Is there a link between an armorial and semantic ?
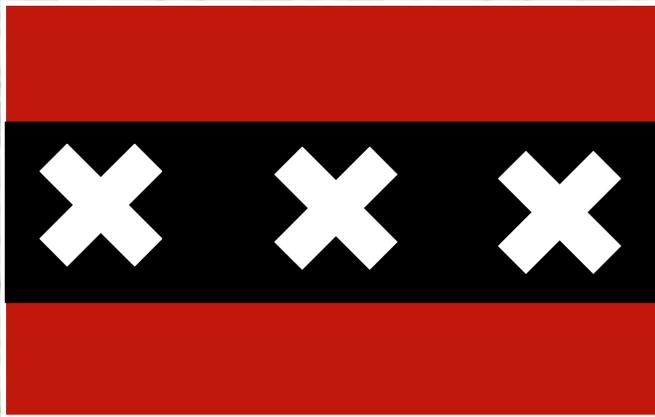
Damned … no semantic at all !

INTEROPERABILITY

PERSISTENCE (Interoperability in time)

The ability of a technology system to ensure to the citizen of today that the citizen of tomorrow will be capable of enjoying the current cultural, sociological … assets.

Abdelaziz Habid (*Memory of the World*) UNESCO

INTERCHANGE (Interoperability in space)

The ability of a technology system to ensure to the citizen of here that the citizen of there will be capable of enjoying the current cultural, sociological … assets.

[derived from the definition of the 'PERSISTENCE' by Abdelaziz Habid (*Memory of the World*) UNESCO]

EMWRT III : the factory is SEMANTIC !!!

1. **Asset Management & Wrapping**

2. **An acquisition wrapping example**

3. **In search of interoperability and semantics standards "State of Play » through four categories of players**

   - DAM (Digital Asset Management) vendors
   - Broadcasters, archives or press agencies (developping bespoke DAM applications)
   - Aggregators (file transfer services providers or software vendors)
   - Metadata integrators ("plumbers")

4. **A global view from the semantic architecture side**

5. **Description of a user case**

6. **Annexe**

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Global Digital Asset Management : Content(Essences+ Metadata and Rights)

Content

Essences

Metadatas

Wrapping

Rights
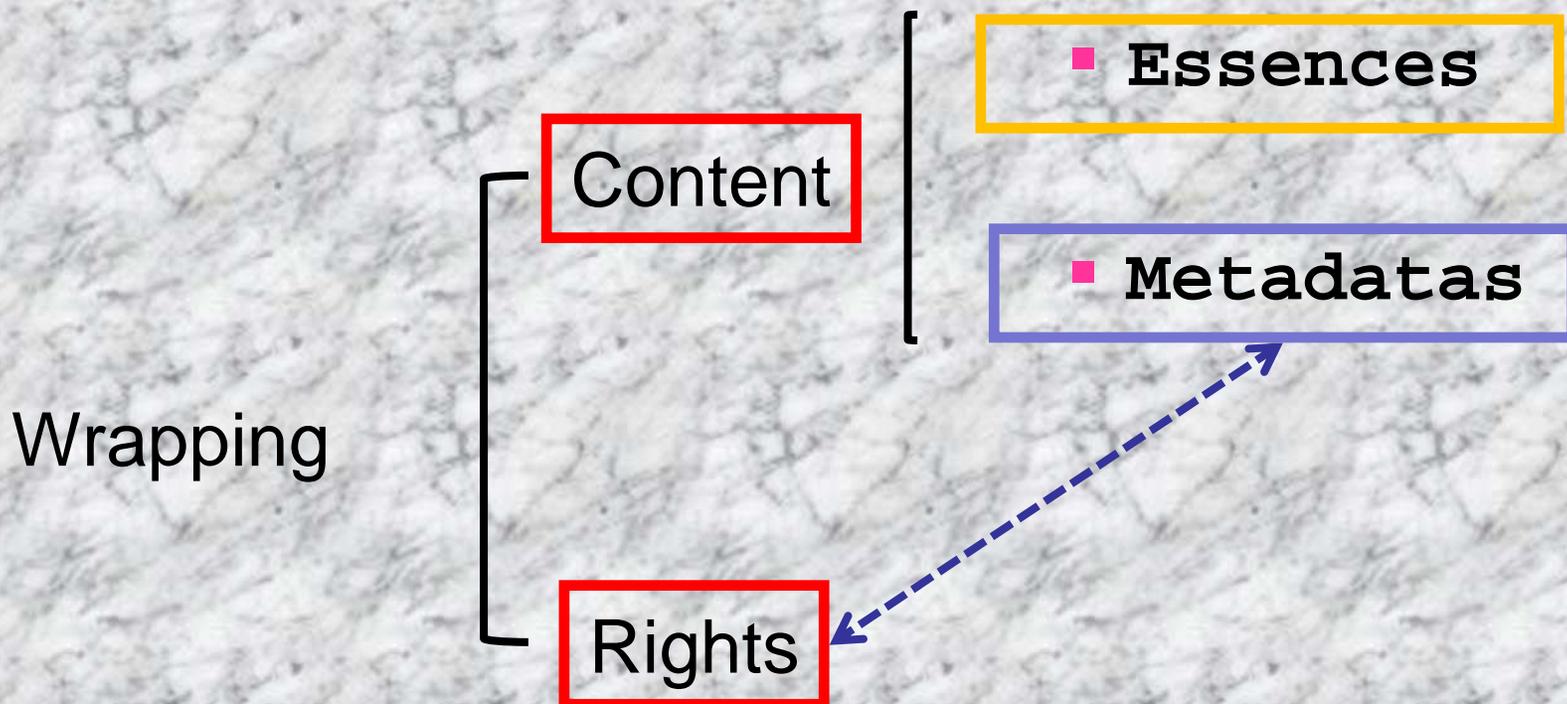
Concret models for descriptive information

PrestoSpace : www.prestospace.org

1. **Ontology and Semantic : FRBR (Functionnal Requirements for Bibliographic Records – IFLA)**
2. **Actual Solutions : AAF / MXF / SMPTE / P-Meta … (pragmatic but ..)**
3. **Solutions for the representation of metadata, structure and synchronisation :**
    XML / XSD / DTD / SMIL (Synchronized Multimedia Integration Language) / …
4. **Specific models : SMEF (BBC) / RAI / FARAO (ORF) / INA / IMMIX (Netherlands) / DR-M / MPEG-7/ MPEG 21 (www.enthrone.org), …**
5. **Wrappers : MXF / METS / PK-ZIP / SPK-ZIP / PDF/A**
6. **Ontology : Dublin Core Metadata Initiative (DCMI) / RDF / MARC (MAchine-Readable Cataloging),**

AXIS : Acquisition, e**X**change, **I**ndexation, **S**tructuration (*based on* **OAIS**)

Prestospace aims to prepare the way for preservation factories providing affordable services to all kinds of collection custodians in order to manage and to allow access to their assets

The usual "Flat model" approach: one level wrapping
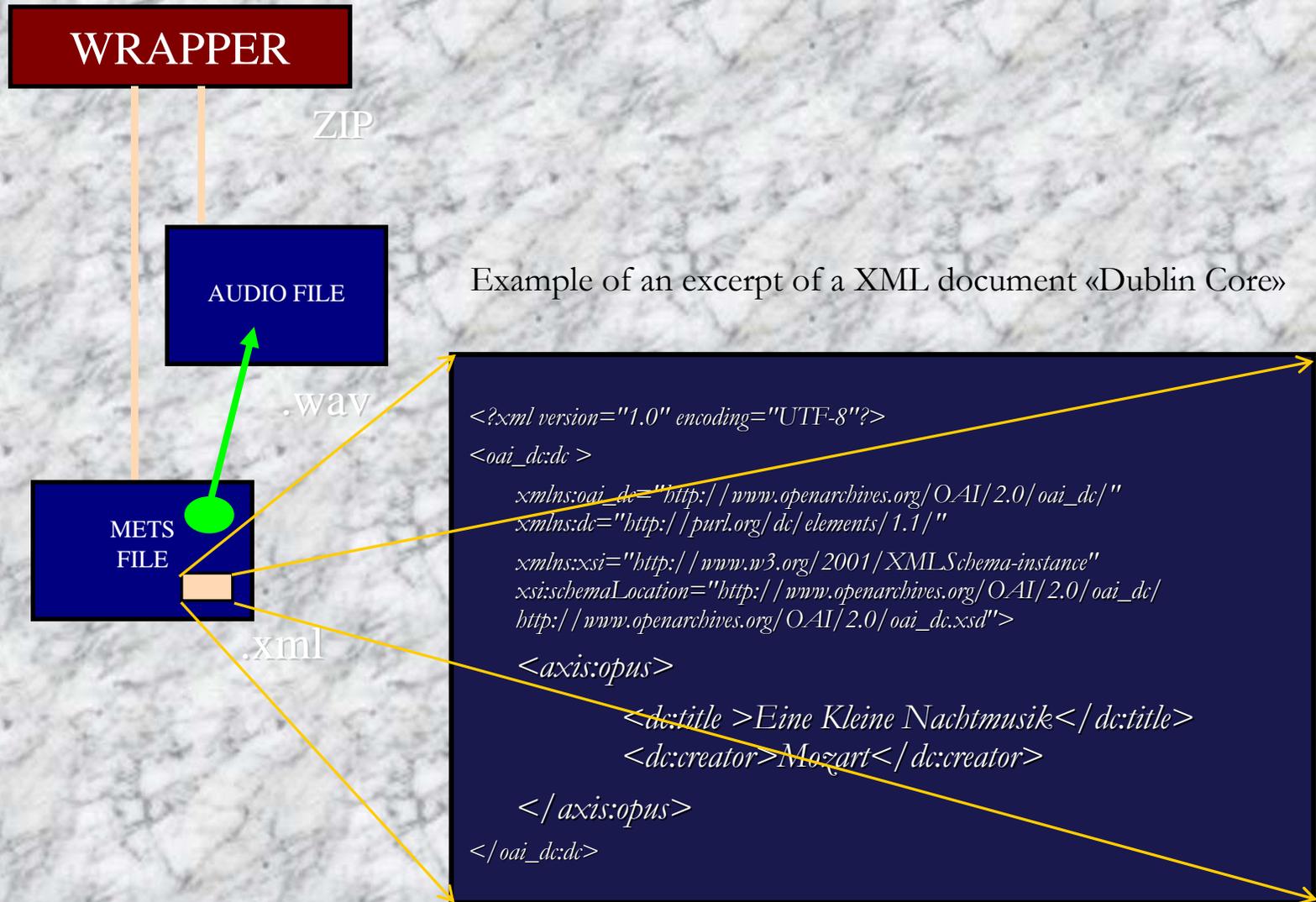
WRAPPER

ZIP

AUDIO FILE

.wav

METS FILE

.xml

Example of an excerpt of a XML document «Dublin Core»

```
<?xml version="1.0" encoding="UTF-8"?>

<oai_dc:dc >

    xmlns:oai_dc="http://www.openarchives.org/OAI/2.0/oai_dc/"
    xmlns:dc="http://purl.org/dc/elements/1.1/"

    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.openarchives.org/OAI/2.0/oai_dc/
    http://www.openarchives.org/OAI/2.0/oai_dc.xsd">

    <axis:opus>

            <dc:title >Eine Kleine Nachtmusik</dc:title>
            <dc:creator>Mozart</dc:creator>

    </axis:opus>

</oai_dc:dc>
```

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Metadata process on the field

Basic File Structure for the P2 Format

< Example >

Clip xxx


```
/
├── Contents
│   ├── Clip
│   │   ├── xxx.xml
│   │   └── yyy.xml
│   ├── Video
│   │   ├── xxx.mxf
│   │   └── yyy.mxf
│   ├── Audio
│   │   ├── xxx_0.mxf
│   │   ├── xxx_1.mxf
│   │   ├── yyy_0.mxf
│   │   └── yyy_1.mxf
│   ├── Thumbnail
│   │   ├── xxx.bmp
│   │   └── yyy.bmp
│   └── Voice
│       └── xxx_0.wav
```

MXF - DMS 1 : Descriptive Metadata Framework and their relationship with an MXF file body

DMS : track 1 - ◆ Global clip			Clip 1 TC
Time code track			
Data track			
Picture track			
Sound track 1			DT
Sound track 2			
Clip 1	Clip 2	Clip 3	PT

Roots Sets, (Preface, Ident. Content Storage)

Package (Material, File and Source)

Production Framework

Clip 1 Framework

Scene 1 Framework

DM Segment

DM Segment

DM Segment

DM Track & Sequence 1

DM Track & Sequence 2

DM Track & Sequence 3

This figure illustrates the structure of the Descriptive Metadata frameworks contained in the header metadata and how it relates to the content of the MXF file body.

P2 Panasonic MXF Metadata workflow :

1) Preparation of metadata
   by P2 viewer / CMS / other application

2) Metadata upload

3) Shooting

4) Editing
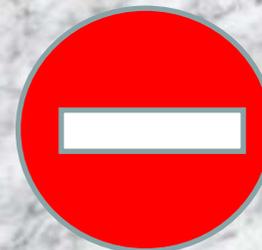
Production view :
BMS - DAM - MAM - WMS - CMS - RMI …...

TITAN

SEMANTIC

BMS (Business Applications) : Resource Management (ERP), Traffic systems (OTA) , Billing, Accounting, Reconciliation, Marketing, Inventory management, NRCS, DRM, …

D A M

CMS (Content Management System Manipulation of essences & Metadata)

WMS (Workflow Management System) : a system that defines and executes workflow process control using application and infrastructure

M A M

Device control (RMI)

Near real-time resource managements

Import/Export Ingest

Audio/Video devices

Editing ONL/OFL

Graphics

…

Digital library HSM, …

Ferme de calcul

Automation

Exploitation

THOMSON images & beyond

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Objective of a future benchmark study « Interoperability State of Play »

- In search of interoperability (interchange and persistence): through synchronization languages and protocols
  - Among 4 categories of players
- To estimate level of interoperability in the video industry?
- To identify breakthrough of interoperability among users and key success factors?
- To identify successfull leverage on vendors

Work in progress

- ## PROPRIATORY PRACTICES ARE DOMINANT

	Critical interoperability resources	MAM vendors	Broadcasters	Press Agencies	Archives	Agregators	Glue services
PROPRIATORY	Active X version	Producers for NRCS and editing app.	Users	Users	Users		Producers for NRCS and editing app.
	Documented/supported API	Producer	Users	Users	Users		Users
	Export mecanism on database	Producer	Users	Users	Users		Users
	Import mecanism on database	Producer	Users	Users	Users		Users
	Proprietory exchange protocol	Producer	Users	Producer	Users	Producer	Producer
NON PROPRIATORY	Exchange protocol (MOS)	Producer	Users				Producers
	Video and audio exchange format (MXF)	Users	Users	Users	Users	Users	Users
	Metadata exchange language (XML)	Producers	Producer/user	Producer/user	Producer/user	Producer/user	Producer
	Taxonomy and data dictionnary		Producer	Producer	Producer	Producer	
	Thesaurus	SGT sell INA's thesaurus by default	User in news (3%)	Producer	Producer		
	Semantic exchange language (RDF)						
	Ontology exchange language (OWL)						

(green)	Frequent
(yellow)	Bare
(orange)	Very bare
(red)	Never

Work in progress

- **BROADCASTERS LONG FOR INTERCHANGE BECAUSE PRODUCTION AND DISTRIBUTION CENTERS ARE HUGE MULTIVENDORS INTEGRATION PROJECTS**
  - No longer « one stop shop » vendor
  - Broadcasters « Best of Breed » strategies
  - + Real time interfaces needed

Work in progress

A TYPICAL NEWSROOM INSTALLATION : FROM 10 TO 20 VENDORS

transfer

attachement

| News Application | | Servers ingest, storage editing broadcasting | EDL | Browse | | Archives (Servers, Database, data library robots) |

attachement

rundown

| Graphics | Automation |
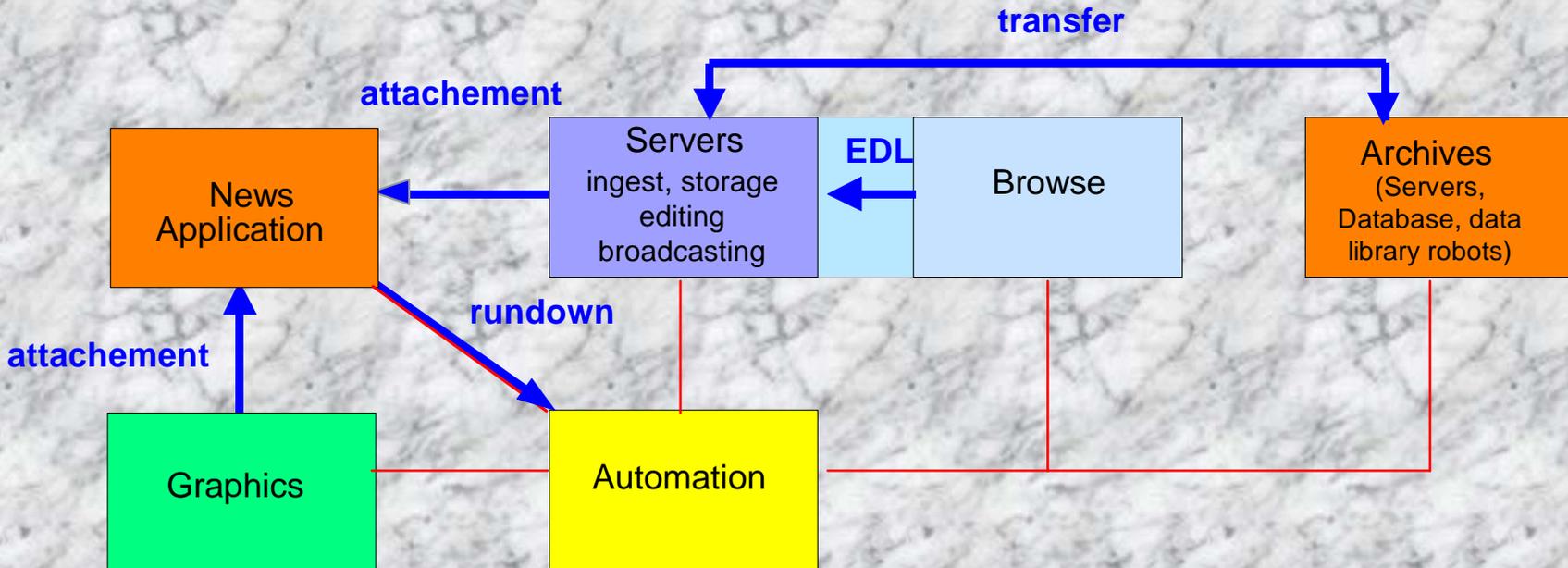
- **BROADCASTERS CARE LESS FOR PERSISTENCE, EVEN IF…**
  - **INCREASE IN ARCHIVE REUTILIZATION**
  - **INCREASE IN STORAGE CAPACITY**
  - **SOME LONG LASTING CONTENT (OBITURIES, BLOCKBUSTER SHOWS)**
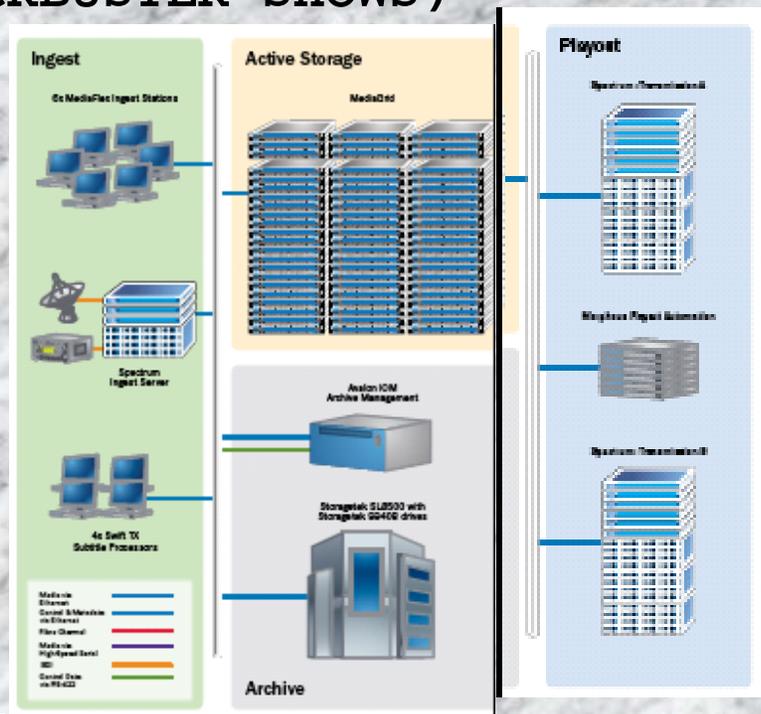
Turner 's new playout center in London

DRIVING FORCES

- **ARCHIVES AND PRESS AGENCIES CARE FOR PERSISTENCE AND INTERCHANGE**
  - **ARCHIVE ARE LONG TERM (PRESENTLY 70 YEARS LEGACY FOR RADIO AND 50 YEARS FOR TV)**
  - **200 FOOTAGE COMPANIES IN THE WORLD SELLING ARCHIVE MATERIALS (B2B)**
    - → **Cinema (extracts)**
    - → **TV (extracts + full programs)**
    - → **Advertisement (extracts)**
    - → **Museum and heritage center (extracts)**
  - **INTERNET GIVES A SECOND CHANCE TO ARCHIVE PROFITABILITY WITH B2C**
  - **SUBSIDIES FOR AUDIOVISUAL HERITAGE**

« NEIN SAGER » FORCES

- VENDORS ARE TRADITIONALY RELUCTANT TO OPEN THEIR SOLUTIONS (TO SELL « THE BIG PICTURE » ?)

- VENDORS ARE MORE AND MORE SHORT TERM ORIENTED IN A SITUATION WHERE DEVELOPMENT COSTS INCREASE (SOFTWARE)

- SOME INSIDE BROADCASTERS PREFER TO PUT ALL POSSIBLE MONEY IN FRESH NEW PROGRAMS

INTEROPERABILITY BREAKTHROUGHS

- To identify breakthroughs in interoperability among users and key success factors?
  - Examples : CNN/Turner precising MXF
    - → Which key success factor ? SMPTE? Clyde Smith? Existence of tools such as XML & MXF
  - Among other ources: partnership between broadcasters and archive service providers working on metadata

Work in progress

LEVERAGE ON VENDORS

- **To identify successfull leverage on vendors**
- Example1: SVT forced in 2001 AVID to develop a « after-editing media browse version » (with Marquis's help)
  - Condition for buying 11 installations (Stockholm + 10 regions)
- Example2: All software are born somewhere. Partnerships between broadcasters and vendors
  - Inews at CNN, AP-ENPS at BBC, S4M at RTL+, …
- Even if the broadcast market has lost a lot of its attraction power toward vendors
  - Yesterday: Broadcast market ➔ Broadcast product ➔ Consumer market
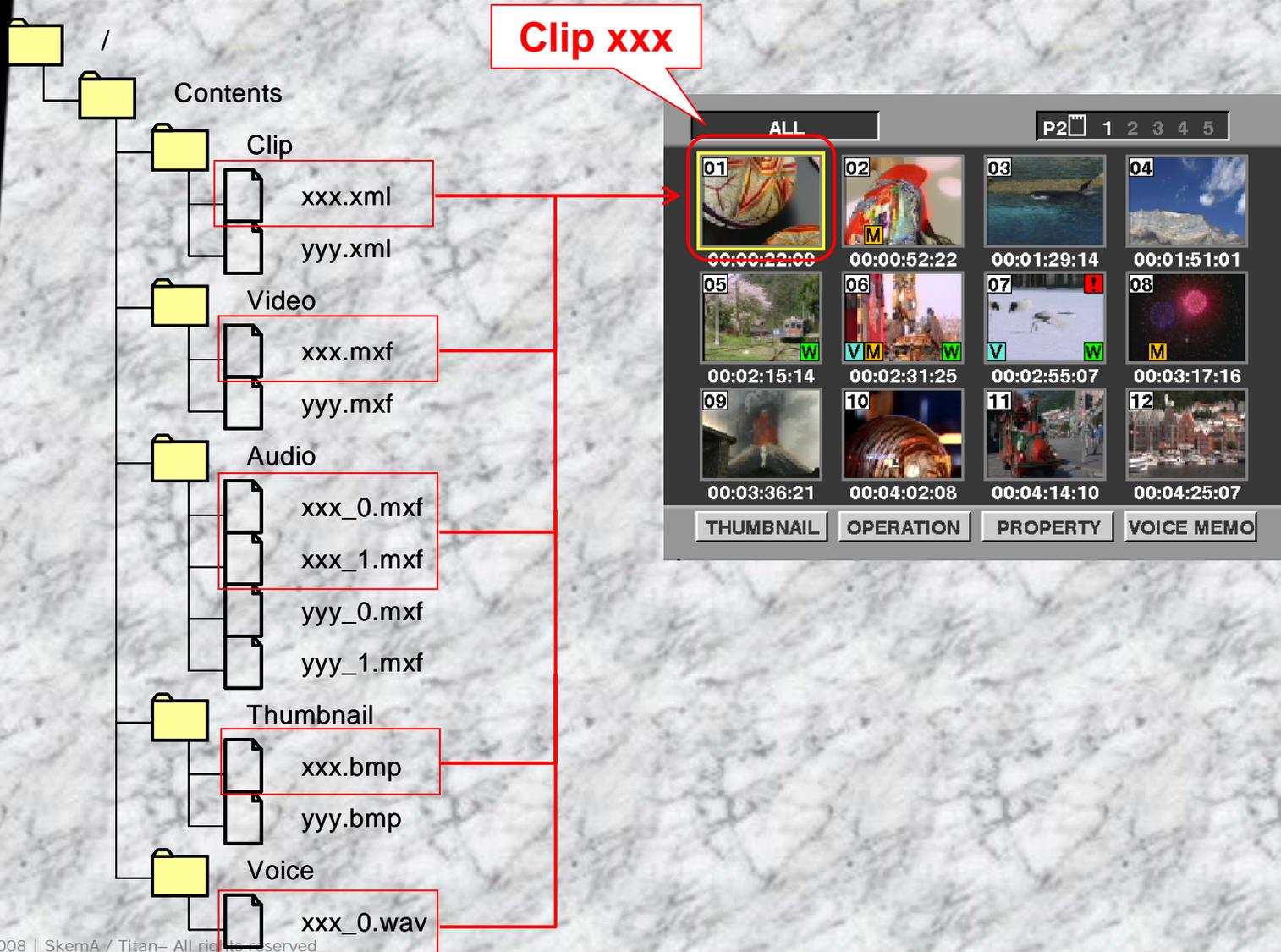 - Nowadays: Consumer market ➔ components ➔ Broadcast product

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4. A global view from the semantic architecture side
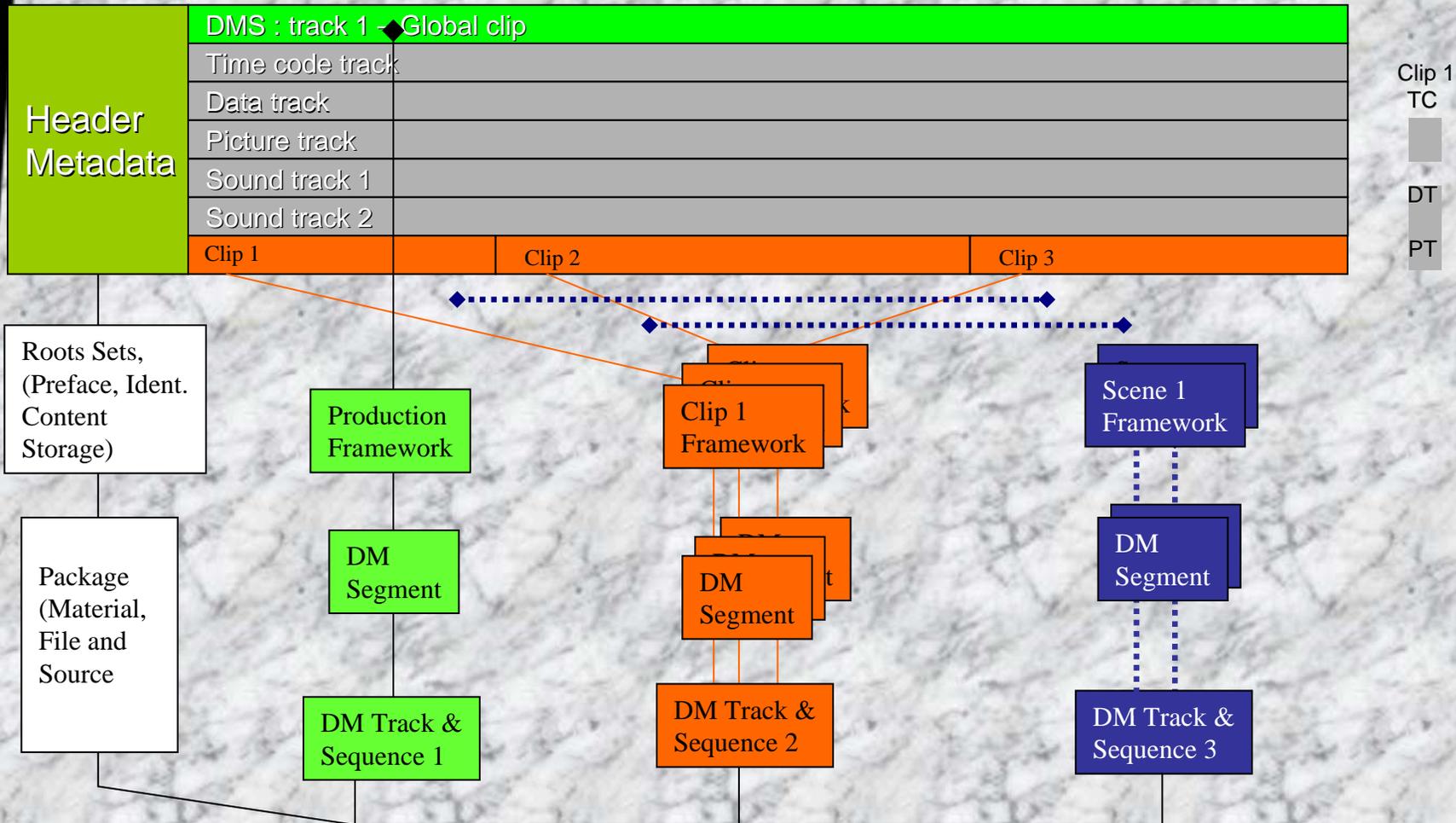5. Description of a user case
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Limitations of Current Knowledge Management Technologies

- *Searching information:* *keyword-based search engines*

- *Extracting information :* human involvement necessary for browsing, retrieving, interpreting, combining, …

- *Maintaining information :* inconsistencies in terminology, outdated information.

- *Viewing information :* impossible to define views on Web knowledge

OAIS: Data reference model (ISO-14721)

Information Package : SIP AIP DIP

- Content Information
- Preservation Description Information
- Packaging Information
- Description Information
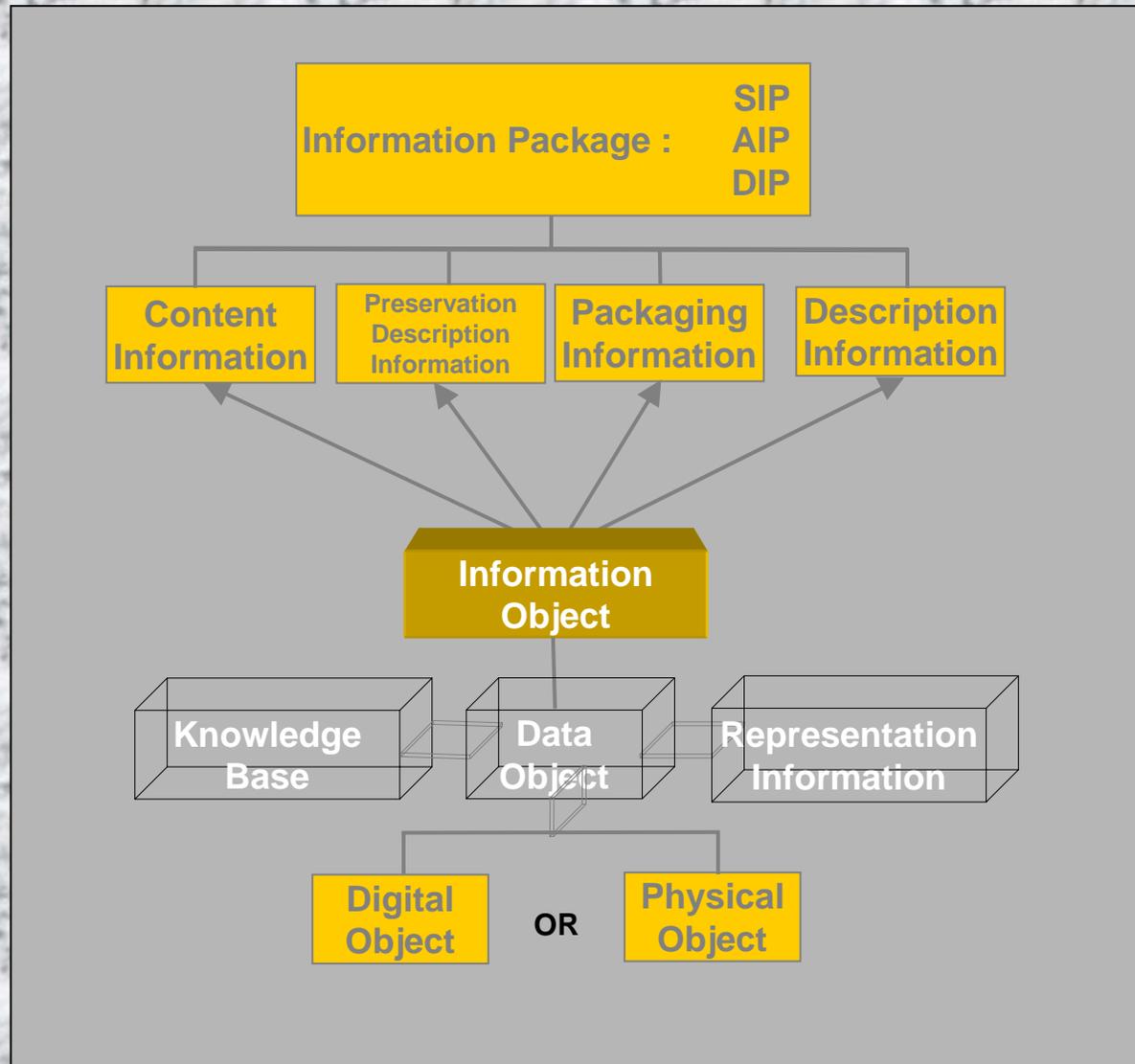
PDI:
- Reference
- Context
- Provenance
- Fixity

Information Object

- Knowledge Base
- Data Object
- Representation Information

Digital Object **OR** Physical Object

Ontology

Semantic

Metadata

1110011011101010011001101010110101010101101010101010011010100110011001101101010101011111010101010001001011101101001100101010110110010100110010101010011010101001101110110110011001001000101010101010101100110101101010010110101010101011001110101010110010101010101101100001010101010101011010101010101011011010001101010111101101011110111010010101101010101010101011001010101010100010101011010101010101010110010101010100101011010101101011010110101110100110001110101011010101100110010101100110101101010110110110010010011001010110010101100110011010101011001101011010110101100110101101010101010100001101011010110110101001001010101010101000110110001101001010110110001100110101010110101101010101101011100101011001110011001010100110011010101011010101010011011011011001010101011110101010101000100101110110100110010101011011001010010011010101010011001101110101010011001101010101101010101011010101010101001101010110110010011001100101011101010101010111110101010101000100101110110100110010101011011001010010011010101010011001101110101010101001011011010101101011001101011010101010010101010101010100011011000110100101011011000110011010101011010110101010110101110010101100111001100101010011010101010110101010100110011011011001010101011110101010100100010101110110100110010101011011011001010010010100110101010100110011011110101010011001101010101101010101011010101010100110101011011001001100110010111010101010101111010101010100010010111011010011001010101101100101001001101010101001100110111010101010010110110101011010110011010101010100101010101010100010011010101011010101010110101010101010101101101000110101011110110101011110111010010101101010101010101011001010101010010101101010010110110101101011101001100010100101010101110011000001010101010101010101010010011010101001010010110010101010101001001010010101011010101010110110011010101010010101010100110110100110010101010110101010101010101001010101010101010101010110101010101011010101100101010101010010100101010101010101010101010101010010101010101011010101101010101010110101011111101101010100101101011010110011010101010001011001010101010101010010101010101101101010001010110010110101101011010010111010101010101010101011010101010101011101101010110101101010101010101011011011011000011010101010101010101101

Modeling of the "Assets" and of their presentation such as to obtain their powerful representation = SEMANTIC

```
Symbols,
Languages
.......
```

Registration → Format definition   *Metadata*

Object → Representation → Content   *Data*

Semantic

Process

Web Semantic Architecture

Proof
Logic
Ontology vocabulary

RDF	RDFS

XML + Name Space + xmlschema
Unicode U.R.I.

- - - - - - - - - - - -

HTML
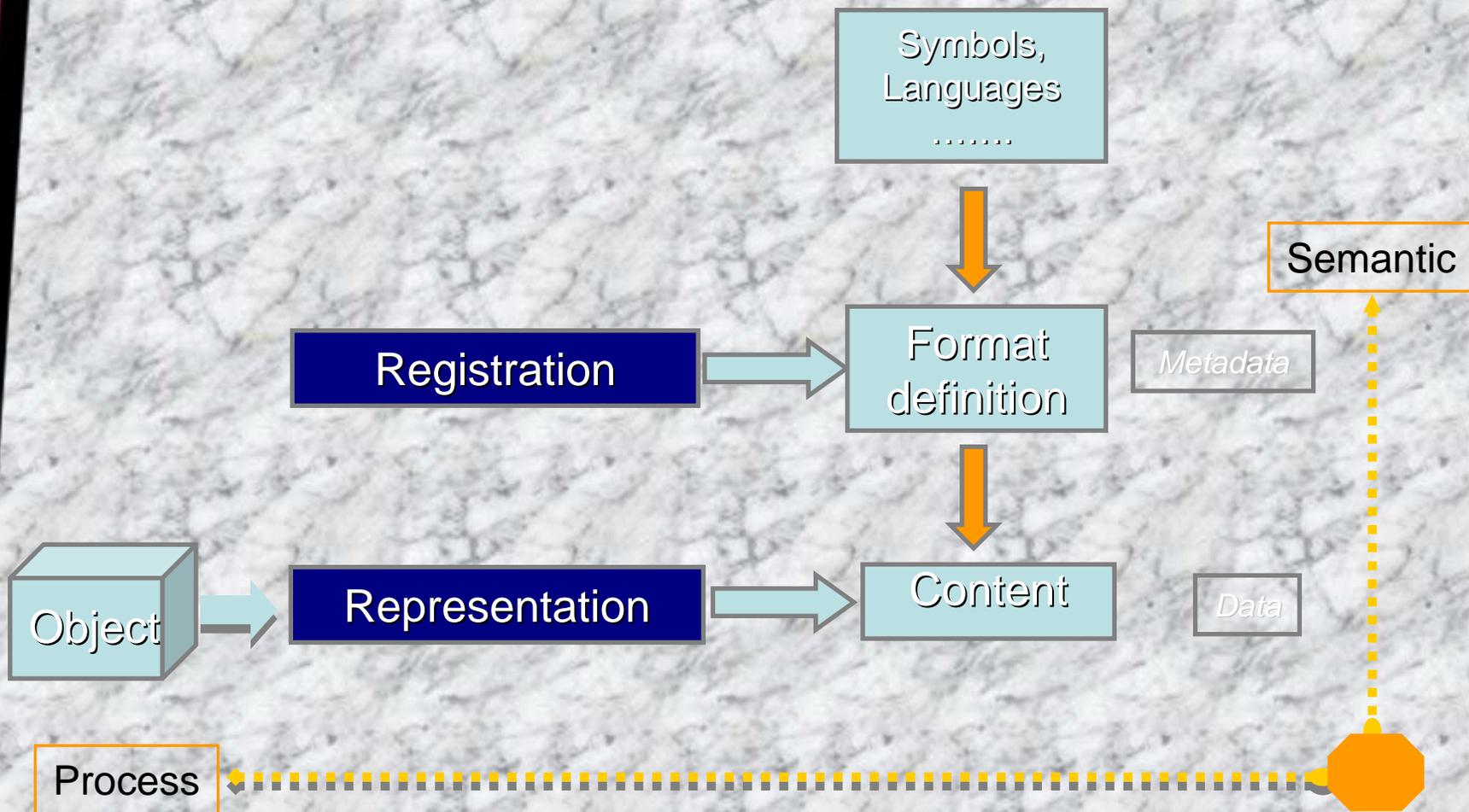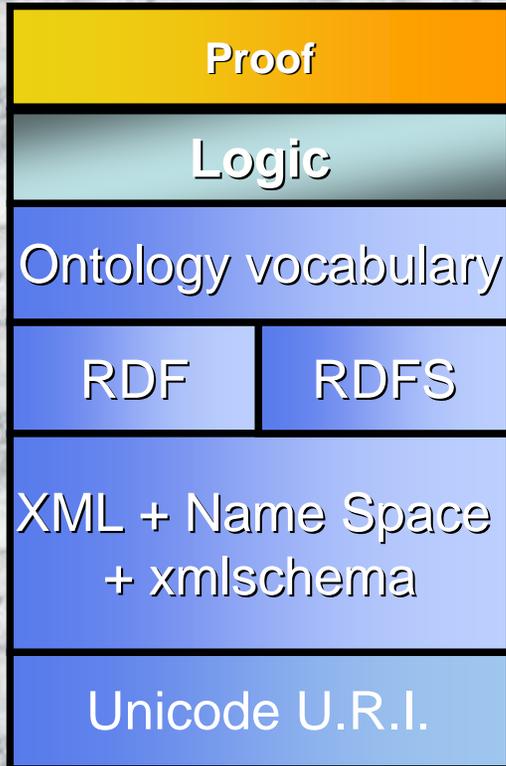
- **Unicode : a comprehension of encoding on every computers.**
- **URI : Universal Resource Identifier (identify a resource)**
- **XML permits abstracts expressions, sharable between different computers in different locations.**
- **NS : Name Space and schemas which (define a set of vocabulary)**
- **RDF (Resource Description Framework) is a way to express a statement between a ressource and a property**
- **OWL allow us to declare some refined relationship between statement and properties (Inverse, equivalent, restrictions, …)**
- **The process of asserting statements and rules, then starting a step of inducing and deducing new assertions**
- **In a context of web analysis, this is a way to prepare data for the future : AXIS is a proposal to do so**

Role & Skill → Data Topographic View

Role & Skill → Project Process

OAIS Orthogonalities

Data → Substance

Data → Physical

Logical → Carrier

Dynamic   **Fixed**

Modeled
(files, objects)

Modeling
(acquisition,
post-
production,)

DAM,
Digital
repositeries,

Structured
(Databases)

Transactional
systems
(ERP - CRM -
E-mail)

Data
Warehouses
Transaction
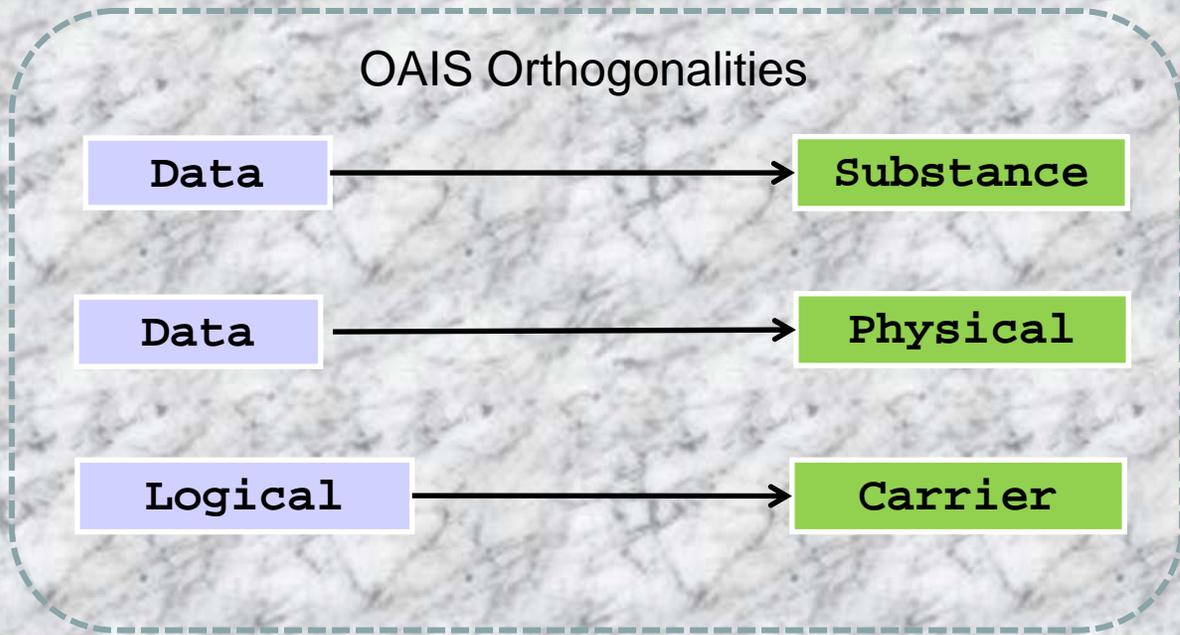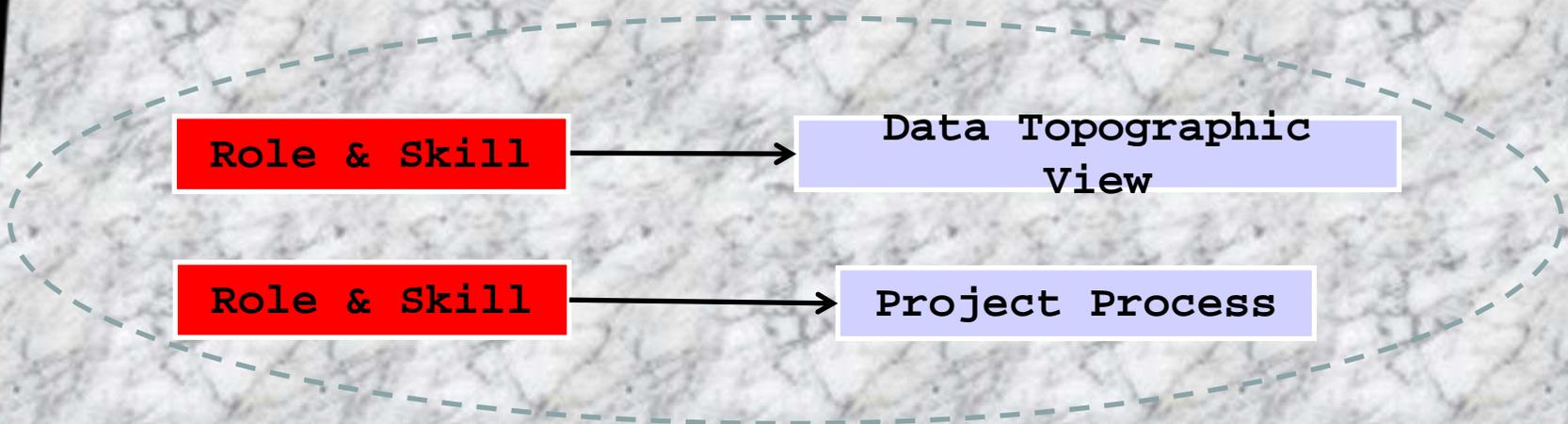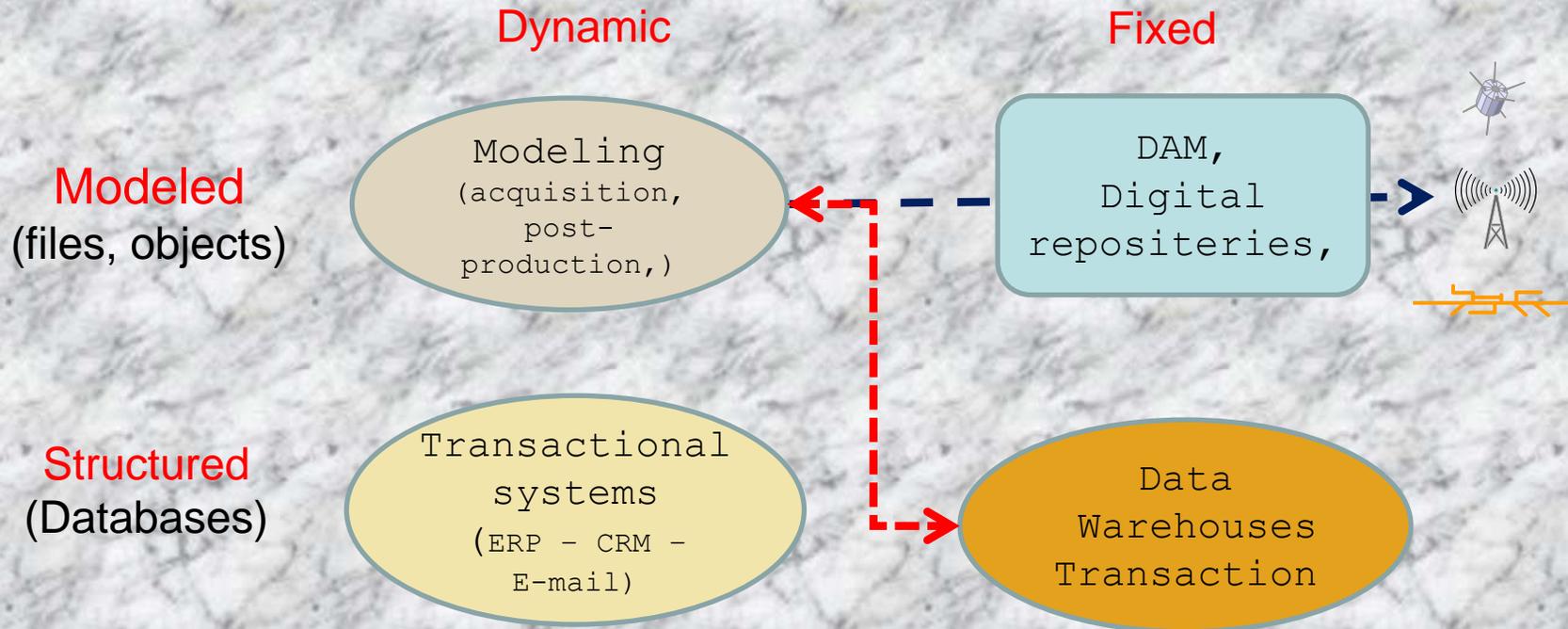
Assets are of different nature and IT equipments and strategies have distinct requirements in each case !
The **horizontal axe** expresses the fact that a dynamic process is always involved in the lifecycle of the assets.
At some moment, most of them have to be fixed.
The **vertical axe** represents the fact that some of the assets could be generated and made accessible through a DBMS. Each asset is managed by independant semantic items !

SNIA : Storage Networking Industry Association

Serendipity Search & Interactivity

Video
Audio

Text

Picture

B R O W S E R
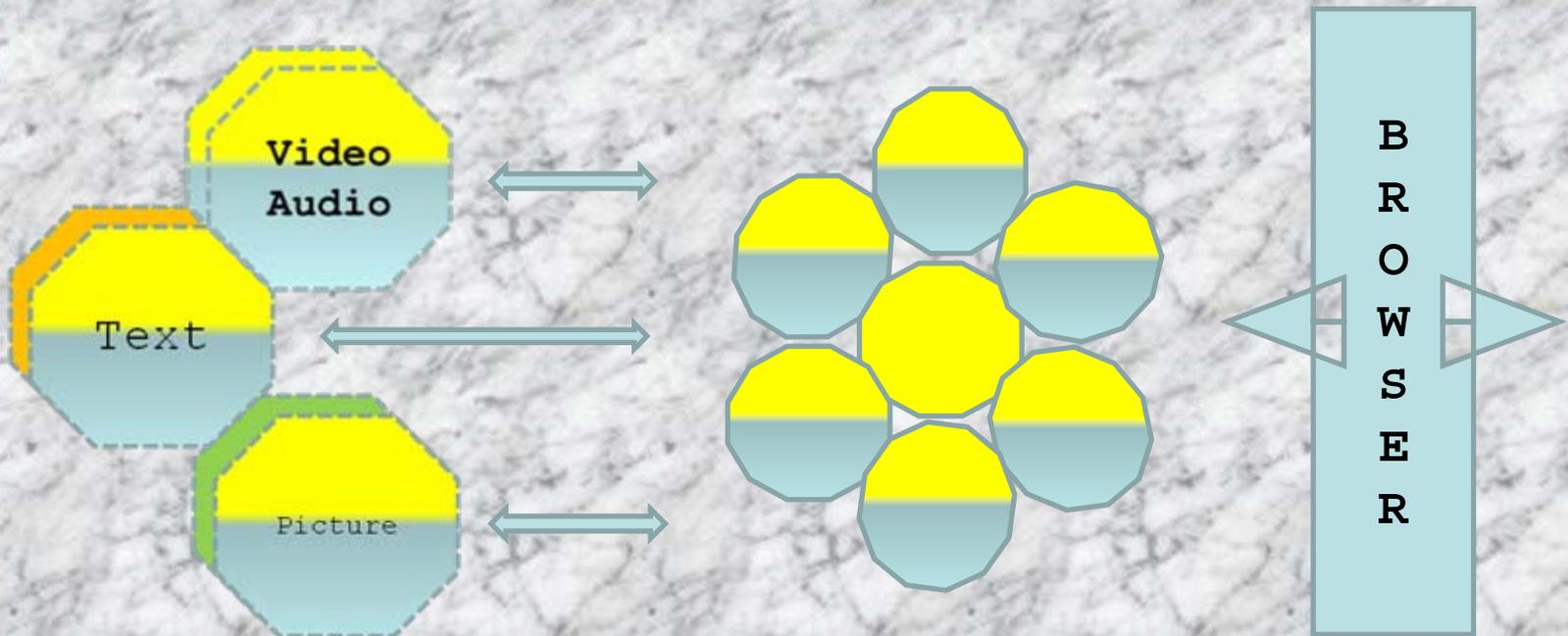
- Cross-lingual search
- Full-text analysis and snippetting
- Navigation through explicit metadatas
- Multi-media extraction
- Results related terms for refining by click

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The broadcast reality :
« live is life »
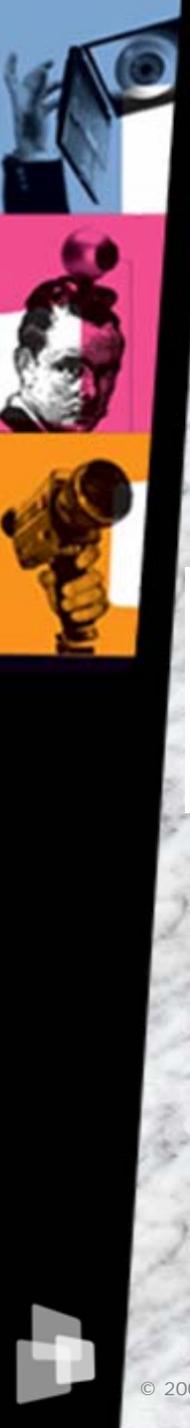
Modeling

Presentation

Technologies
&
Standards

Technologies
&
Standards

The broadcast reality : « live is life »

PRODUCTION | **EXPLOITATION**

Registration	Query

"Live" — **Modelling** | **Presentation** — "Live"

Storage	Services

FESTIVAL DE CANNES

du 13 au 24 mai 2009
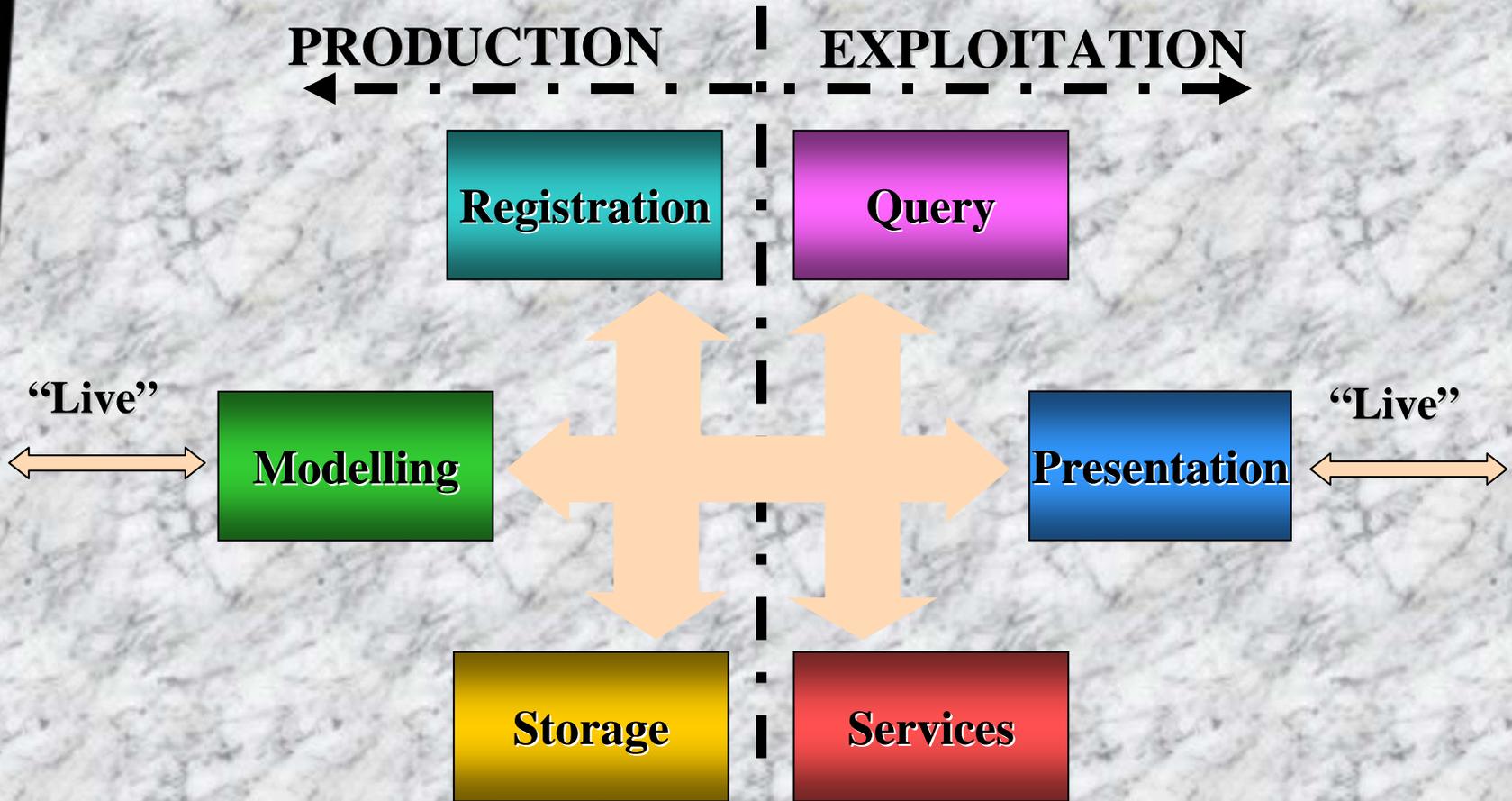
Otto Preminger	
Nom	Otto Ludwig Preminger
Naissance	5 décembre 1906 Vienne **Autriche**
Nationalité	Américain
Mort	23 avril 1986 New York États-Unis
Profession(s)	Réalisateur
Films notables	*La Rivière sans retour*, *L'Homme au bras d'or*, *Exodus*, **Autopsie d'un meurtre**
Fiche IMDb	

A User Case

Registration   Query   BRF   Web topic

"Live"   Modelling   Presentation   "Live"

rtbf   News : Live event = sequence

Storage   Services

vrt   Documentary
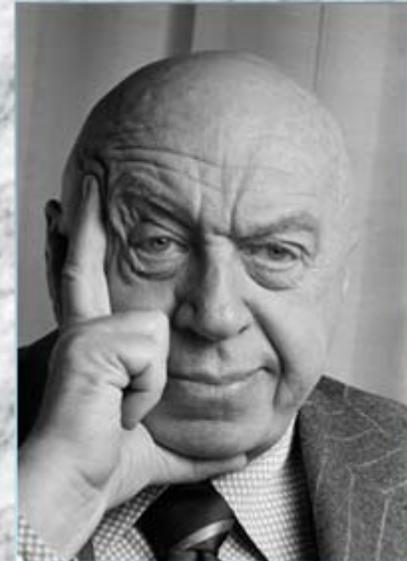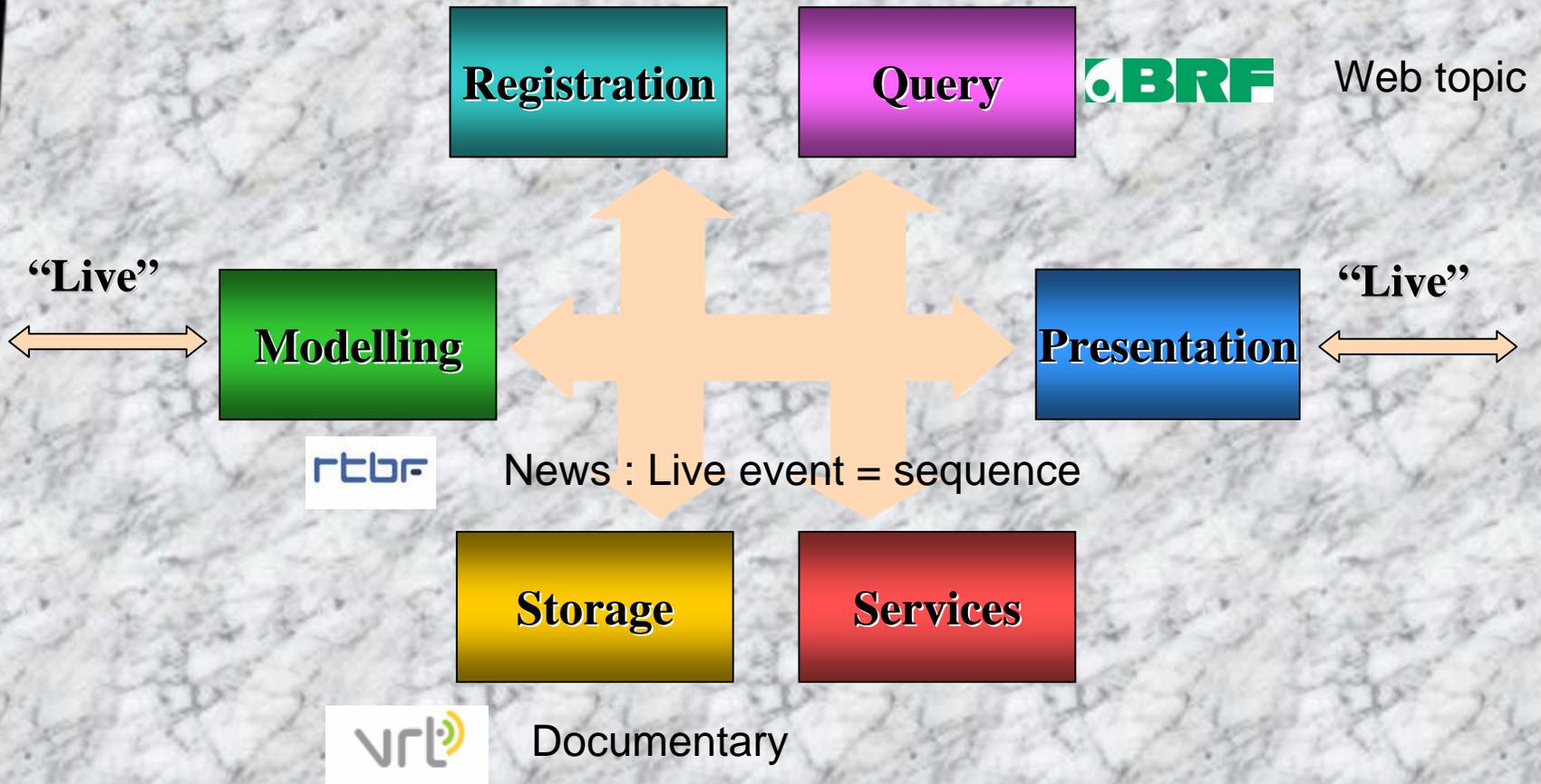
An audiovisual semantic container ?

Event : Festival de Cannes — Broadcast — WEB site

Broadcast
- Date of transmission
- Time of transmission

Channel — Programme

Production

Rights — Archive document

Producer

Video-Clips

Languages

Moral person

Story component

UK-D-FR-NL

Live Broadcast
- Begins at
- Ends at

Interview recording

Physical person — Journalist

Interviewer

Interviewee

Live
- Date
- Place
- Live condition

Begins at

Ends at

Physical person — Director — Editing

Physical person — Script-girl

Translation ?

Production Documents — Conductor

SQ 1
SQ 2
SQ 3
SQ 4
SQ 5
SQ 6

Thank you for your on-line attention

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Titan & Co Semantic acronym's :

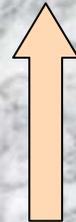- **AAE**   **Autonomous Assets Entity (AXIS)**
- **ACE**   **Autonomous Content Entity (European project)**
- **AIP**   **Archival Information Package (OAIS)**
- **AXE**   **Autonomous eXchange Entity (AXIS)**
- **AXIS**   **Acquisition eXchange Indexing, Structuration (Titan)**
- **Container**   **Container are means to wrap a document in evidence in order to constitute one SIP, AIP or DIP**
- **INDEX**   **The expression of a sequential link between items**
- **DIP**   **Dissemination Information Package**
- **IW**   **Interoperability Wicket**
- **LIP**   **Labelling Information Package (IASA)**
- **OPUS**   **A complete semantic item (AXIS)**
- **OSB**   **Open Semantic Bus (MediaMap)**
- **OWL**   **ontology Web language (W3C)**
- **Package**   **An embodiment of information (AXIS)**
- **Profile**   **By choosing a set of representation formats with a choice of parameters, it is possible to get the capacity to represent information for a class of applications.**
- **RDF**   **Ressource Description Format**
- **SIP**   **Submission Information Package (OAIS)**
- **USE**   **Unique Semantic Entity (MediaMap)**

References :

Sources :

- 'Metadata Principles and Practicalities' : The D-Lib Magazine April 2002 Volume 8 Number 4ISSN 1082 9873 : http://www.dlib.org/dlib/april02/weibel/04weibel.html

- 'RDF' by W3C : http://www.w3.org/TR/rdf-primer/

- 'Dublin Core' : http://dublincore.org/documents/

- 'The Metadata Encoding and Transmission Standard' (METS) http://www.loc.gov/standards/mets/

- 'MPEG-7' : http://mpeg.tilab.comcselt.it

- 'Cover Pages 'METS': http://xml.coverpages.org/mets.html

- 'Introduction to semantic web : http://www.ics.forth.gr/isl/swprimer/ index2.php

- Ontology engine : http://protege.stanford.edu

THANKS & ACKNOWLEDGMENTS :

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