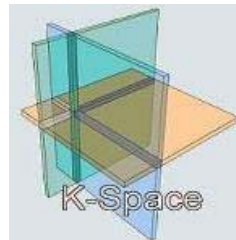


A Semantic Multimedia Web: Create, Annotate, Present and Share your Media

Raphaël Troncy, Lynda Hardman

<Raphael.Troncy | Lynda.Hardman@cwi.nl>

CWI, Semantic Media Interfaces



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

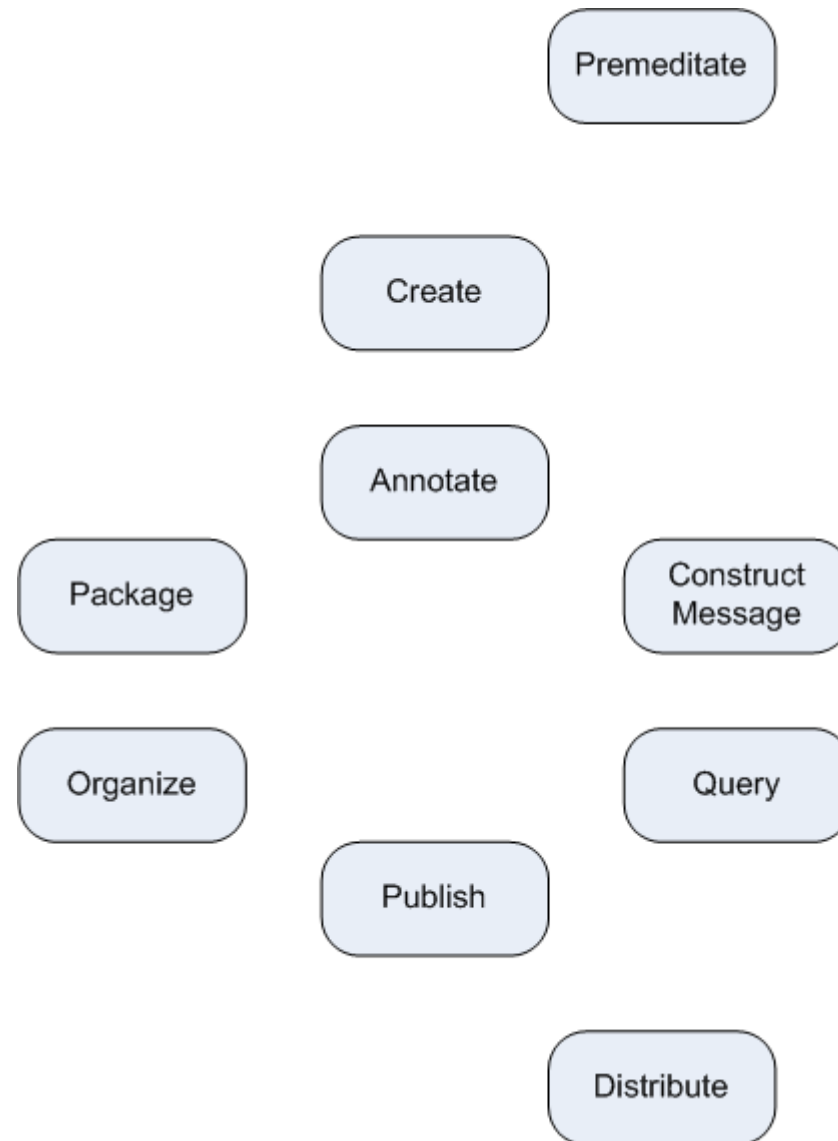
1. Understanding Multimedia Applications Workflow
 - CeWe Color Photo Book creation application
 - Vox Populi argumentation-based video sequences generation
 - *Canonical Processes of Media Production*
2. Semantic Annotation of Multimedia Content
 - Multimedia metadata formats: use cases and requirements
 - 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

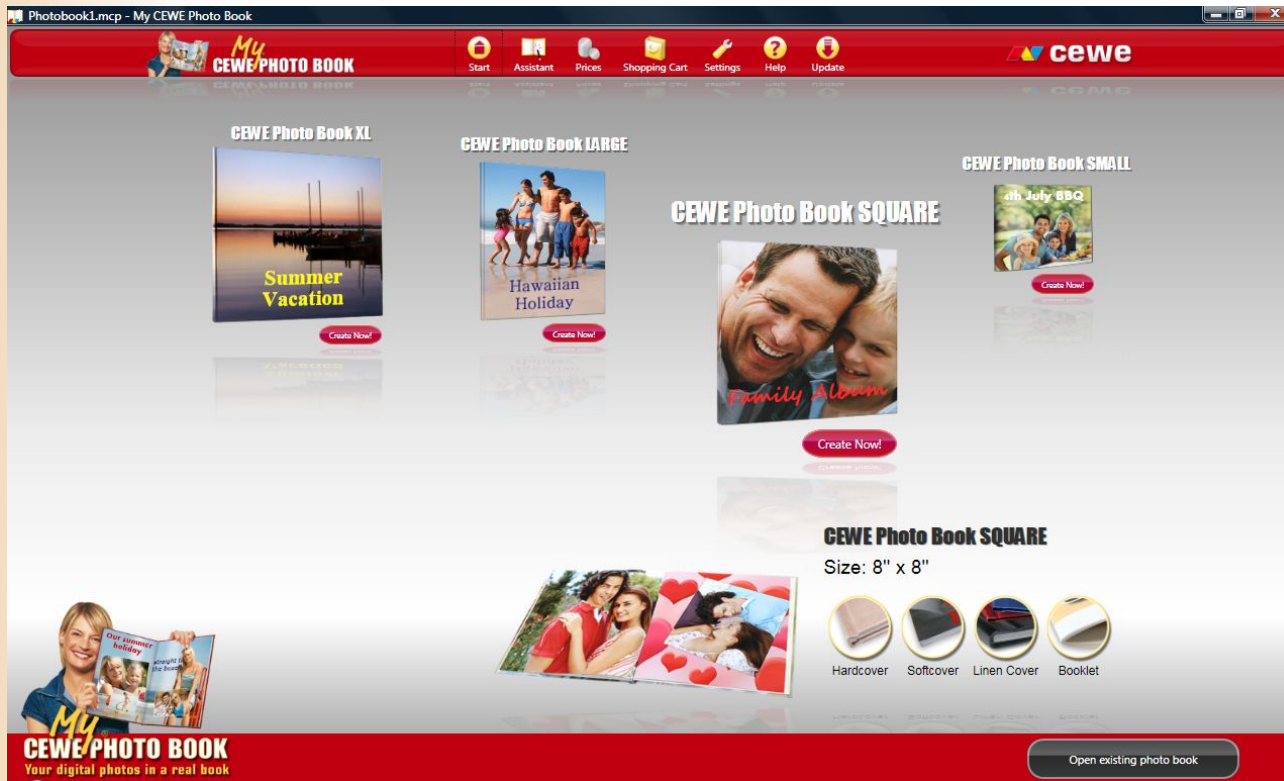
- Application for authoring digital photo books
- Automatic selection, sorting and ordering of photos
 - Context analysis methods: timestamp, annotation, etc.
 - Content analysis methods: color histograms, edge detection, etc.
- Customized layout and background
- Print by the European leader photo finisher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

<http://www.cewe-photobook.com>

CeWe Color PhotoBook Processes

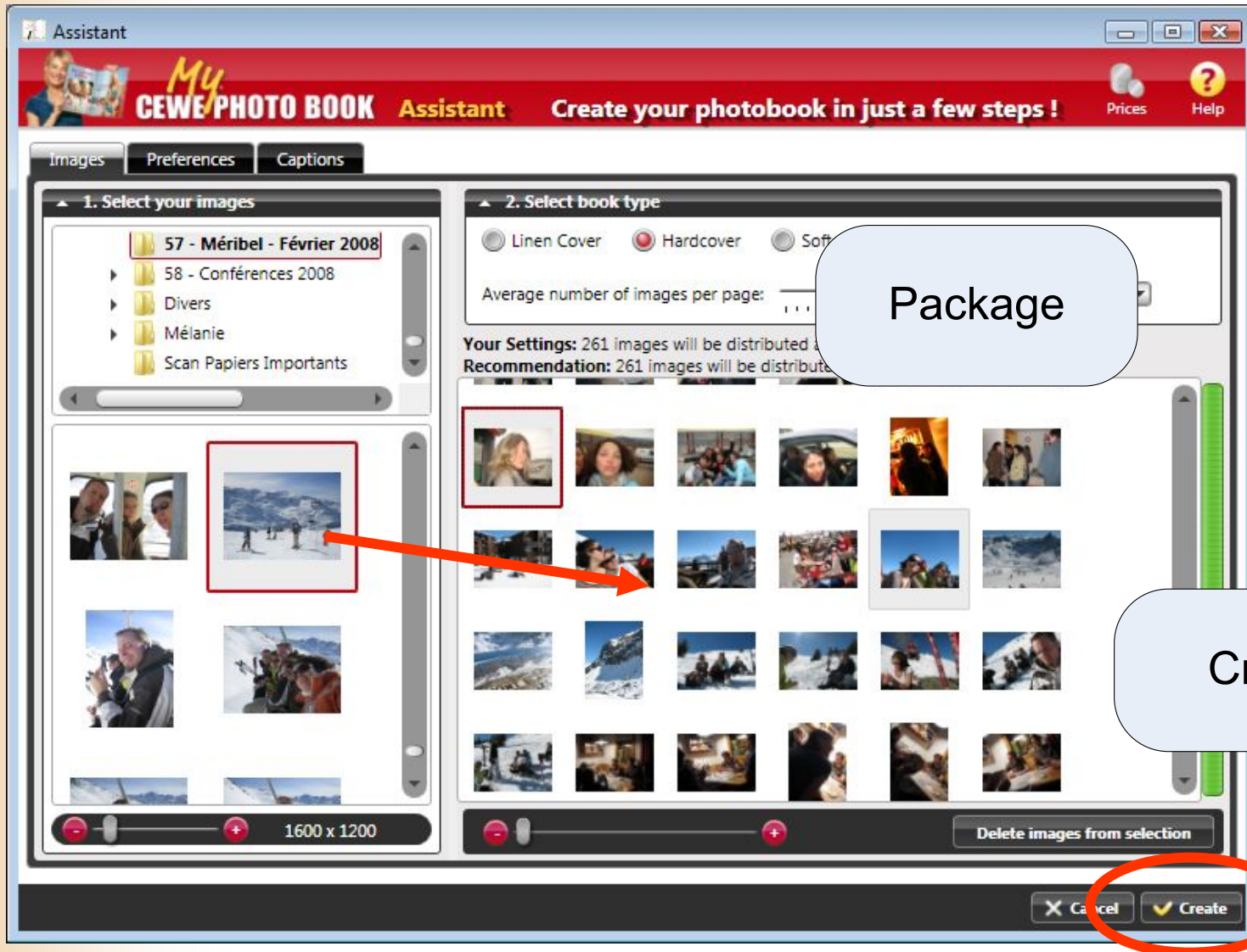
- My winter ski holidays with my friends

Premeditate

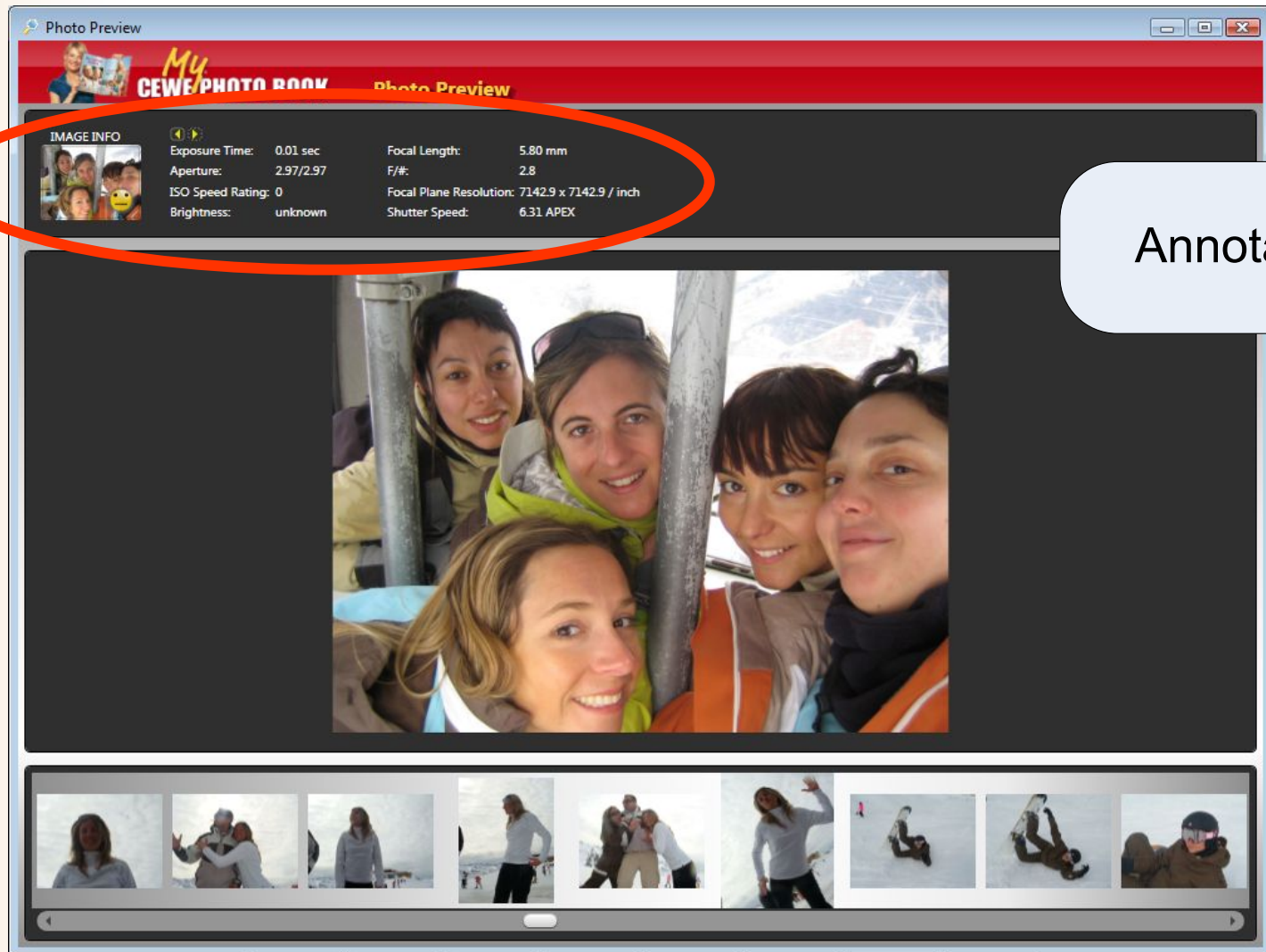


Construct Message

CeWe Color PhotoBook Processes

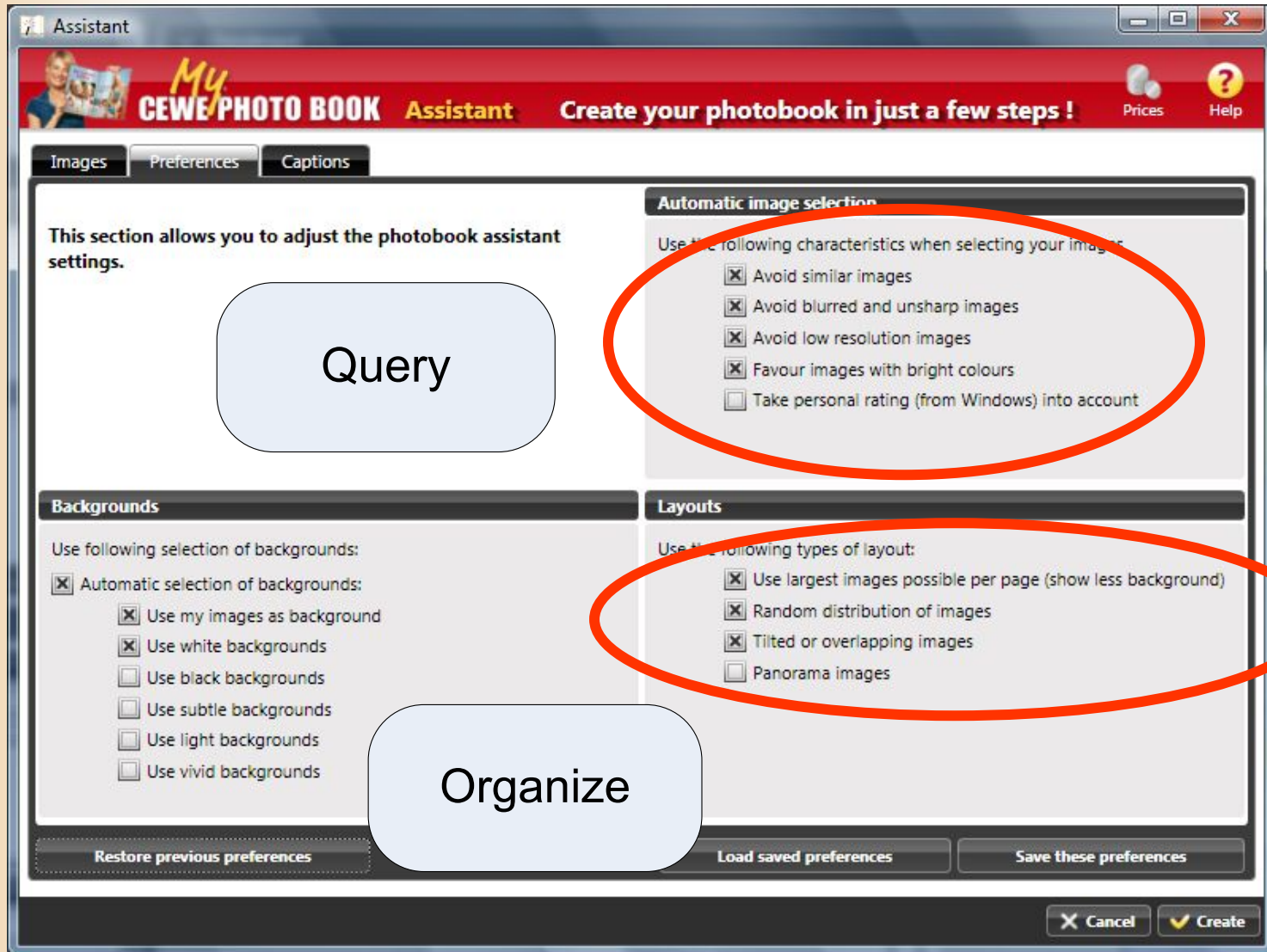


CeWe Color PhotoBook Processes



Annotate

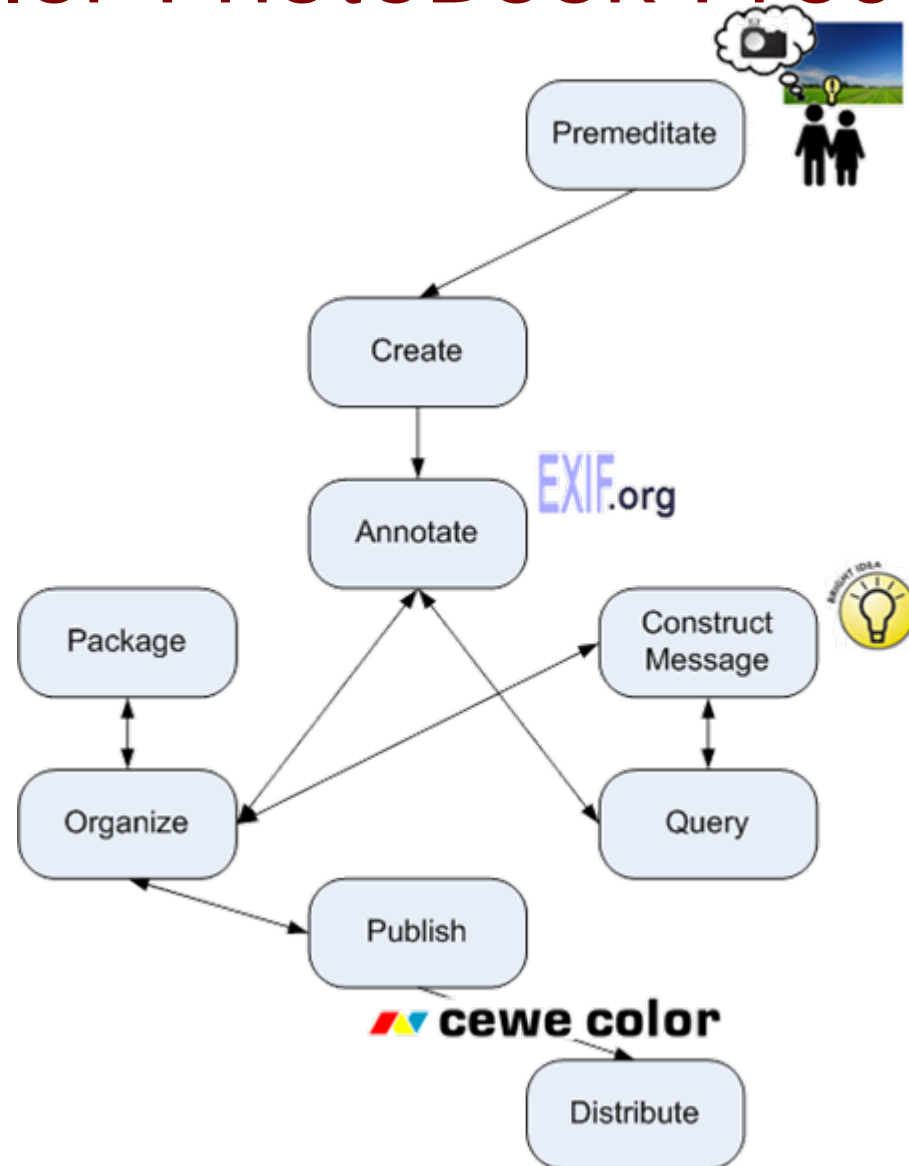
CeWe Color PhotoBook Processes



CeWe Color PhotoBook Processes

The screenshot displays the CeWe Color PhotoBook web interface. At the top, a red navigation bar contains the text "My CEWE PHOTO BOOK" and several icons for "Start", "Assistant", "Prices", "Shopping Cart", "Settings", "Help", and "Update". The main area features a large collage of winter-themed photographs, including snowy mountain peaks, people skiing, and individuals sitting on a snowy slope. A white callout box with the text "Publish" is positioned over the top right of the photo collage. At the bottom of the interface, a dark grey control bar includes navigation arrows and a central "Publish" button. A white callout box with the text "Distribute" is positioned over this bar. In the bottom right corner, a red-bordered button labeled "Order now!" is highlighted with a red circle.

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

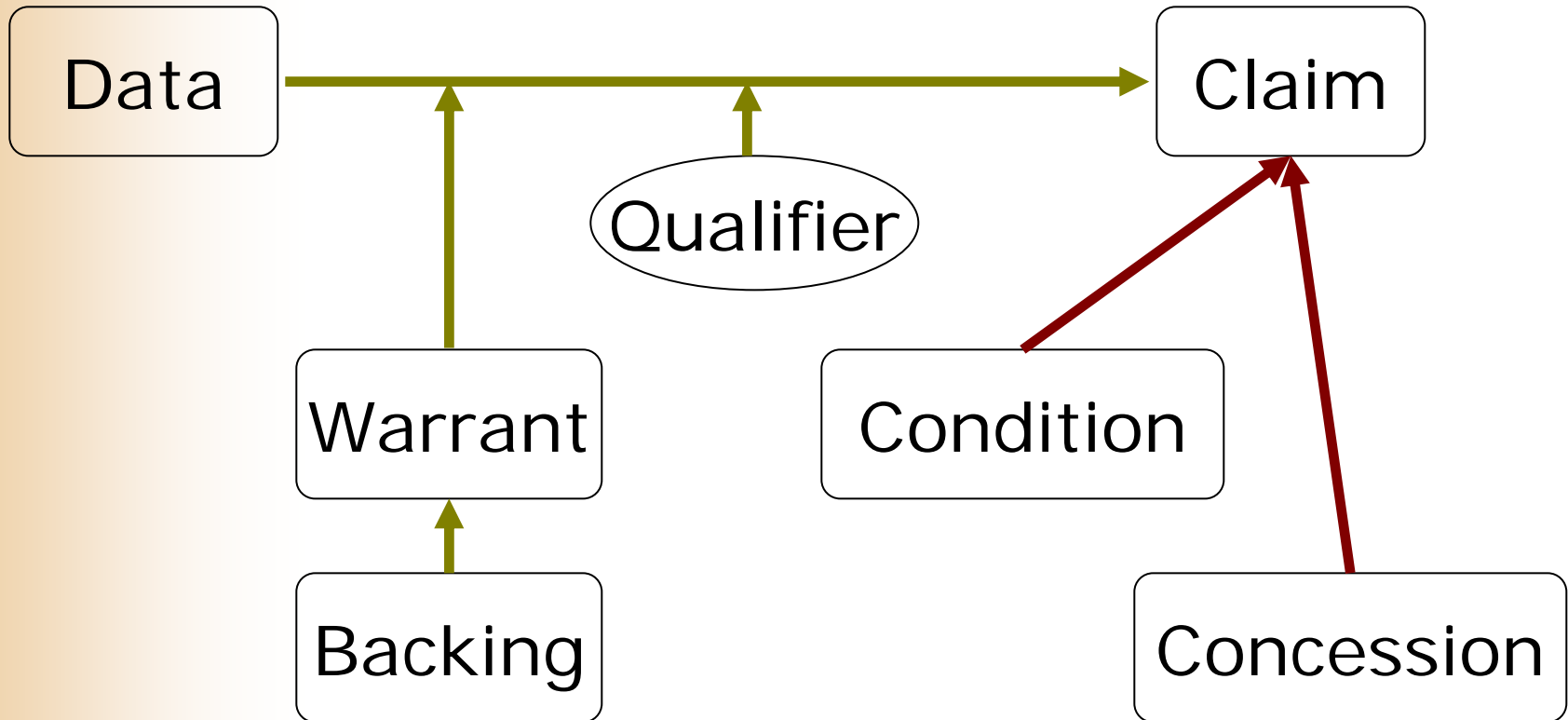
Vox Populi Annotations

- 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

Construct Message

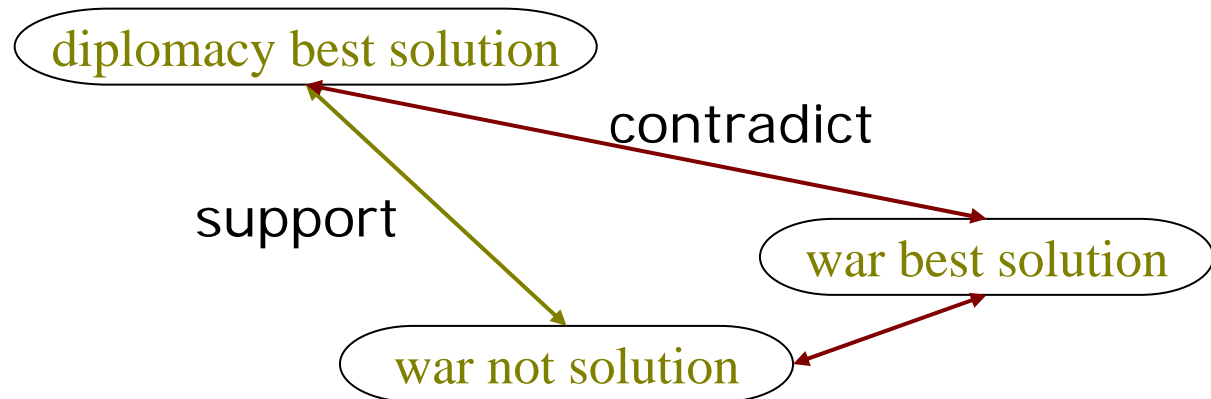
Question	Interviewee		Opinion			
Why did they do what they did? What do you think of the casualties among civilians? What do you think of the Afghanistan war? What are the consequences of the war? What are the roots of the problem? What do you think about the Anthrax?	Cameroun Parking Guard at Stamford Lawyer in Harvard		War in Afghanistan - Pro			
Position						
Age	Education	Employment	GeoLocation	Race	Religion	Sex
Middleage Old Teenager Young	HighEducated LowEducated MediumEducated	HighIncomeJob LowIncomeJob MiddleIncomeJob Retired Student	NotUSA USA	AmericanIndian Asian Black Hispanic White	Atheist Christian Muslim	Female Male
First Character						
Age	Education	Employment	GeoLocation	Race	Religion	Sex
Middleage Old Teenager Young	HighEducated LowEducated MediumEducated	HighIncomeJob LowIncomeJob MiddleIncomeJob Retired Student	NotUSA USA	AmericanIndian Asian Black Hispanic White	Atheist Christian Muslim	Female Male
Second Character						
Strategy	Bandwidth	Intercut	Caption			
<input type="radio"/> None <input checked="" type="radio"/> Create Clash <input type="radio"/> Create Support <input type="radio"/> Vox Populi	<input type="radio"/> Low Bandwidth <input checked="" type="radio"/> Medium Bandwidth <input type="radio"/> High Bandwidth	<input checked="" type="radio"/> True <input type="radio"/> False	<input type="radio"/> On (can cause problems) <input checked="" type="radio"/> Off			
Done	Reset					

Query

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*

Organize



Result of Vox Populi Query

I am not a fan of military actions

I cannot think of a more effective solution

Publish

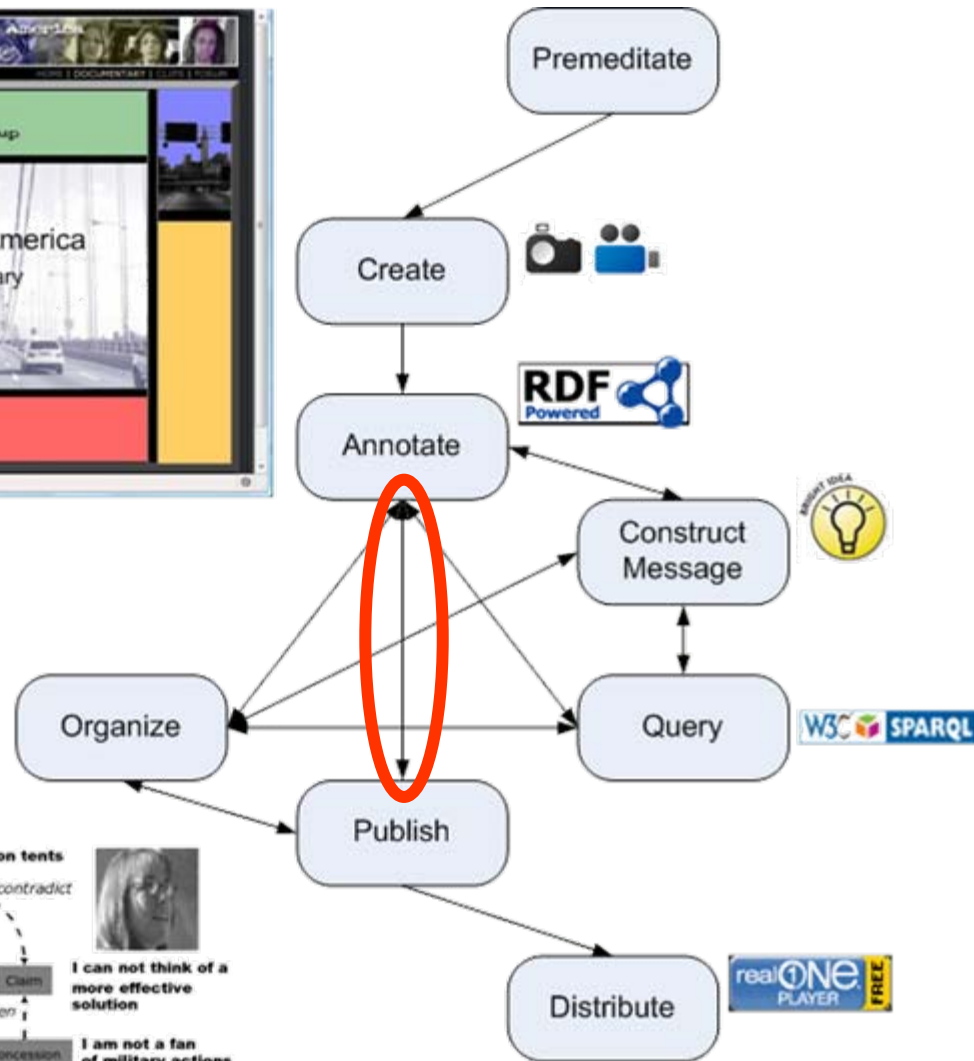


Distribute

War has never solved anything

Two billions dollar bombs on tents

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

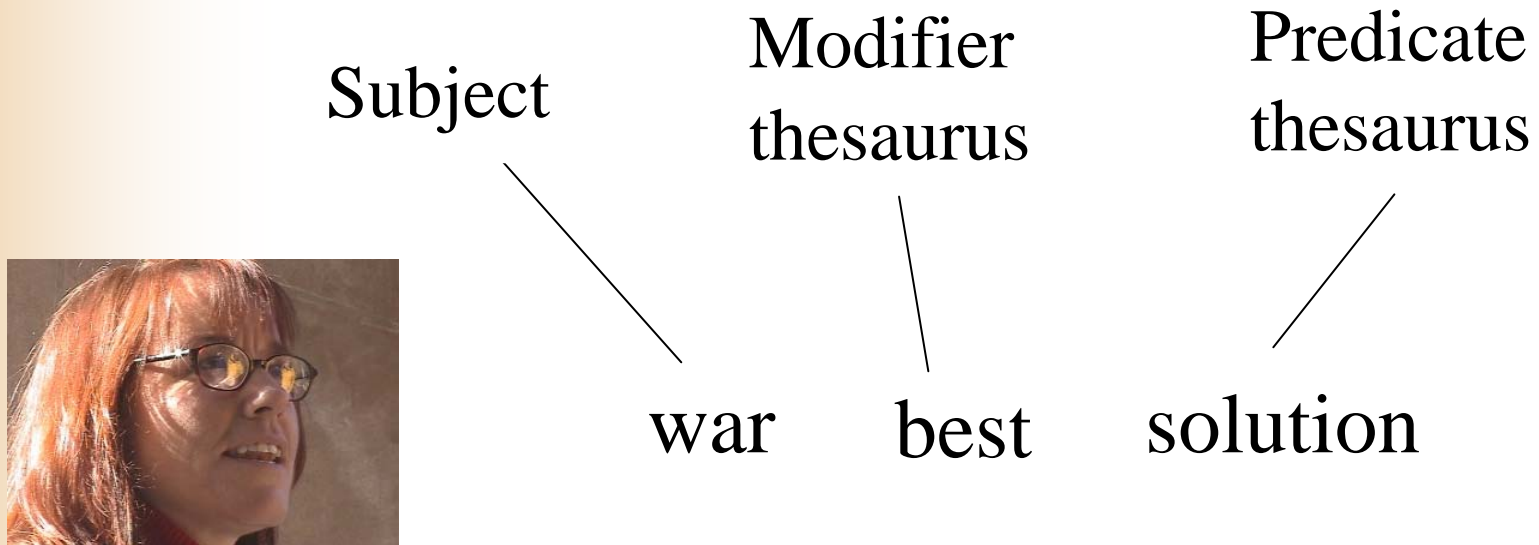


Q: "What do you think of the Afghanistan war?"

Speaker:
Female,
Caucasian...

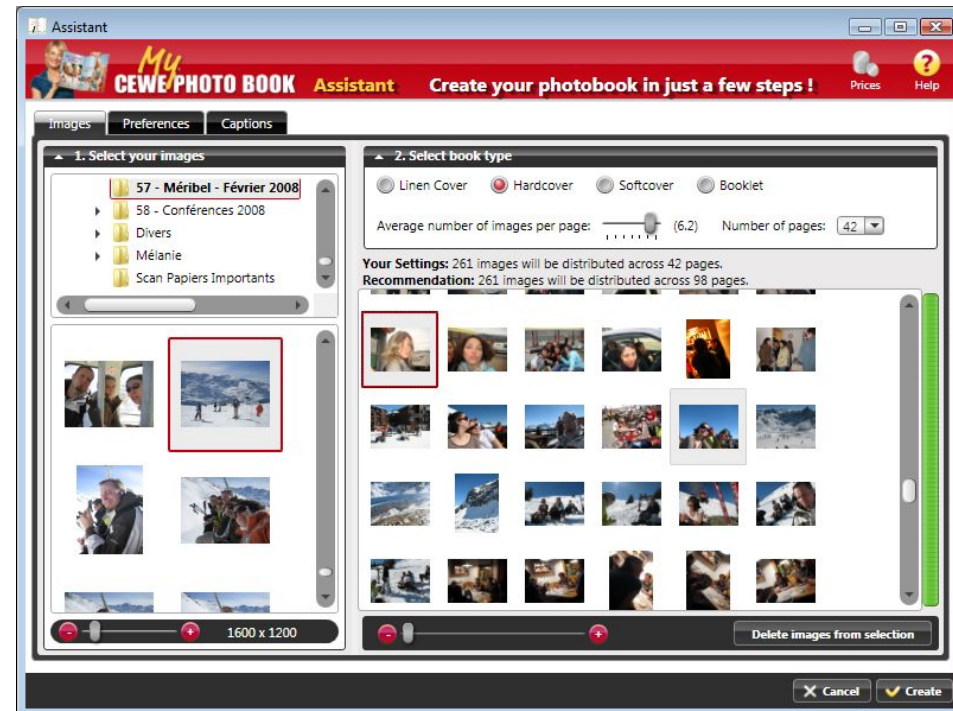
Semantic Annotate

- 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

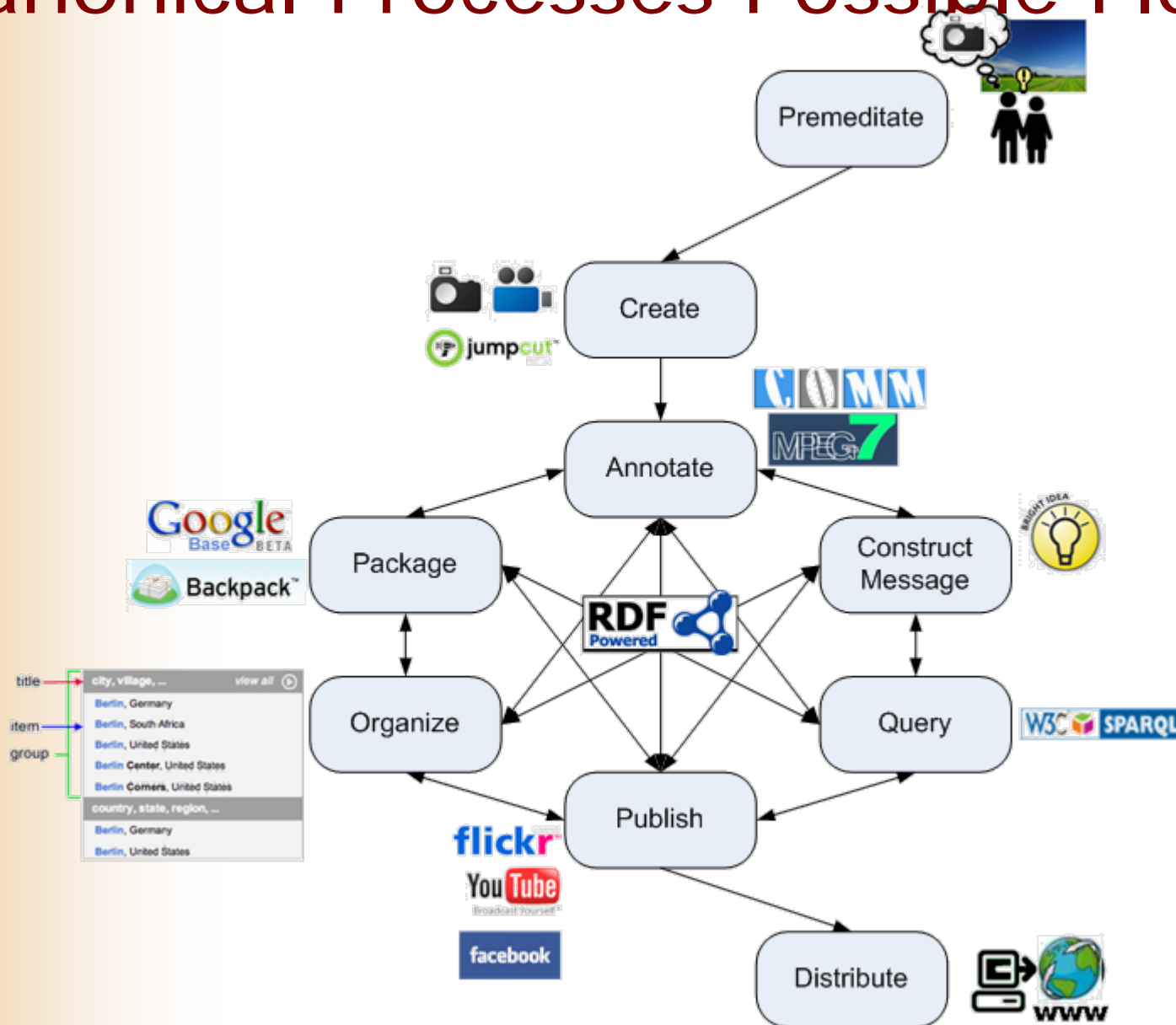
Organize

- Process where process artifacts are organized according to the message
 - *Organize a number of 2-page layouts in a 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 and Distribute

- Process where final content and user interface is created
- Process where final interaction between end-users and produced media occurs
 - *Ship the photobook to your home address*
 - *Get the online version of a personalized documentary*

Canonical Processes Possible Flow

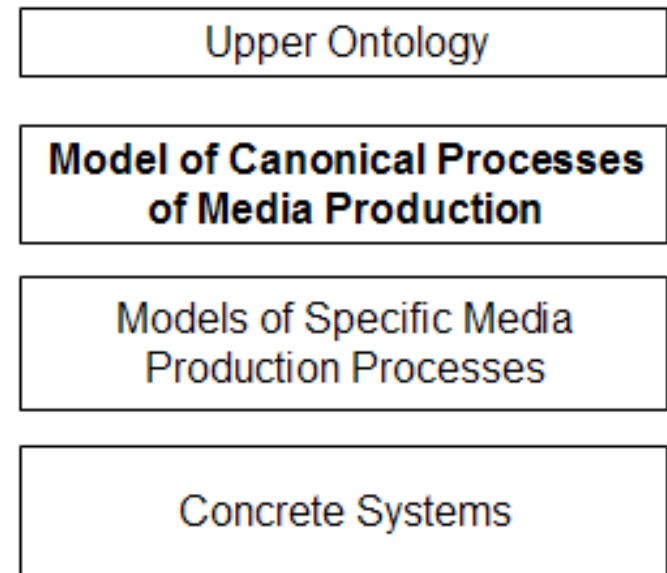


Sum Up

- 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



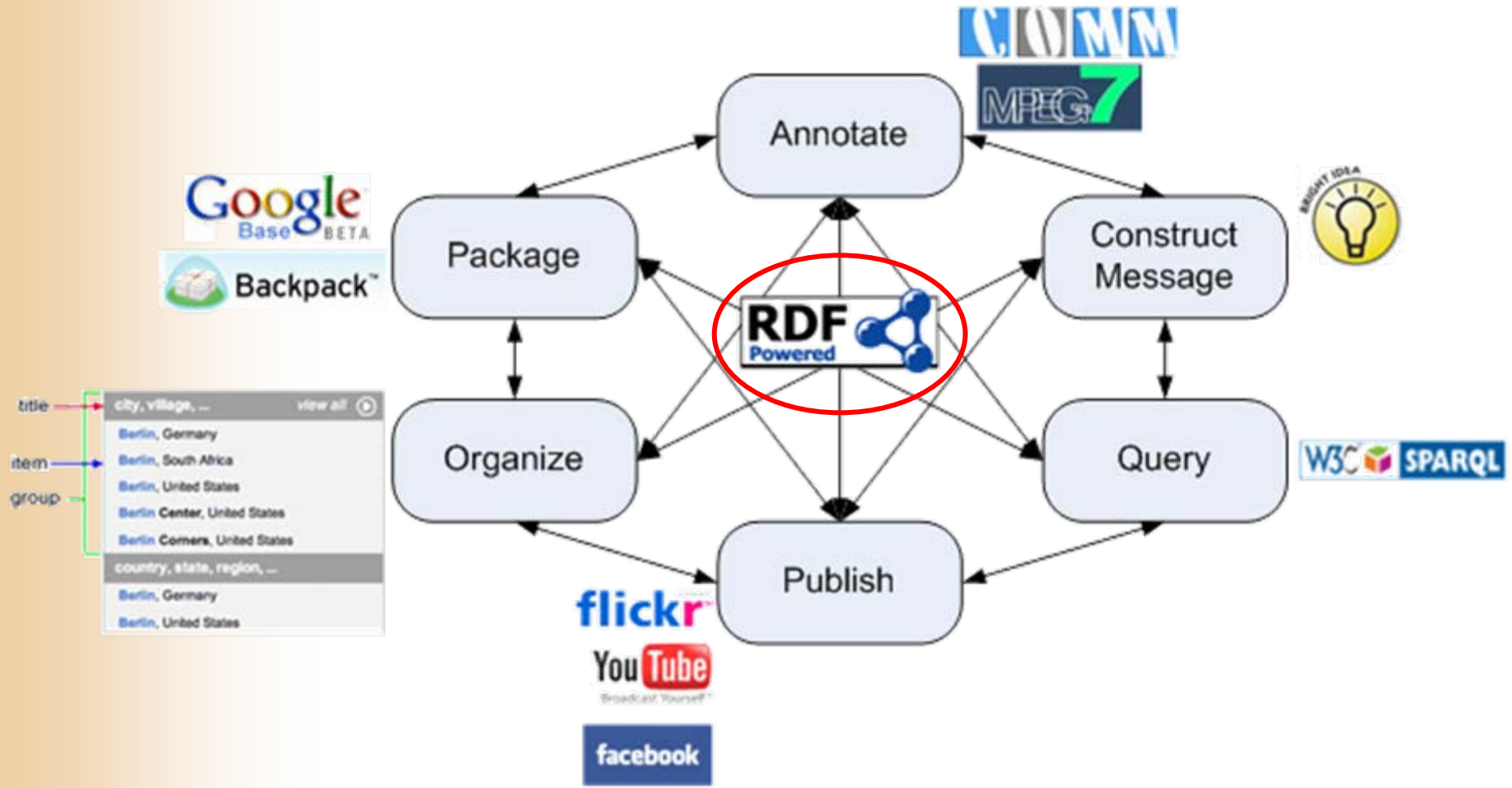
Literature

- 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



EXIF.org

flickr GAMMA™

Tagging

MPEG7

You Tube
Broadcast Yourself™

Multimedia

D 3v2

last.fm

ifra

IPTC

xmp™
Adding Intelligence to Media

RDF
Powered

FOAF + SKOS

Semantic
Web



OPL

Web

W3C Multimedia Semantics XG

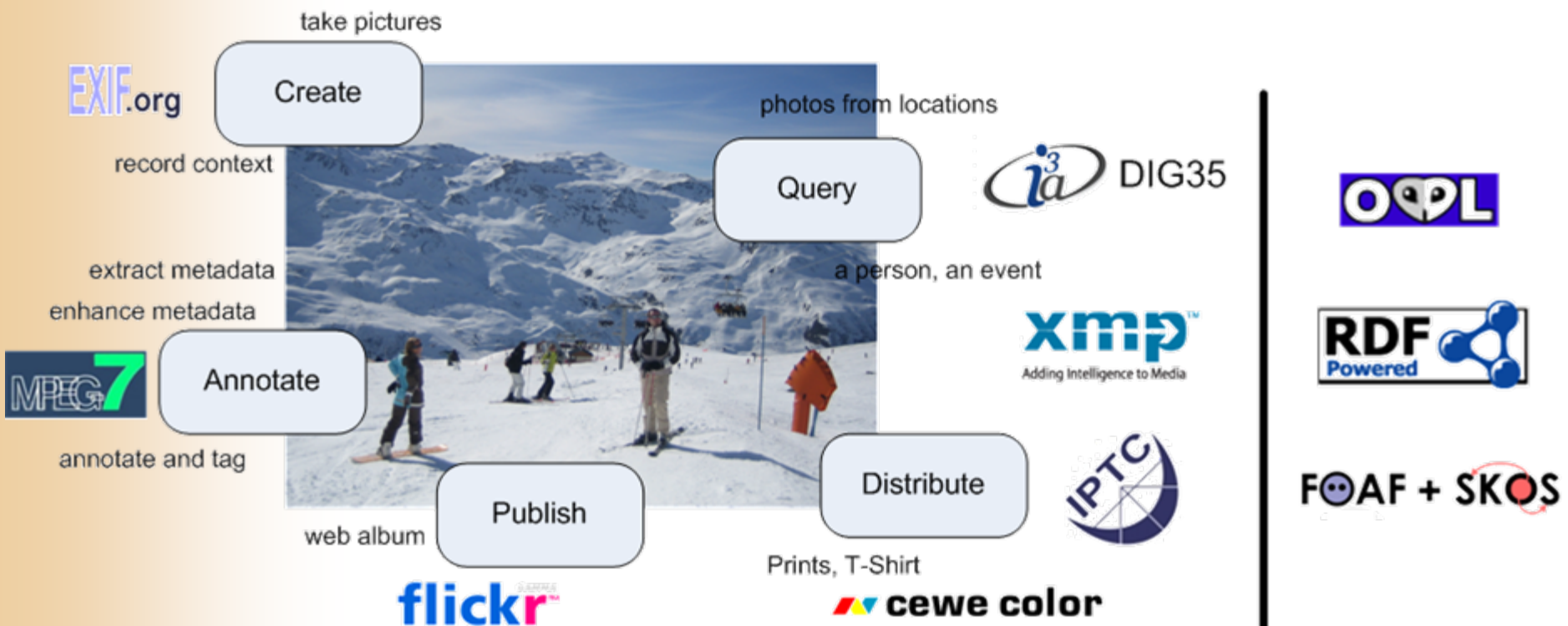
W3C Multimedia Semantics XG

<http://www.w3.org/2005/Incubator/mmsem/>



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

The screenshot shows the Muzzle application window titled "Muzzle: MultimediaN e-Culture". It features a search bar with "Anything" and a "facet navigation" button. Below the search bar are four faceted filters: "playedBy", "Intensity", "Key Mode", and "key". Each filter has a scrollable list of options and a numerical count. The "playedBy" filter is set to "Liquid Zen" (20 items). The "Intensity" filter is set to "Soft" (20 items). The "Key Mode" filter is set to "minor" (13 items). The "key" filter is set to "C" (5 items). Below the filters is a table of results with columns for "Results", "target", "Track", "views", "local", "table", "images", and "map". The table lists 10 tracks, with the third track, "Slip Into Surreal" by Liquid Zen, highlighted in blue.

Results	target	Track	views	local	table	images	map
1	title	playedBy	Intensity	key	Key Mode		
1	Ribbons	Liquid Zen	Soft	A	minor		
2	Long Trip To Evaporate	Liquid Zen	Soft	A	minor		
3	Slip Into Surreal	Liquid Zen	Soft	C	minor		
4	Television	Liquid Zen	Soft	F#	major		
5	Underwater Equinox	Liquid Zen	Soft	F#	major		
6	30 Miles	Liquid Zen	Soft	E	minor		
7	Come To That	Liquid Zen	Soft	G	minor		
8	Drop The Sky	Liquid Zen	Soft	E	minor		
9	Por Tus Ojos	Liquid Zen	Soft	A	minor		
10	Colors Burning Edge	Liquid Zen	Soft	C	minor		



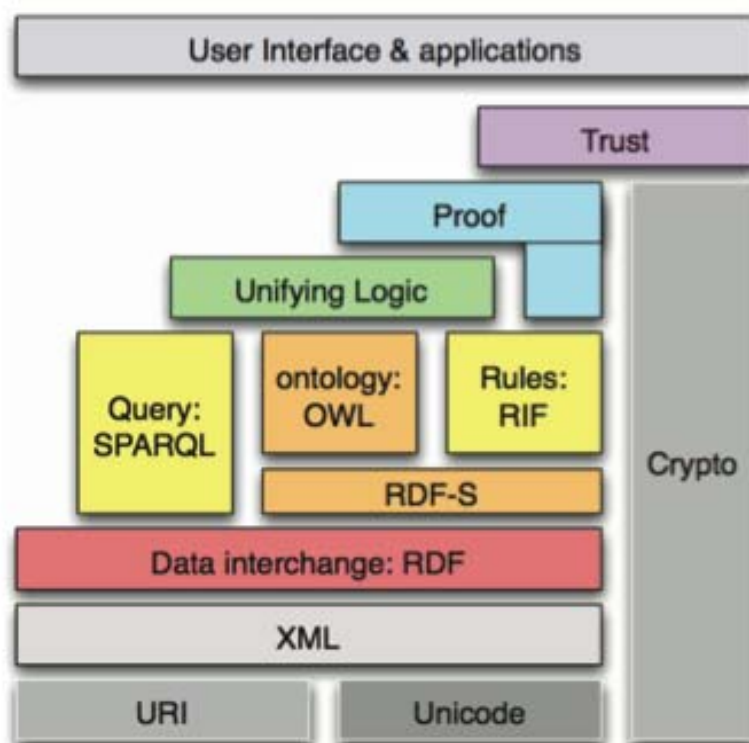
The Music Ontology



Multimedia: Description methods



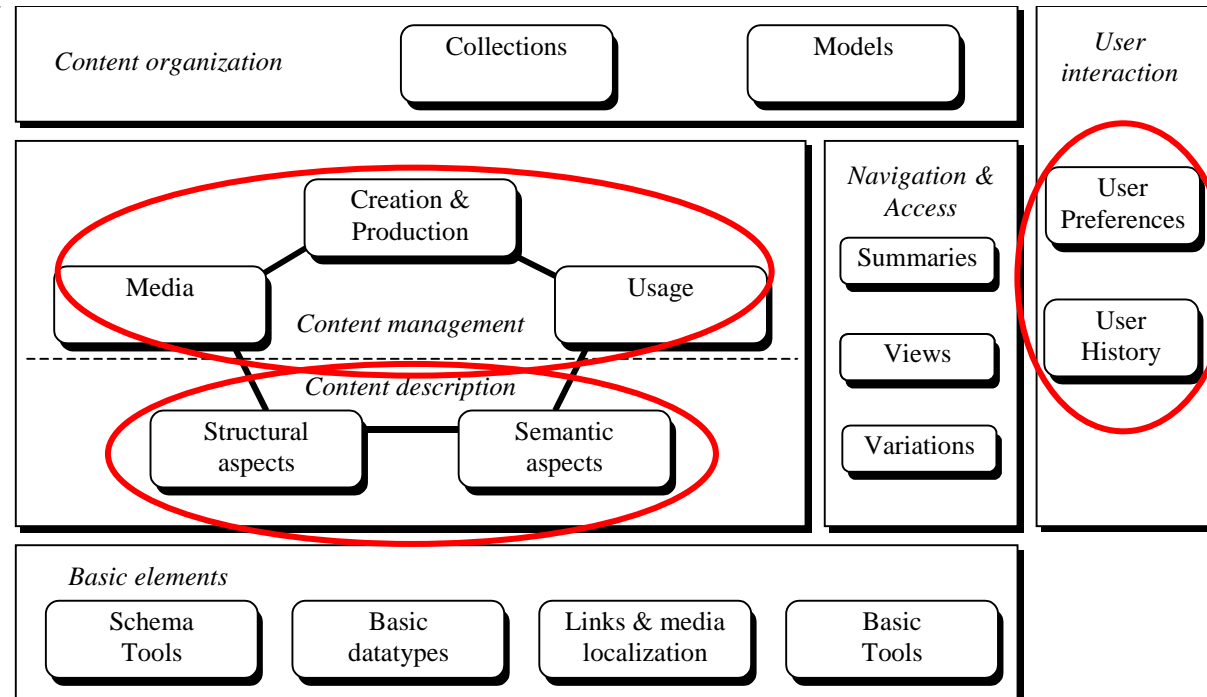
ISO



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

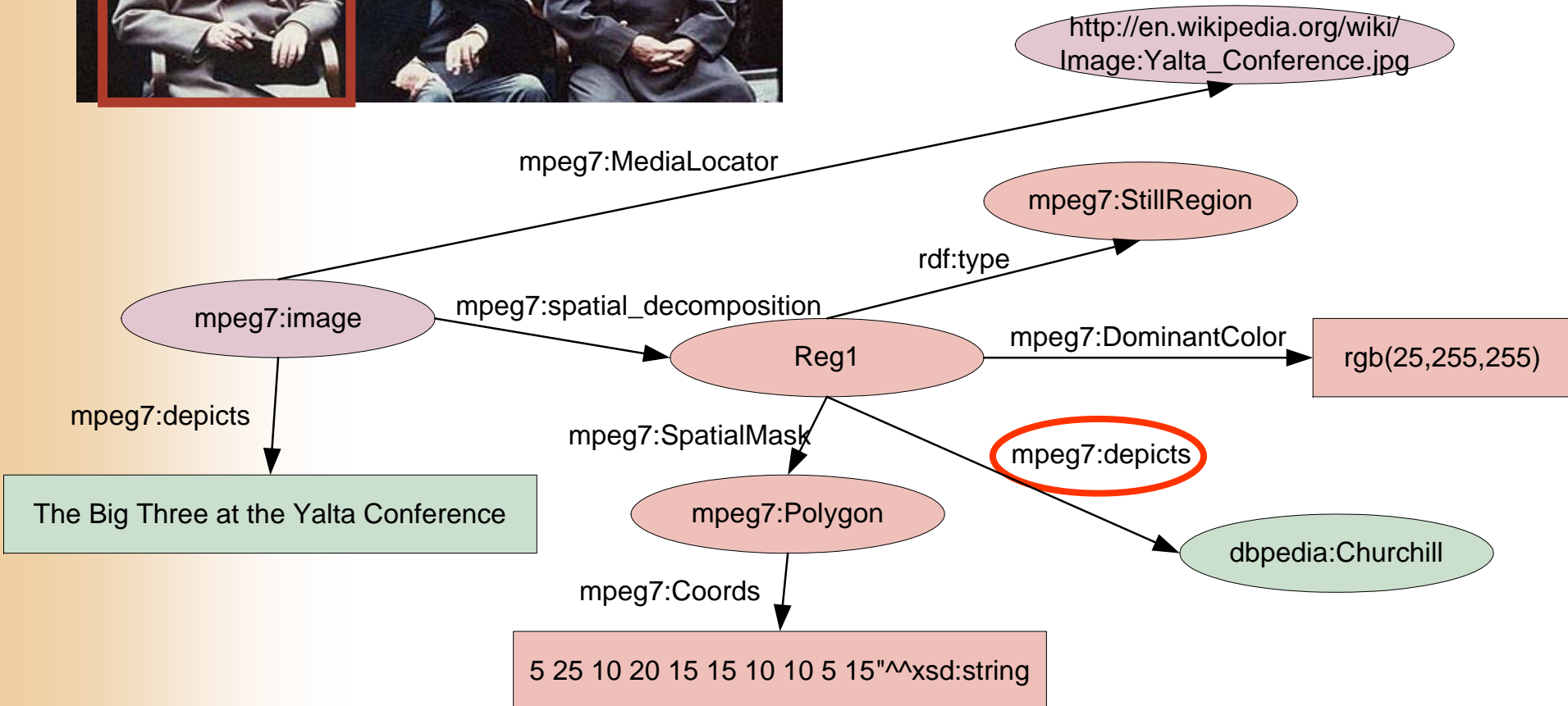


The "[Big Three](#)" at the Yalta Conference (Wikipedia)

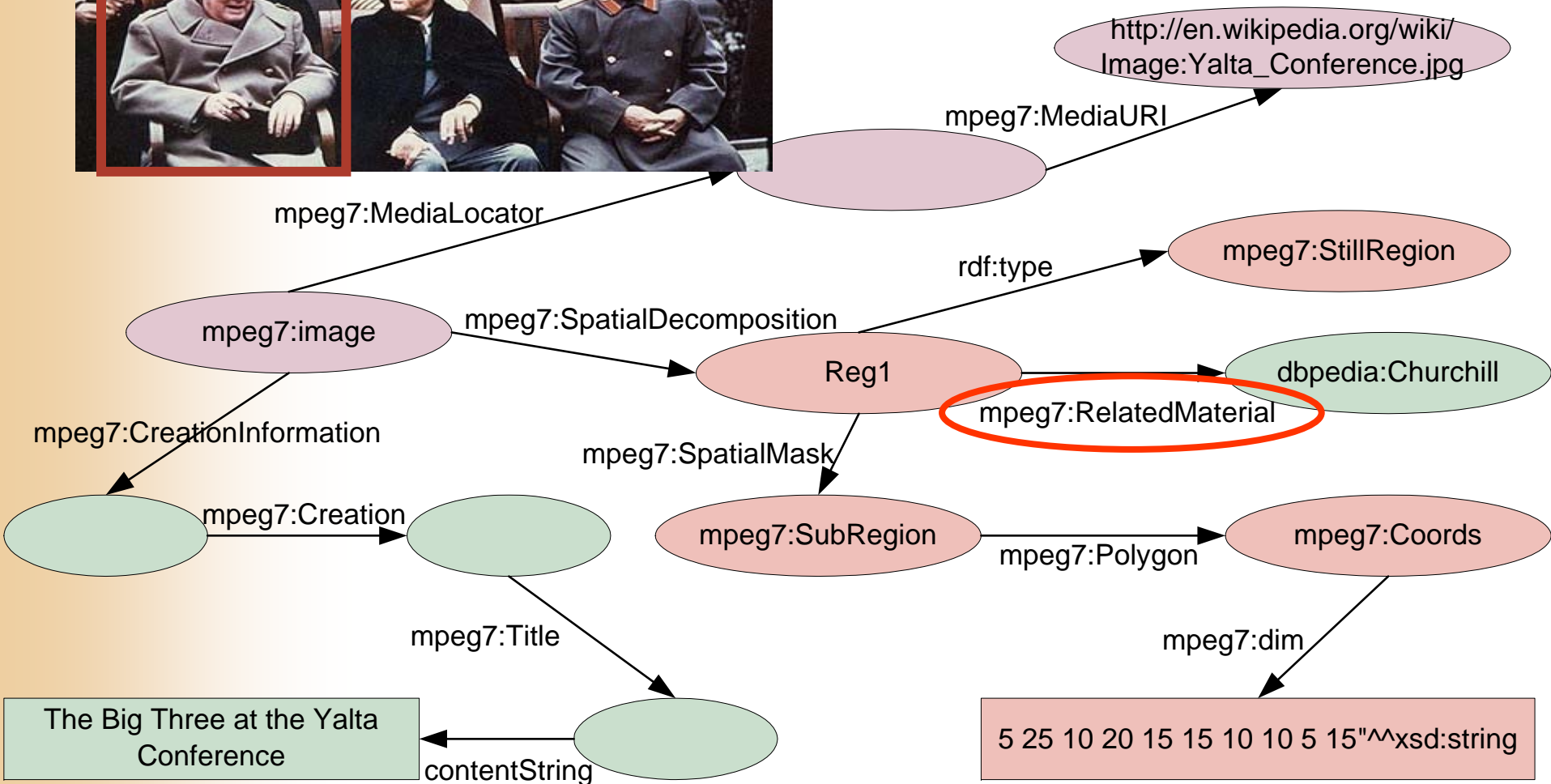
- Localize a region
 - Draw a bounding box, a circle around a shape
- Annotate the content
 - Interpret the content
 - Link to knowledge on the Web

```
: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

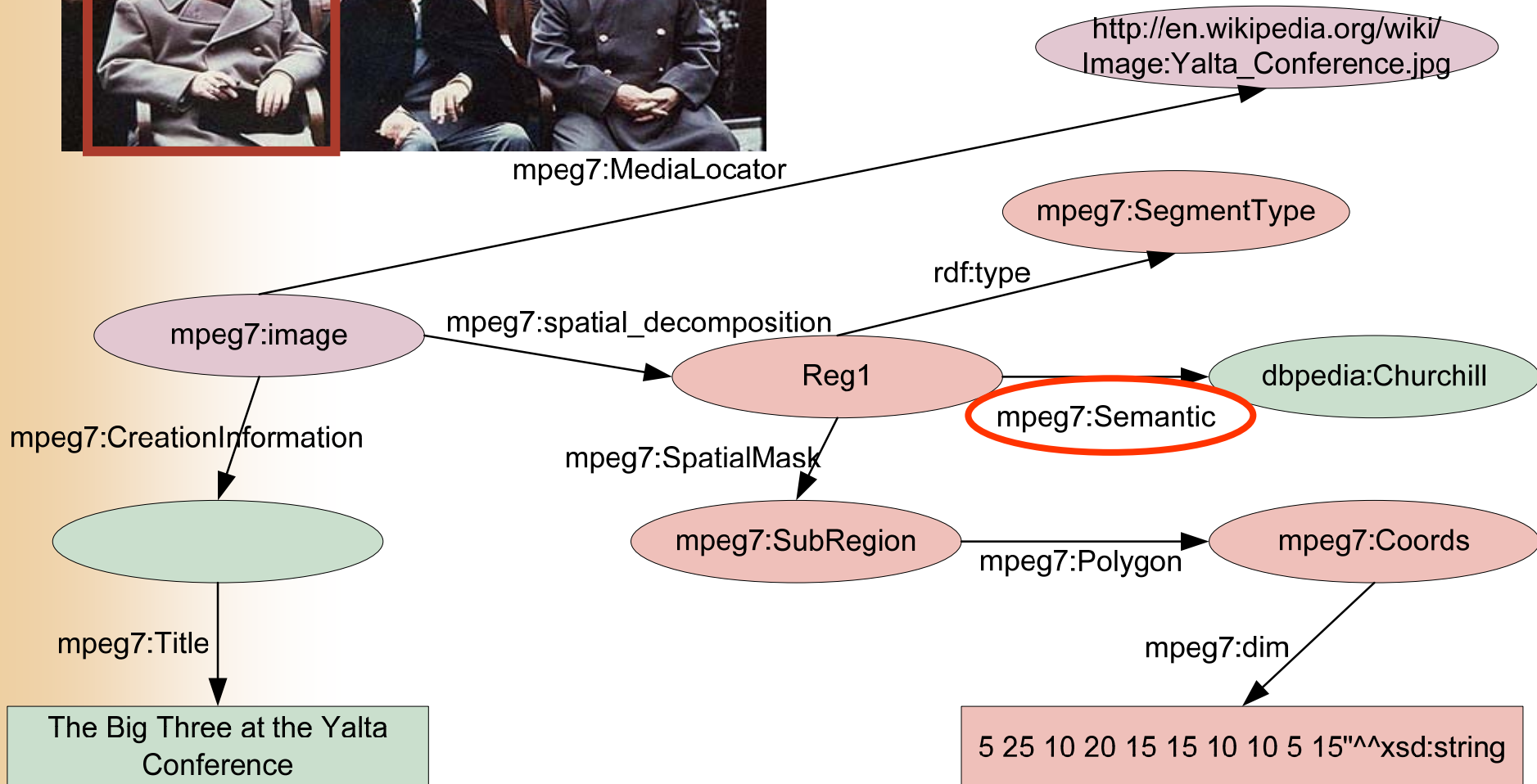


Rhizomik MPEG-7 Ontology

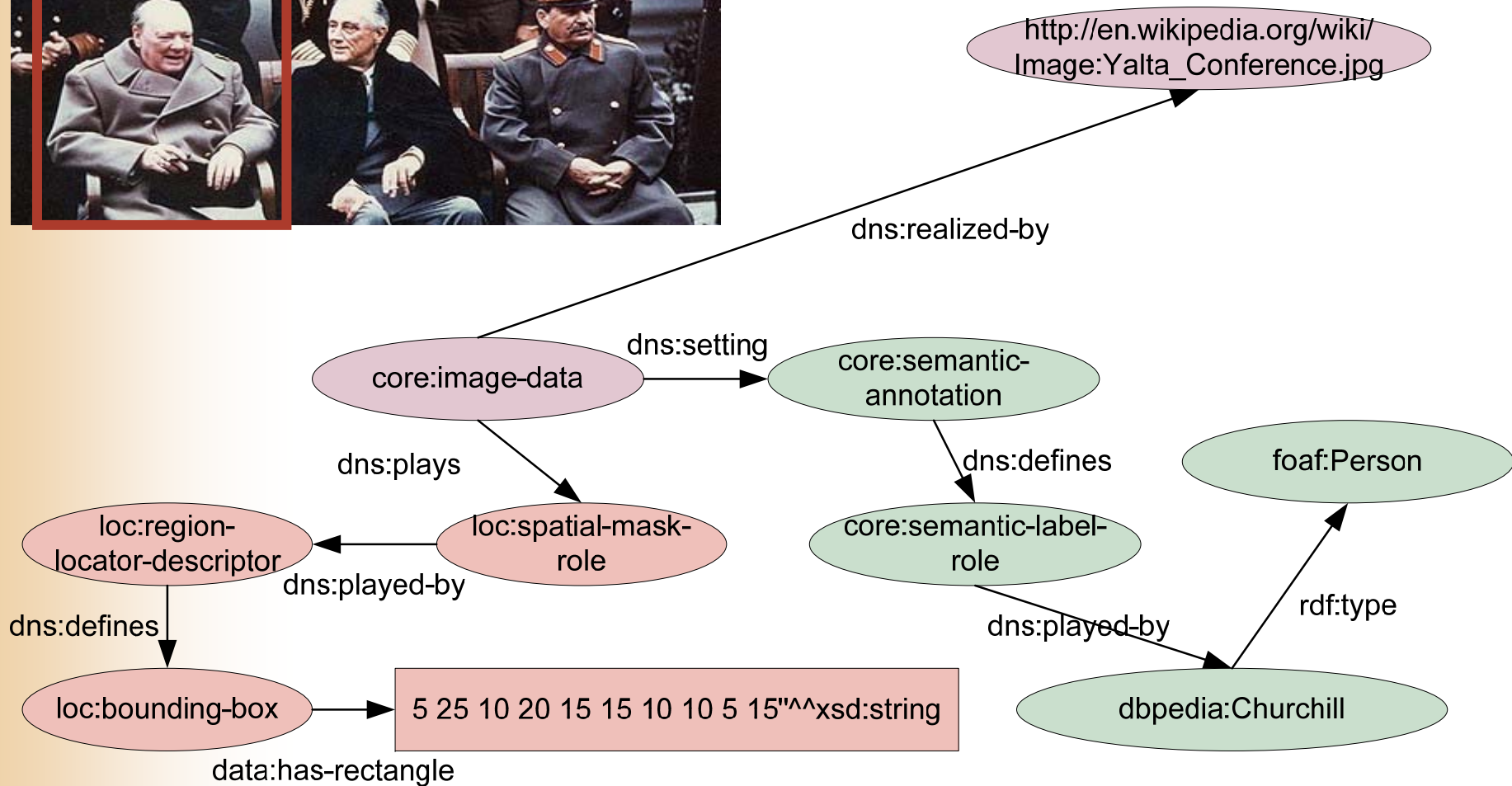


mpeg7:MediaLocator

http://en.wikipedia.org/wiki/Image:Yalta_Conference.jpg



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/

Search News RDFa Highlight Raphael Troncy Mélanie CWI K-Space NewsML FP7, Call 3 W3C Conférences Planet RDF ramm.x (RDFa-deploy... ShapeShift.TV

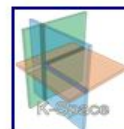
Google Rechercher RS Mes favoris PageRank Traduire Envoyer à Paramètres



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.



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

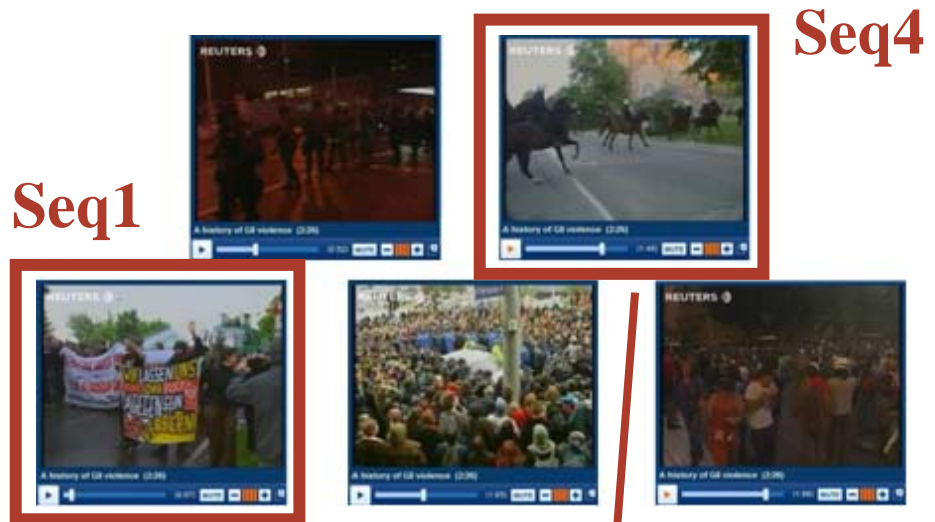
```
:Reg1 foaf:depicts dbpedia:Winston_Churchill
```

```
dbpedia:Winston_Churchill skos:altLabel
```

```
"Sir Winston Leonard Spencer-Churchill"
```

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

Scenario: Video



Seq1

Seq4

A history of G8 violence ([video](#))
(© Reuters)

EU Summit, Gothenburg, 2001

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

: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



A history of G8 violence ([video](#))
(© Reuters)



Seq4

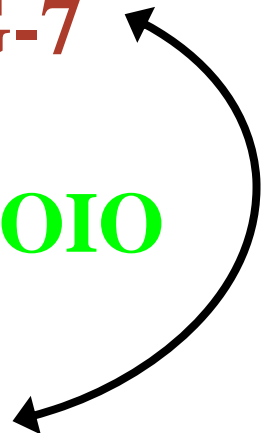


- Multimedia objects are complex
 - Compound information objects, fragment identification
- Semantic annotation
 - Subjective interpretation, context dependent
- Linked data principle
 - Open to reuse existing knowledge

⇒ **MPEG-7**

⇒ **D&S | OIO**

⇒ **RDF**



COMM: Design Rationale

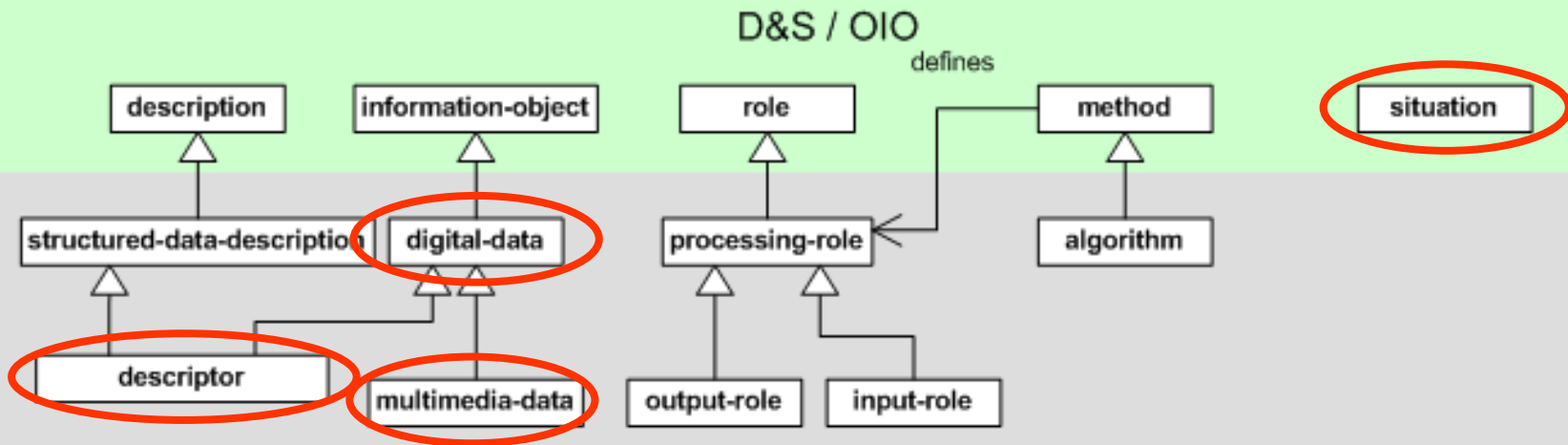
- Approach:
 - NO 1-to-1 translation from MPEG-7 to OWL/RDF
 - Need for patterns: use DOLCE, a well designed foundational ontology as a modeling basis
- Design patterns:
 - Ontology of Information Objects (OIO)
 - Formalization of information exchange
 - Multimedia = complex compound information objects
 - 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

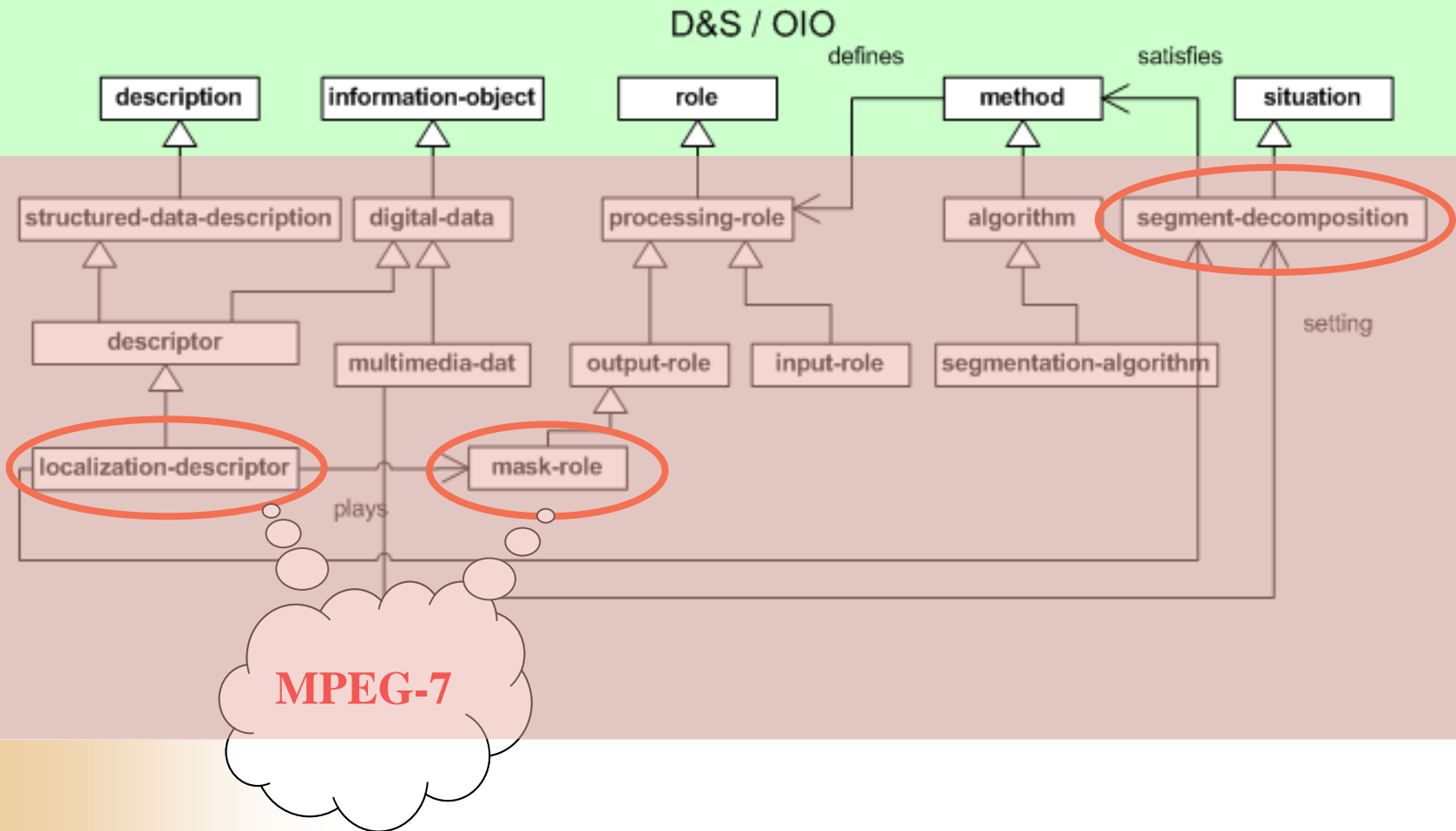
COMM: D&S / OIO Patterns



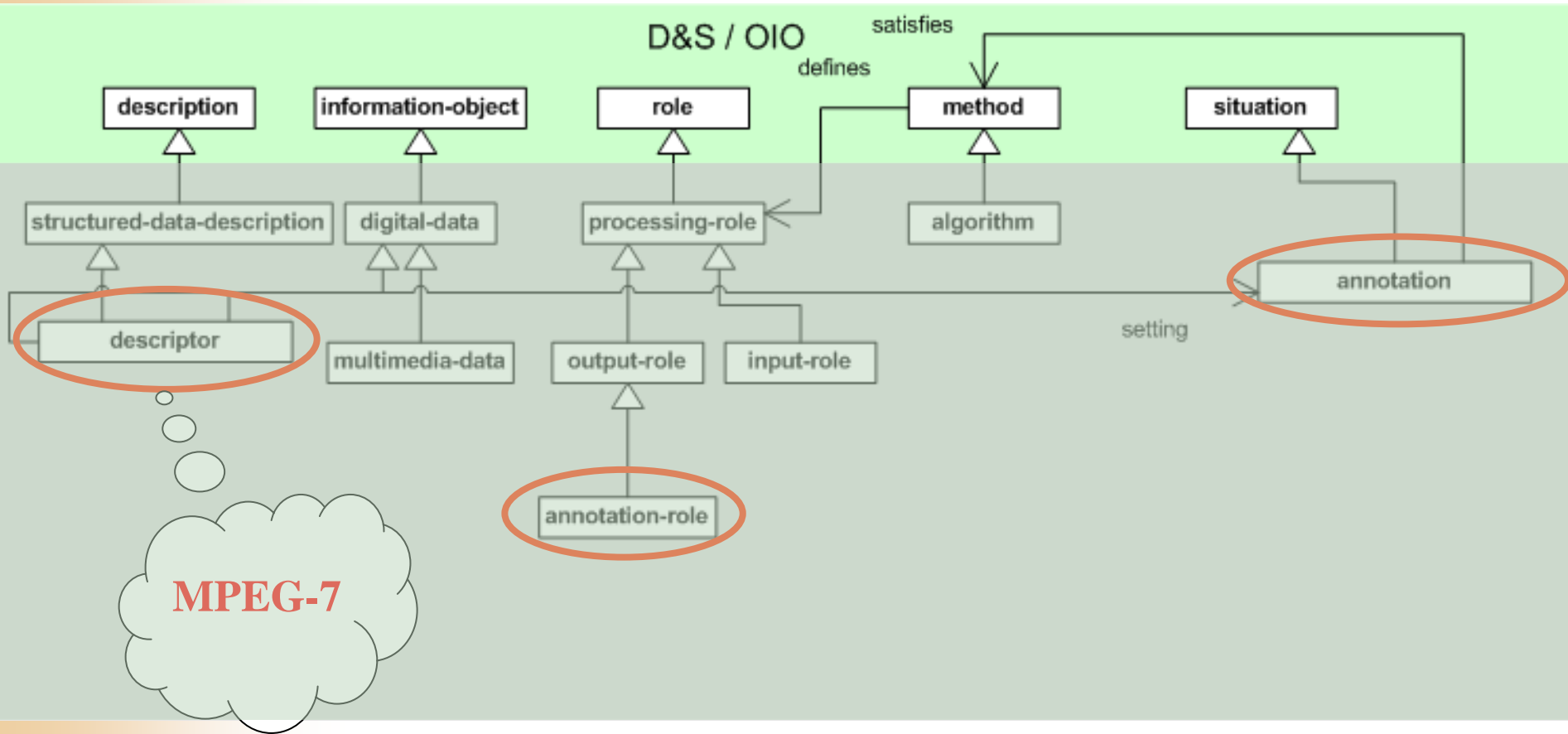
■ Definition of design patterns for **decomposition** and **annotation** based on D&S and OIO

- 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

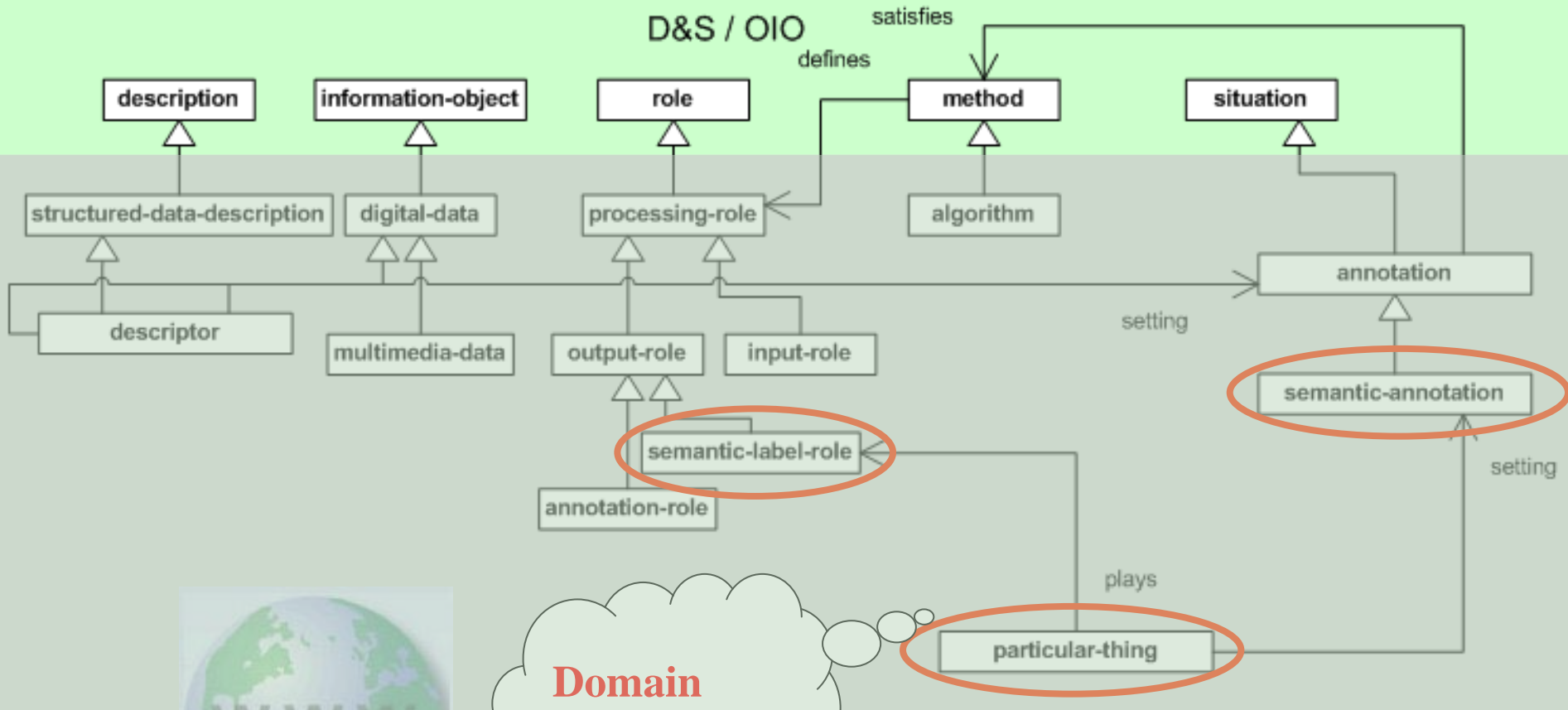
COMM: Decomposition Pattern



COMM: Annotation Pattern



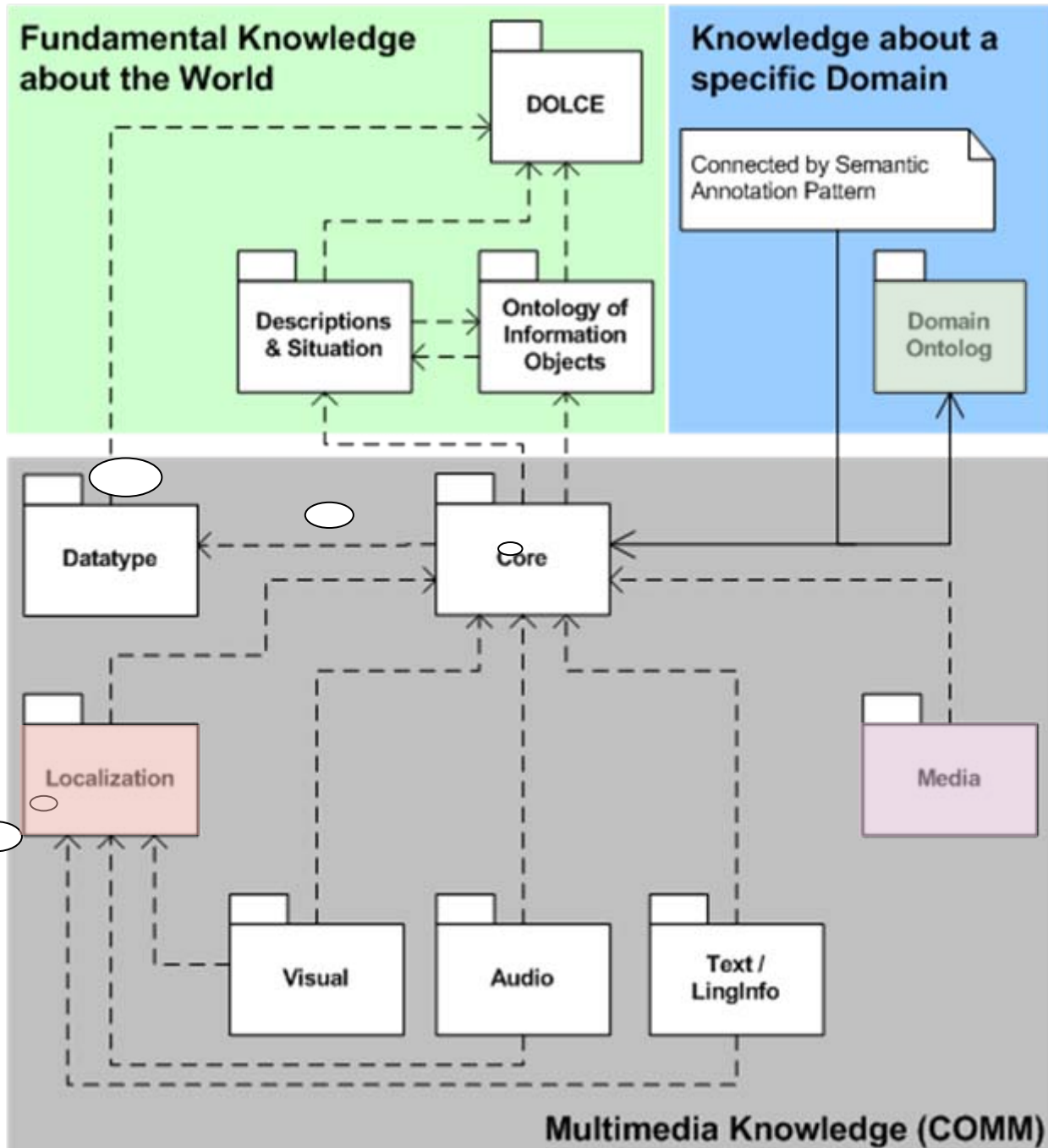
COMM: Semantic Pattern



COMM: Modules

Annotation
Pattern

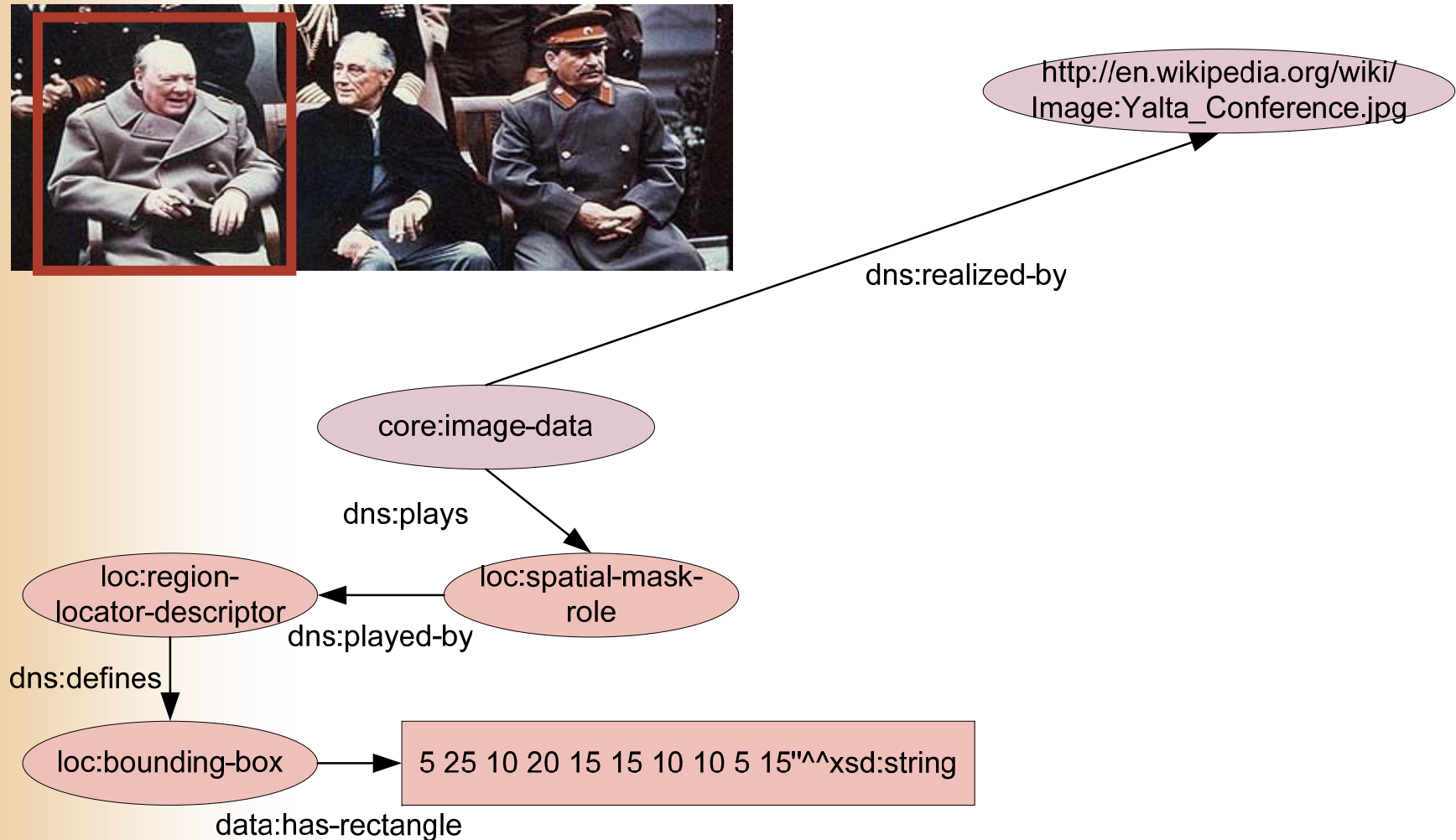
Decomposition
Pattern



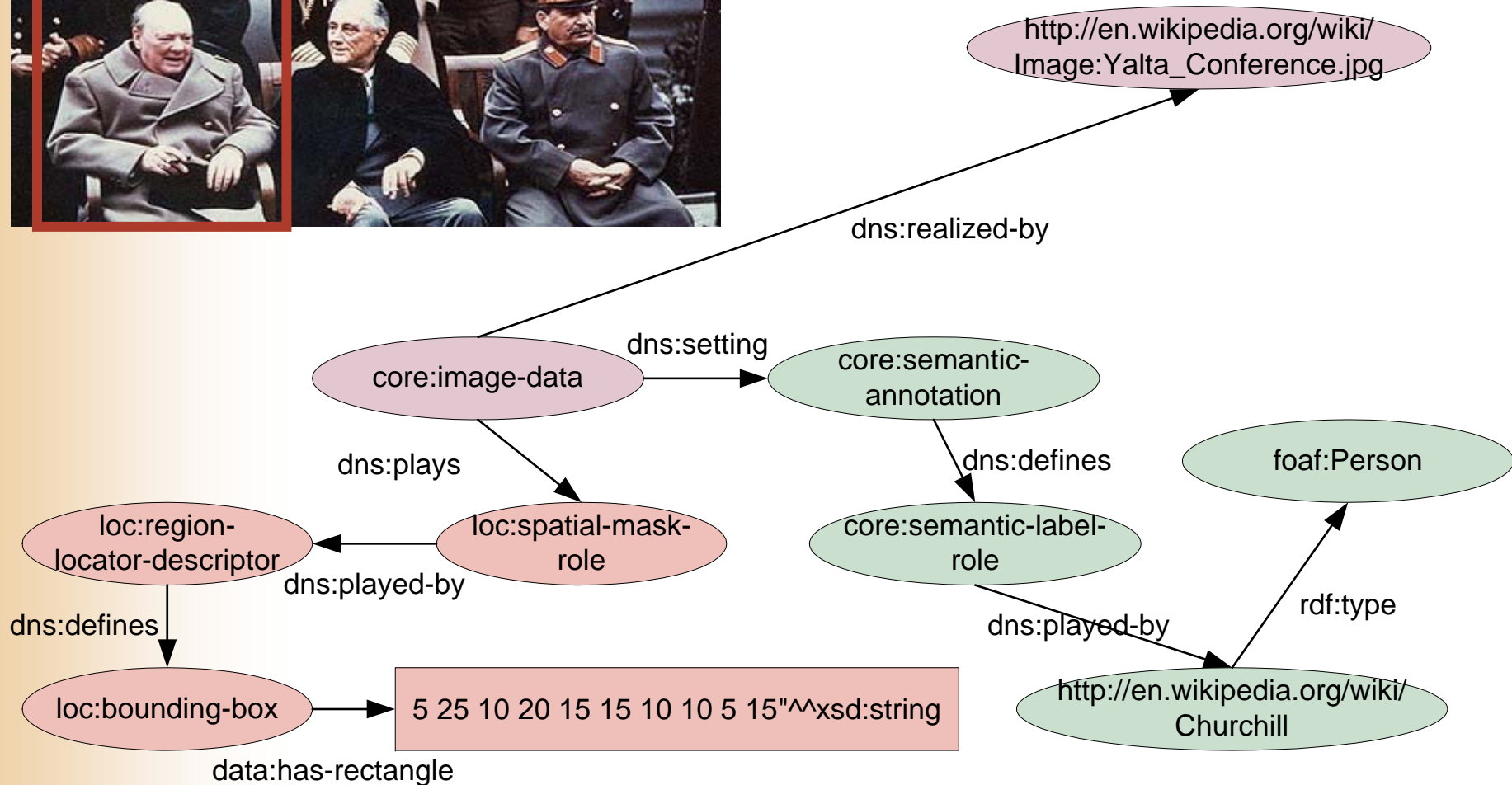
Example 1: Fragment Identification



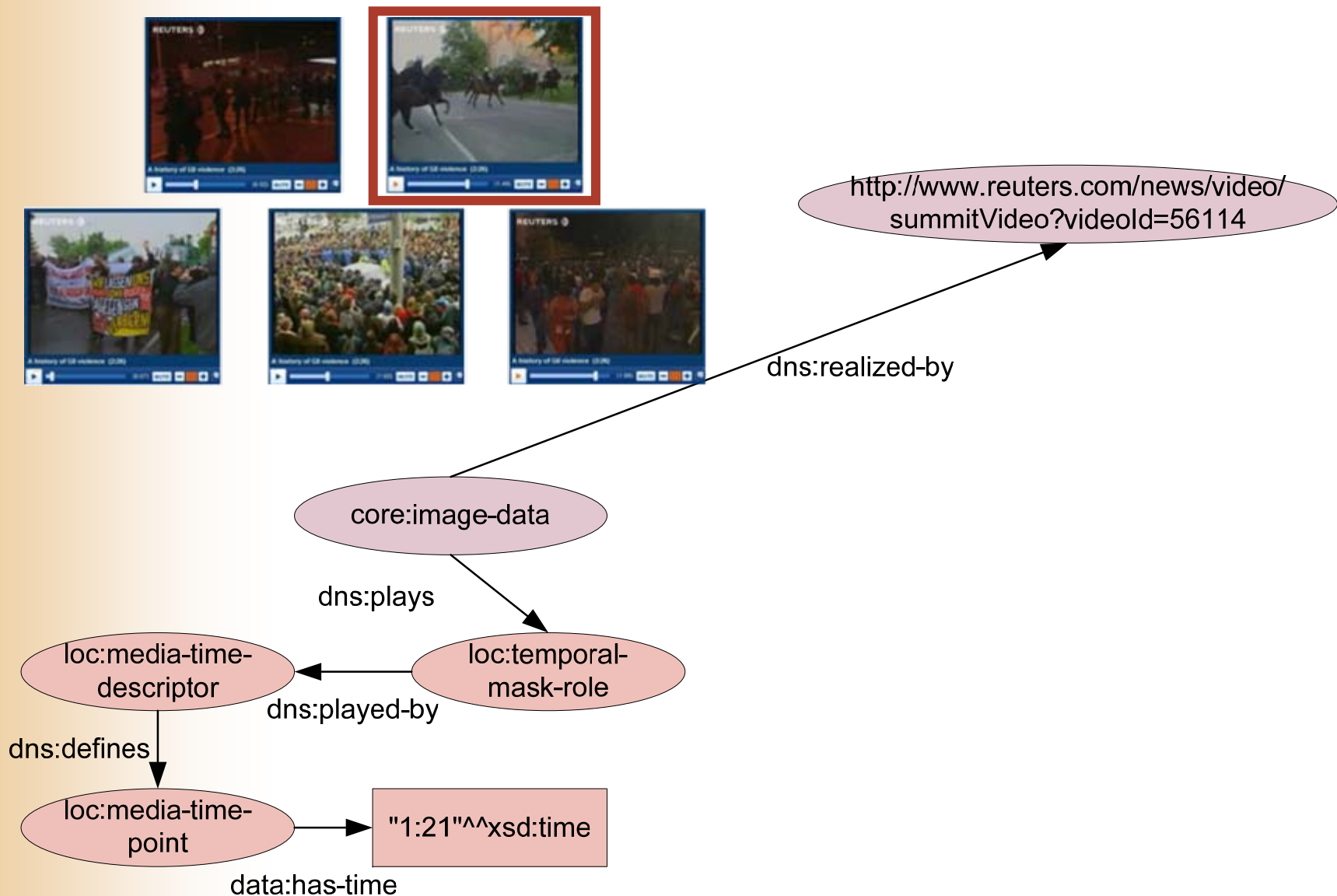
http://en.wikipedia.org/wiki/Image:Yalta_Conference.jpg



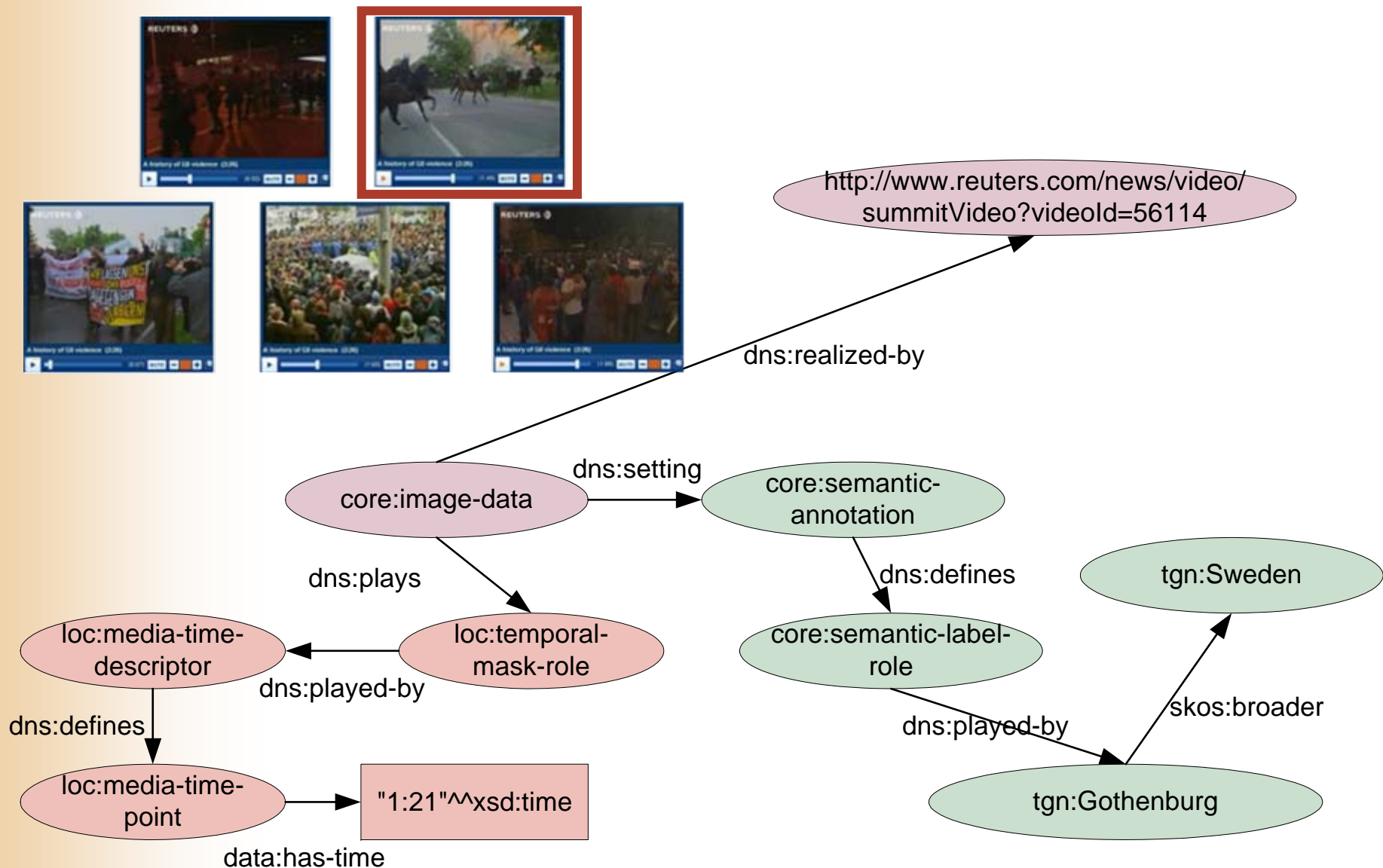
Example 1: Region Annotation



Example 2: Fragment Identification



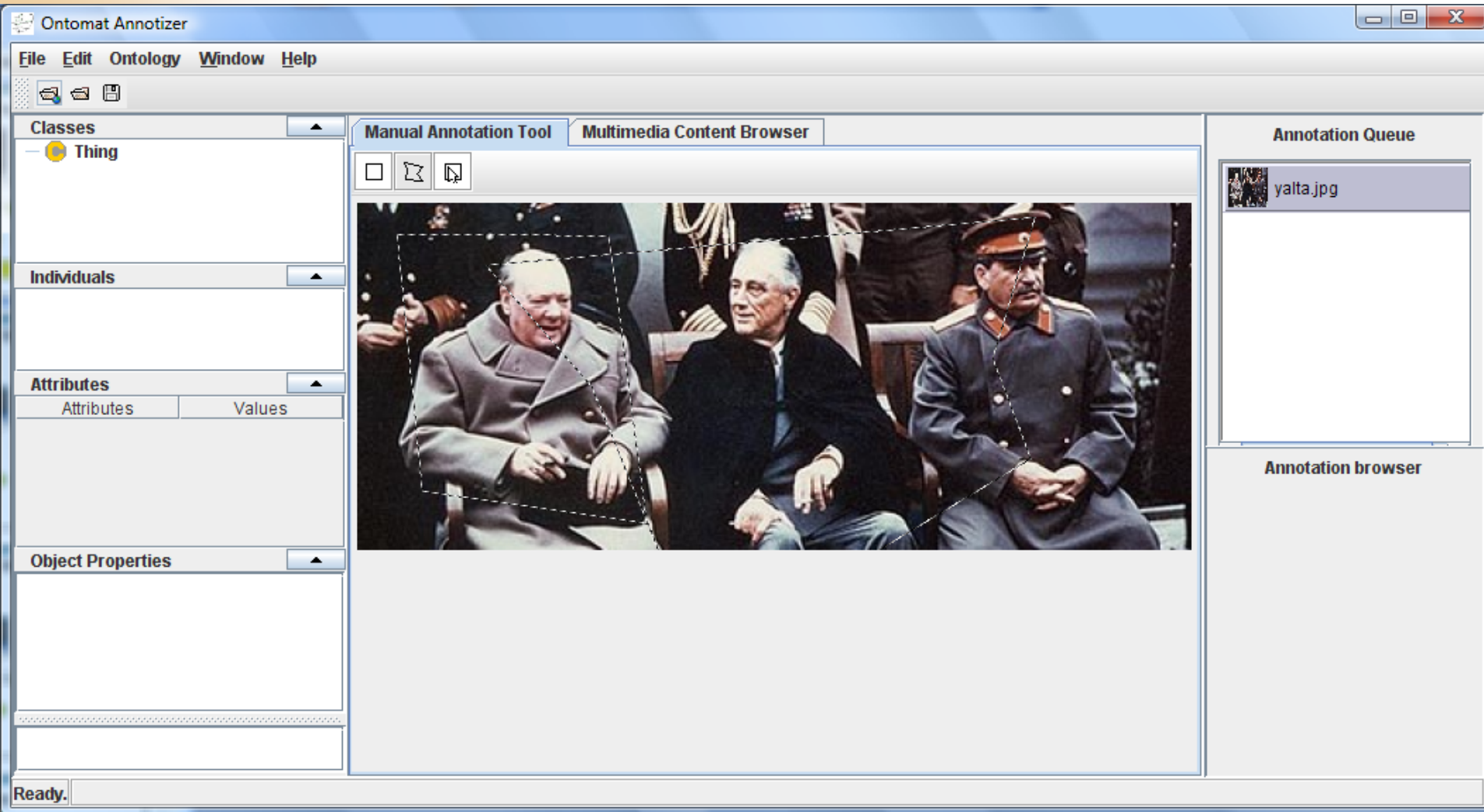
Example 2: Sequence Annotation



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



Evaluation

- Applied Domains
 - Knowledge management for multimedia documents
 - Driving multimedia analysis process
 - Generate new interfaces for browsing multimedia content
- Scalability
 - 4 minutes video,
TRECVID metadata expressed in COMM
 - 250 K statements
 - Reasoning in large scale applications

Making Music Out Of The Social Noise



Metadata Working Group

Home | Member Companies | Press | Specifications | Contact Us



Canon

Microsoft NOKIA SONY

SPECIFICATIONS

Guidelines for Handling Image Metadata

Consumer sharing of still images has exploded with the maturing of Internet services for the storage, manipulation, and sharing of pictures. However, the majority of standards related to still images are oriented toward the documentation of the creation of an image or towards professional (e.g. print media) usage and management of images. In addition, the content overlap between the most commonly used standards can result in some confusion. This document describes how best to use existing standards such as Exif, IPTC, and XMP to address the key organizational metadata questions that most consumers have. [Download the specification \(PDF: 1.7M\).](#)



Copyright © 2008 Metadata Working Group [Contact Us](#)


Adobe XMP Developer Center





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



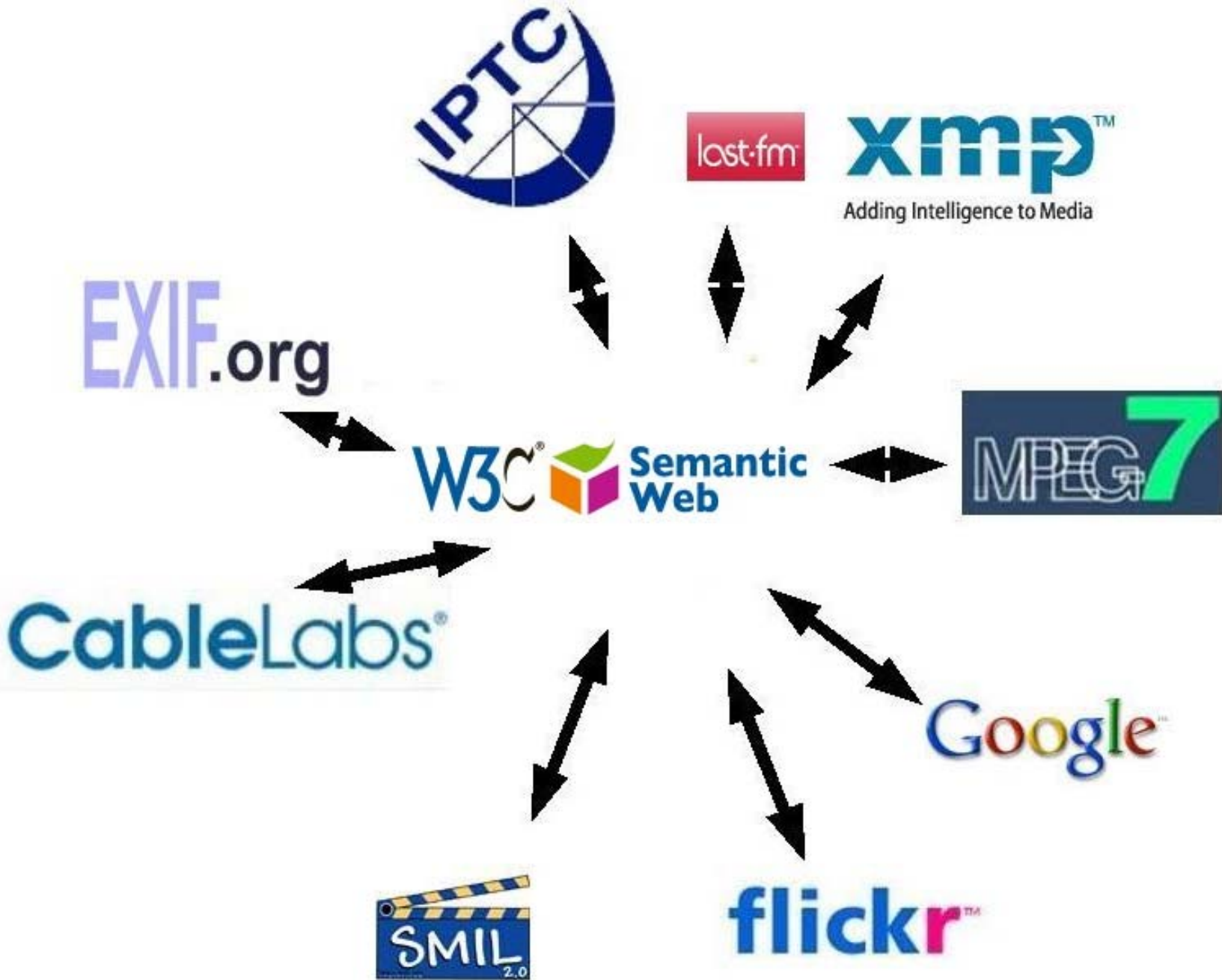
[Mission](#) · [Administrative information](#) · [Drafts](#) · [Issues](#) · [Meeting records](#) ·
[Drafts](#) · [Wiki](#) · [Schedule](#) · [Discussion lists](#)



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](#)



W3C Media Fragments WG

W3C Media Fragments WG

<http://www.w3.org/2008/WebVideo/Fragments/>



YouTube Videos Fragments

Randy Pausch - Really Achieving Your Childhood Dreams - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils ?

http://video.google.com/videoplay?docid=3047771997186190855&ei=MCH-SNFJD5HS2gKirMD2Dg&q="that's+a+tremendous+gift"#50m16

Search Web 2.0 RDFa Highlight Add To Twine Raphael Amis CWI K-Space NewsML FP7, Call 3 W3C Conférences K-Space Book Blogs

Google "that's a tremendous gift" Rechercher

Use Cases & Requirements ... Quicktime Chapter Track | P... Adobe - XMP Developer Ce... ExifTool by Phil Harvey The 7th International Sema... Randy Pausch - Really Achi...

Google Video "that's a tremendous gift" Rechercher des vidéos

Rechercher : toutes les vidéos vidéos lisibles sur Google

Recherche avancée de vidéos Préférences La fonction SafeSearch modérée est activée.

raphael.troncy@gmail.com | Nouvelles fonctionnalités | Historique Web | Déconnexion

Randy Pausch - Really Achieving Your Childhood Dreams

Détails Commentaires D'autres vidéos de cet utilisateur

Randy Pausch - Really Achieving Your Childhood Dreams - 104 mn - 10 déc. 2007





★★★★★ (217 Avis) Note : ★★★★★

Randy Pausch's Last Lecture with English and German subtitles by Friederike Sophie Brand, Spanish subtitles by Carlos Velásquez and Ezequie...[suite »](#)

[Partager](#) [Signaler un problème](#)

[Télécharger - iPod/PSP](#) | [Intégrer dans un site](#)

Vidéos similaires Page 1 sur 47

 Randy Pausch Last Le... 76 mn - youtube.com	 Really Achieving You... 85 mn - video.google.com
 Lê Toàn - La Femme... 4 mn - youtube.com	 Randy Pausch Really ... kidstube.com

Et je pense que c'est une des meilleures choses qu'on peut donner à quelqu'un

50:16 / 1:44:08

Transfert des données depuis fgkcpq.vp.video.l.google.com...

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

```
<rdf:Description
  rdf:about="Ganesh.jpg">
  <dc:title>An image of the
  Elephant Ganesh</dc:title>
  <dc:creator>
  Raphaël Troncy</dc:creator>
</rdf:Description>
```



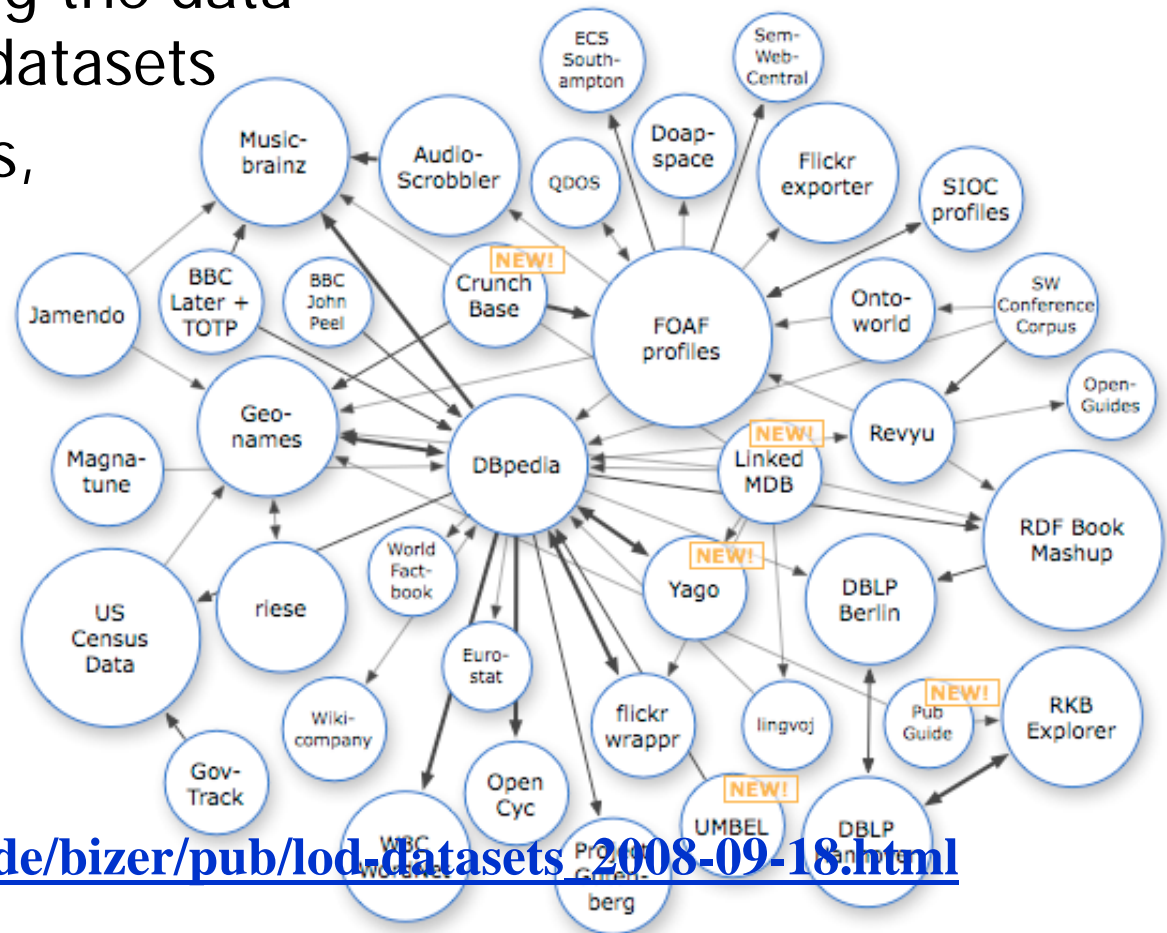
- Annotate the content (interpretation)
Elephant, Ganesh, Thaïlande, Holidays, Chiang Mai
- Link to knowledge on the Web

```
:img foaf:depicts dbpedia:Ganesh
dbpedia:Ganesh rdfs:label "Vinayaka"
dbpedia:Ganesh skos:altlabel "Ganapati"
dbpedia:Ganesh rdf:type wn:synset-Deities-noun-1
dbpedia:Ganesh owl:sameas wn:synset-Ganesh-noun-1
```

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



<http://www4.wiwiwiss.fu-berlin.de/bizer/pub/lod/datasets/2008-09-18.html>

DBpedia

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



UNIVERSITÄT LEIPZIG

Freie Universität  Berlin



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

Calgary	
	
Downtown Calgary.	
Government	
- Mayor	Dave Bronconnier (Past mayors)
- Governing body	Calgary City Council
- Manager	Owen A. Tobert
Area ^[1]	
- City	726.50 km ² (280.5 sq mi)
- Metro	5,107.43 km ² (1,972 sq mi)
Elevation	1,048 m (3,438.3 ft)
Population (2006) ^[1]	
- City	988,193
- Density	1,360.2/km ² (3,522.9/sq mi)
- Metro	1,079,310
- Population rank	3rd
- Metro rank	5th

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

Automatic Links Among Open Datasets

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

DBpedia

```
<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"  
  ...
```

Geonames

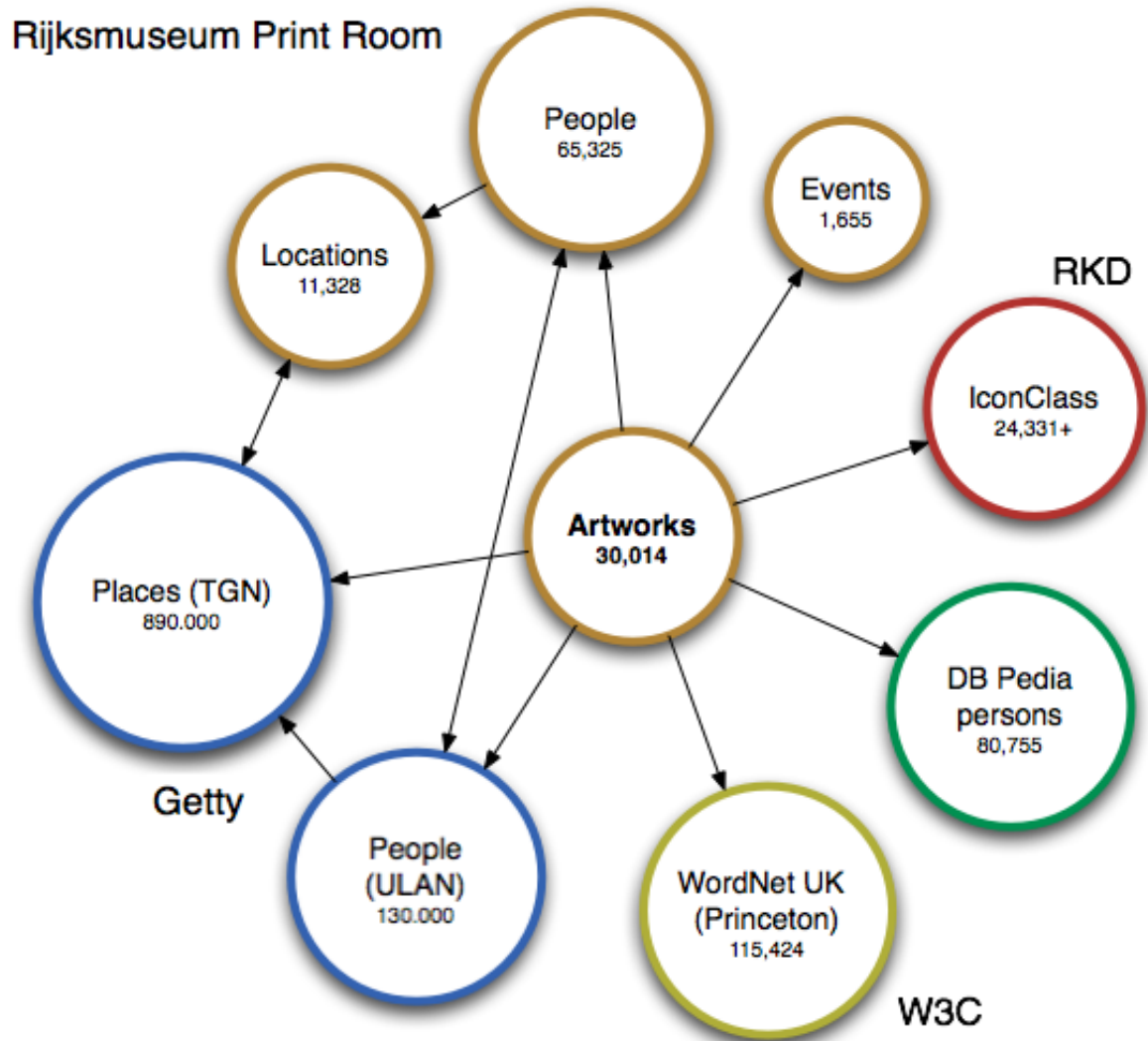
Processors can switch automatically from one to the other ...

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/bloxxom.cgi/WorkRelated/SemanticWeb/xmpextract.html>
- Expose what you make



Cultural Heritage Data Cloud



Professional Art Annotation with Thesauri from the Web

E-Culture MultimediaN *Rijksmuseum PrentenKabinet Online* Login | help | English ▾

search | browse | local view | **annotate**

annotate: Veroordeling van Johan van Oldenbarnevelt

Veroordeling van Johan van Oldenbarnevelt



[RP-P-OB-77.320](#)

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

Who Historical persons

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

Where Name of place or region

When Date, year or period

[done](#) | [cancel](#)

Terminé

search

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



Getty AAT (>31.000)



Getty ULAN (>130.000)



Getty TGN (>890.000)



SVCN (Dutch ethnology, >11.000)



Princeton Wordnet (>115.000)

© 2006-2008 E-Culture MultimediaN



Powered by ClioPatria 1.0 alpha 3 (14/04/2008)

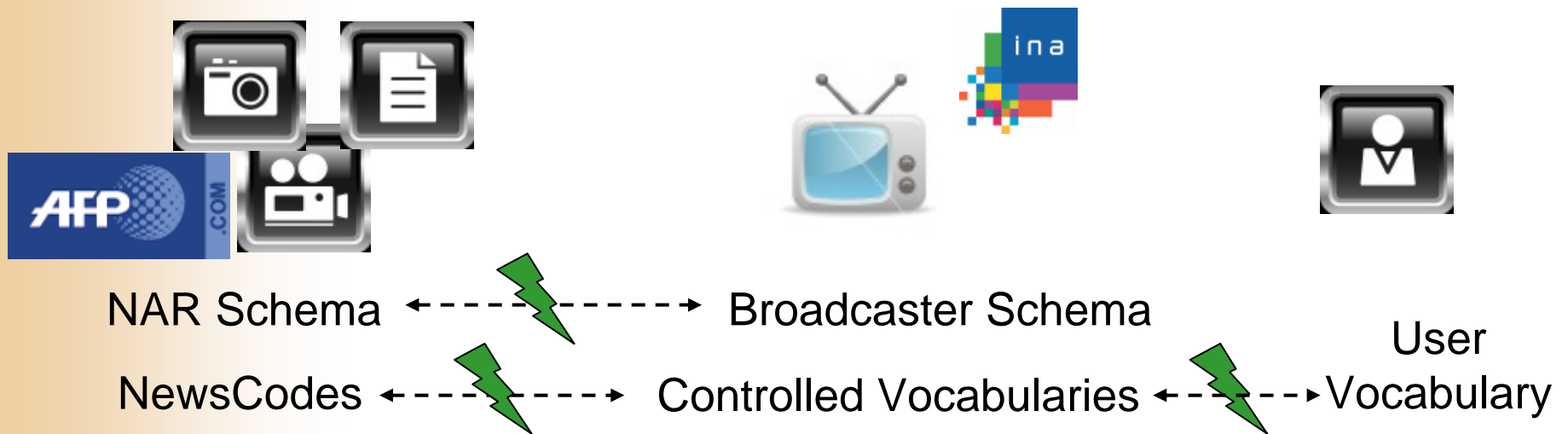


Semantic Browsing of Multimedia News

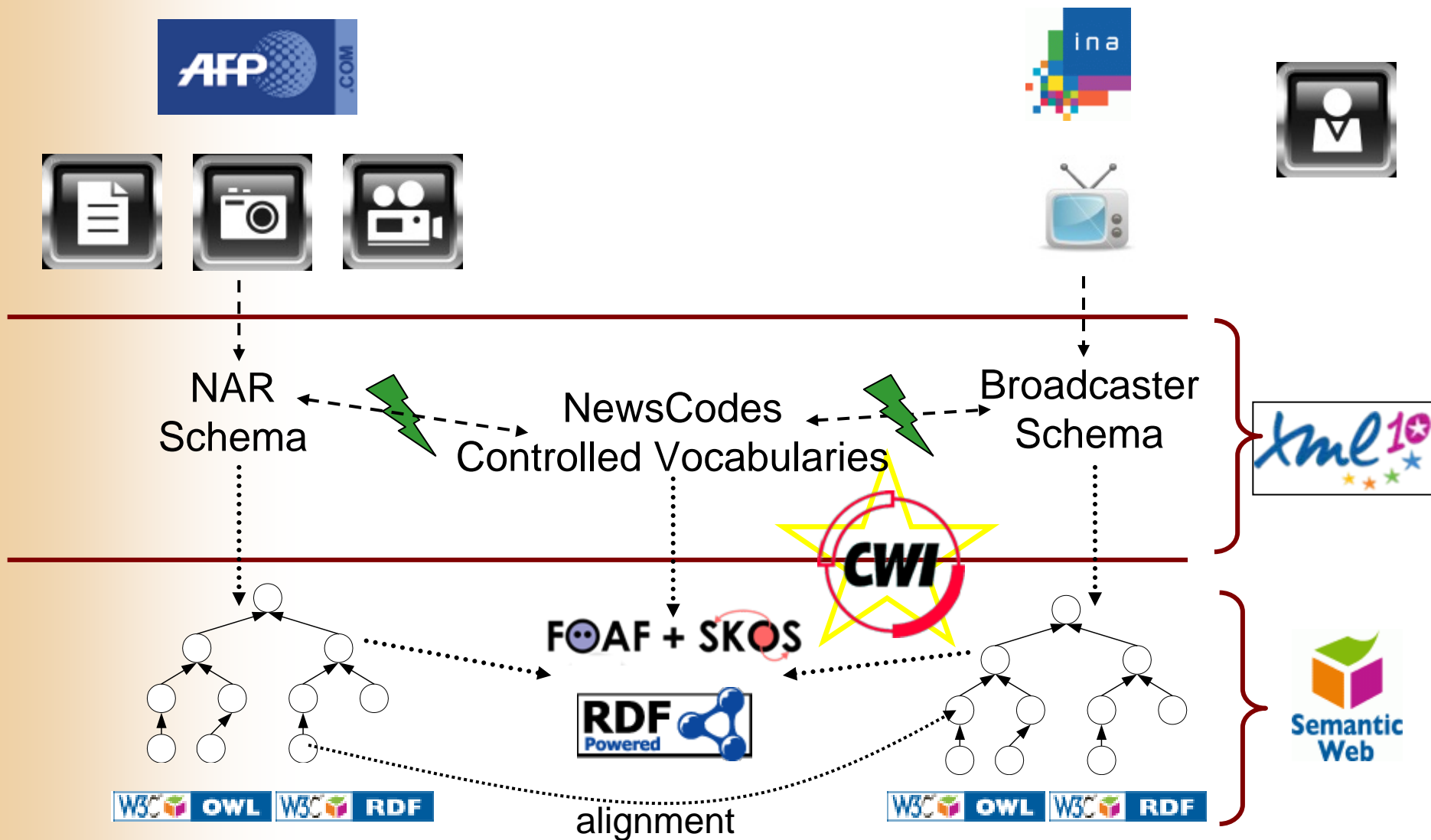
- Goal:
 - Provide an environment for *searching* and *browsing contextualized multimedia news* information
- Method:
 - Semantic processing of multimedia news items
 - Link news items with knowledge on the web
- Datasets:
 - News stories: Jun/Jul 2006 (en/fr) newsfeed, AFP ± 90,000 items
 - Photos: 2006 football world cup, AFP ± 2,500 items
 - Video: Jun/Jul 2006 TV News (fr), INA ± 30 items

Problems

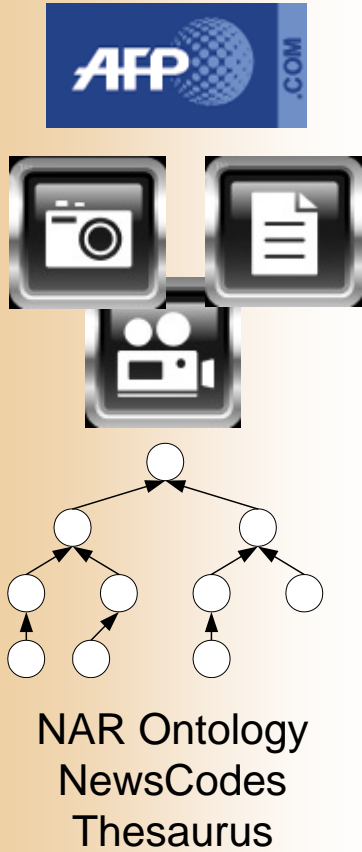
- No integration of media (stories, photo, video)
- Little (or no) context in the news presentation
- Lack of interoperability in the current workflow



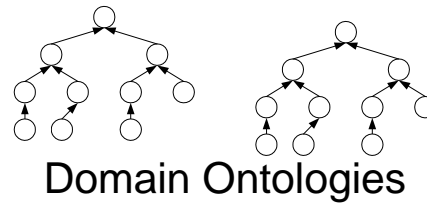
Metadata Conversion



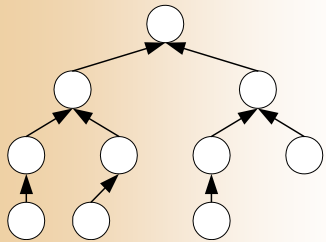
Semantic Processing



spout



Semantic Processing

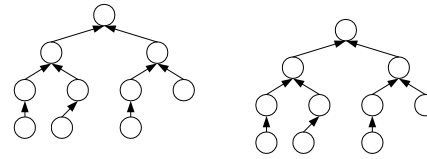


NAR Ontology
NewsCodes
Thesaurus

Knowledge
Assisted
Analysis



Concept Detectors



Domain Ontologies

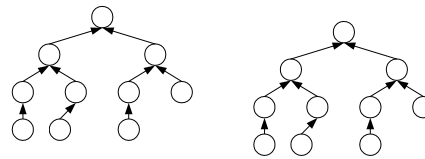
Semantic Processing



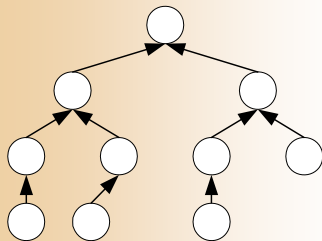
spout



Named Entity Recognition



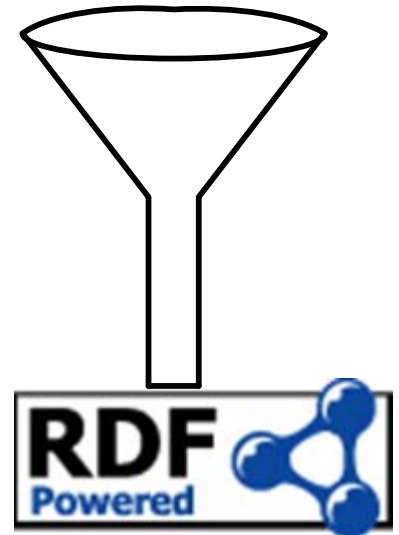
Domain Ontologies



NAR Ontology
NewsCodes
Thesaurus



Linked Data



Browser - Mozilla Firefox

http://newsml.cwi.nl/explore/facet#19

Wikipedia (English)

Search News RDFa Highlight Raphael Troncy Mélanie CWI K-Space NewsML FP7, Call 2 W3C Conferences Planet RDF ramm.x (RDFa-deploy... ShapeShift.TV

Rechercher Mes favoris PayPerk 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	slugline	creator	locCreated	location	person
golf	FBL-WC2006-MATCH64-ITA-FRA	JACK_GUEZ	Pans	Irachi	Zidane, Zinedine
luge	FBL-WC2006-MATCH64-FRA-ITA	"no label"	Berlin	France	Ronaldo
motor racing	FBL-WC2006-MATCH64-ITA-FRA	OLIVIER_LABAN-MATTEI	Rome	Portugal	Robinho
motorcycling	FBL-WC2006-FRA-POR-FANS	FILIPPO_MONTEFORTE	Stuttgart	Ukraine	Franck Ribery
rugby union	FBL-WC2006-FRANCE	KAMBOU_SIA	Photos-WC2006-all_data.rdf	Switzerland	Oleg Gusev
soccer	FBL-WC2006-MATCH64-FRA-ITA	FRANCOIS_GUY	Honnelle		Zinedine Zidane

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

Group by: NewsItem

NewsItem (>1000)

Par788550_2.rdf DANIEL_RALJNIC

Par788547_2.rdf DANIEL_RALJNIC

Par788543_2.rdf JONAS_EKSTROMER

Par788540_2.rdf JONAS_EKSTROMER

Par788539_2.rdf JONAS_EKSTROMER

[search](#) | [browse](#) | [local view](#) | [annotate](#)

This news search engine will give you access to news items kindly provided by AFP
Type a keyword, for example: Amsterdam, Lyon or Zidane



Powered by [GlioPatria 1.0 alpha 2](#)



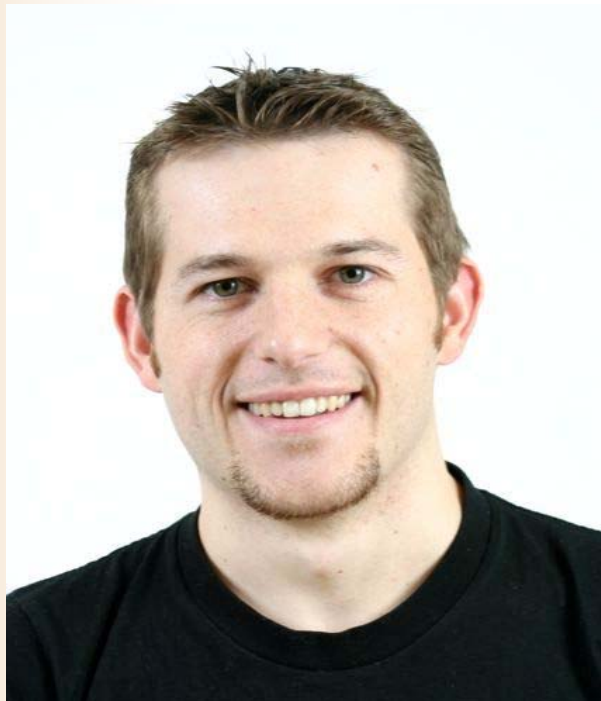
Future Work

- Integrate the video browser in the interface
 - Metadata conversion and interoperability
 - Address temporal fragments of the video
 - Visualize videoclips in the interface
- Enrich metadata with visual analysis
 - Apply K-Space concept detectors on visual media
 - Provide new dimensions (facets) for browsing the data
 - Ex: distinguish field images vs stadium and street images with a grass detector for the World Cup dataset
- **Evaluation, Evaluation, Evaluation ...**

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.
- 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>.

Thanks for your attention



<http://www.cwi.nl/~media/iswc08/>