalta Conference (Wikipedia)

- Localize a region
  - Draw a bounding box, a circle around a shape
- Annotate the content
  - Interpret the content
  - Link to knowledge on the Web

```
:Reg1 foaf:depicts dbpedia:Winston_Churchill
dbpedia:Winston_Churchill skos:altLabel
        "Sir Winston Leonard Spencer-Churchill"
dbpedia:Winston_Churchill rdf:type foaf:Person
```

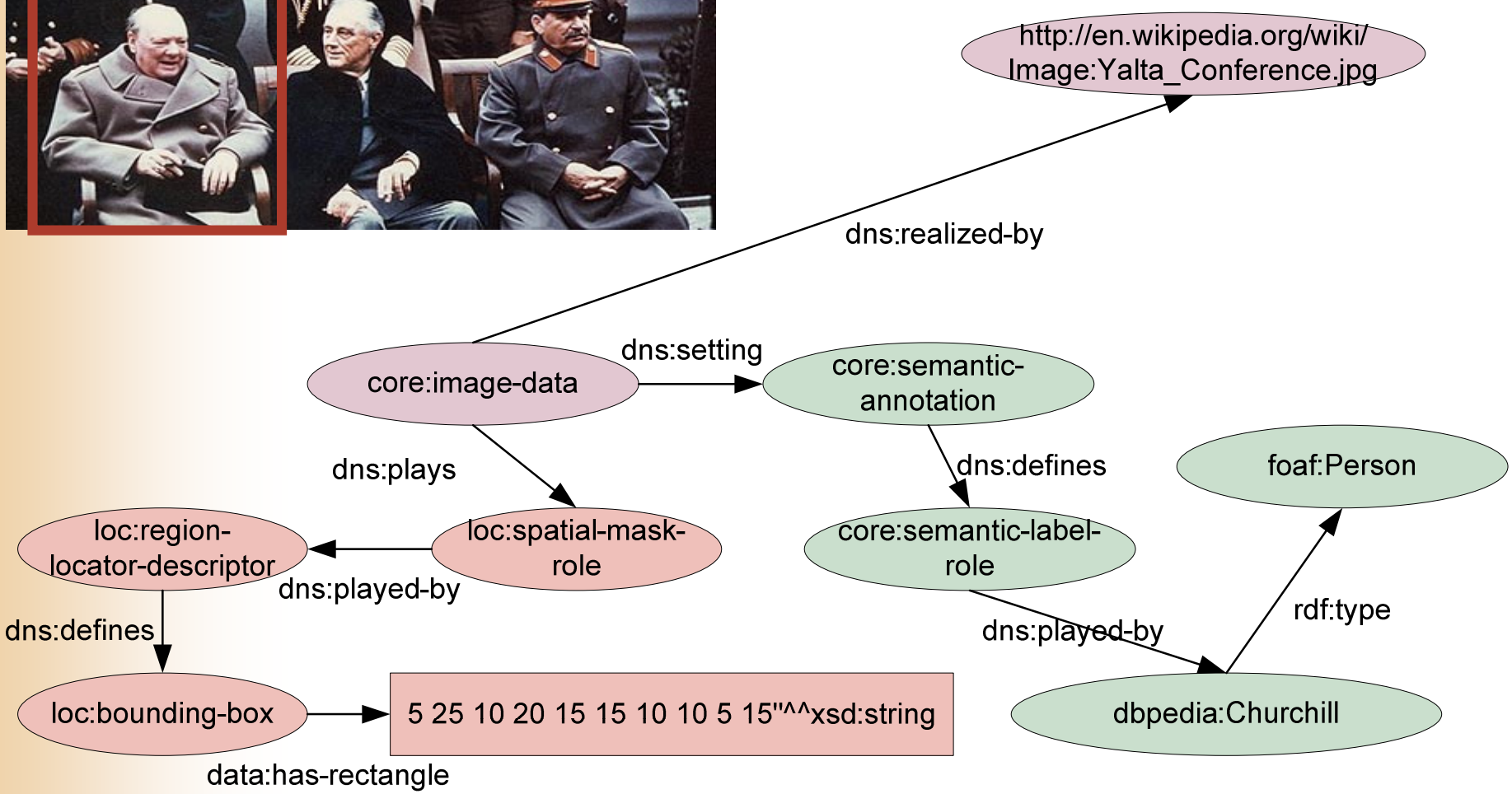
Hunter's MPEG-7 Ontology



DS-MIRF MPEG-7 Ontology

Rhizomik MPEG-7 Ontology

COMM: Fragment Identification



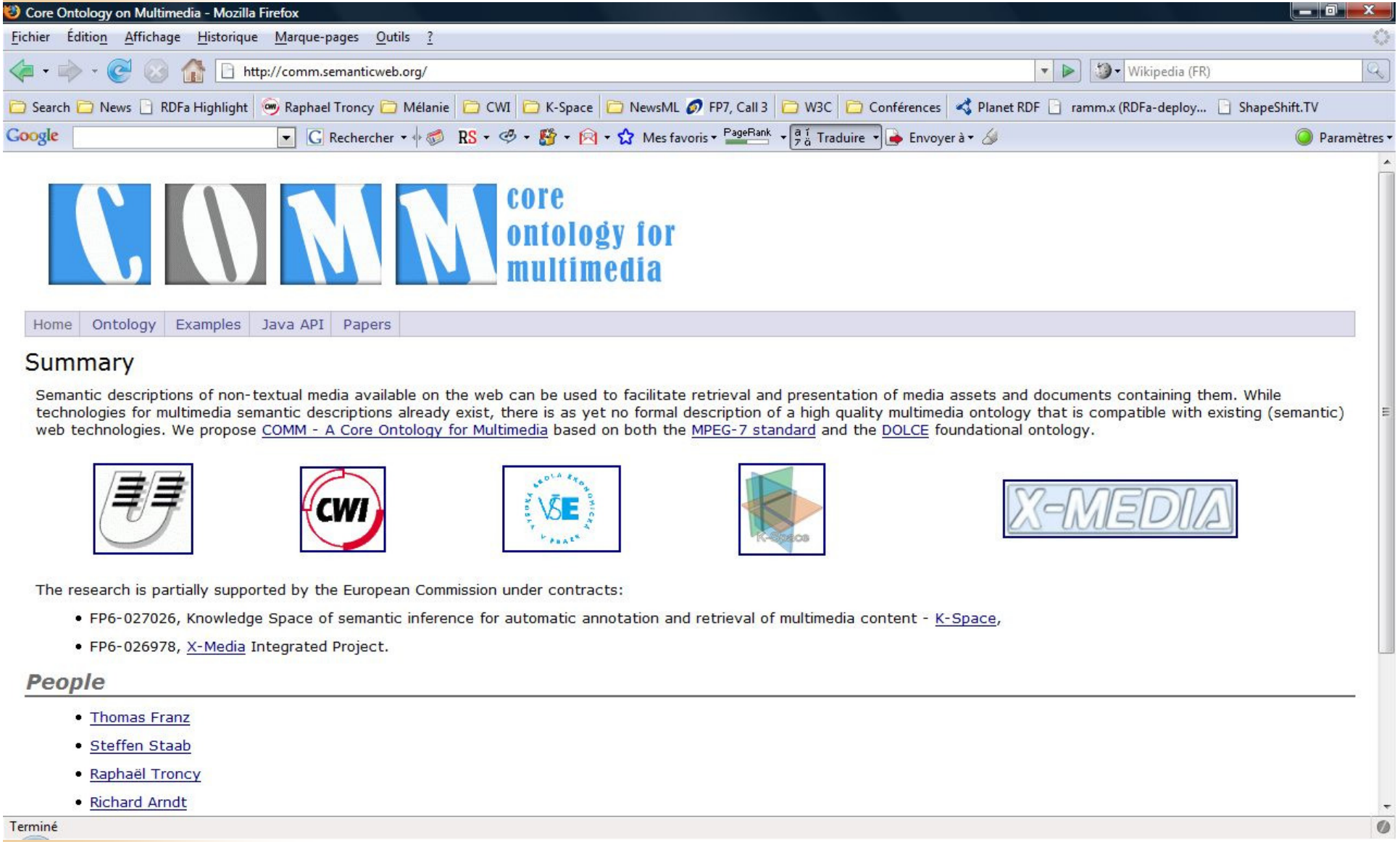
Comparison

- Link with domain semantics
  - Hunter: ABC model + `mpeg7:depicts` relationship
  - DS-MIRF: Domain ontologies needs to subclass the general MPEG-7 categories
  - Rhizomik: Use the `mpeg7:semantic` relationship
  - COMM: Semantic Annotation pattern
- MPEG-7 coverage
  - Hunter: extension of the MPEG-7 visual descriptors
  - COMM:
    - Formalization of the context of the annotation
    - Representation of the method (algorithm) that provides the annotation

Comparison

- Modeling Decisions:
  - DS-MIRF and Rhizomik: 1-to-1 translation from MPEG-7 to OWL/RDF
  - Hunter: Simplification and link to the ABC upper model
  - COMM: NO 1-to-1 translation
    - Need for patterns: use DOLCE, a well designed foundational ontology as a modeling basis
- Scalability:

	Hunter	DS-MIRF	Rhizomik	COMM
Triples	11	27	20	19


Core Ontology on Multimedia - Mozilla Firefox
Fichier Édition Affichage Historique Marque-pages Outils ?
http://comm.semanticweb.org/
Wikipedia (FR)
Search News RDFa Highlight Raphael Troncy Mélanie CWI K-Space NewsML FP7, Call 3 W3C Conférences Planet RDF ramm.x (RDFa-deploy... ShapeShift.TV
Google Rechercher Mes favoris PageRank Traduire Envoyer à Paramètres
COMM core ontology for multimedia
Home Ontology Examples Java API Papers
Summary
Semantic descriptions of non-textual media available on the web can be used to facilitate retrieval and presentation of media assets and documents containing them. While technologies for multimedia semantic descriptions already exist, there is as yet no formal description of a high quality multimedia ontology that is compatible with existing (semantic) web technologies. We propose COMM - A Core Ontology for Multimedia based on both the MPEG-7 standard and the DOLCE foundational ontology.
CWI
X-MEDIA
The research is partially supported by the European Commission under contracts:
FP6-027026, Knowledge Space of semantic inference for automatic annotation and retrieval of multimedia content - K-Space,
FP6-026978, X-Media Integrated Project.
People
Thomas Franz
Steffen Staab
Raphaël Troncy
Richard Arndt
Terminé

Scenario: Image

Reg1

The "Big Three" at the Yalta Conference (Wikipedia)

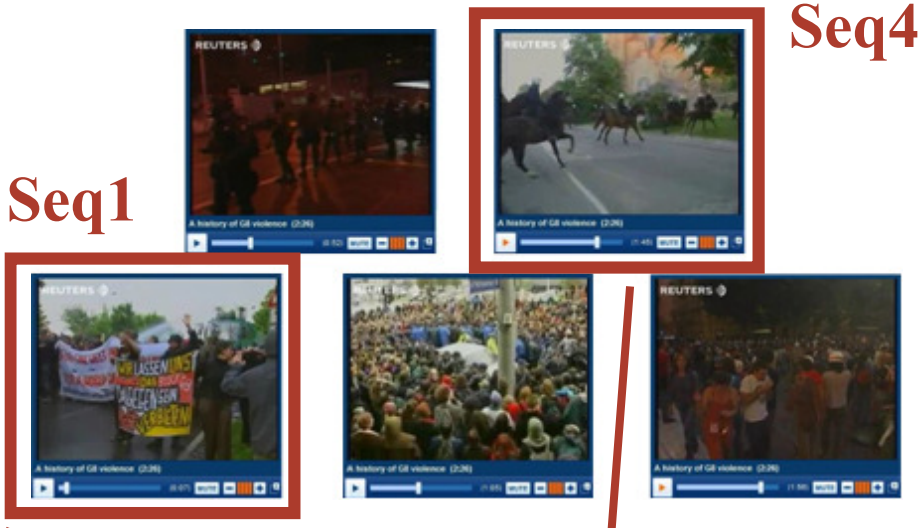
- Localize a region (bounding box)
- Annotate the content (interpretation)
  - Tag: Winston Churchill, UK Prime Minister, Allied Forces, WWII
  - Link to knowledge on the Web

```
:Reg1 foaf:depicts dbpedia:Winston_Churchill

dbpedia:Winston_Churchill skos:altLabel
        "Sir Winston Leonard Spencer-Churchill"

dbpedia:Winston_Churchill rdf:type foaf:Person
```

Scenario: Video



A history of G8 violence (video)
(© Reuters)

- Localize a region
- Annotate the content
  - Tag: G8 Summit, Heiligendamn, 2007
  - Link to knowledge on the Web

EU Summit, Gothenburg, 2001

```
:Seq1 foaf:depicts dbpedia:34th_G8_Summit
:Seq4 foaf:depicts dbpedia:EU_Summit
geo:Heilegendamn skos:broader geo:Germany
```

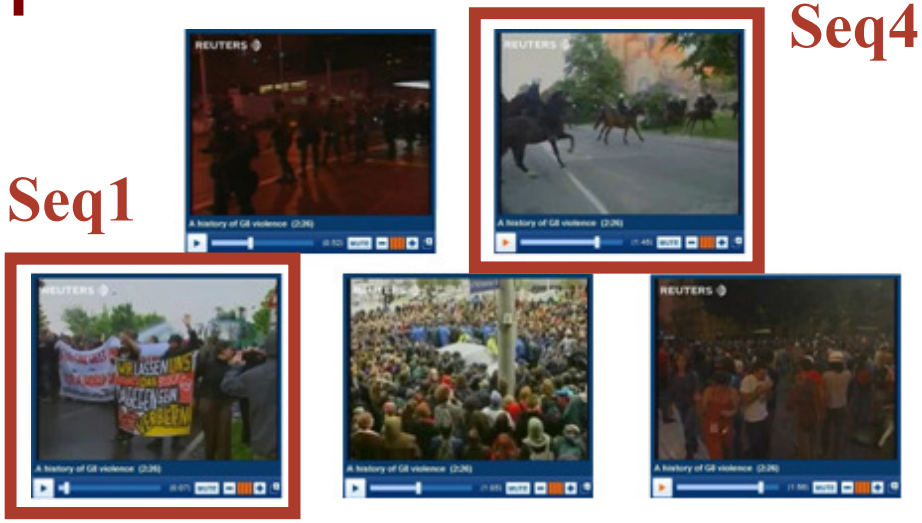
Research Problem

Reg1

The "Big Three" at the Yalta Conference (Wikipedia)

Seq1

Seq4



A history of G8 violence (video) (© Reuters)

- Multimedia objects are complex
  - Compound information objects, fragment identification

⇨ **MPEG-7**

- Semantic annotation
  - Subjective interpretation, context dependent

⇨ **D&S | OIO**

- Linked data principle
  - Open to reuse existing knowledge

⇨ **RDF**

COMM: Design Rationale

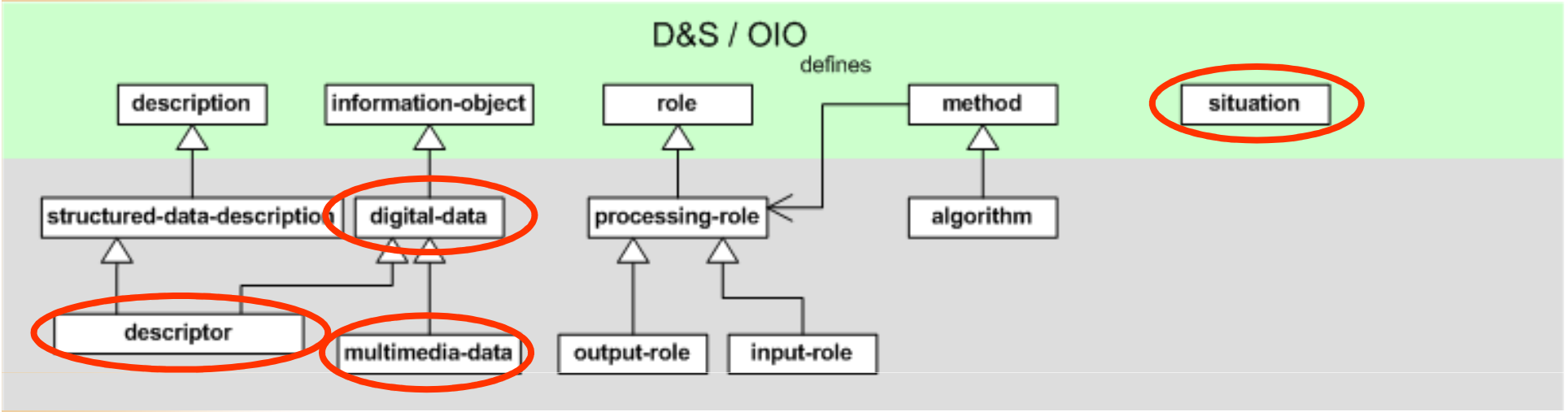
- Approach:
  - NO 1-to-1 translation from MPEG-7 to OWL/RDF
  - Need for patterns: use DOLCE, a well designed foundational ontology as a modeling basis
- Design patterns:
  - Ontology of Information Objects (OIO)
    - Formalization of information exchange
    - Multimedia = complex compound information objects
  - Descriptions and Situations (D&S)
    - Formalization of context
    - Multimedia = contextual interpretation (situation)
- Define **multimedia patterns** that translate MPEG-7 in the DOLCE vocabulary

COMM: Core Functionalities

- Most important MPEG-7 functionalities:
  - **Decomposition** of multimedia content into segments
  - **Annotation** of segments with metadata
    - Administrative metadata: creation & production
    - Content-based metadata: audio/visual descriptors
    - Semantic metadata: interface with domain specific ontologies

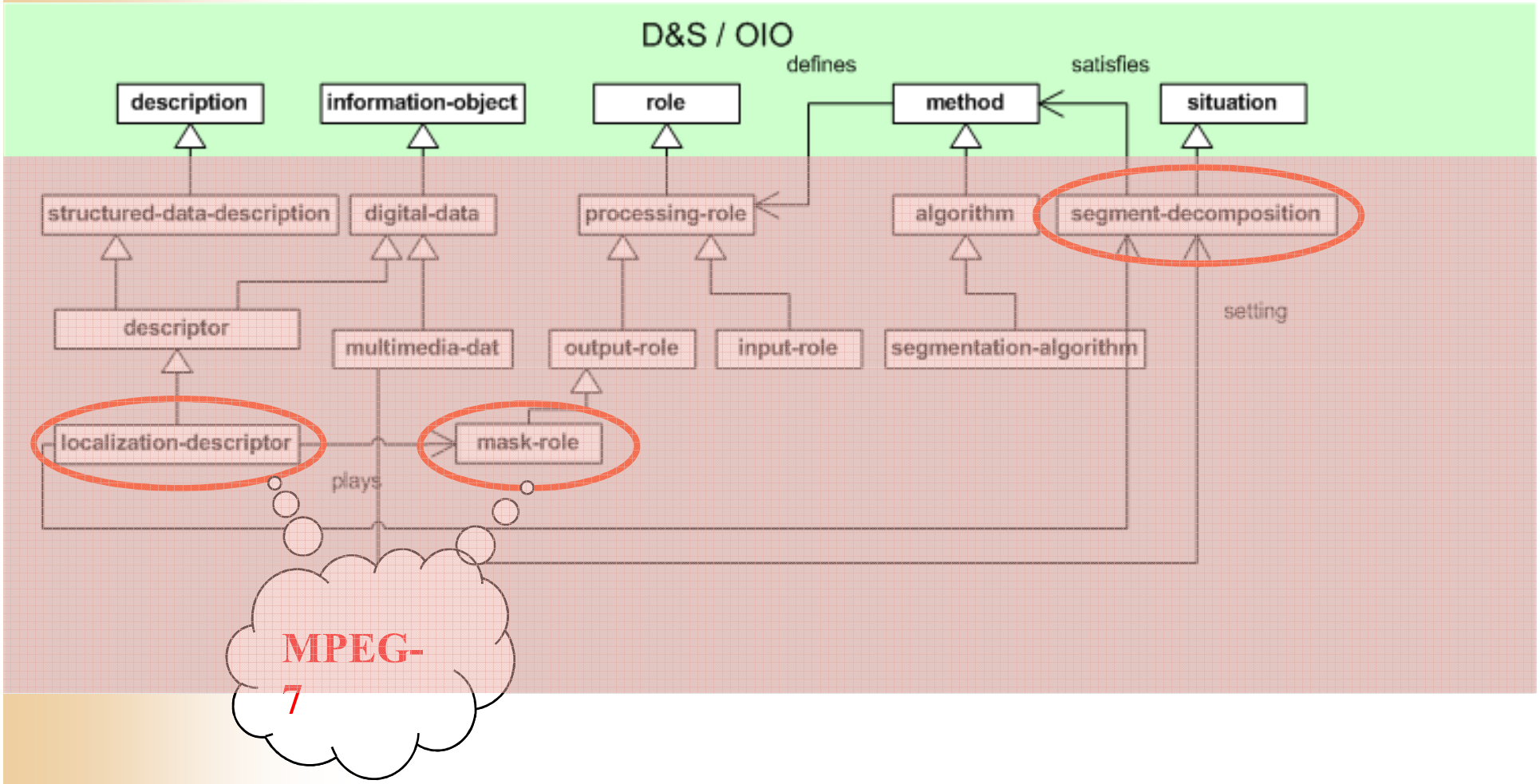
⇨ Note that all are subjective and context dependent situations

COMM: D&S / OIO Patterns

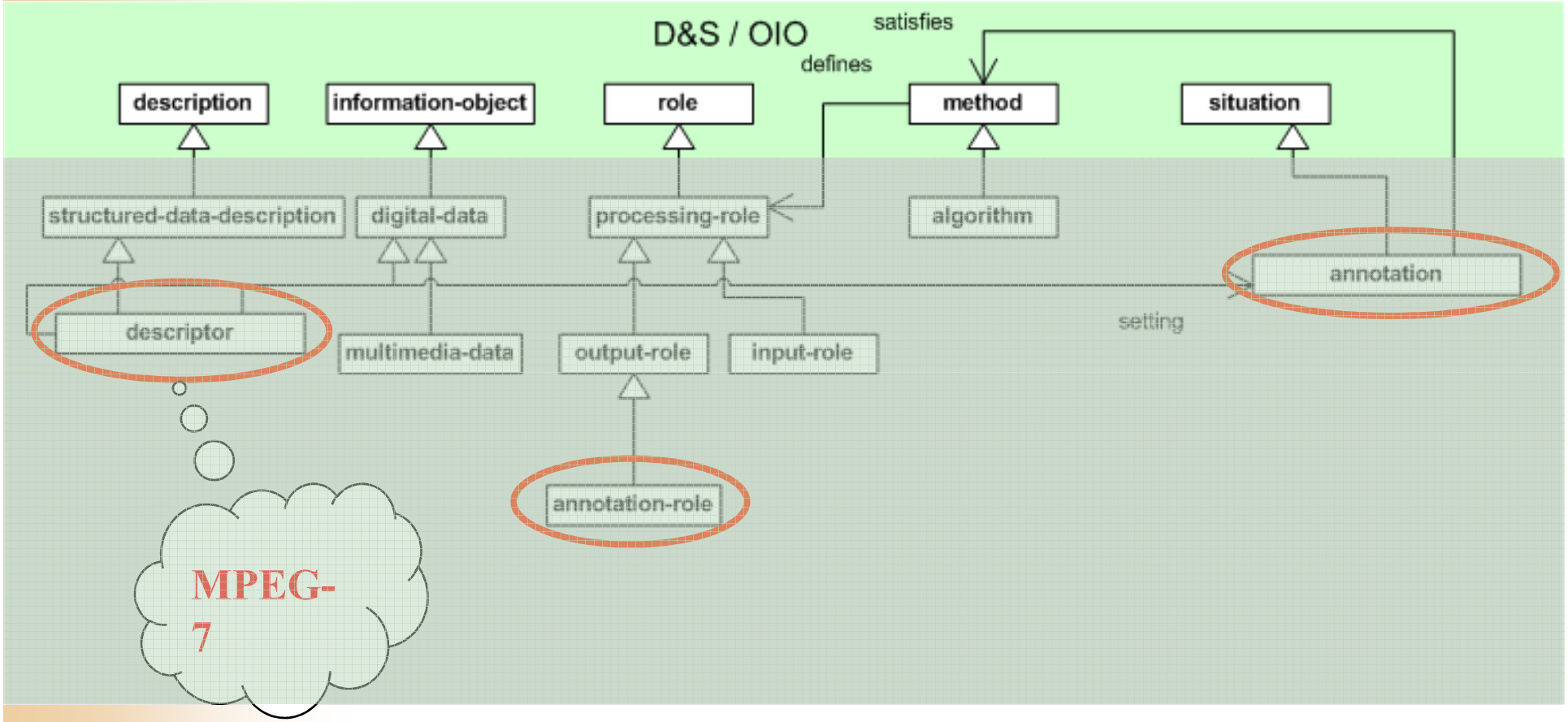


- Definition of design patterns for **decomposition** and **annotation** based on D&S and OIO
  - MPEG-7 describes digital data (*multimedia information objects*) with digital data (*annotation*)
  - *Digital data* entities are information objects
  - Decompositions and annotations are *situations* that satisfy the rules of a method or algorithm

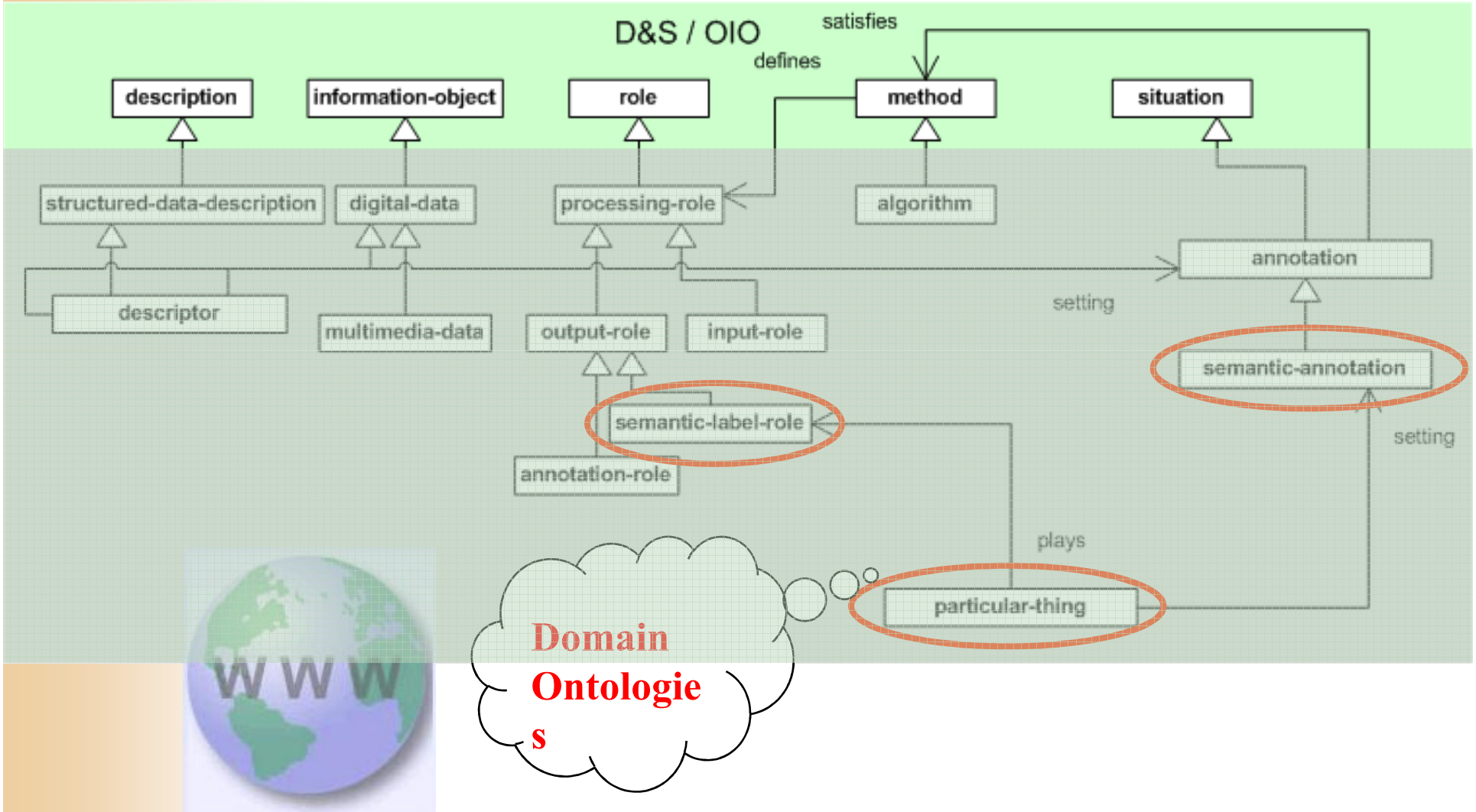
COMM: Decomposition Pattern



COMM: Annotation Pattern



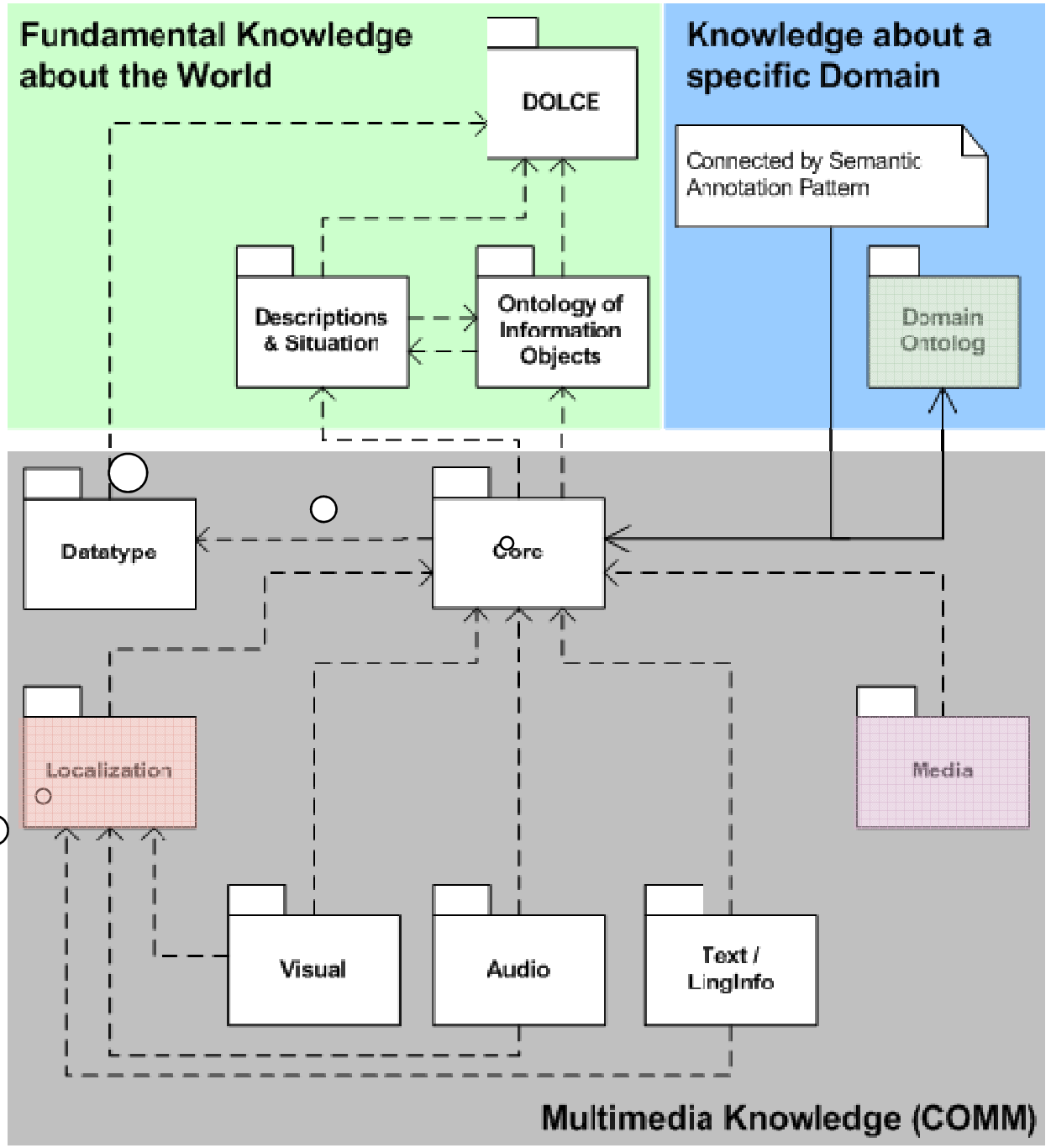
COMM: Semantic Pattern



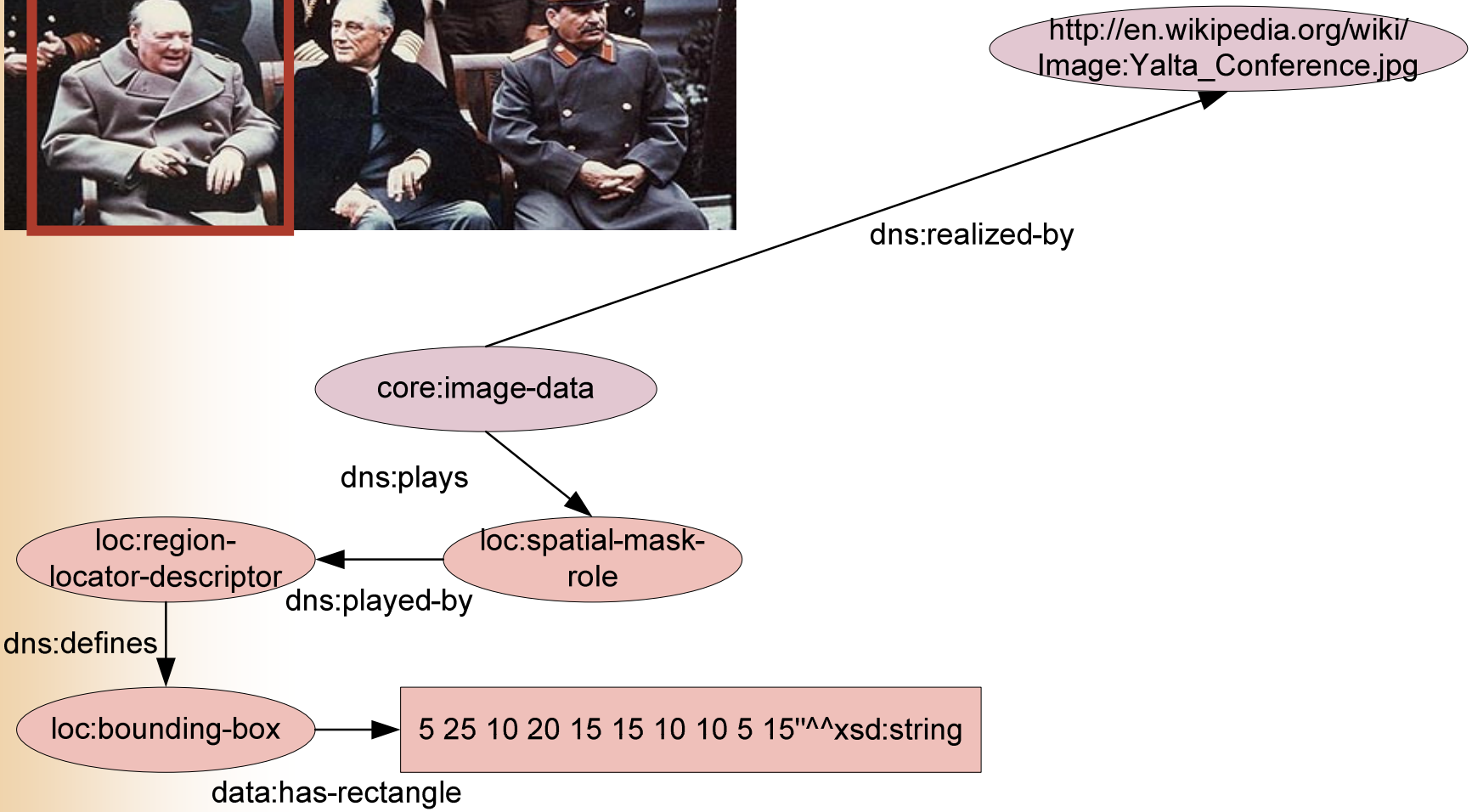
COMM: Modules

Annotation Pattern

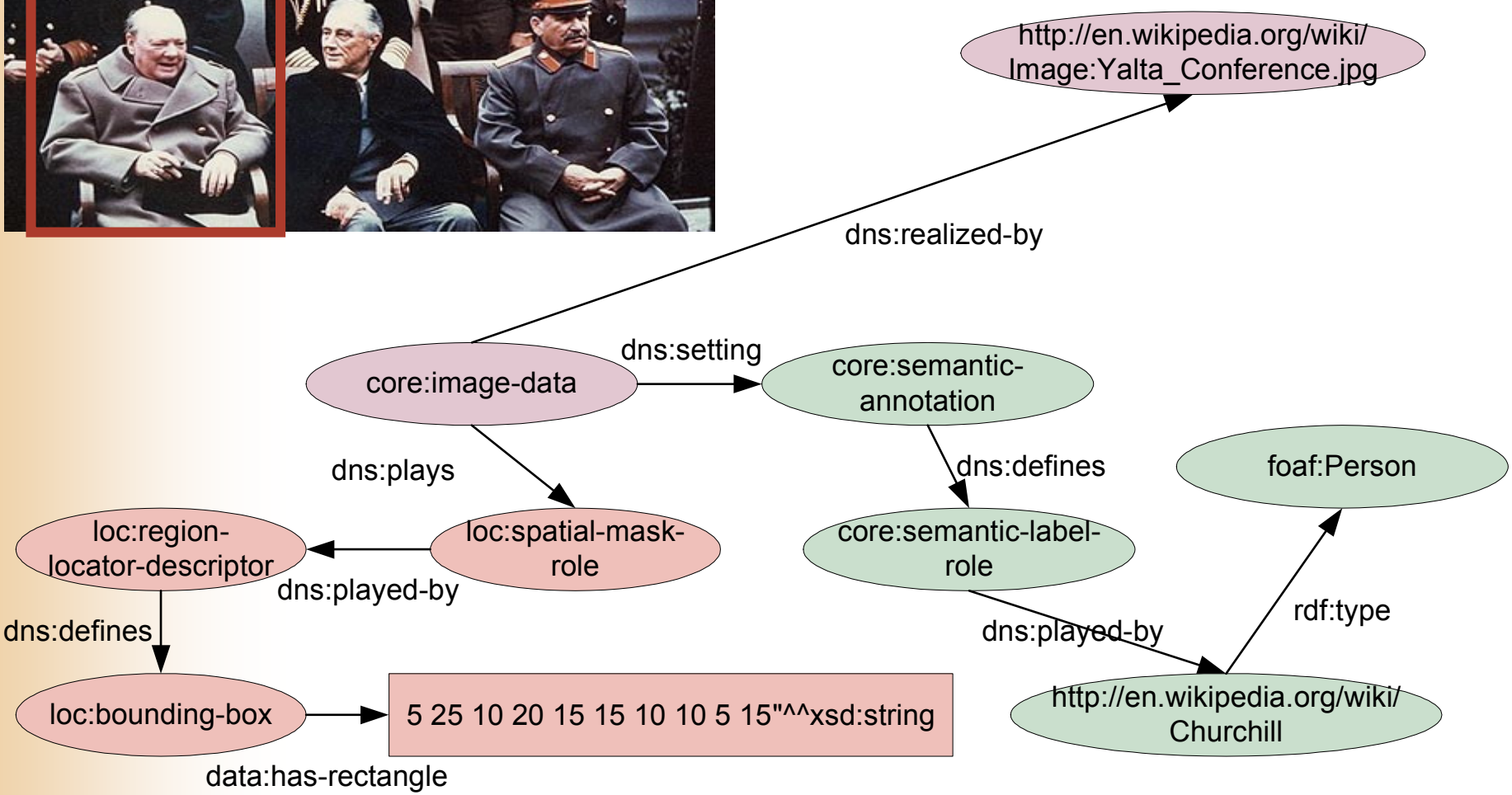
Decompositio n Pattern



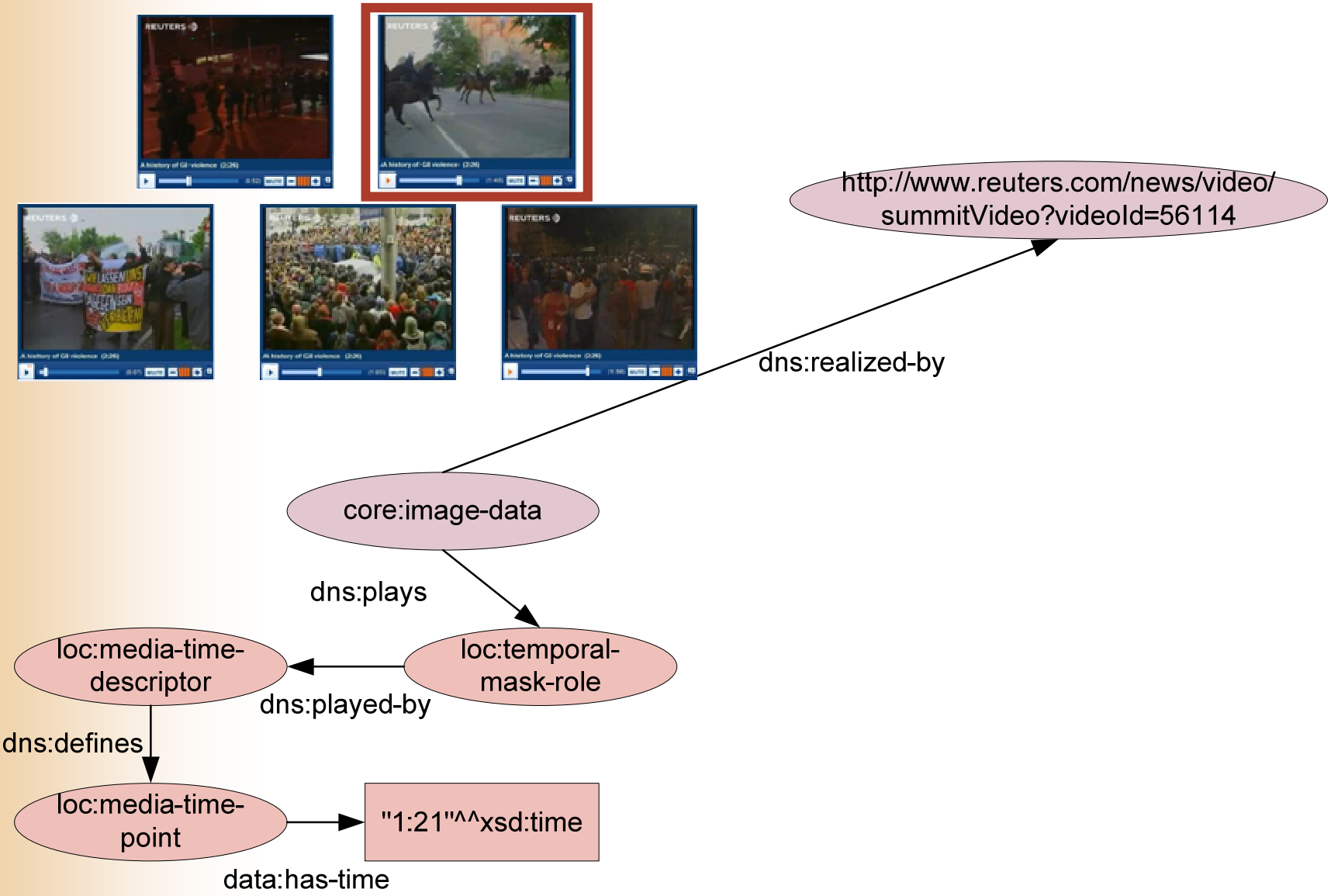
Example 1: Fragment Identification



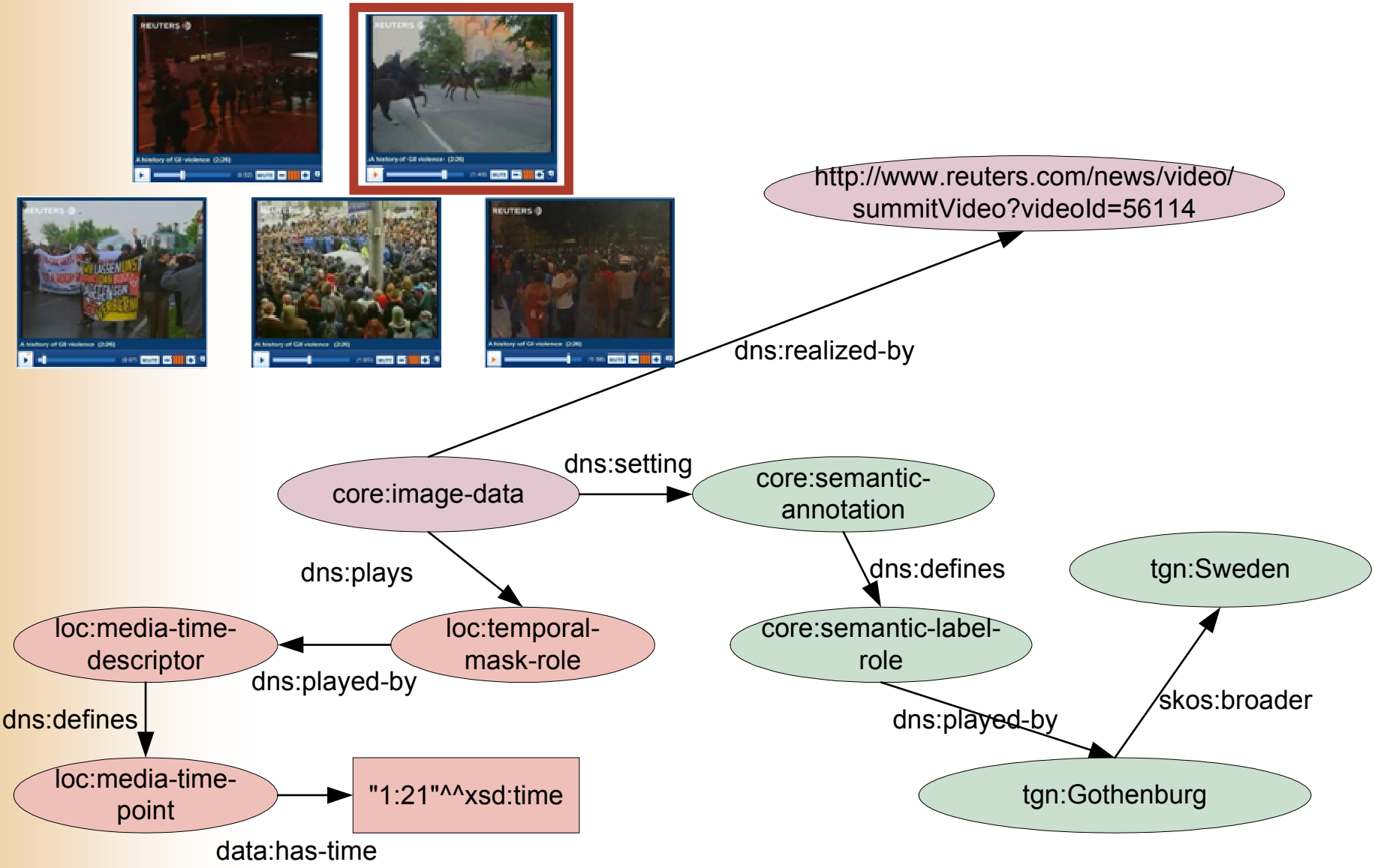
Example 1: Region Annotation



Example 2: Fragment Identification



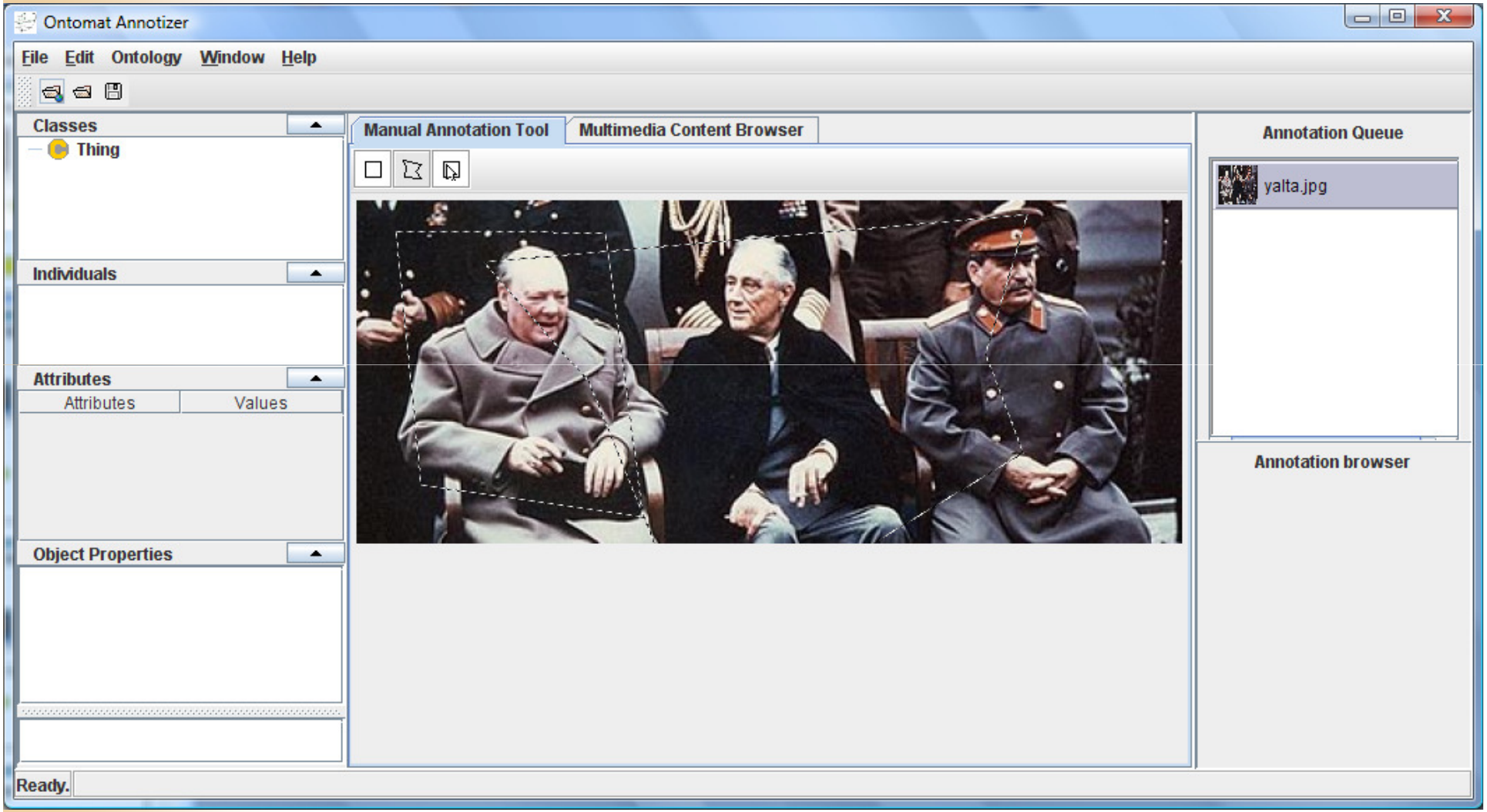
Example 2: Sequence Annotation



Implementation

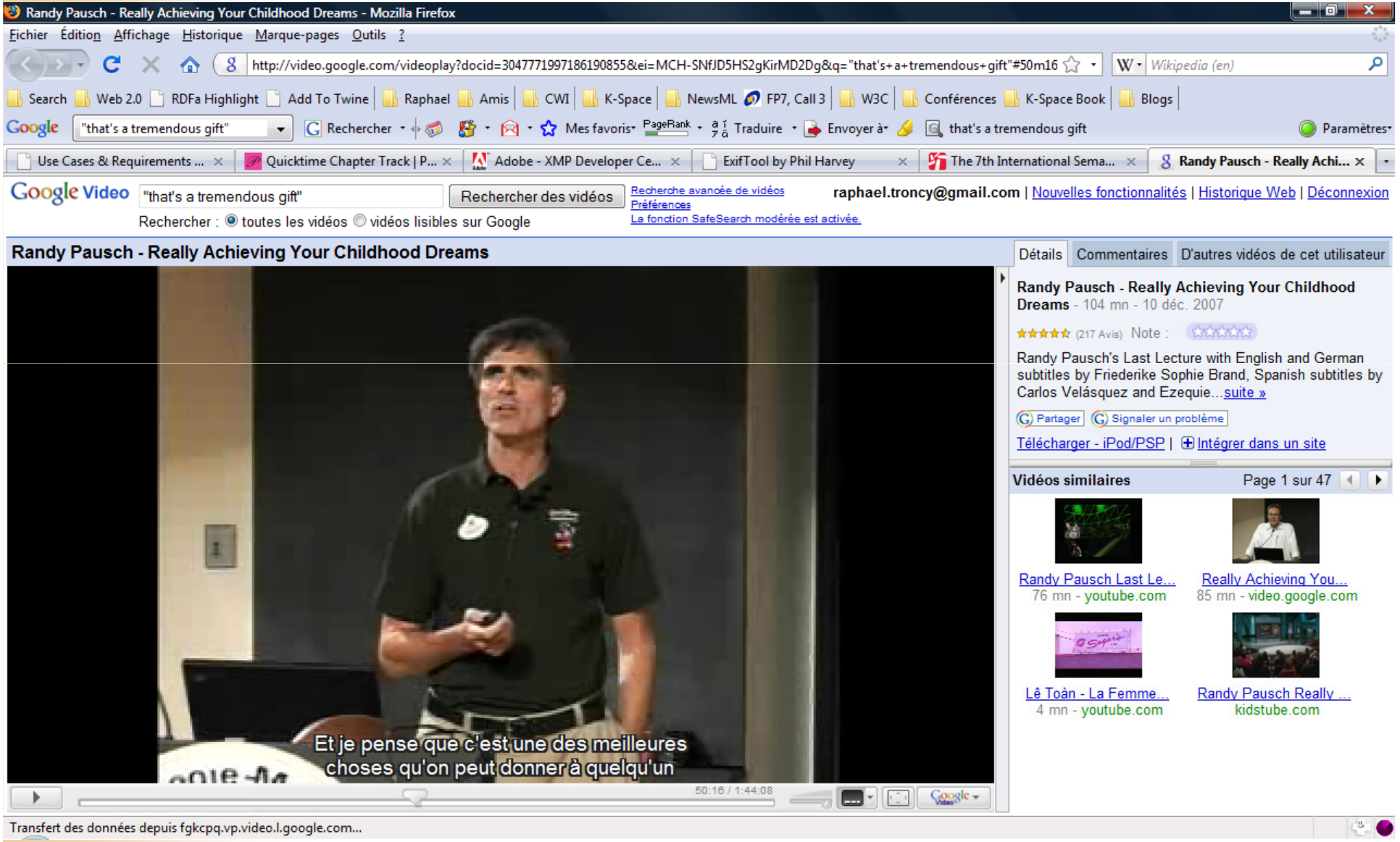
- COMM fully formalized in OWL DL
  - Rich axiomatization, consistency check (Fact++v1.1.5)
  - OWL 2.0: qualified cardinality restrictions for number restrictions of MPEG-7 low-level descriptors
- JAVA API available
  - MPEG-7 class interface for the construction of meta-data at runtime

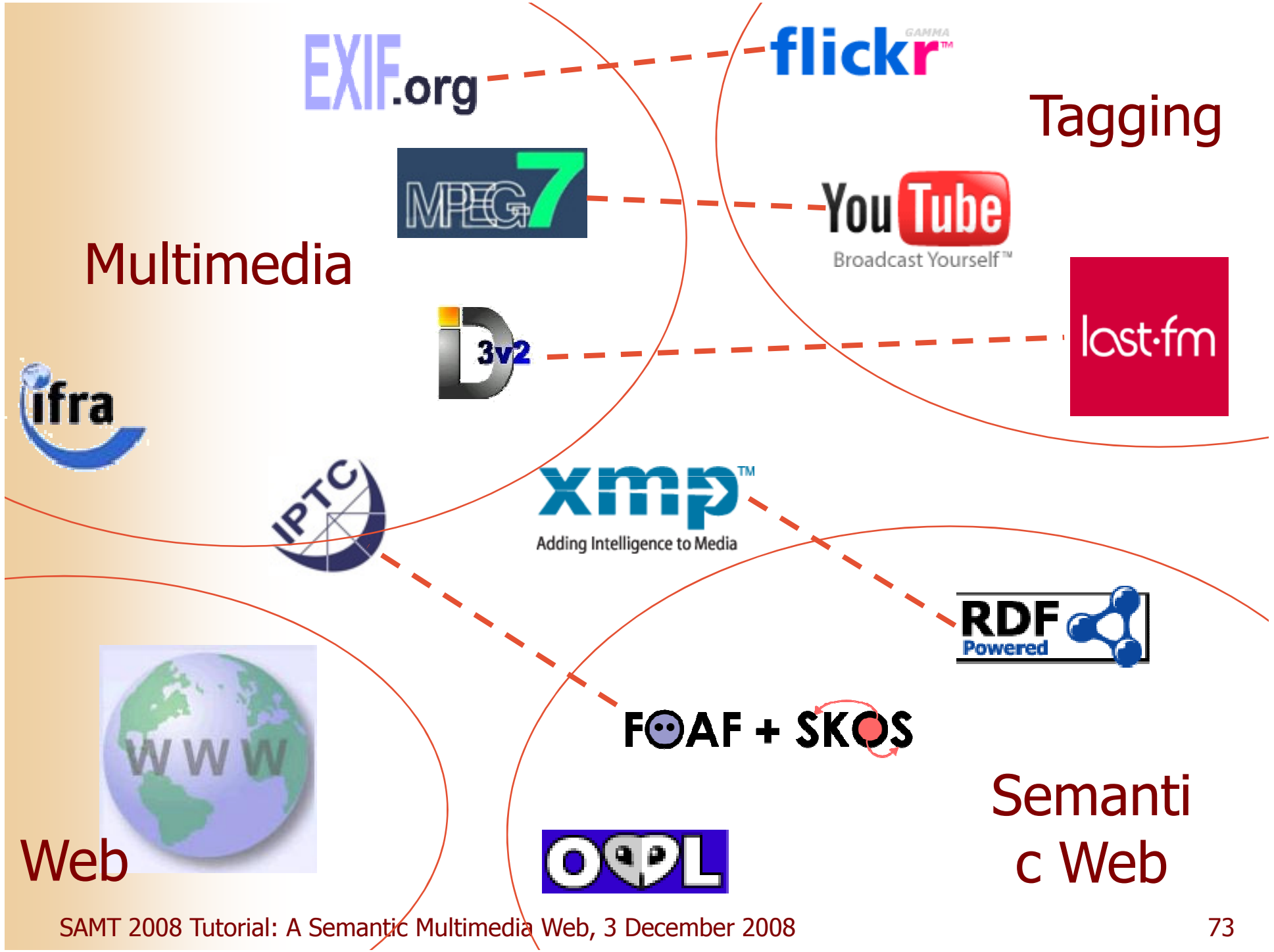
KAT Annotation Tool



W3C Media Fragments WG

YouTube Videos Fragments




EXIF.org
flickr
Tagging
MPEG7
YouTube
Broadcast Yourself
Multimedia
ID3v2
last·fm
ifra
IPTC
xmp
Adding Intelligence to Media
RDF
Powered
FOAF + SKOS
WWW
Web
OWL
Semanti
c Web

Making Music Out Of The Social Noise

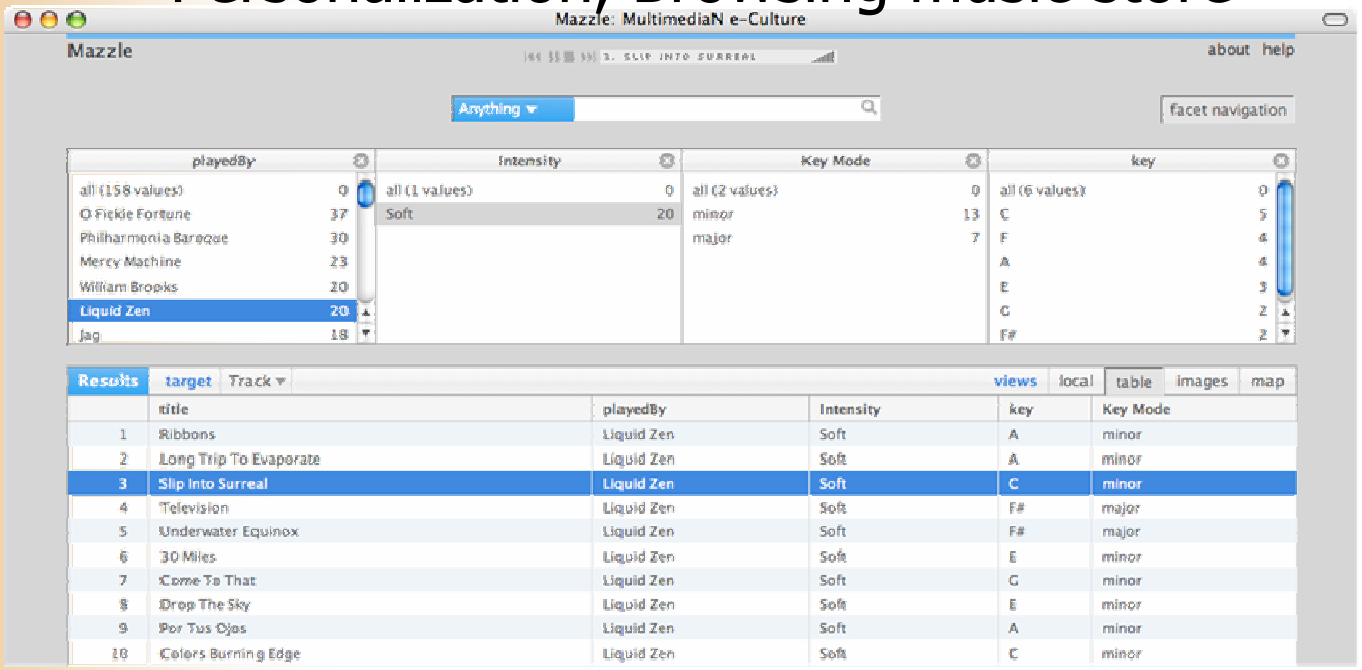
W3C Multimedia Semantics XG

Managing Personal Photos

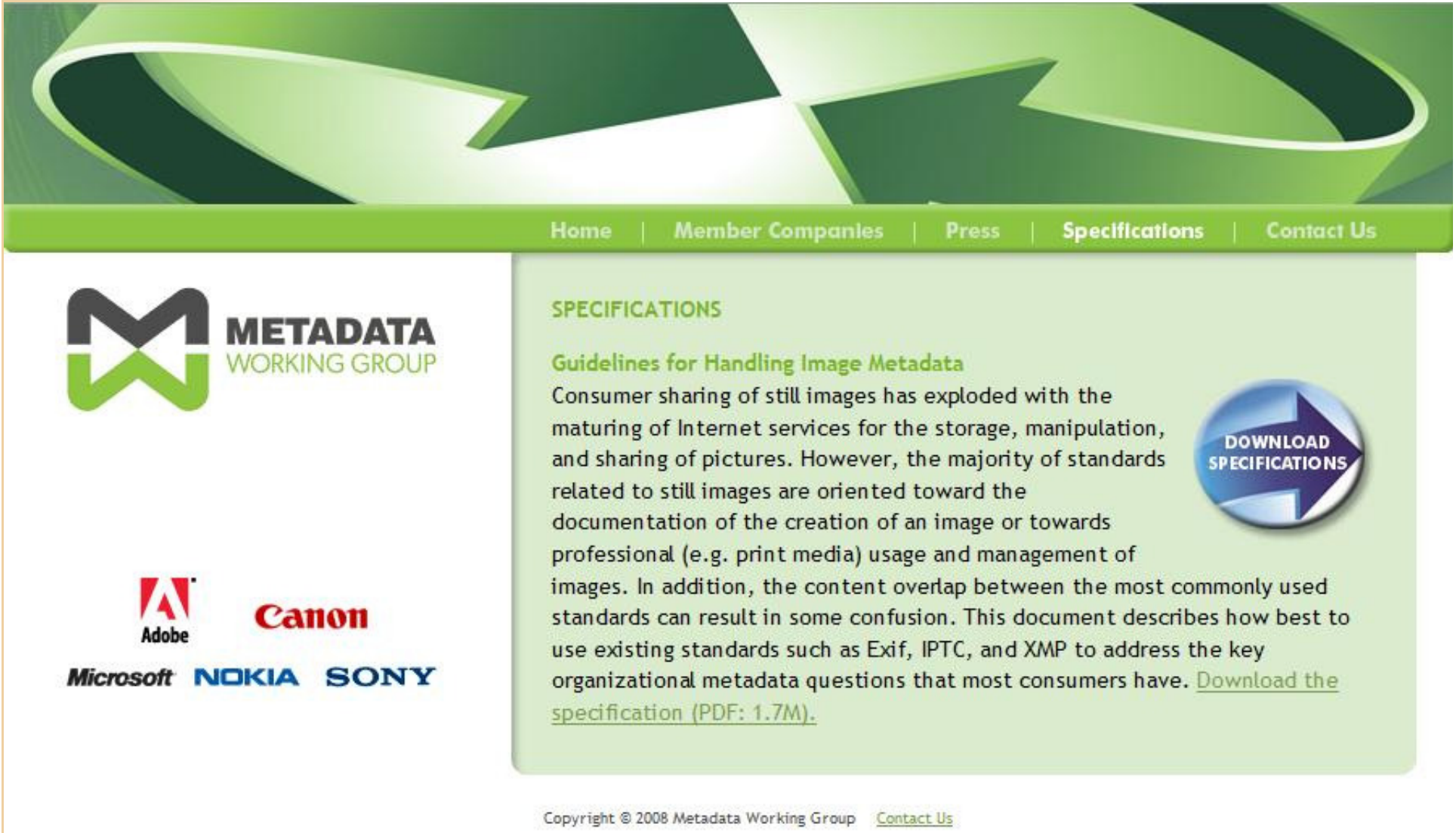
- Interoperable Image Metadata
  - Combining EXIF, MPEG-7, IPTC and DIG35 metadata using RDF and OWL schemas

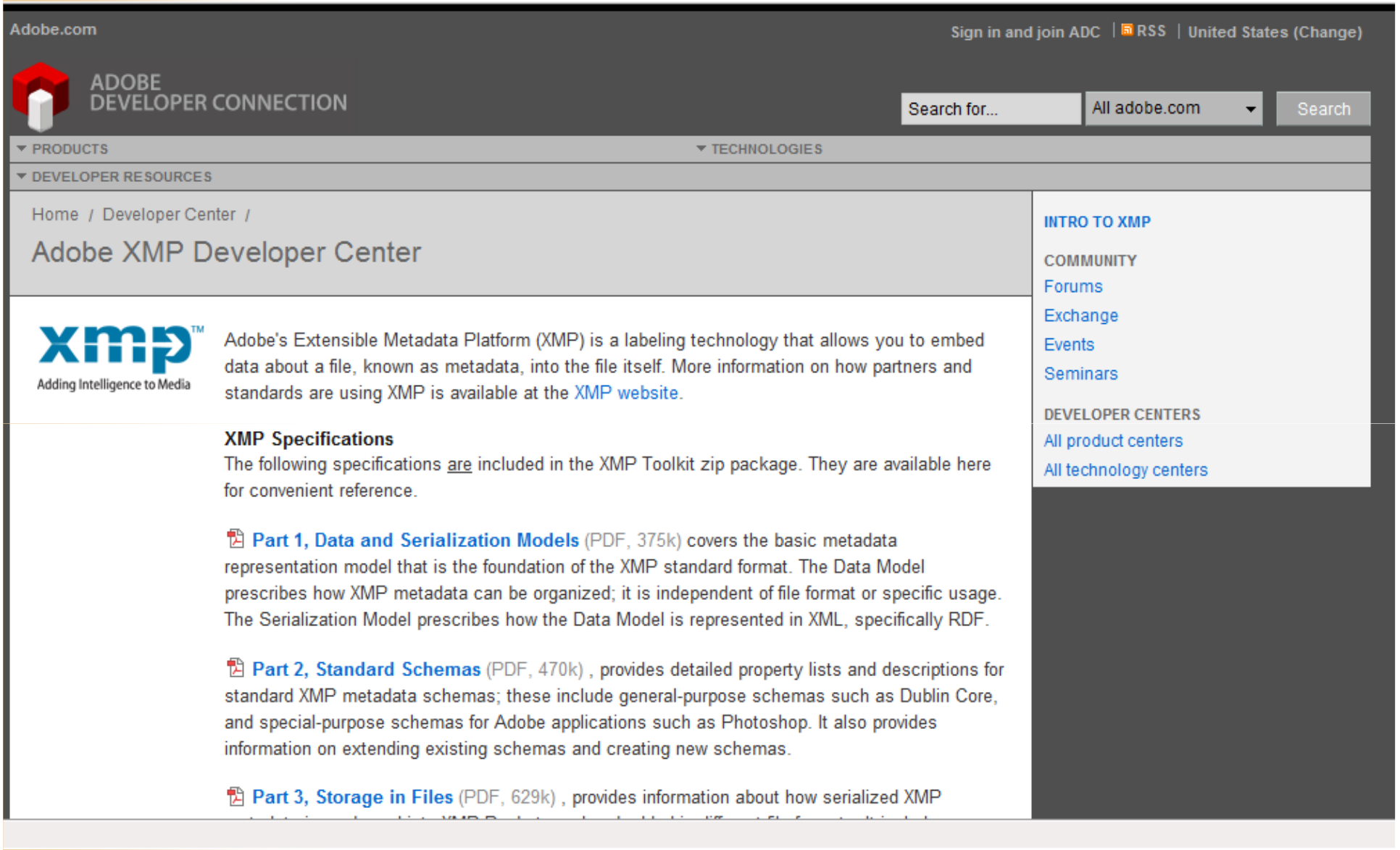
Facetting Music Songs

- Interoperable Music and Social Metadata
  - ID3 Tags + low-level features extraction + lastFM recommendations + FOAF profiles + ...
  - Auto-construction of playlist (similar bit rate), Personalization, Browsing music store



Metadata Working Group

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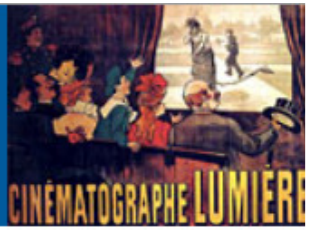
All adobe.com
Search
PRODUCTS
TECHNOLOGIES
DEVELOPER RESOURCES
Home / Developer Center /
Adobe XMP Developer Center
Adding Intelligence to Media
Adobe's Extensible Metadata Platform (XMP) is a labeling technology that allows you to embed data about a file, known as metadata, into the file itself. More information on how partners and standards are using XMP is available at the XMP website.
XMP Specifications
The following specifications are included in the XMP Toolkit zip package. They are available here for convenient reference.
Part 1, Data and Serialization Models (PDF, 375k) covers the basic metadata representation model that is the foundation of the XMP standard format. The Data Model prescribes how XMP metadata can be organized; it is independent of file format or specific usage. The Serialization Model prescribes how the Data Model is represented in XML, specifically RDF.
Part 2, Standard Schemas (PDF, 470k) , provides detailed property lists and descriptions for standard XMP metadata schemas; these include general-purpose schemas such as Dublin Core, and special-purpose schemas for Adobe applications such as Photoshop. It also provides information on extending existing schemas and creating new schemas.
Part 3, Storage in Files (PDF, 629k) , provides information about how serialized XMP
INTRO TO XMP
COMMUNITY
Forums
Exchange
Events
Seminars
DEVELOPER CENTERS
All product centers
All technology centers

W3C Media Annotations WG

W3C Media Annotations WG
http://www.w3.org/2008/WebVideo/Annotations/

Media Annotations Working Group
Video, Audio, Images

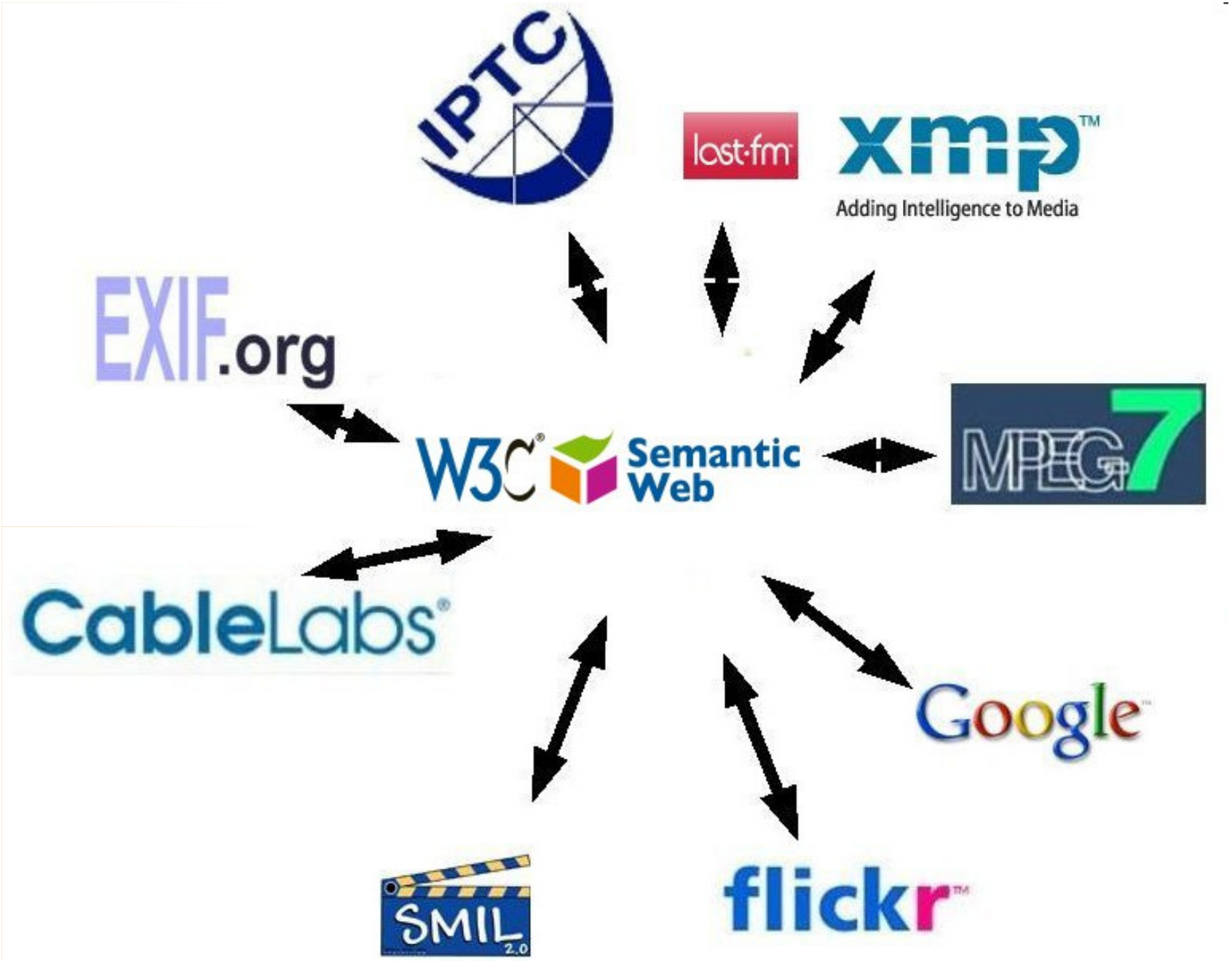


Mission · Administrative information · Drafts · Issues · Meeting records · Drafts · Wiki · Schedule · Discussion lists

Mission

The **mission** of the Media Annotations Working Group, part of the Video in the Web Activity, is to provide an ontology designed to facilitate cross-community data integration of information related to media objects in the Web, such as video, audio and images.

See also: charter and liaisons to non-W3C groups


IPTC
last·fm
xmp™
Adding Intelligence to Media
EXIF.org
W3C
Semantic Web
MPEG7
CableLabs®
Google
SMIL 2.0
flickr™

Literature

- Michael Hausenblas *et al.*: Multimedia Vocabularies on the Semantic Web. W3C Multimedia Semantics Incubator Group Report (XGR), 24 July 2007.
- Raphaël Troncy, Jacco van Ossenbruggen, Jeff Z. Pan and Giorgos Stamou. Image Annotation on the Semantic Web. W3C Multimedia Semantics Incubator Group Report (XGR), 14 August 2007.
- Vassilis Tzouvaras, Raphaël Troncy and Jeff Z. Pan. Multimedia Annotation Interoperability Framework. W3C Multimedia Semantics Incubator Group Report Editor's Draft, 14 August 2007.
- Richard Arndt, Raphaël Troncy, Steffen Staab, Lynda Hardman and Miroslav Vacura: *COMM: Designing a Well-Founded Multimedia Ontology for the Web*. In 6th International Semantic Web Conference (ISWC'2007), Busan, Korea, November 11-15, 2007.
- Raphaël Troncy, Oscar Celma, Suzanne Little, Roberto Garcia, Chrisa Tsinaraki: *MPEG-7 based Multimedia Ontologies: Interoperability Support or Interoperability Issue?* In 1st Workshop on Multimedia Annotation and Retrieval enabled by Shared Ontologies (MAReSO'2007), Genoa, Italy, December 2007.

Agenda

1. Understanding Multimedia Applications Workflow
   - CeWe Color Photo Book creation application
   - Vox Populi argumentative video sequences generation system
   - *The Canonical Processes of Media Production*
2. Semantic Annotation of Multimedia Content
   - Multimedia metadata formats: use cases and requirements
   - Multimedia metadata interoperability issues
   - MPEG-7 based ontologies
   - *COMM: A Core Ontology for MultiMedia*
3. Semantic Search and Presentation of Multimedia Content
   - Link your data!
   - *Searching and Browsing Multimedia Semantic Datasets with Cliopatria*

A Giant Graph Open to the World

wp:2006_FIFA_Wolrd_Cup#Final

nc:15054000

nar:subject

events:id

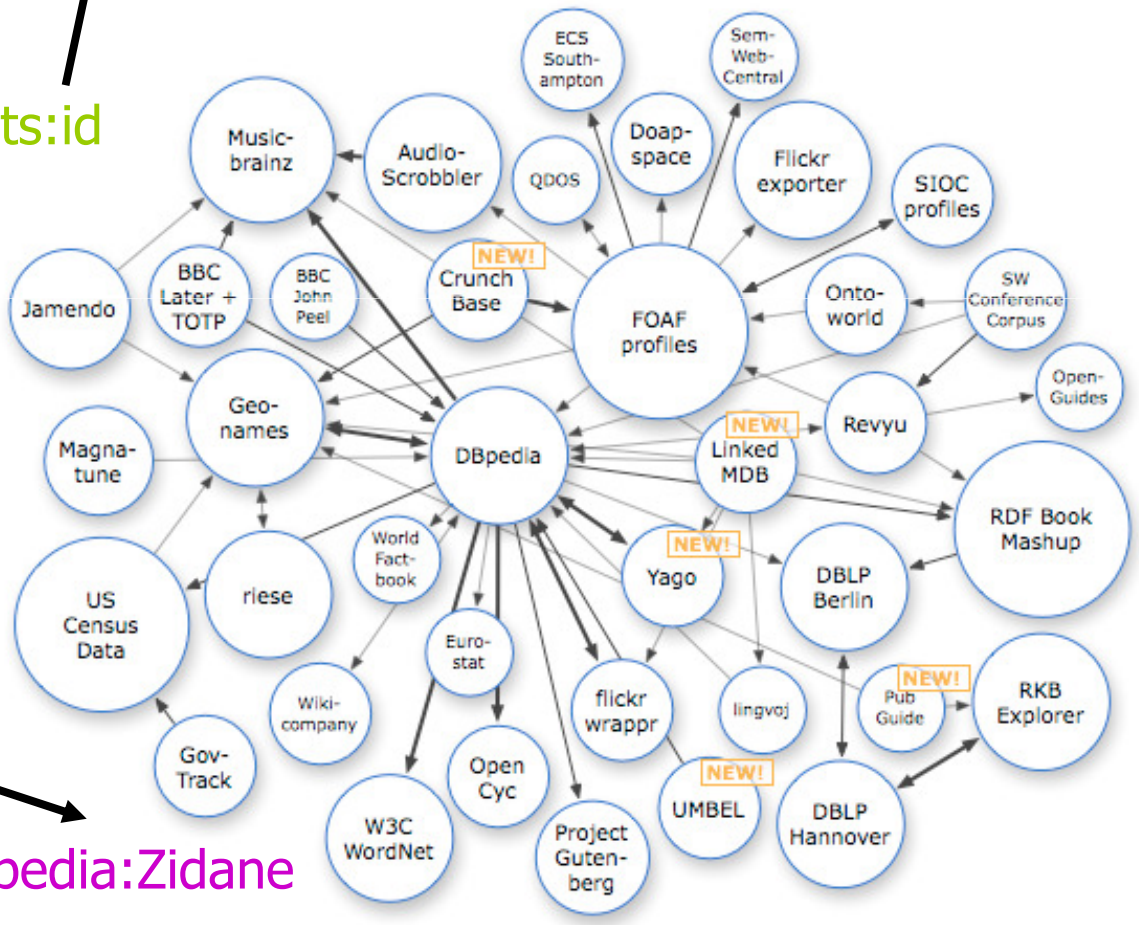
nar:location

foaf:depicts

geonames:2950159

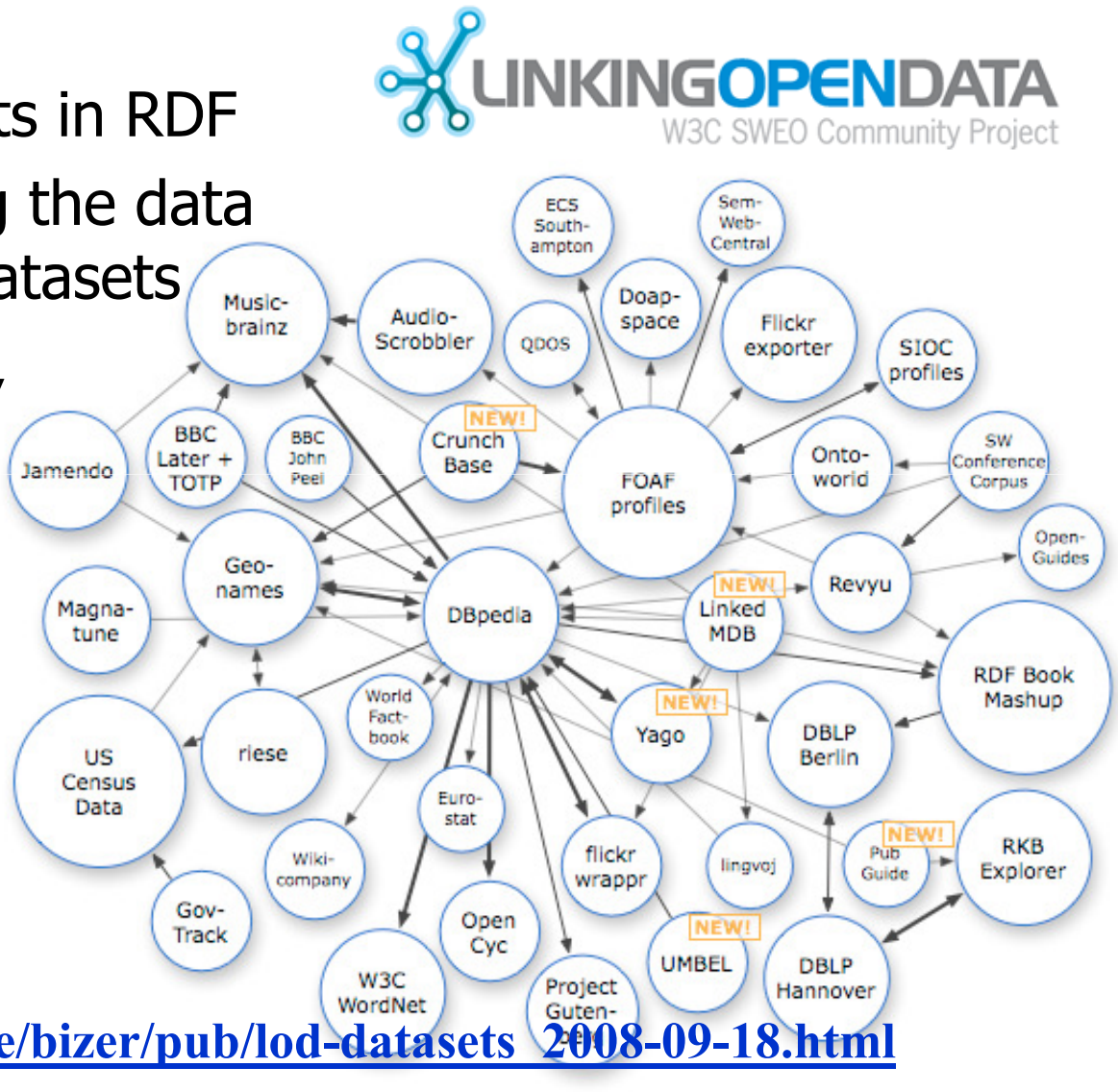
dbpedia:Zidane

LINKINGOPENDATA
W3C SWEO Community Project



Linking Open Data Project

- Expose open datasets in RDF
- Set RDF links among the data items for different datasets
- Over 2 billion triples, 3 millions links (March 2008)
- Many many many more ... now



DBpedia

- DBpedia is a community effort to:
  - extract structured "infobox" information from Wikipedia
  - interlink DBpedia with other datasets on the Web

UNIVERSITÄT LEIPZIG

DBpedia

Extracting Infobox Data

http://en.wikipedia.org/wiki/Calgary

```
<http://dbpedia.org/resource/Calgary>
  dbpedia:native_name "Calgary" ;
  dbpedia:altitude "1048" ;
  dbpedia:population_city  "988193" ;
  dbpedia:population_metro "1079310" ;
  mayor_name
       dbpedia:Dave_Bronconnier ;
  governing_body
       dbpedia:Calgary_City_Council ;
 ...
```

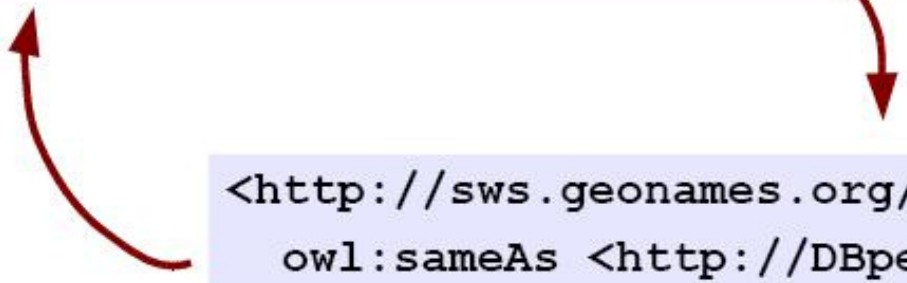
- Altogether 9,100,000 RDF triples extracted from 754,000 infoboxes

Christian Bizer et al: DBpedia – Querying Wikipedia Like a Database (May 11, 2007)

Automatic Links Among Open Datasets

DBpedia

```
<http://dbpedia.org/resource/Calgary>
  owl.sameAs <http://sws.geonames.org/5913490>;
 ...
```



Geonames

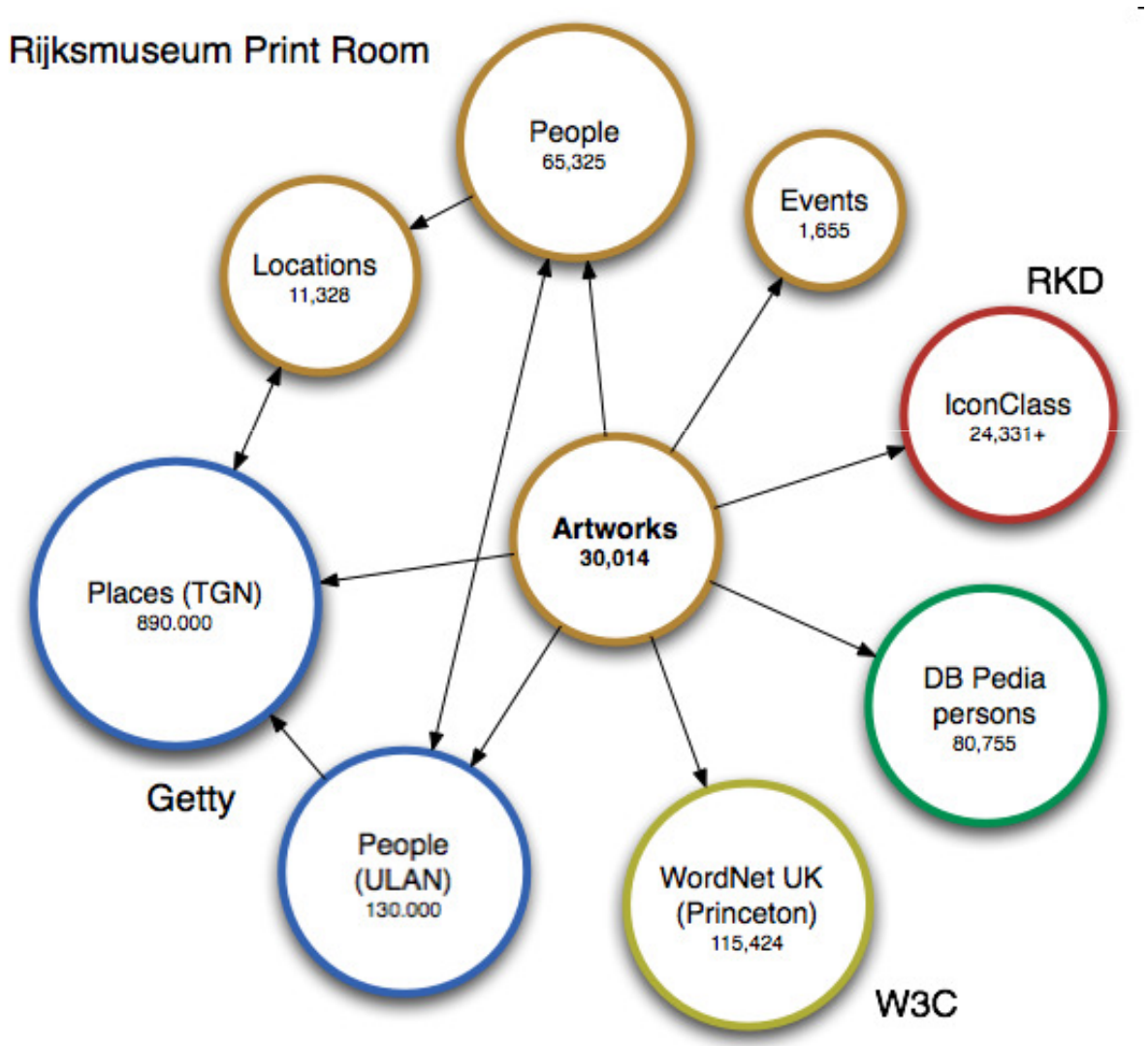
```
<http://sws.geonames.org/5913490>
  owl:sameAs <http://DBpedia.org/resource/Calgary>
  wgs84_pos:lat "51.050112282";
  wgs84_pos:long "-114.085285152";
  sws:population "968460"
 ...
```

Processors can switch automatically from one to the other …

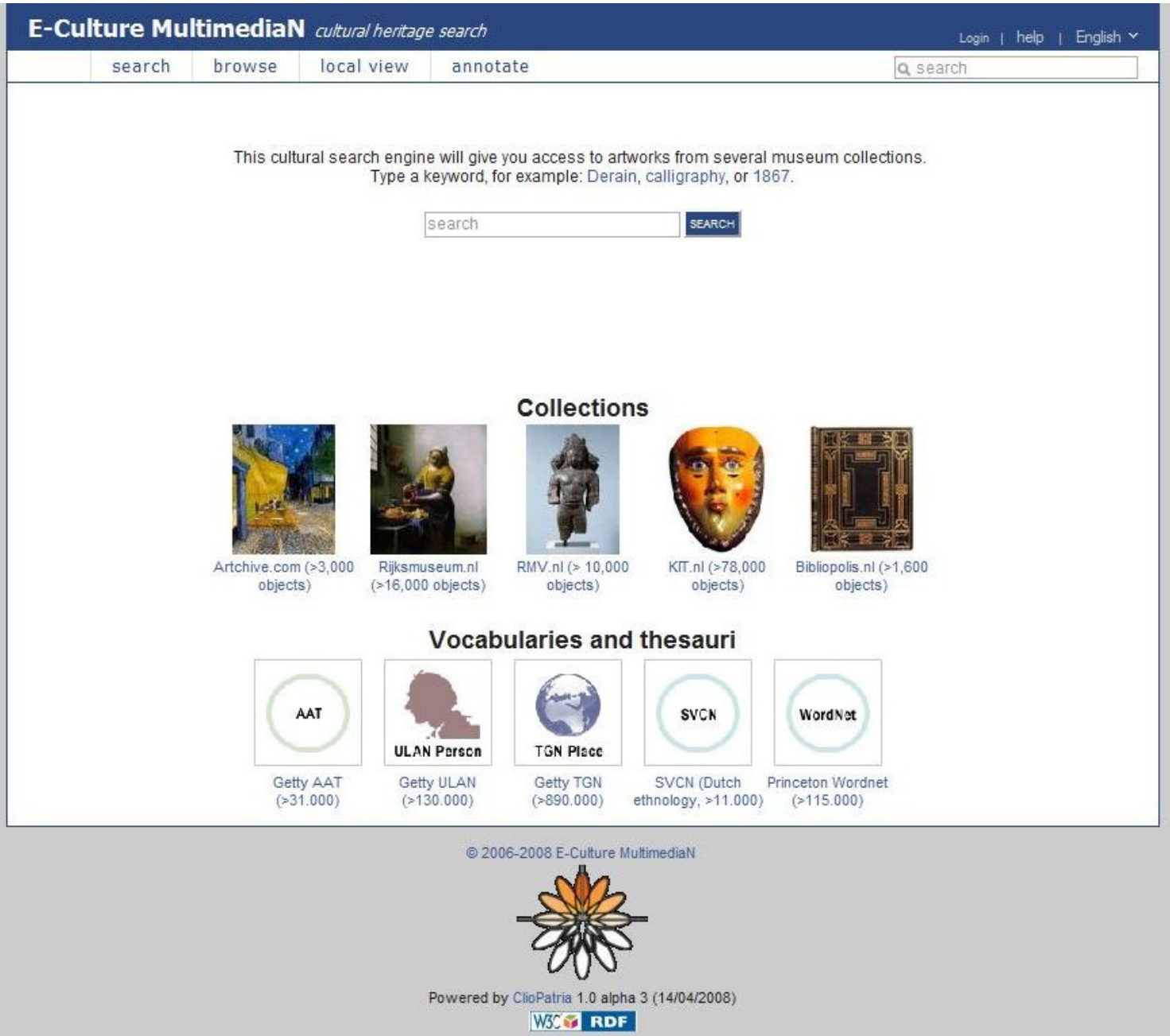
Take Home Message

- Reuse what is there
  - Of course, one could create RDF data manually ...
    ... but that is unrealistic on a large scale
  - Goal is to generate RDF data automatically when possible and "fill in" by hand only when necessary
    - service to get RDF from flickr images
      http://www.kanzaki.com/works/2005/imgdsc/flickr2rdf
    - service to get RDF from XMP
      http://www.ivan-herman.net/cgi-bin/blosxom.cgi/WorkRelated/SemanticWeb/xmpextract.html
- Expose what you make

Cultural Heritage Data Cloud



Professional Art Annotation with Thesauri from the Web


E-Culture MultimediaN cultural heritage search
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browse
local view
annotate
search
This cultural search engine will give you access to artworks from several museum collections.
Type a keyword, for example: Derain, calligraphy, or 1867.
search
SEARCH
Collections
Artchive.com (>3,000 objects)
Rijksmuseum.nl (>16,000 objects)
RMV.nl (> 10,000 objects)
KIT.nl (>78,000 objects)
Bibliopolis.nl (>1,600 objects)
Vocabularies and thesauri
AAT
ULAN Person
TGN Place
SVCN
WordNet
Getty AAT (>31.000)
Getty ULAN (>130.000)
Getty TGN (>890.000)
SVCN (Dutch ethnology, >11.000)
Princeton Wordnet (>115.000)
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Global financial crisis of September–October 2008

From Wikipedia, the free encyclopedia

It has been suggested that this article or section be merged with *Economic crisis of 2008*. (Discuss)

The **global financial crisis of September–October 2008** is a major ongoing financial crisis, the worst of its kind since the Great Depression. It became prominently visible in September, 2008 with the failure, merger or conservatorship of several large United States-based financial firms. The underlying causes leading to the crisis had been reported in business journals for many months before September, with commentary about the financial stability of leading U.S. and European investment banks, insurance firms and mortgage banks consequent to the subprime mortgage crisis.[1][2][3][4]

Beginning with failures of large financial institutions in the United States, it rapidly evolved into a global crisis resulting in a number of European bank failures and declines in various stock indexes, and significant reductions in the market-value of equities (stock), down 27% as of October 24,[5] and commodities worldwide.[1] The crisis has led to a liquidity problem and the de-leveraging of financial institutions especially in the United States and Europe, which further accelerated the liqudity crisis. World political leaders and national ministers of finance and central bank directors have coordinated their efforts to reduce fears but the crisis is ongoing and continues to change. The crisis has roots in the subprime mortgage crisis and is an acute phase of the financial crisis of 2007–2008.

navigation
- Main page
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- Current events
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Contents [hide]
1 Week of September 7, 2008
2 Week of September 14, 2008
2.1 Major financial firm crisis
2.2 Money market funds insurance and short sales prohibitions

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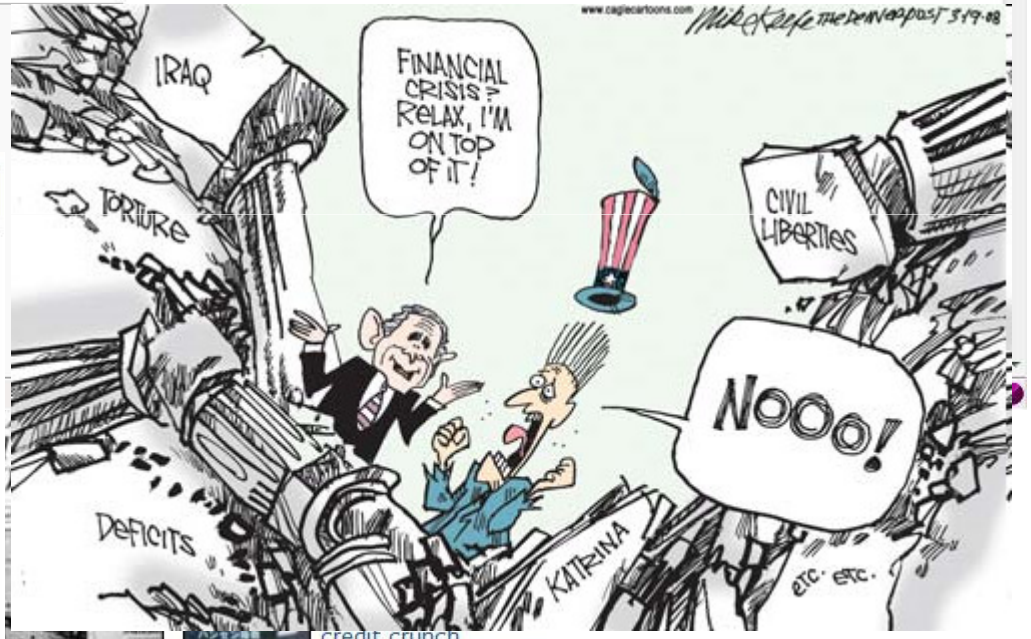
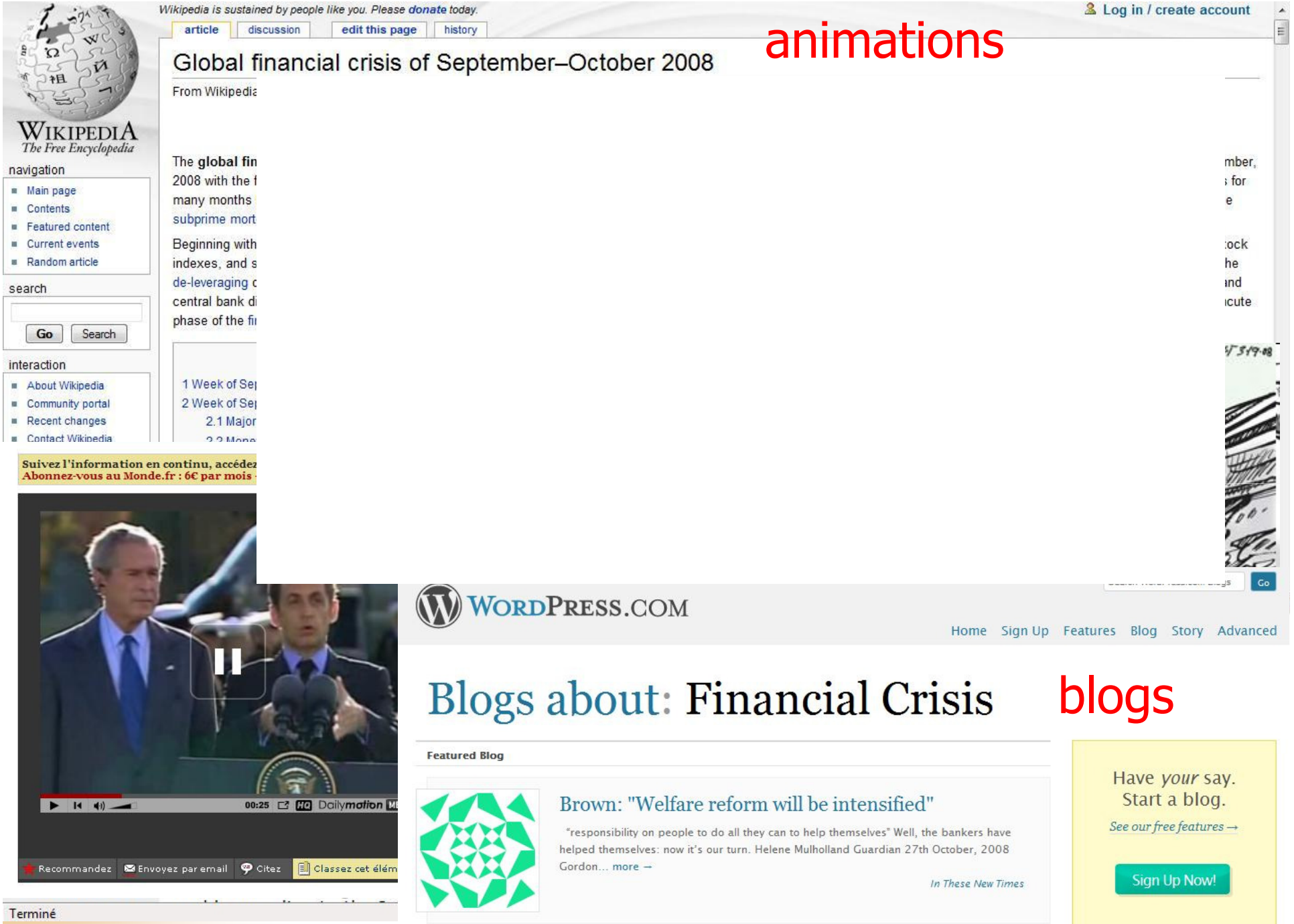
videos



cartoons

credit crunch
African investment could be hit
China 'can be engine of growth'
Are my savings safe?
Have bail-outs worked?
CRISIS OVERVIEW
How market moves affect you

Terminé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Global financial crisis of September–October 2008
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Community portal
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animations
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00:25
Dailymotion
Recommandez
Envoyez par email
Citez
Classez cet élém
Terminé
WordPress.com
Home
Sign Up
Features
Blog
Story
Advanced
Blogs about: Financial Crisis
blogs
Featured Blog
Brown: "Welfare reform will be intensified"
"responsibility on people to do all they can to help themselves" Well, the bankers have helped themselves: now it's our turn. Helene Mulholland Guardian 27th October, 2008 Gordon... more →
In These New Times
Have your say.
Start a blog.
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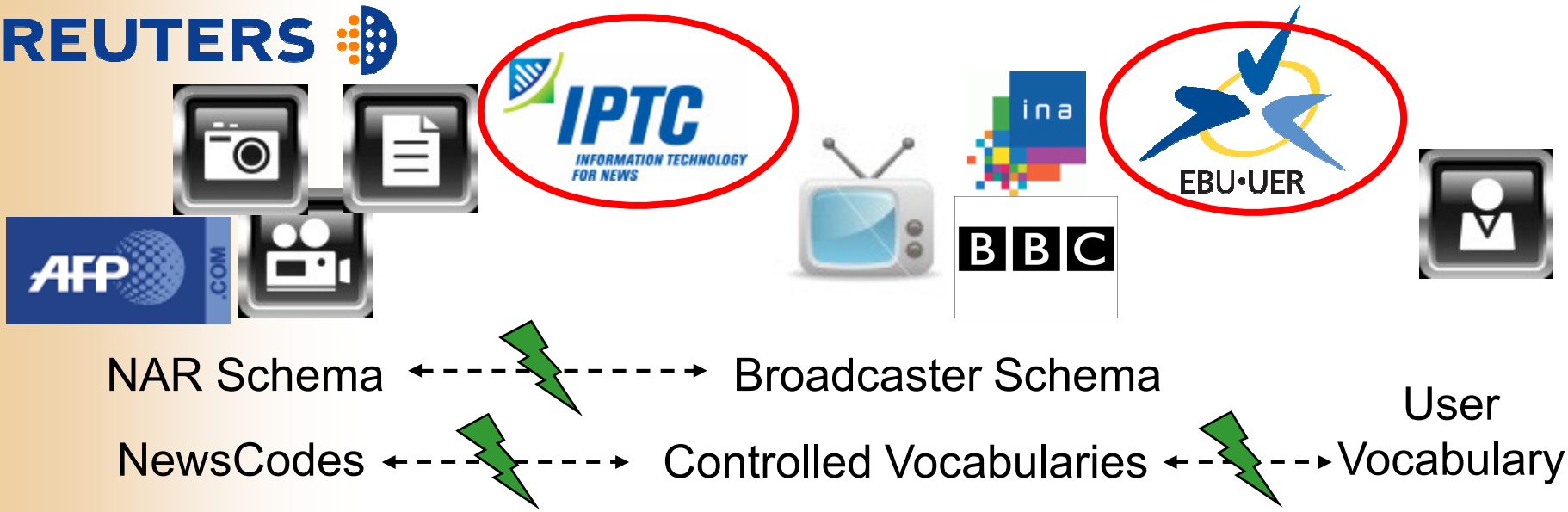
News Workflow Interoperability

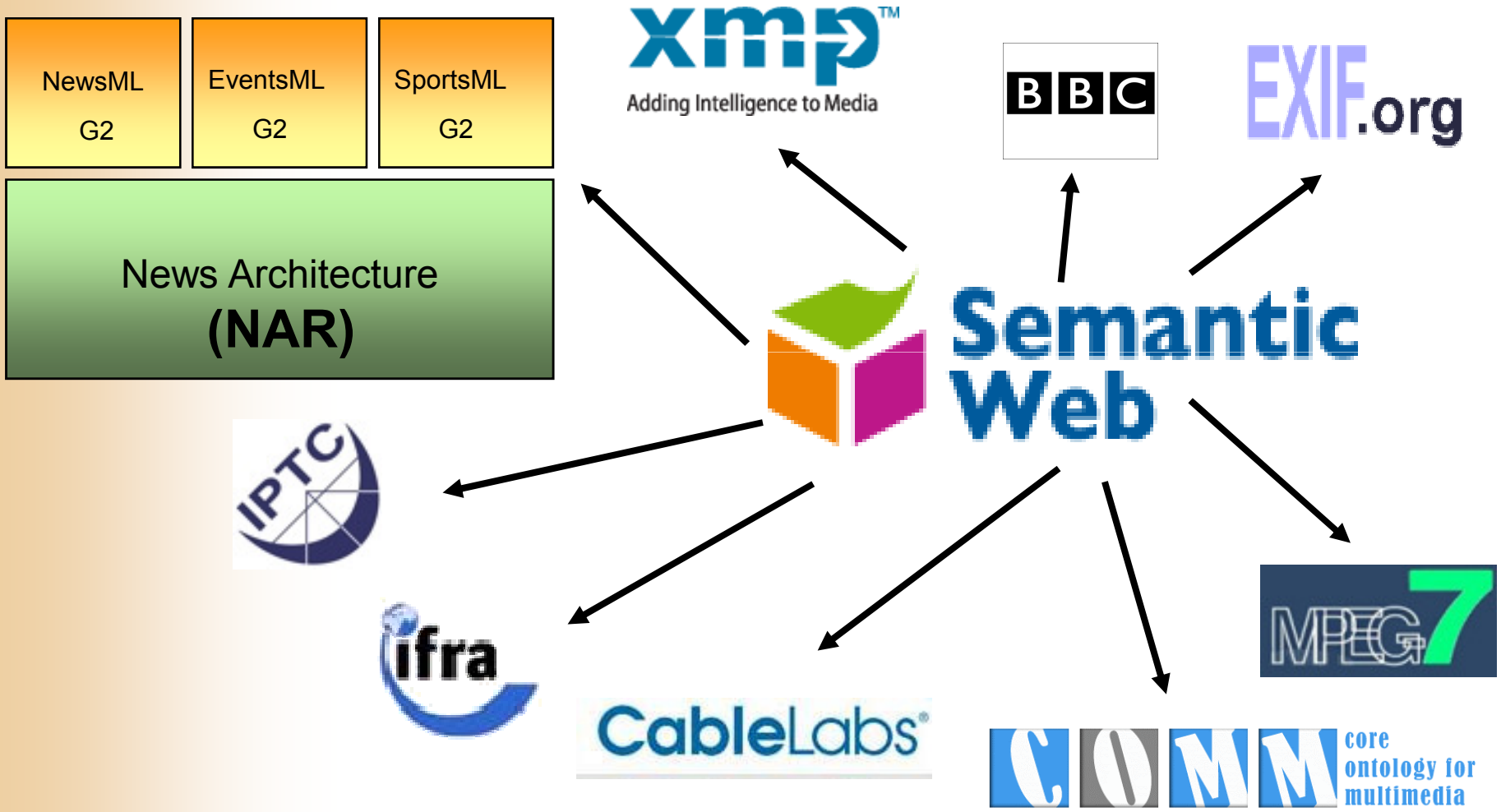
- No integration of media (stories, photo, animation, video)
- Little (or no) context in the news presentation
- Lack of interoperability in the current workflow



Metadata is Key

- (Ultimate) Goal:
  - Provide an environment for ***searching*** and ***browsing*** ***contextualized multimedia news*** information
- Required integration:
  - Data: various media, different forms, various sources
  - Metadata: schema integration, semantic models
- Influence and implications of UI:
  - How to **represent** semantic multimedia metadata to facilitate **presenting** information?
  - *in other words* ... What constraints do end-user interfaces put on the modeling of the metadata?

News and Multimedia Formats

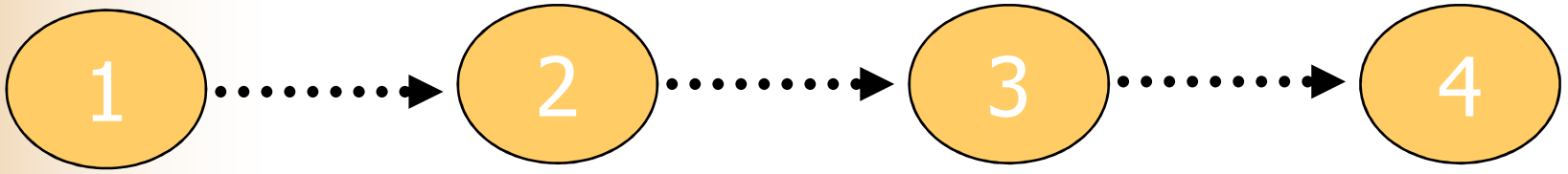


Porting Schemas and Thesauri to the Semantic Web

- Methodologies and tools for building ontologies:
  ... from scratch
- □SKOSification□ of thesauri in the CH domain:
  - preparation, syntactic and semantic conversion, standardization

⇨ Lack of best practices for
modeling ontologies from UML diagrams,
integrating ontologies with various thesauri,
while taking the end-user interface into account

Building a Semantic Web Infrastructure for News



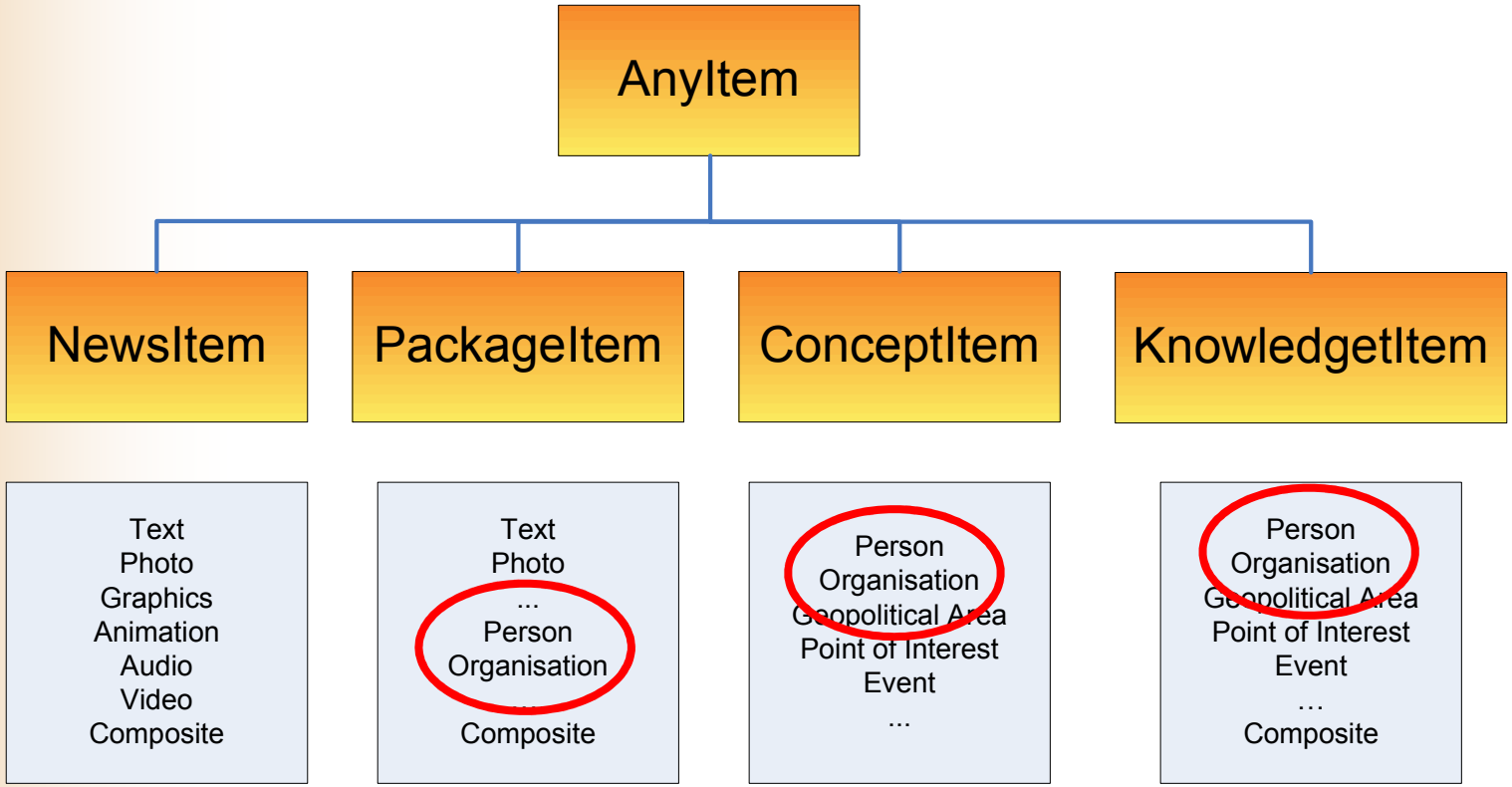
Modeling the NAR ontology

Linking with media ontologies

Building SKOS thesauri

Enriching the metadata

Step 1: Modeling the NAR Ontology

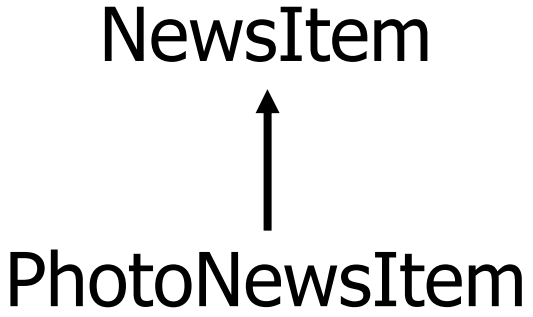


⇨ focus on reuse of XML types leading to multiple repetition resulting in overly complex nested XML structures

Step 1: Modeling the NAR Ontology

- Flattening the XML structure

```
<!--AFP NewsML2 text-photo profile-->
<!--Processed by Xafp1-4ToNewsML2 b11-->
- <newsMessage>
  + <header></header>
  - <itemSet>
    - <newsItem guid="urn:newsml:afp.com:20010101:.DV90996" schema="0.7" version="11" xml:lang="en">
        <catalogRef href="http://iptc.org/std-dev/NAR/1.0/specification/IPTC-TempCatalog-inc_3.xml"/>
      - <itemMeta>
          <contentClass code="ccls:photo"/>
          <provider literal="afp.com"/>
          <itemCreated>2006-07-09T21:20:00Z</itemCreated>
          <modified>2006-07-11T09:14:38Z</modified>
          <fileName>DV90996</fileName>
          <edNote>MOBILE SERVICES OUT</edNote>
        </itemMeta>
      + <contentMeta></contentMeta>
      + <contentSet></contentSet>
      </newsItem>
    </itemSet>
  </newsMessage>
```

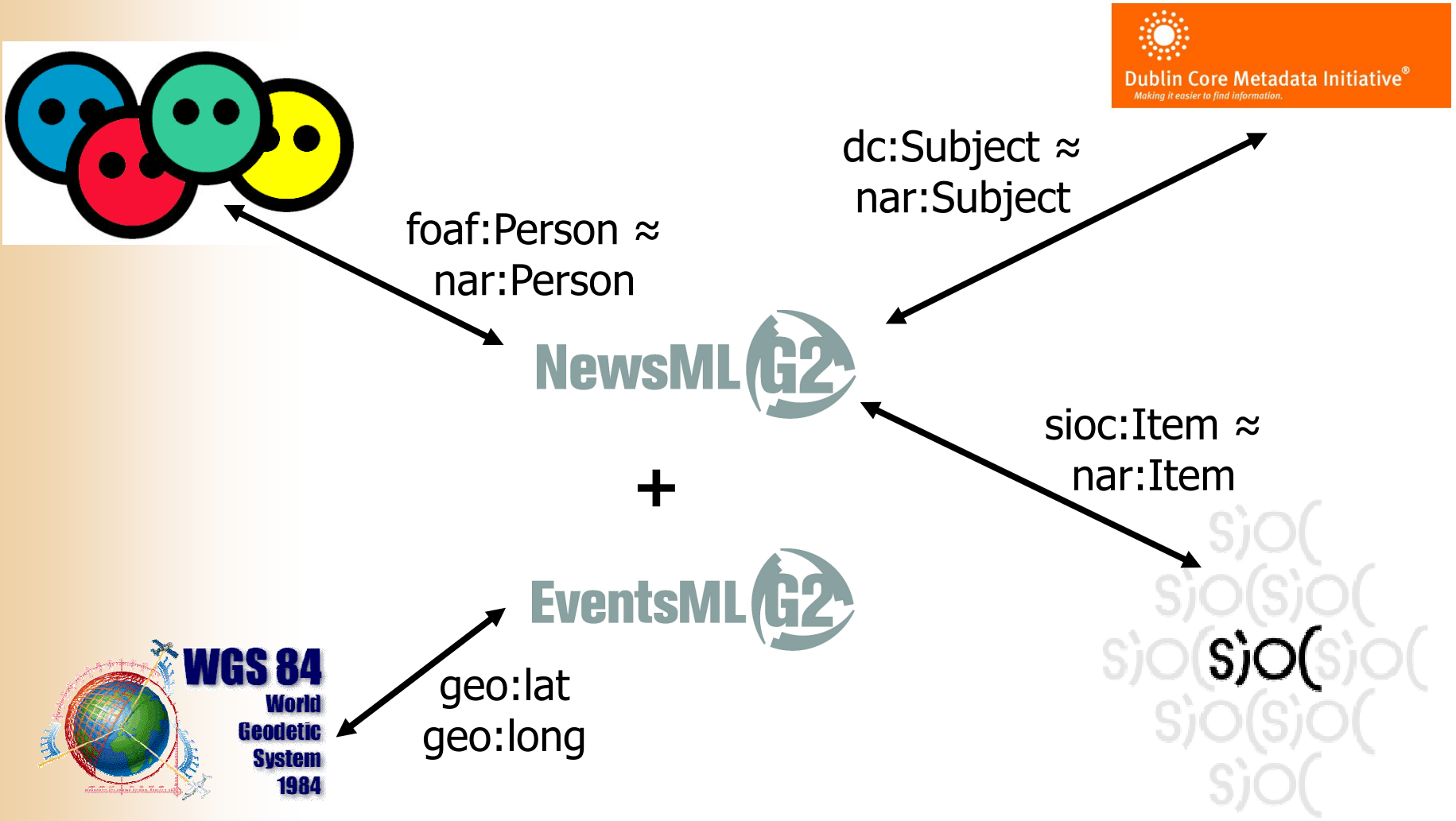


Step 1: Modeling the NAR Ontology

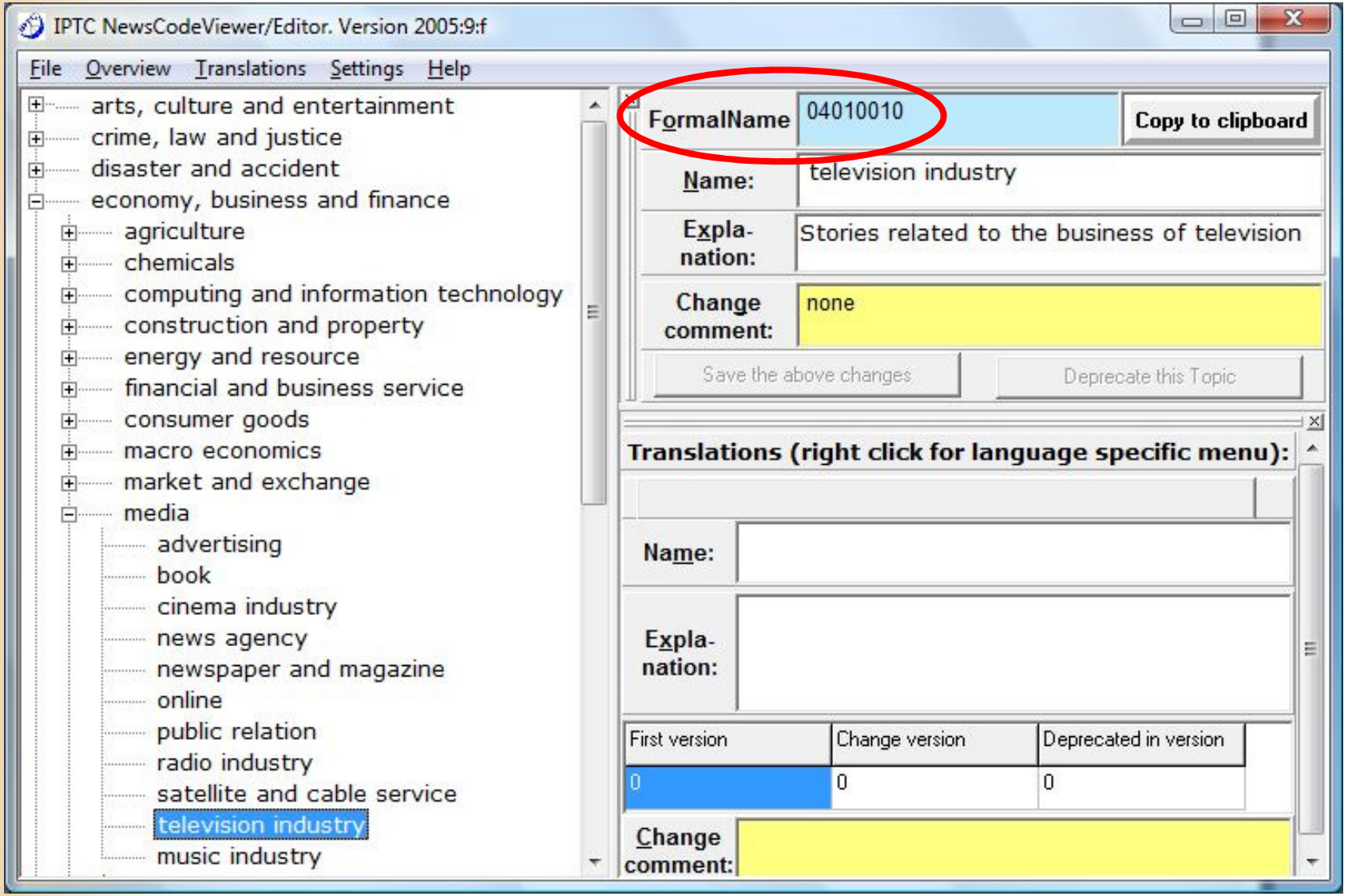
- Modeling unique identifiers
  - Use of dereferencable URIs for any resources (news items + vocabularies)
  - Future: Use of URIs for resource fragments http://www.youtube.com/watch?v=1bibCui3lFM#t=1m45s
- Modeling the provenance of the information
  - Reification
  - Named (and Networked) Graphs

```
{<> nar:subject cat:11002000}
        dc:creator team:md ;
        dc:modified ''2005-11-11T08:00:00Z''.
```

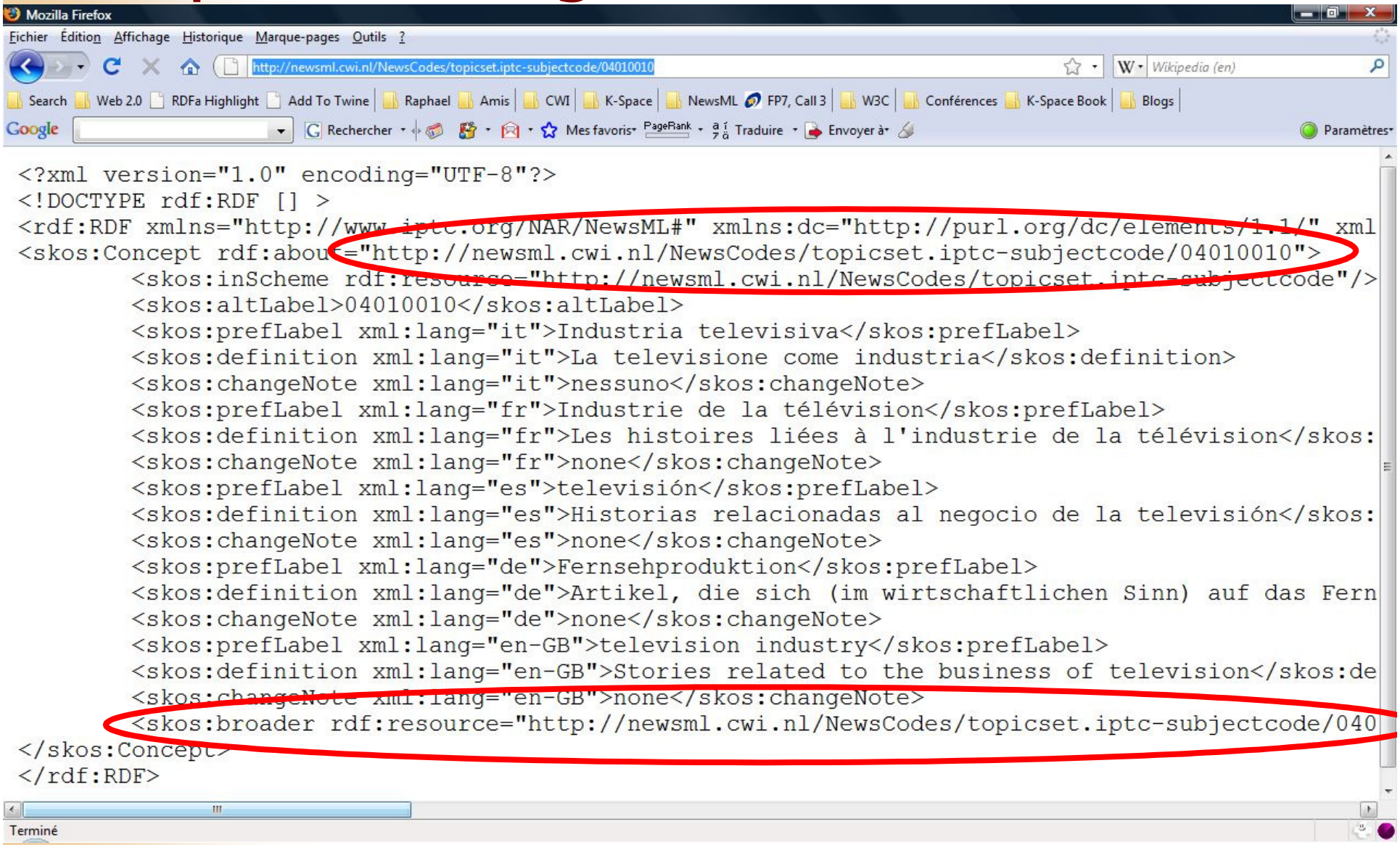
Step 2: Linking with Media Ontologies



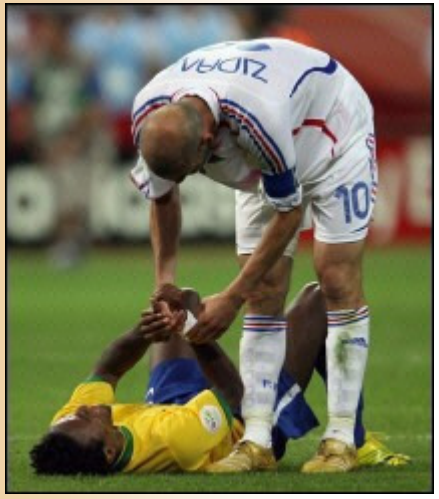
Step 3: Getting SKOS Vocabularies



Step 3: Getting SKOS Vocabularies



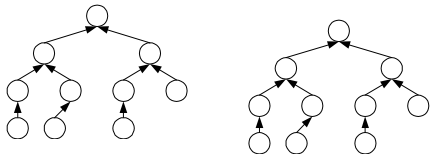
Step 4: Enriching the News Metadata



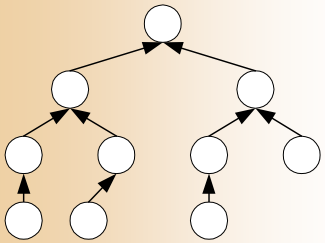
- Concepts/Entities that are subject of news
  - Thematic categories
  - People
  - Organizations
  - Geopolitical Areas
  - Points of Interest
  - Events
  - Products or artefacts

Step 4: Enriching the News Metadata

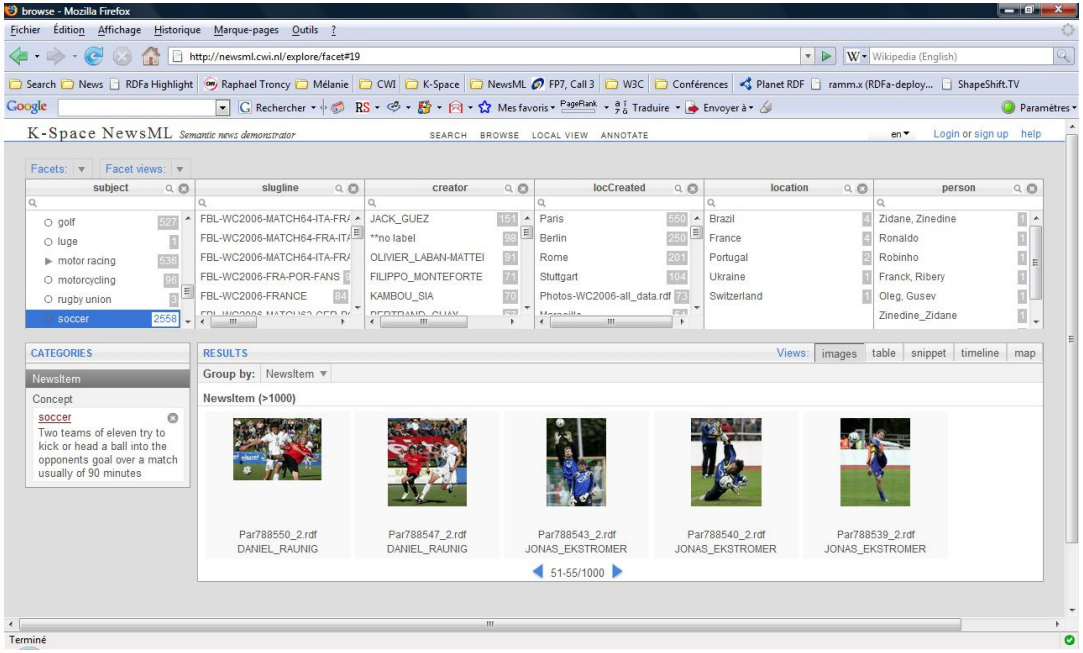
Named Entity Recognition

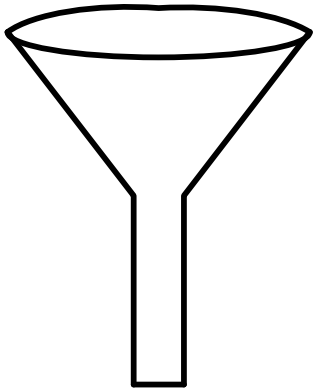


Domain Ontologies

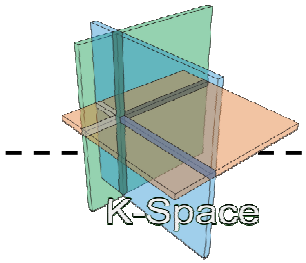


NAR Ontology
NewsCodes
Thesaurus

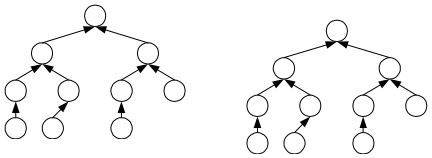




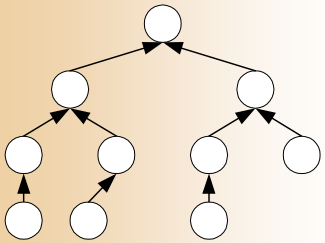
Step 4: Enriching the News Metadata



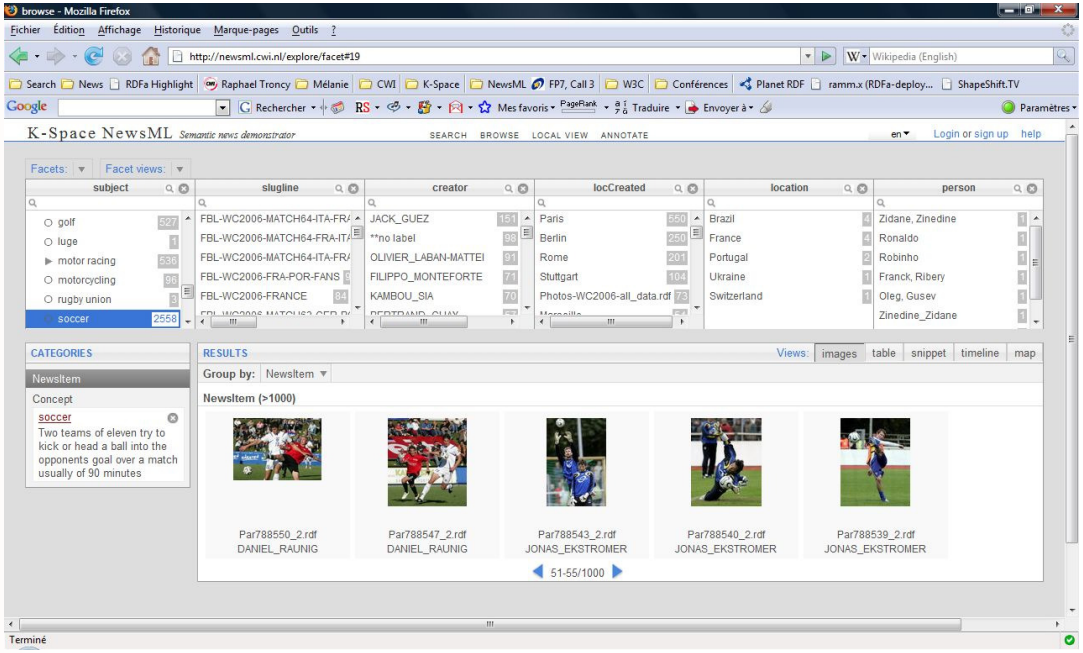
Concept Detectors

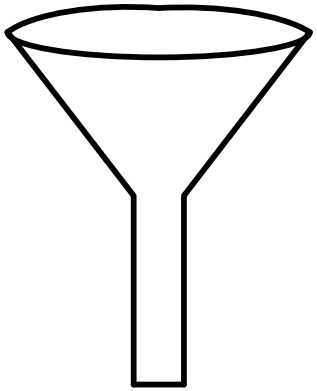


Domain Ontologies



NAR Ontology
NewsCodes
Thesaurus





Web of Data and Linked Data

wp:2006_FIFA_Wolrd_Cup#Final

nc:15054000

nar:subject

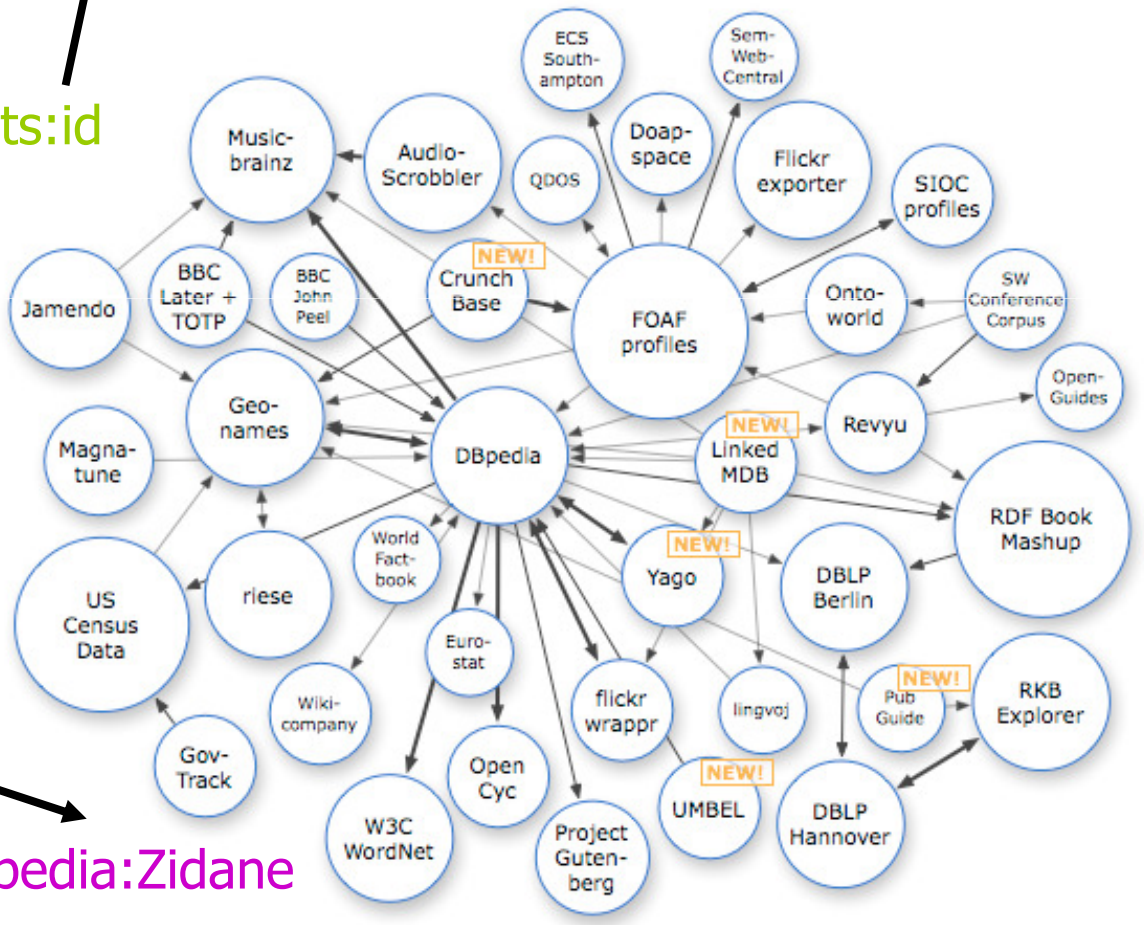
events:id

nar:location

foaf:depicts

geonames:2950159

dbpedia:Zidane



Presenting News Information

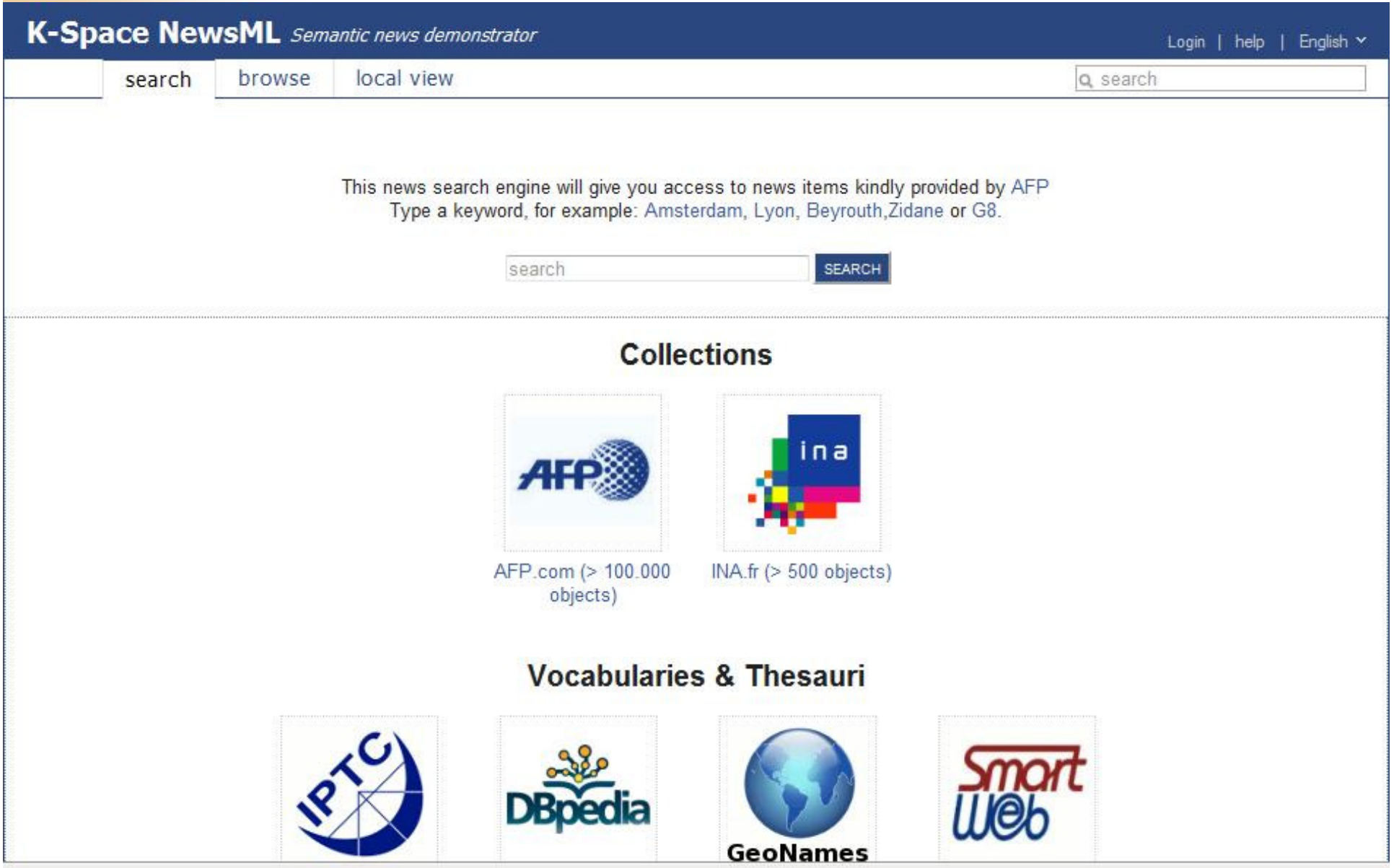
- Dimensions used for searching news items
  - When *time* 10/07/2006
  - Where *location* Paris
  - What *is depicted* J. Chirac, Z. Zidane
  - Why *event* WC 2006
  - Who *photographer* Bertrand Guay, AFP

Metadata

Semantic Search of Multimedia News

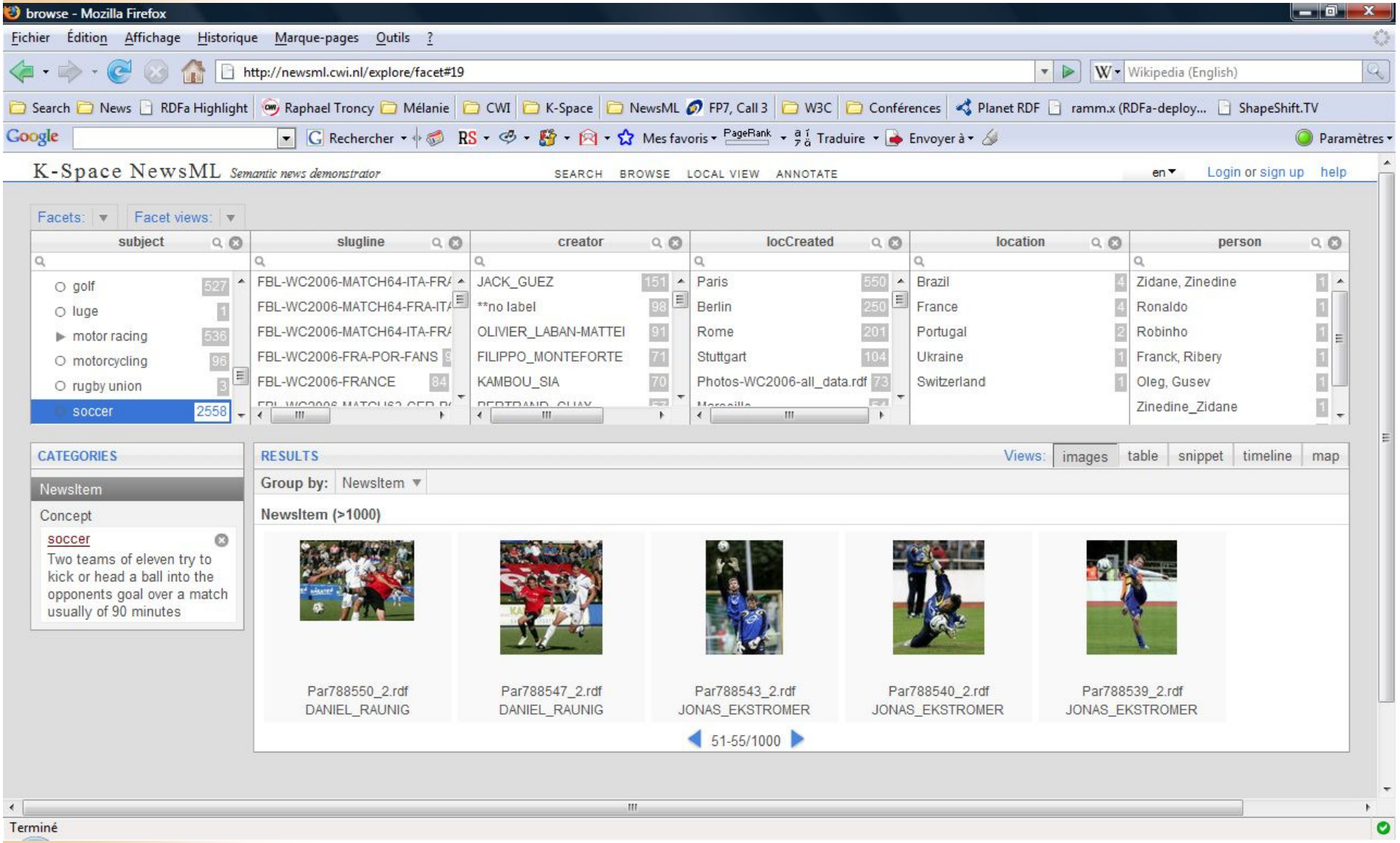
Description	Number of RDF Triples
General Ontologies: NAR, DC, FOAF	7,336
Domain Specific Ontologies: football	104,358
Thesauri: newscodes	34,903
DBpedia, Geonames	53,468
AFP News Feed (June/July 2006)	804,446
AFP Photos (June/July 2006)	61,311
INA Broadcast Video (June/July 2006)	1,932
Total	1,067,754

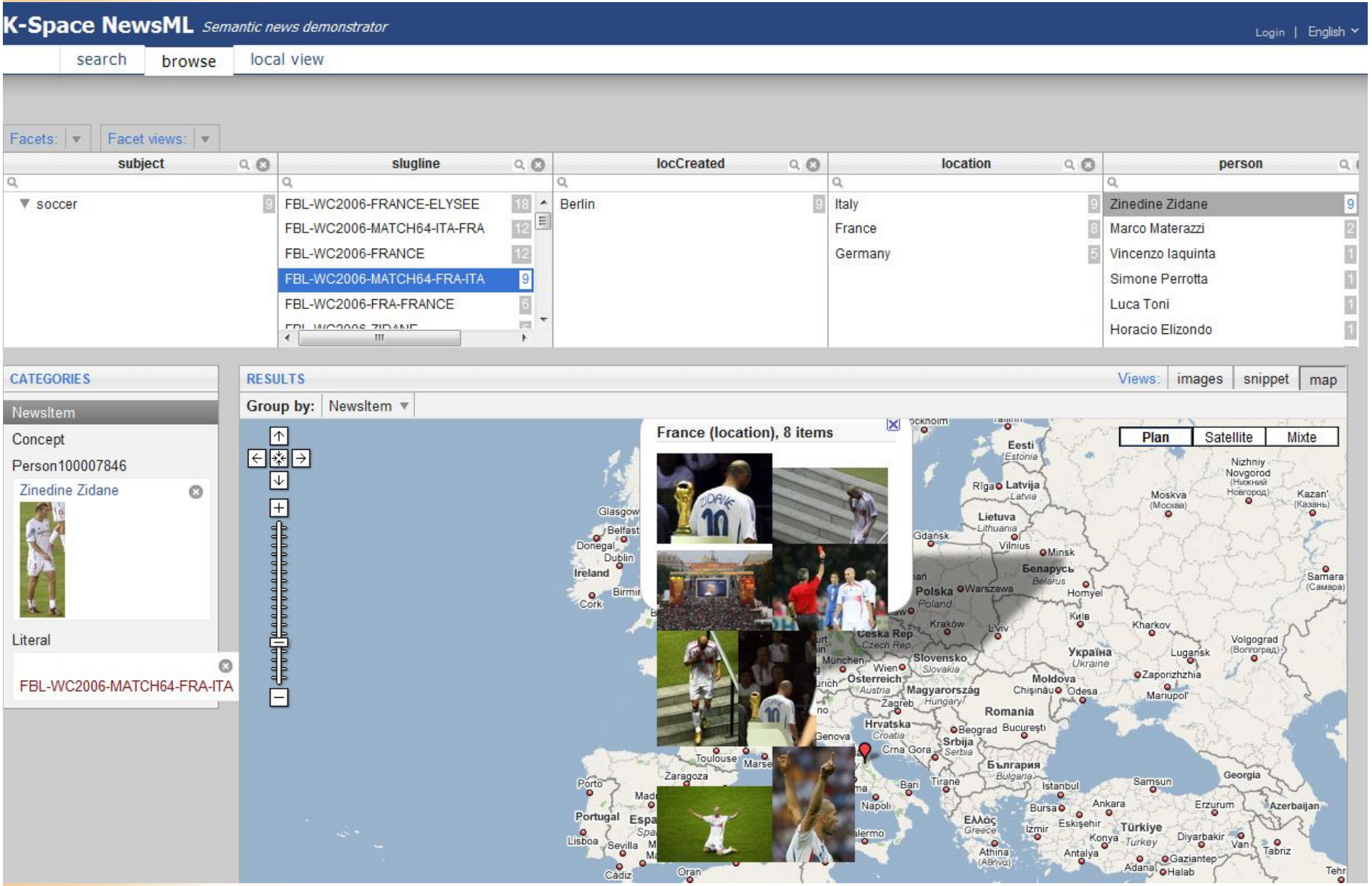
Powered by ClioPatria 1.0 alpha 3

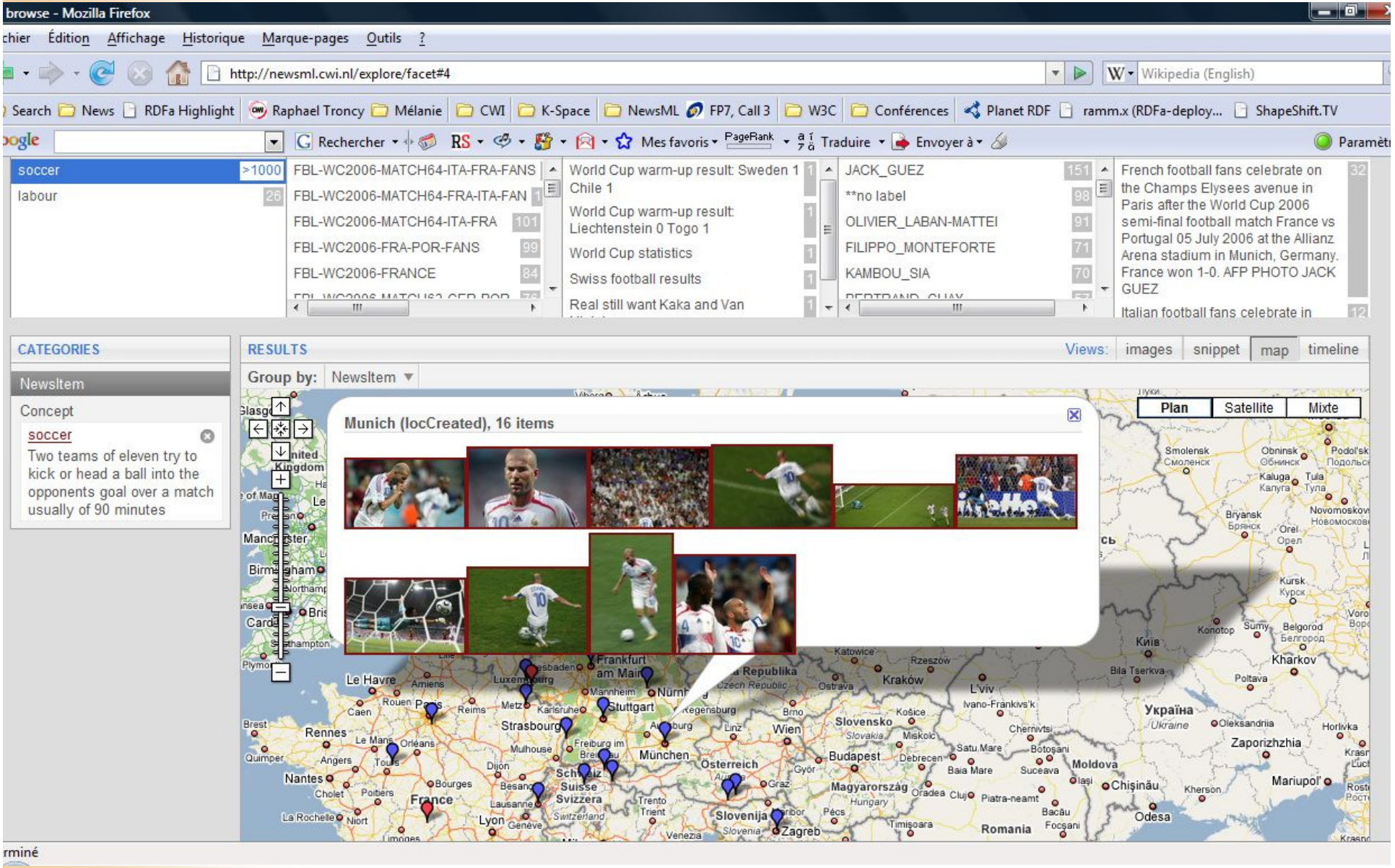

K-Space NewsML Semantic news demonstrator
Login | help | English
search
browse
local view
search
This news search engine will give you access to news items kindly provided by AFP
Type a keyword, for example: Amsterdam, Lyon, Beyrouth,Zidane or G8.
search
SEARCH
Collections
AFP.com (> 100.000 objects)
INA.fr (> 500 objects)
Vocabularies & Thesauri
IPTC
DBpedia
GeoNames
SmartWeb

Provide new dimensions for browsing

Distinguish field images vs stadium and street images with a grass detector for the World Cup dataset


browse - Mozilla Firefox
Fichier Édition Affichage Historique Marque-pages Outils ?
http://newsml.cwi.nl/explore/facet#19
Wikipedia (English)
Search News RDFa Highlight Raphael Troncy Mélanie CWI K-Space NewsML FP7, Call 3 W3C Conférences Planet RDF ramm.x (RDFa-deploy... ShapeShift.TV
Google Rechercher Mes favoris PageRank Traduire Envoyer à Paramètres
K-Space NewsML Semantic news demonstrator
SEARCH BROWSE LOCAL VIEW ANNOTATE
en Login or sign up help
Facets: Facet views:
subject
golf 527
luge 1
motor racing 536
motorcycling 96
rugby union 3
soccer 2558
slugline
FBL-WC2006-MATCH64-ITA-FRA
FBL-WC2006-MATCH64-FRA-ITA
FBL-WC2006-MATCH64-ITA-FRA
FBL-WC2006-FRA-POR-FANS
FBL-WC2006-FRANCE 84
creator
JACK_GUEZ 151
**no label 98
OLIVIER_LABAN-MATTEI 91
FILIPPO_MONTEFORTE 71
KAMBOU_SIA 70
locCreated
Paris 550
Berlin 250
Rome 201
Stuttgart 104
Photos-WC2006-all_data.rdf 73
location
Brazil 4
France 4
Portugal 2
Ukraine 1
Switzerland 1
person
Zidane, Zinedine 1
Ronaldo 1
Robinho 1
Franck, Ribery 1
Oleg, Gusev 1
Zinedine_Zidane 1
CATEGORIES
NewsItem
Concept
soccer
Two teams of eleven try to kick or head a ball into the opponents goal over a match usually of 90 minutes
RESULTS
Views: images table snippet timeline map
Group by: NewsItem
NewsItem (>1000)
Par788550_2.rdf
DANIEL_RAUNIG
Par788547_2.rdf
DANIEL_RAUNIG
Par788543_2.rdf
JONAS_EKSTROMER
Par788540_2.rdf
JONAS_EKSTROMER
Par788539_2.rdf
JONAS_EKSTROMER
51-55/1000
Terminé


K-Space NewsML Semantic news demonstrator
Login | English
search
browse
local view
Facets:
Facet views:
subject
slugline
locCreated
location
person
soccer 9
FBL-WC2006-FRANCE-ELYSEE 18
FBL-WC2006-MATCH64-ITA-FRA 12
FBL-WC2006-FRANCE 12
FBL-WC2006-MATCH64-FRA-ITA 9
FBL-WC2006-FRA-FRANCE 6
Berlin 9
Italy 9
France 8
Germany 5
Zinedine Zidane 9
Marco Materazzi 2
Vincenzo Iaquinta 1
Simone Perrotta 1
Luca Toni 1
Horacio Elizondo 1
CATEGORIES
NewsItem
Concept
Person100007846
Zinedine Zidane
Literal
FBL-WC2006-MATCH64-FRA-ITA
RESULTS
Views: images snippet map
Group by: NewsItem
France (location), 8 items
Plan
Satellite
Mixte


browse - Mozilla Firefox
http://newsml.cwi.nl/explore/facet#4
soccer >1000
labour 26
FBL-WC2006-MATCH64-ITA-FRA-FANS
FBL-WC2006-MATCH64-FRA-ITA-FAN
FBL-WC2006-MATCH64-ITA-FRA 101
FBL-WC2006-FRA-POR-FANS 99
FBL-WC2006-FRANCE 84
World Cup warm-up result: Sweden 1 Chile 1
World Cup warm-up result: Liechtenstein 0 Togo 1
World Cup statistics
Swiss football results
Real still want Kaka and Van
JACK_GUEZ 151
**no label 98
OLIVIER_LABAN-MATTEI 91
FILIPPO_MONTEFORTE 71
KAMBOU_SIA 70
French football fans celebrate on the Champs Elysees avenue in Paris after the World Cup 2006 semi-final football match France vs Portugal 05 July 2006 at the Allianz Arena stadium in Munich, Germany. France won 1-0. AFP PHOTO JACK GUEZ
Italian football fans celebrate in
CATEGORIES
NewsItem
Concept
soccer
Two teams of eleven try to kick or head a ball into the opponents goal over a match usually of 90 minutes
RESULTS
Views: images snippet map timeline
Group by: NewsItem
Munich (locCreated), 16 items
Plan Satellite Mixte

K-Space NewsML *Semantic news demonstrator*

Login | English

search | browse | local view

search

local view

display | cell format

G8Video_002.rdf

http://newsml.cwi.nl/AFP/G8Video/G8Video_002.rdf

Links

- permanent link
- annotate

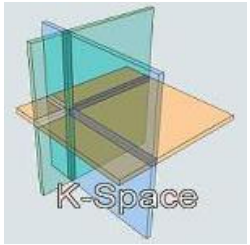
tcin | tcout

Property	Value
SecondOrMoreBroadcast	•
audiencePresent	•
availableMaterial	• [COM] - FPVDB06071308 . 01/01 - Stat. Num.: Numérisé et en ligne - TC IN: 00:13:37:14 TC OUT: 00:19:29:23 - Format: MPEG2 - Définition: CIS - Son: STEREO - Coul.: COULEUR - Filière: FP - Type Mat.: COP - Durée: 00:37:11 - Stat.Vers.: Versé Localisation: NAP (02/08/2006) -
broadcastGoal	•
broadcastInformation	• 13/07/2006 - type date: Diffusé -heure:20:16:01 - canal:2eme chaine (A2) -ext.géo.:Nationale
broadcastMode	•
collectionTitle	• 20 heures le journal
corpus	•
descriptors	• DET: alpinisme ; DET: accident ; DET: expédition ; DET: cadavre ; DET: recherche ; DET: retour (rappatriement) ; DEL: Népal ; DEL: Himalaya ;
duration	• 00:05:27
eventDate	•
foreignOriginalVersion	•
generic	• JOU Jacquier, Gilles ; PAR Koenig, Serge ; PAR Baud, Alain ;
genre	• Journal télévisé ; Reportage ;
id	• 3129199001020
material	• [COM] - FPVDB06071308 . 01/01 - Stat. Num.: Numérisé et en ligne - TC IN: 00:13:37:14 TC OUT: 00:19:29:23 - Format: MPEG2 - Définition: CIS - Son: STEREO - Coul.: COULEUR - Filière: FP - Type Mat.: COP - Durée: 00:37:11 - Stat.Vers.: Versé Localisation: NAP (02/08/2006) -
materialID	• FPVDB06071308 . 01

Credits

- Datasets:

- People:



- More info: **http://newsml.cwi.nl**

Literature

- Michiel Hildebrand, Jacco van Ossenbruggen and Lynda Hardman: */facet: A Browser for Heterogeneous Semantic Web Repositories*. In 5th International Semantic Web Conference (ISWC'2006), pages 272-285, Athens (GA), USA, November 5-9, 2006.
- Jan Wielemaker, Michiel Hildebrand, Jacco van Ossenbruggen and Guus Schreiber: *Infrastructure for thesaurus-based search and annotation: evauating the standards*. In 7th International Semantic Web Conference (ISWC'2008), pages ?-?, Karlsruhe, Germany, October 26-30, 2008.
- Raphaël Troncy: *Bringing the IPTC News Architecture into the Semantic Web*. In 7th International Semantic Web Conference (ISWC'2008), pages 483-498, Karlsruhe, Germany, October 26-30, 2008.
- Raphaël Troncy, Lynda Hardman, Jacco van Ossenbruggen and Michael Hausenblas: *Identifying Spatial and Temporal Media Fragments on the Web*. In W3C Video on the Web Workshop, San Jose (California) and Brussels (Belgium), December 2007.
- W3C Video on the Web Activity, April 2008 http://www.w3.org/2008/01/video-activity.

What are the messages?

- Features can be extracted and used to describe multimedia content (metadata)
- Multimedia presentations embody messages
- Media, structure and aesthetics all contribute to conveying the message
- The message can be made explicit (more metadata)
- Media content and metadata can be passed around and among systems
- We need to agree on how to do this (e.g. canonical processes; COMM; W3C working groups; IPTC)
- Users can be given much richer and more flexible access to (semantically annotated) content, but…
- we are still figuring out how to do this.

Thanks for your attention

http://www.cwi.nl/~media/samt08/