The European Media Wrapper Round Table-V

(*Amsterdam, 2010 Friday September 10th*)

From Semantic to Ontology

Towards the management of the KNOWLEDGE

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AXIS-CRM

Plan of the presentation

1. **INFORMATION versus DATA**
2. **WHY ONTOLOGY modeling?**
3. **The concepts of Upper & Dedicated ONTOLOGIES**
4. **The concept of PROFILE**
5. **AXIS-CRM: a Configuration Management ONTOLOGY**

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SEMANTIC versus ONTOLOGY

SEMANTIC

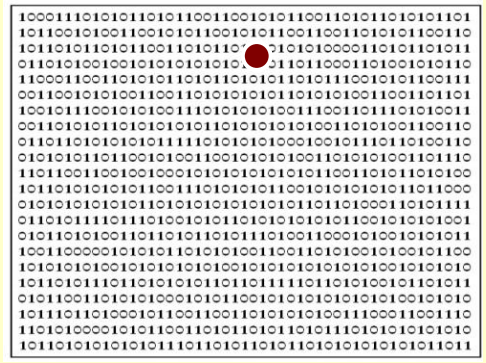
- Gastronomy
- Astronomy
- …
- English
- French
- Chinese
- …

ONTOLOGY

- Gastronomy
- Astronomy
- …
- English
- French
- Chinese
- …

Information

Data



Definitions *(ISO)*

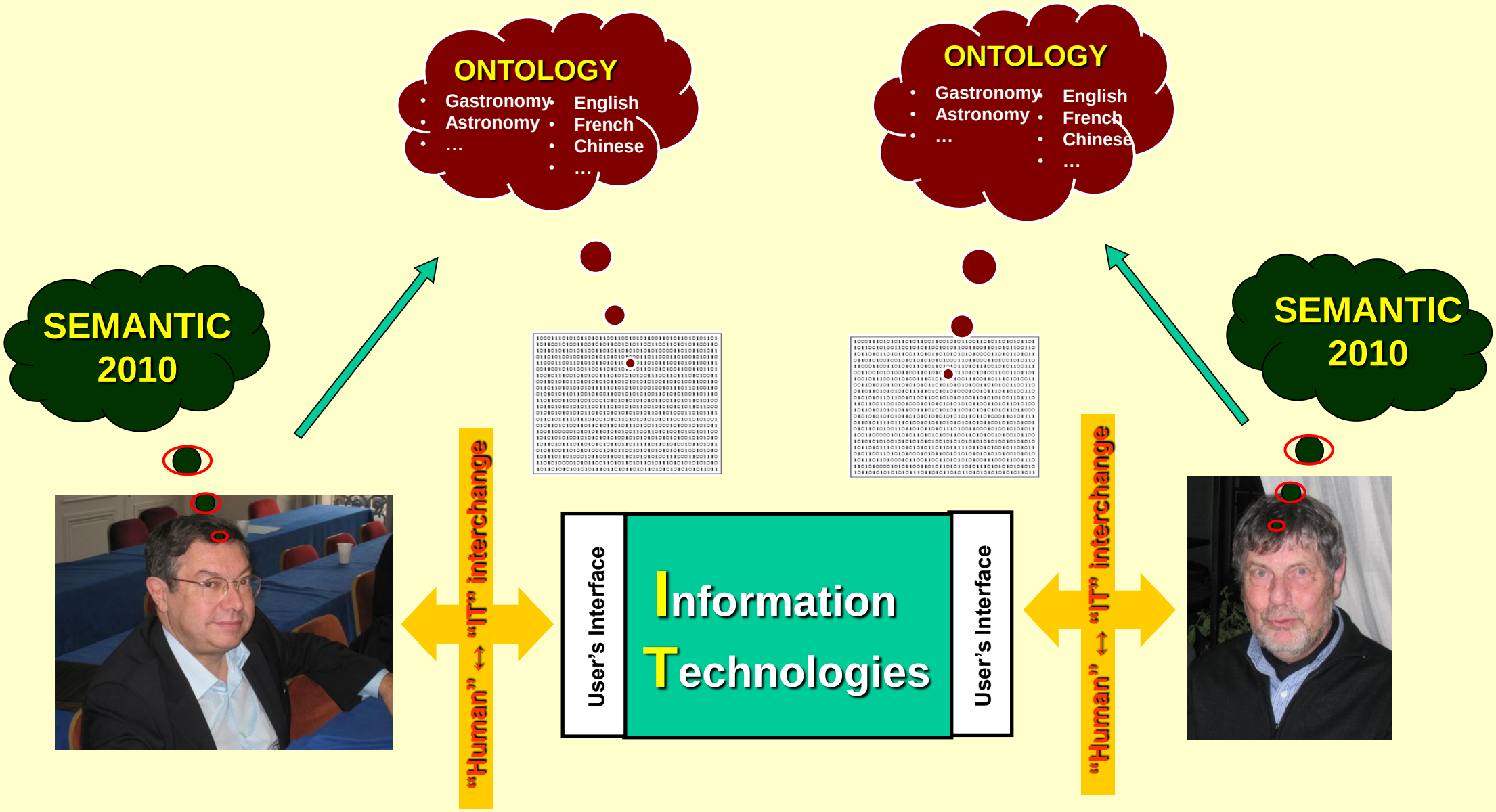
INFORMATION :

The **meaning** that human assigns to **data** by means of **conventions** applied to the data

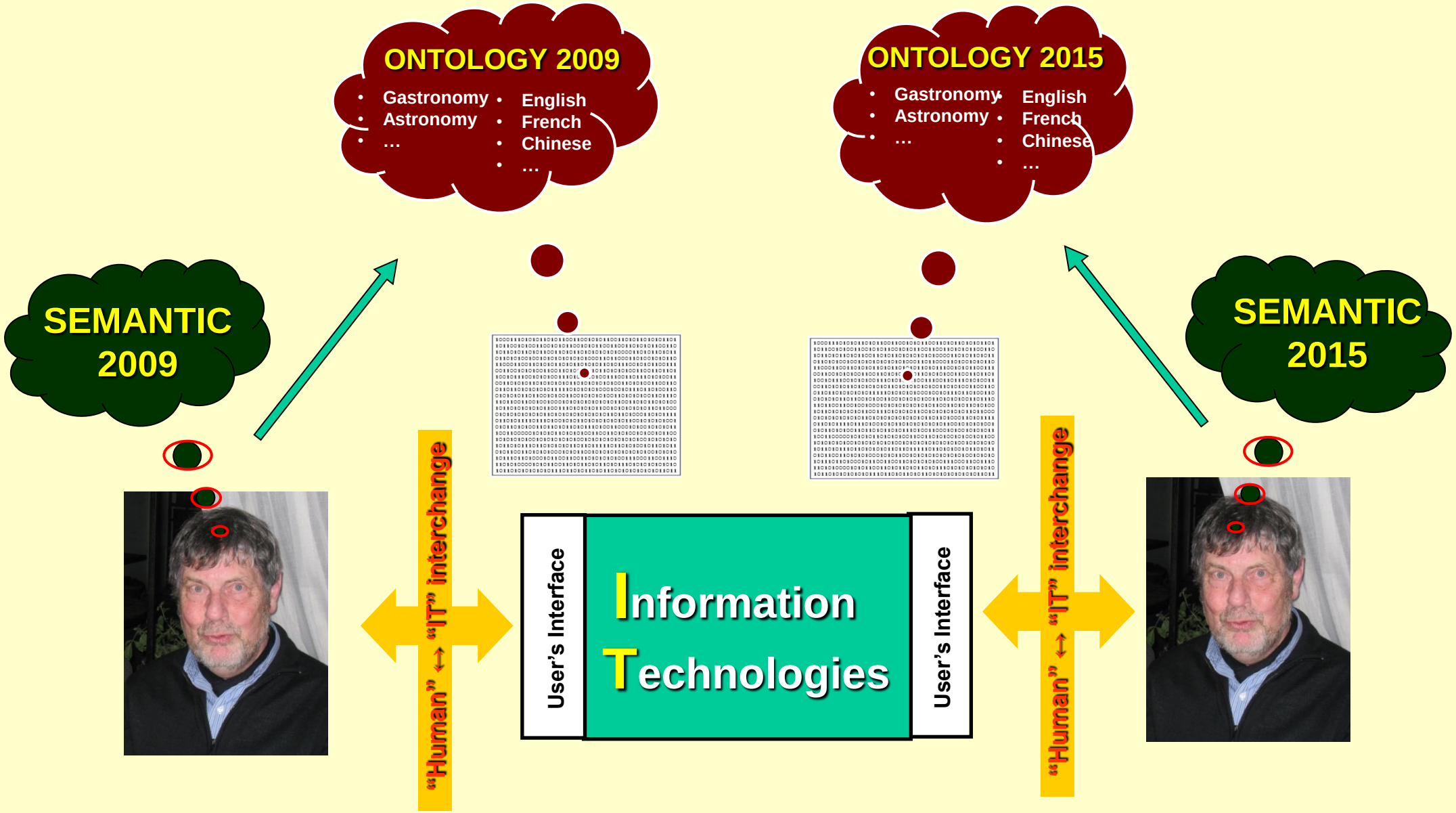
DATA

A **representation** of facts, concepts or instructions, in a **formalized** manner, suitable for communication, interpretation, or processing by **human** or by **automatic means**

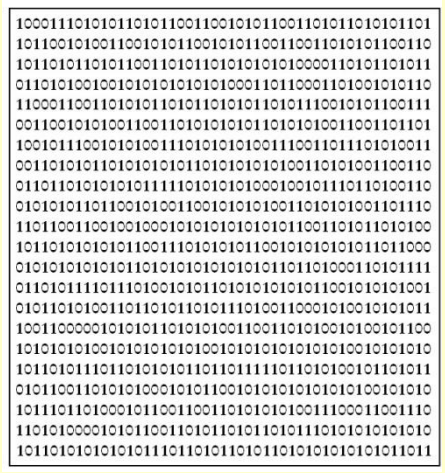
INTEROPERABILITY in space



INTEROPERABILITY in time



“DATA” modelling

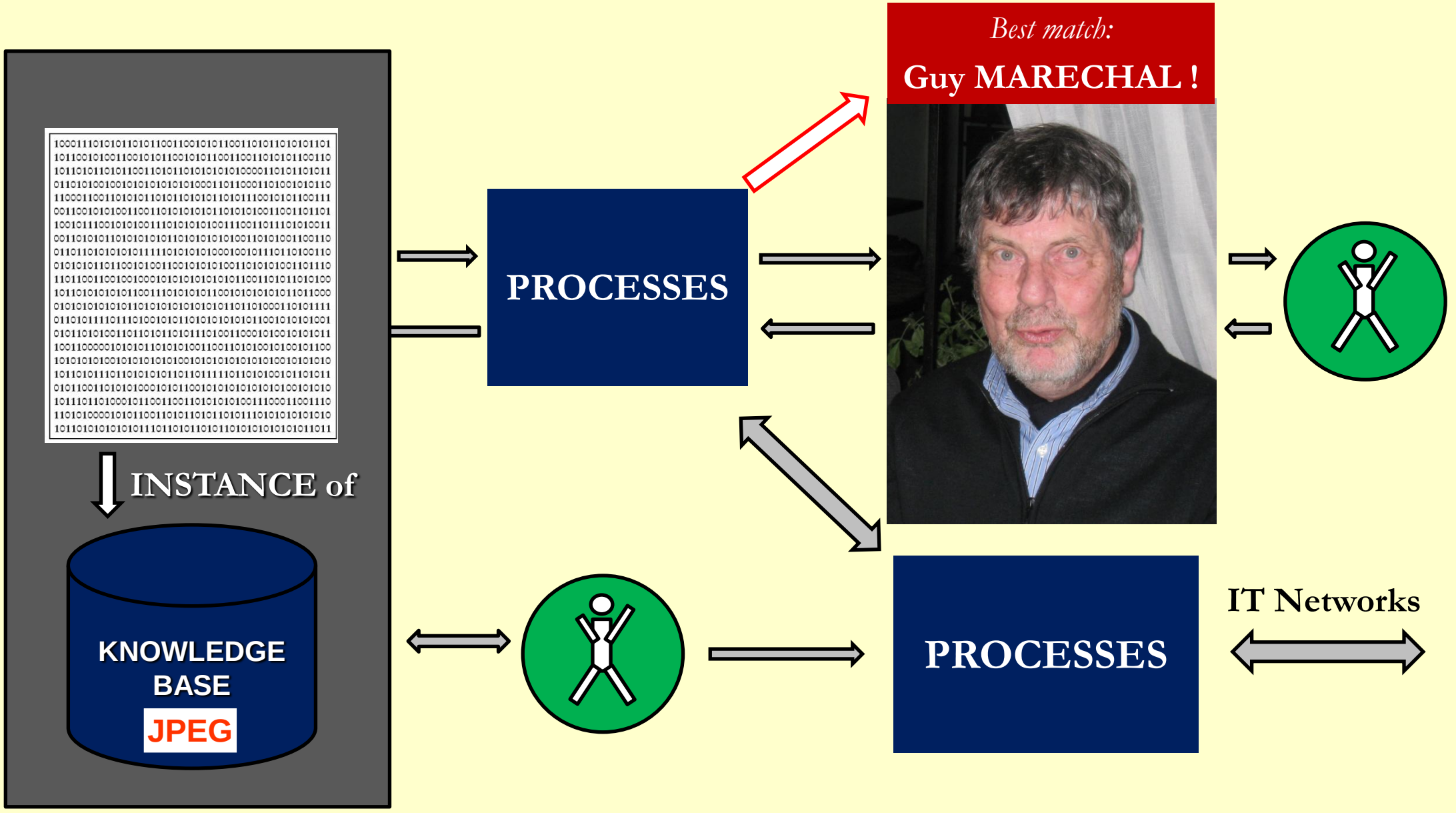


PROCESS

JPEG
ISO Standard

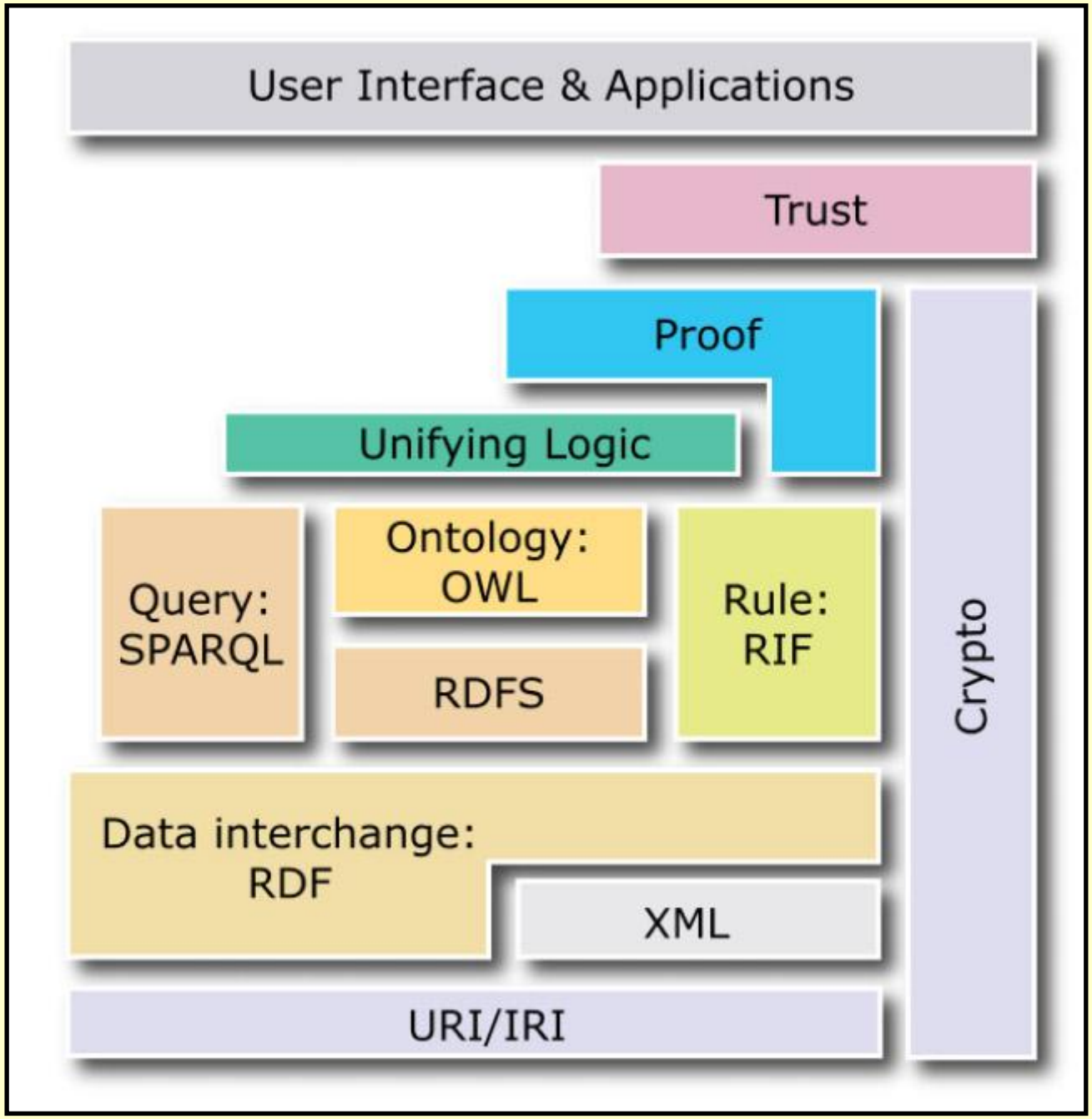
The IT does not access to the “formalized” manner of representing the “conventions”!

“SEMANTIC” modelling



The IT accesses to the “formalized” manner of representing the “conventions”!

The W3C standards for the modelling of ONTOLOGIES



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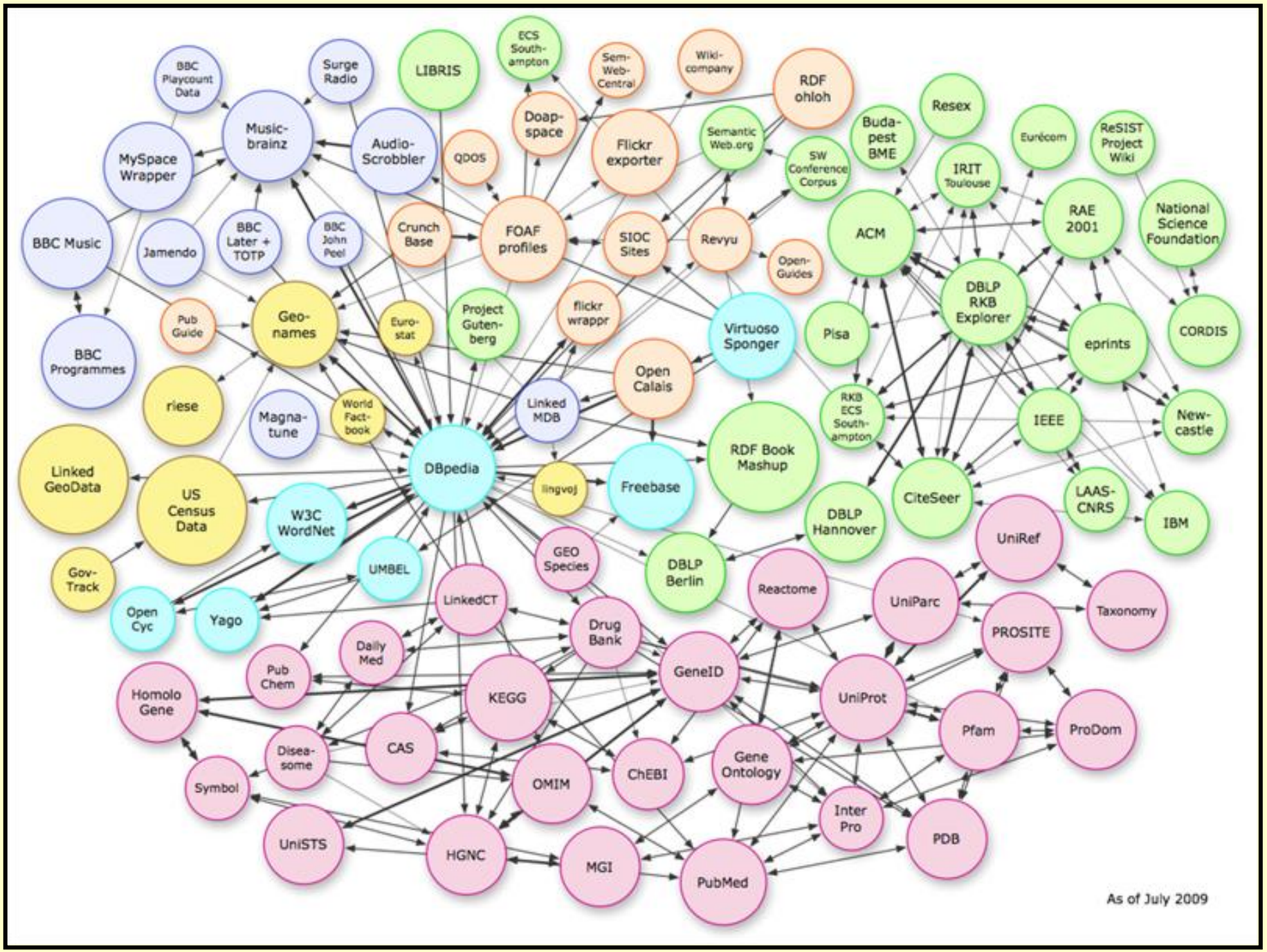
Why ONTOLOGY modelling?

1. Linking Persons / Resources / Documents (Web-2)
2. Linking DATA (Web-3)
3. Structural navigations
4. Inference
5. Enhancements (Negentropy)
6. ‘Unstructured’ to ‘Structured’
7. ‘Active’ to ‘Passive’ / ‘Passive’ to ‘Active’
8. Structural queries
9. Interoperability in ‘time’, ‘space’ and ‘formats’
10. …

LINKED DATA


BBC Playcount Data
Surge Radio
LIBRIS
ECS South-ampton
Sem-Web-Central
Wiki-company
RDF ohloh
Resex
Buda-pest BME
Eurécom
ReSIST Project Wiki
Music-brainz
Audio-Scrobbler
Doap-space
Flickr exporter
Semantic Web.org
SW Conference Corpus
IRIT Toulouse
RAE 2001
National Science Foundation
MySpace Wrapper
QDOS
BBC Music
Jamendo
BBC Later + TOTP
BBC John Peel
Crunch Base
FOAF profiles
SIOC Sites
Revyu
Open-Guides
ACM
DBLP RKB Explorer
CORDIS
Pub Guide
Geo-names
Euro-stat
Project Guten-berg
flickr wrappr
Virtuoso Sponger
Pisa
eprints
BBC Programmes
Open Calais
RKB ECS South-ampton
IEEE
New-castle
riese
Magna-tune
World Fact-book
Linked MDB
Linked GeoData
US Census Data
DBpedia
lingvoj
Freebase
RDF Book Mashup
CiteSeer
LAAS-CNRS
W3C WordNet
DBLP Hannover
IBM
Gov-Track
UMBEL
GEO Species
DBLP Berlin
Reactome
UniParc
UniRef
Open Cyc
Yago
LinkedCT
Drug Bank
PROSITE
Taxonomy
Daily Med
GeneID
Pub Chem
KEGG
UniProt
Homolo Gene
Pfam
ProDom
Disea-some
CAS
Gene Ontology
ChEBI
OMIM
Symbol
Inter Pro
UniSTS
HGNC
MGI
PDB
PubMed
As of July 2009

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The controversial approach of the UPPER ontologies

See WIKIPEDIA: http://en.wikipedia.org/wiki/Upper_ontology_(computer_science)

Information science

In information science, an upper ontology (top-level ontology, or foundation ontology) is an ontology which describes very general concepts that are the same across all knowledge domains. The most important function of an upper ontology is to support very broad semantic interoperability between a large number of ontologies accessible "under" this upper ontology. As the metaphor suggests, it is usually a hierarchy of entities and associated rules (both theorems and regulations) that attempts to describe those general entities that do not belong to a specific problem domain.

The seemingly conflicting use of metaphors implying a solid rigorous bottom-up "foundation" or a top-down imposition of somewhat arbitrary and possibly political decisions is no accident - the field is characterized by controversy, politics, competing approaches and academic rivalry.

Philosophy

In philosophy, an upper ontology implies debates! It can be said that a very important part of each upper ontology can be considered as the computational implementation of natural philosophy, which itself is a more empirical method for investigating the topics within the philosophical discipline of physical ontology.

Library classification

Library classification systems predate these upper ontology systems. Though library classifications organize and categorize knowledge using general concepts that are the same across all knowledge domains, neither system is a replacement for the other.

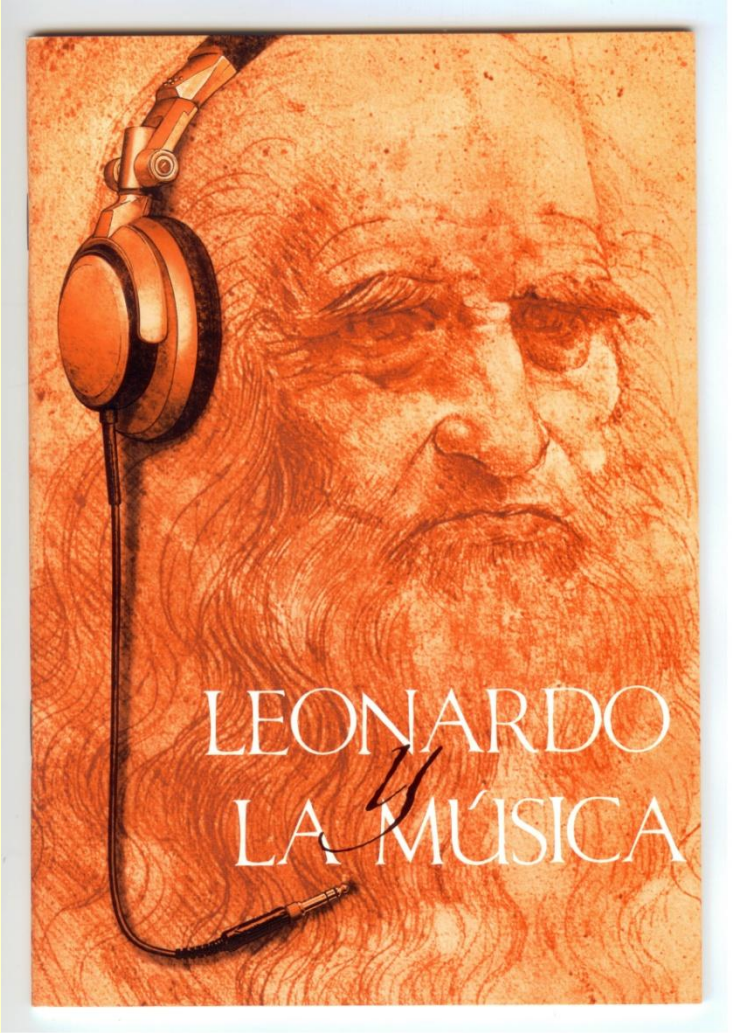
The IEEE initiative

Standard Upper Ontology (SUO) is a term for a near-universal upper ontology.
The Upper Ontology Summit organised in 2006 by IEEE 1600.1 has identified the issue without clear action plan.

The controversial approach of the UPPER ontologies

A few attempts of "Upper ontologies":

- **Cyc** http://en.wikipedia.org/wiki/Cyc
- **Basic Formal Ontology (BFO)** http://en.wikipedia.org/wiki/Basic_Formal_Ontology
- **DOLCE & WonderWeb** http://www.loa-cnr.it/Papers/D18.pdf
- **COSMO** http://micra.com/COSMO/
- **….**



The limits of the approach of the dedicated ontologies

Typical detailed DOMAIN Ontologies:

- **FOAF**
- **EVENT**
- **MUSIC**
- **UNITS of MEASURE**
- **…**

The controversial approach of the UPPER ontologies

CONCLUSIONS

- **No single approach will fit**
- **The use of “Upper ontologies” means easy interoperability even if distinct**
- **Mapping of good ontologies on the same topics is easy**
- **Mapping of distinct philosophical approaches require ‘Interoperability wickets’**
- **Management of the evolution of the ontologies is required for persistence**
- **Make the trade-of between “COPY” / “DERIVE” / “ABSORB / … of existing ontologies or ‘parts’ of ontologies**
- **The W3C intends of organising a workshop in Brussels on the subject in spring 2011**
- **The approach by the “PROFILES” seems to offer a powerful solution.**

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The KEY contents of a PROFILE

1. An IDENTIFICATION system
2. A CONFIGURATION MANAGEMENT system
3. The ONTOLOGY expressed in a specific IT technology (for example: .owl)
4. The AUTHORITY LISTS
5. The ALIAS LISTS
6. The REFERENCES pertaining to dedicated applications
7. The REFERENCES to the STANDARDS not represented in the definition of the ontology

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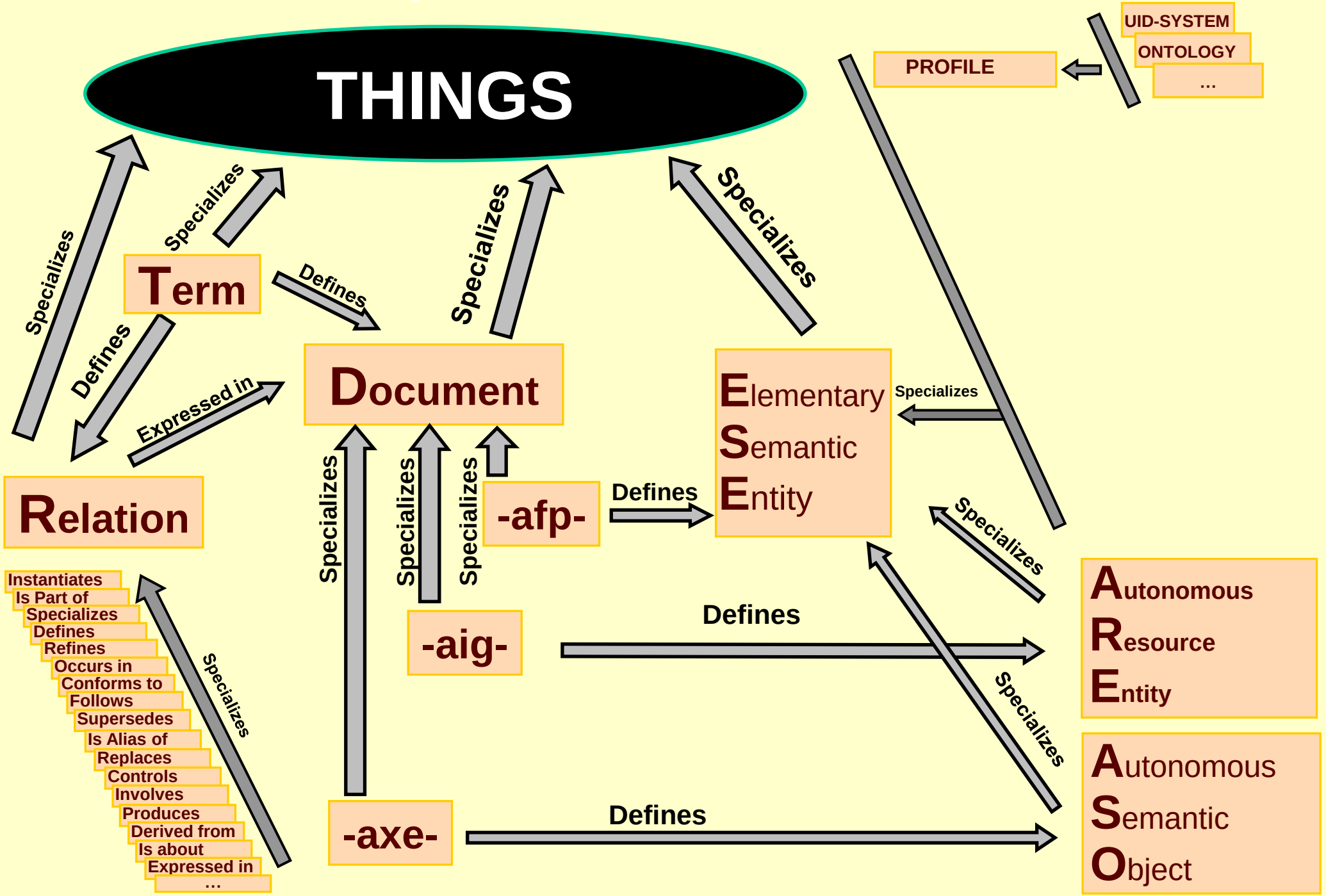
REQUIREMENTS for the Management of the Semantic models:

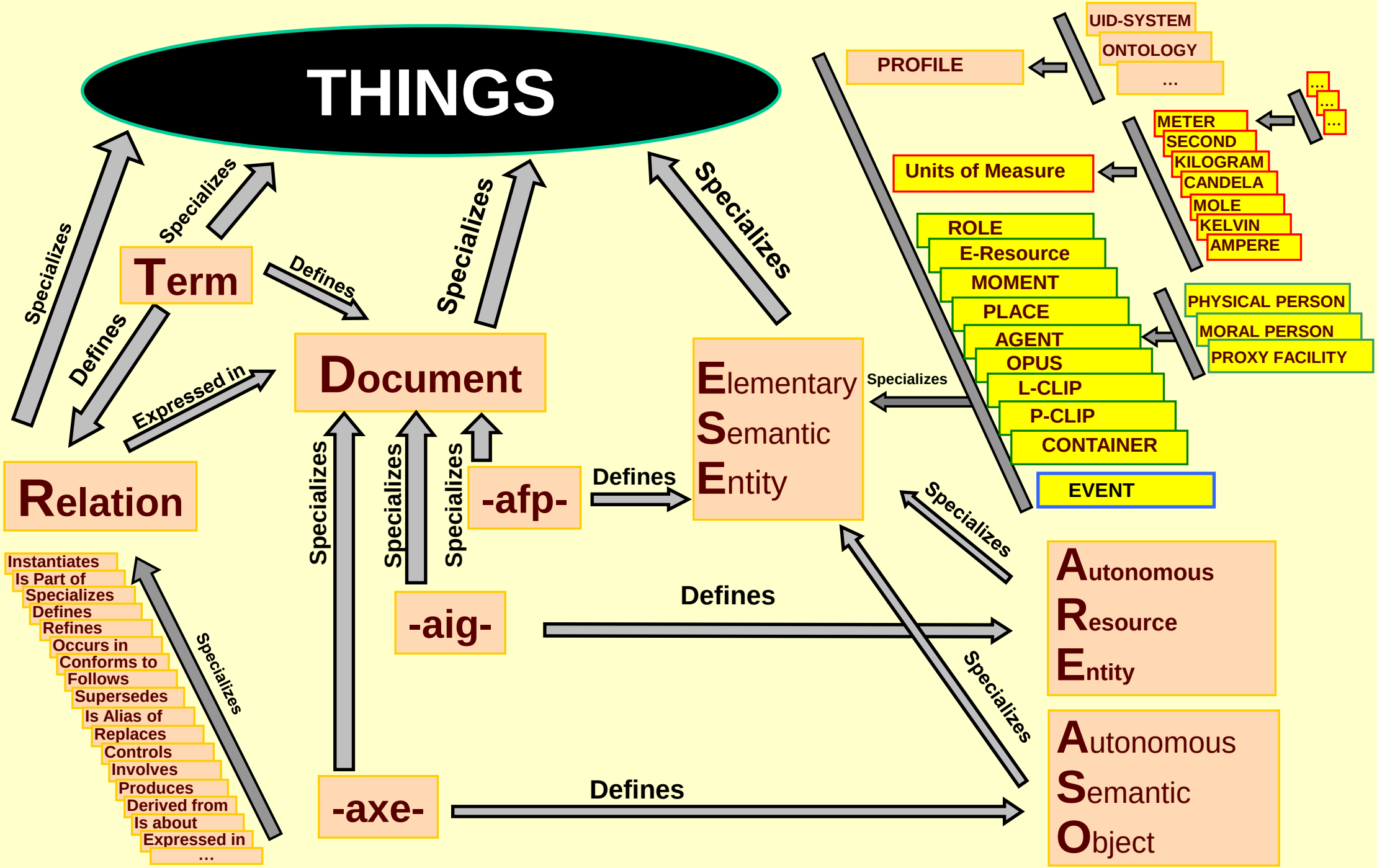
Representing "Knowledge" through the IT's

- **EVERYTHING should be possible to be covered**
- **HUMAN can express their visions of the MEANING of things (SEMANTICS)**
- **ITC MACHINES can 'understand', 'process', 'retrieve', … the semantic items**
  (Through Intelligent Active Agents)
- **Any new semantic item can be added**
- **The representation can go at any level of detail and accuracy**
- **Several representations of the same semantic item can coexist**
  (*multiple point of views and multiple representation formats*)
- **The representations can be distributed**
- **The representations are enabled native persistent**

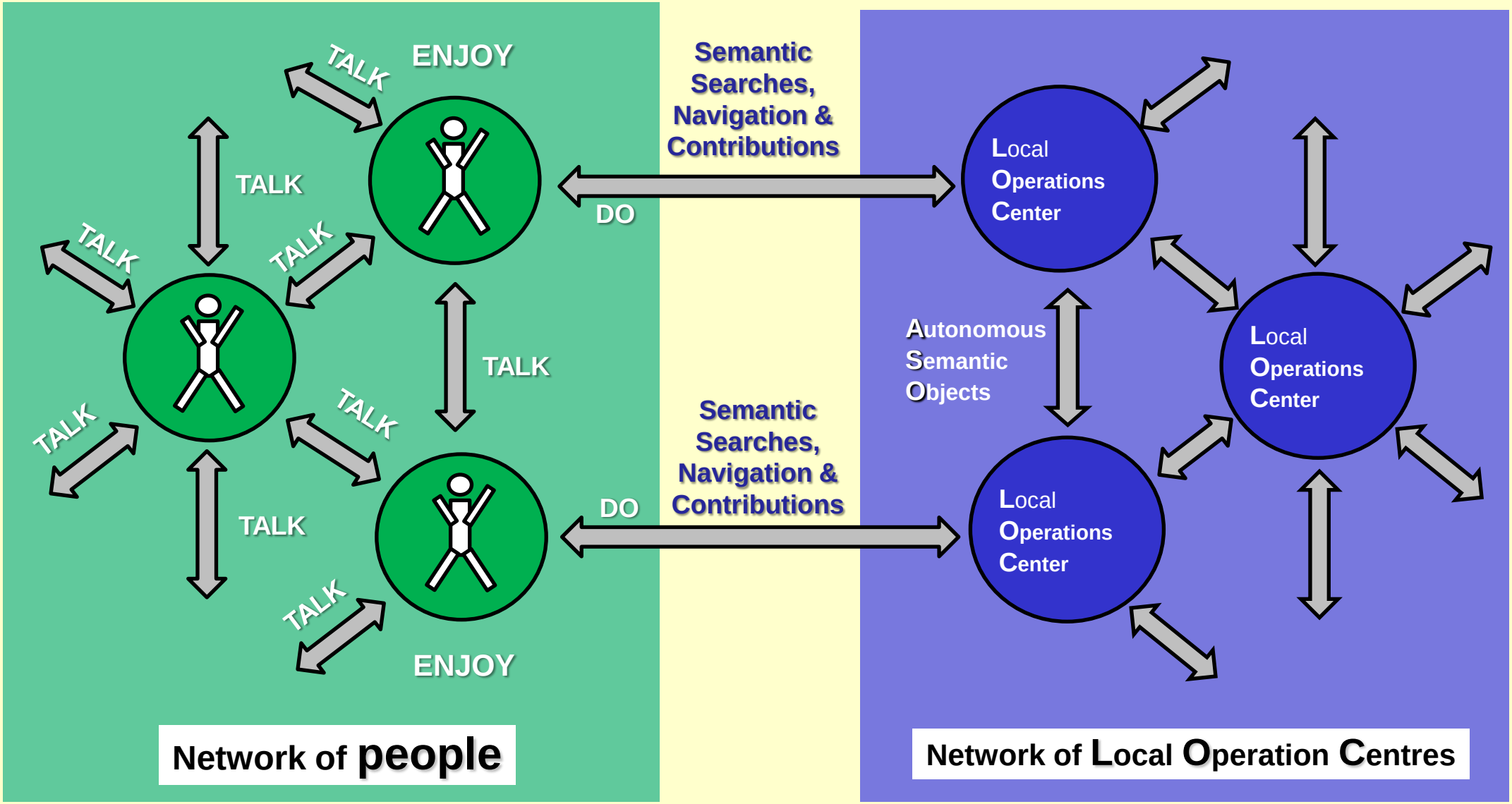
The key constructs of the "AXIS-CRM"



Attaching an "UPPER ONTOLOGY" to the AXIS-CRM

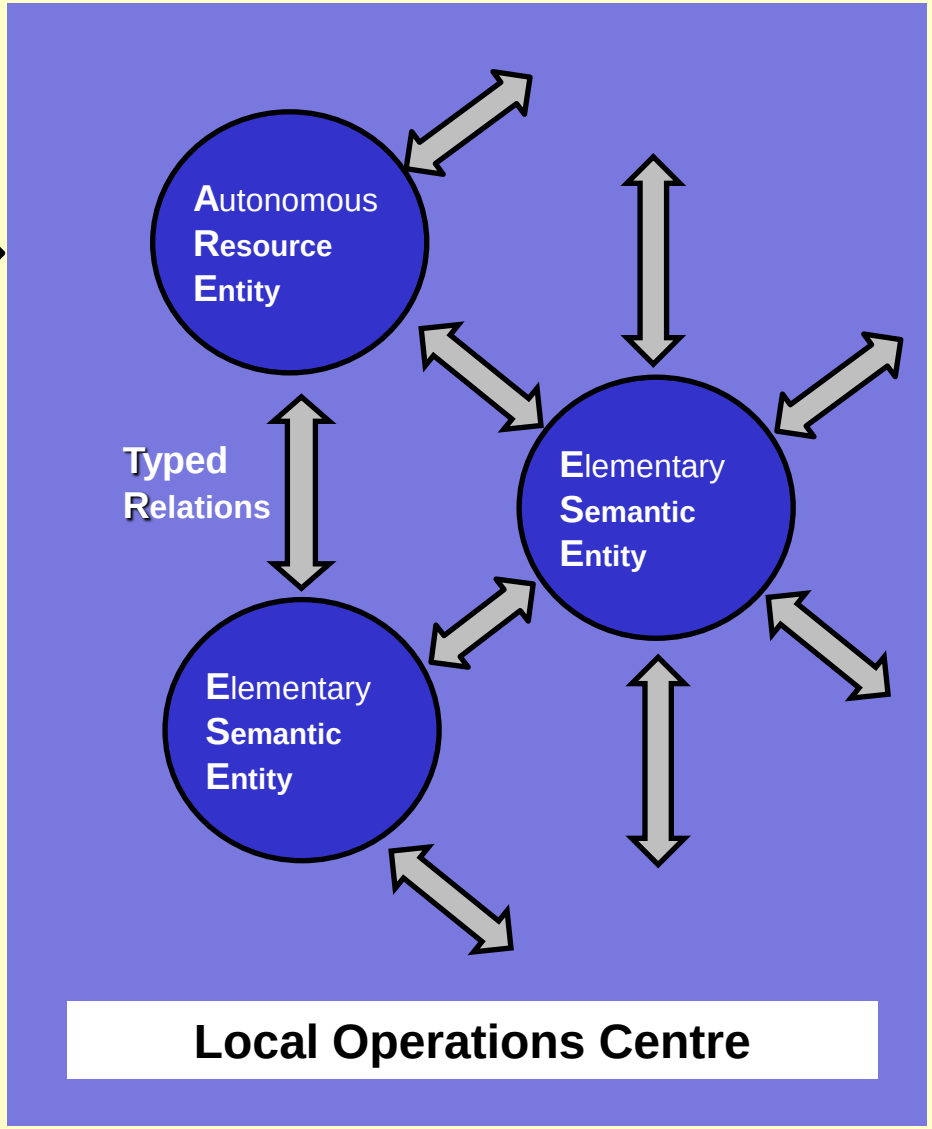


Accessing, Creating, Enriching, Sharing ASO's

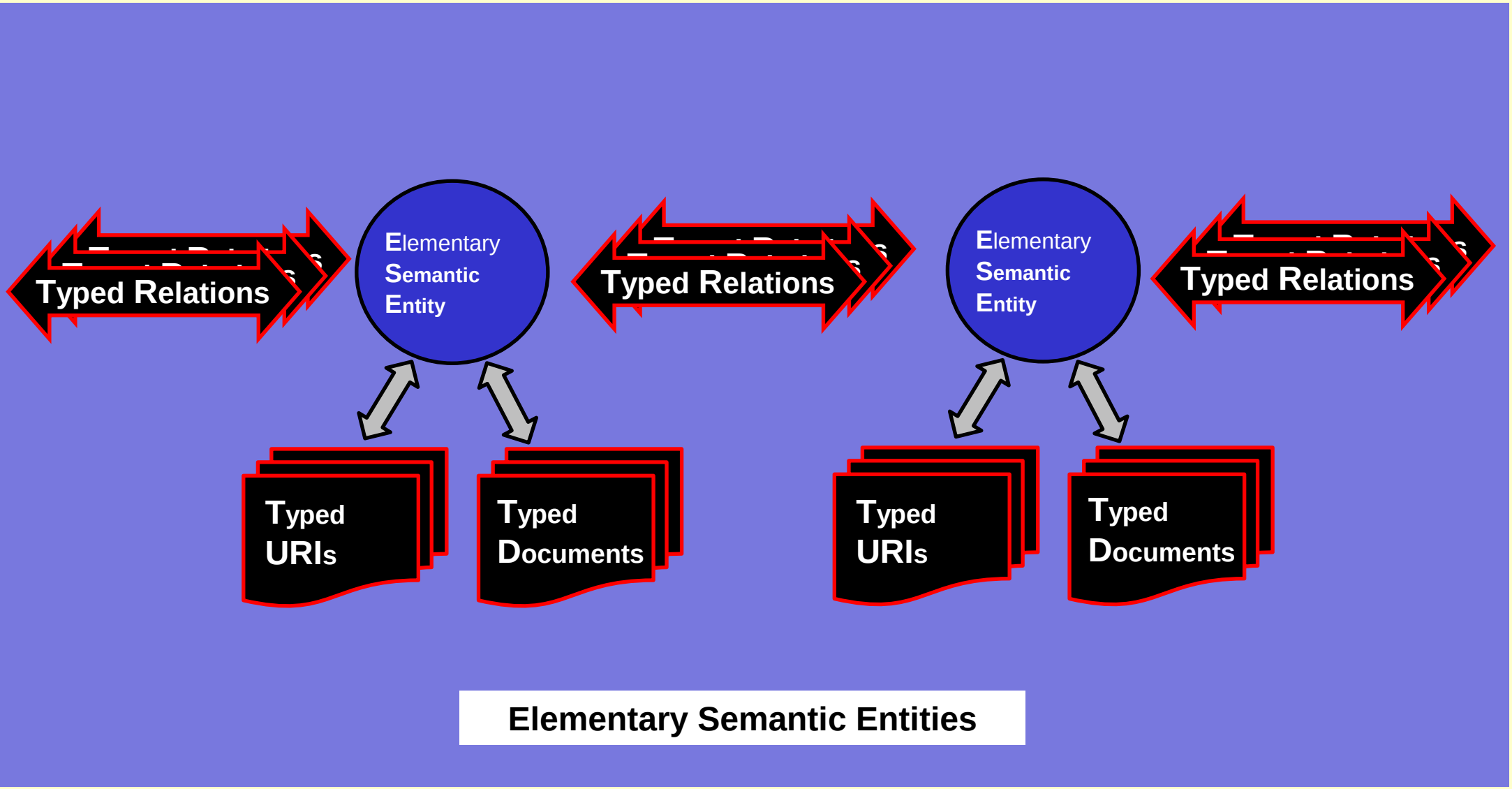


Accessing, Creating, Enriching, Sharing ASO's

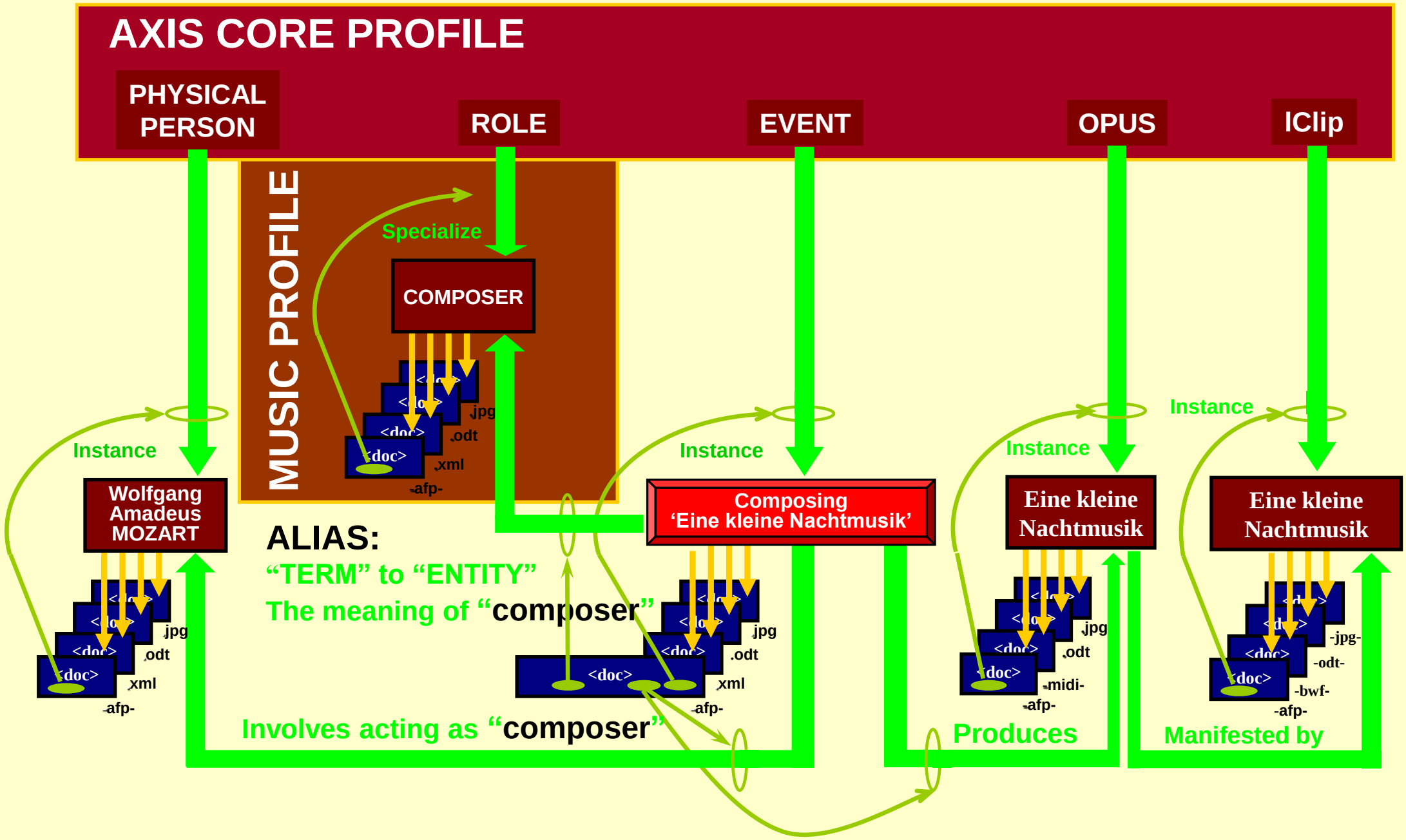
Imports & Exports of
Autonomous Semantic Objects

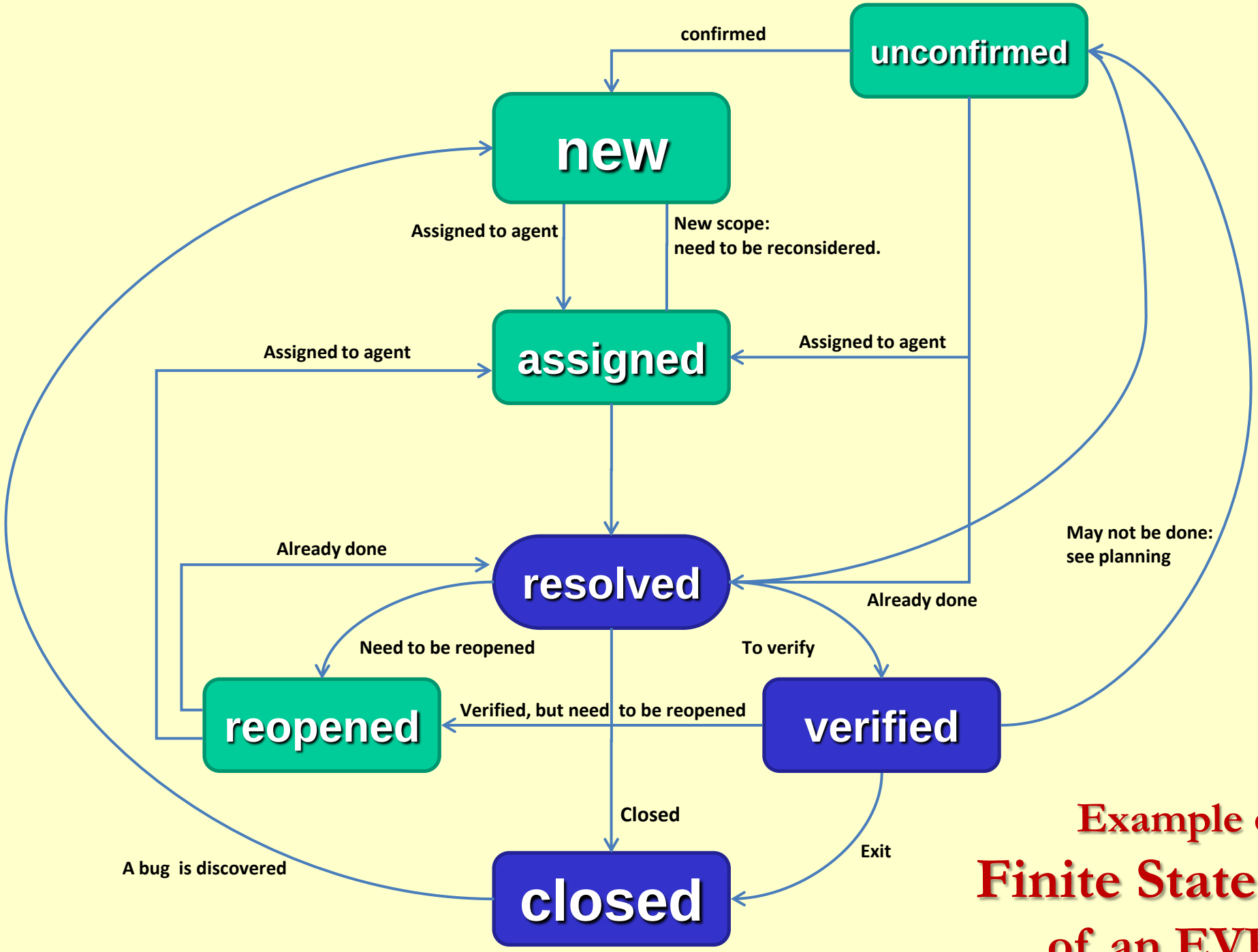


The ESE's construct



A composite concrete example:





Example of a Finite State Model of an EVENT

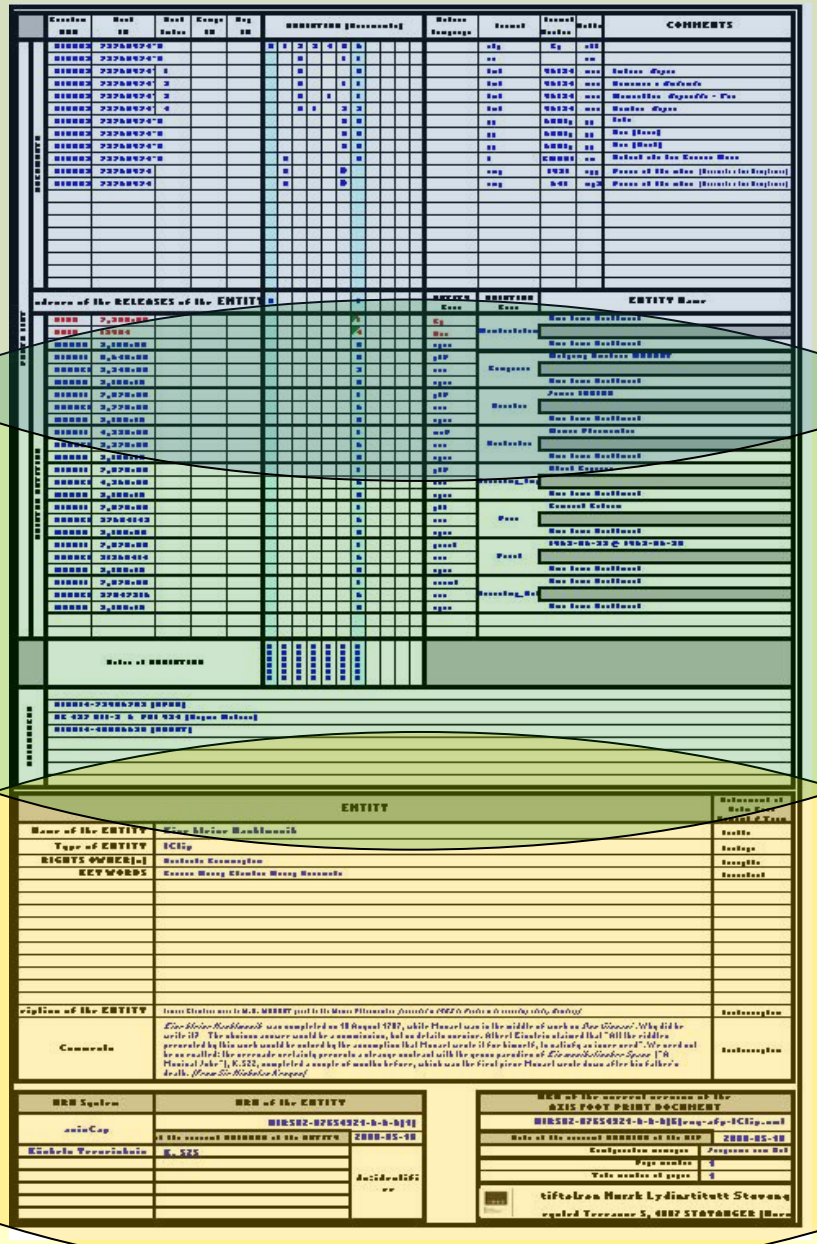
Example of a Configuration Management View at the

Norwegian Institute of Recorded Sound (FULL view)

DOCUMENTS
level

RELATIONS level

Entity (ESE)
level



Definitions

SUBSTANCE :

Abstract concept designating the specific thing intended to be represented through data.

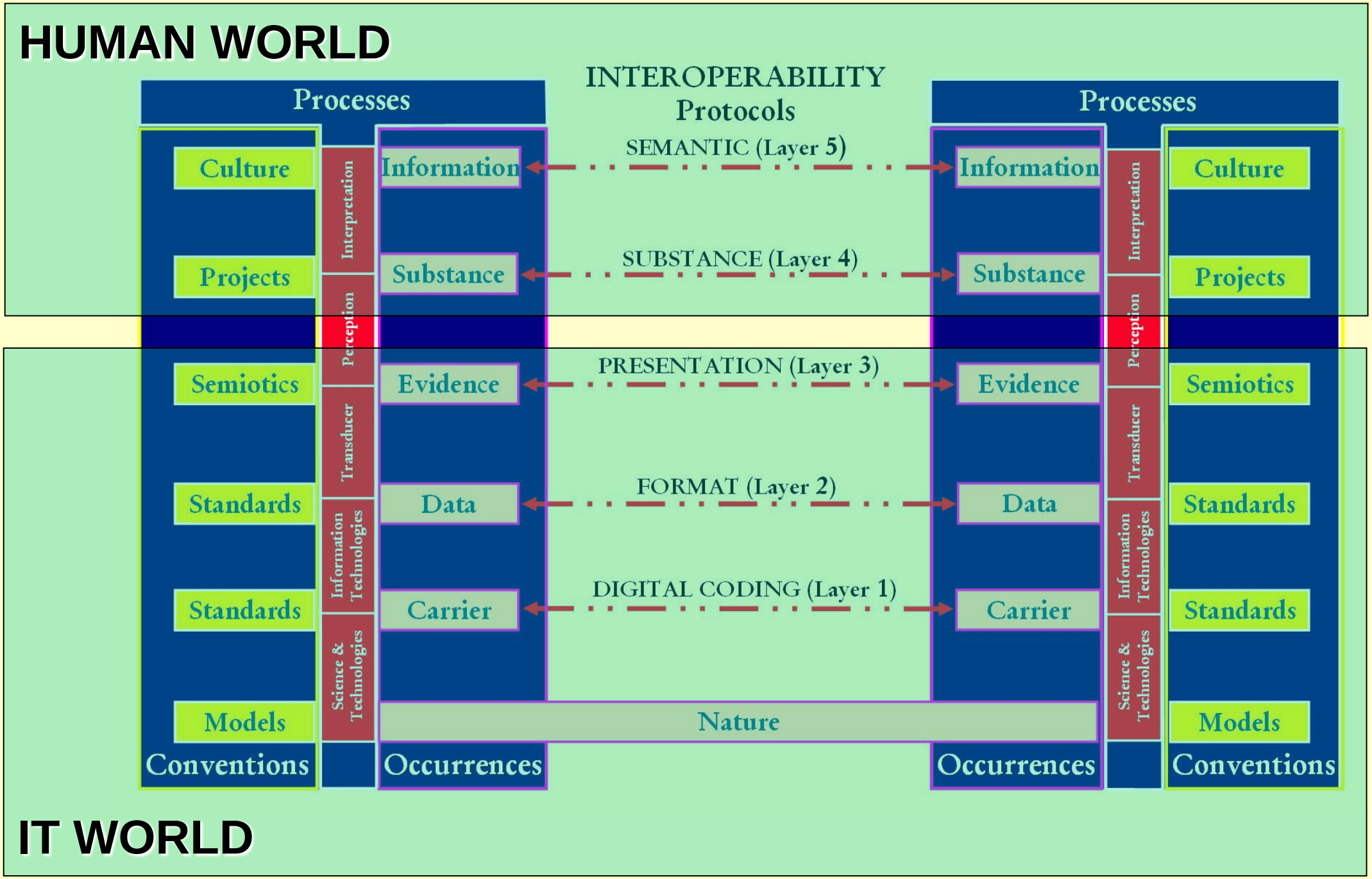
Example: The 'substance' is the information induced from several represented of the song "Yesterday" by the Beatles, coded in .wav or .mp3 or .ogg

ORTHOGONALITY :

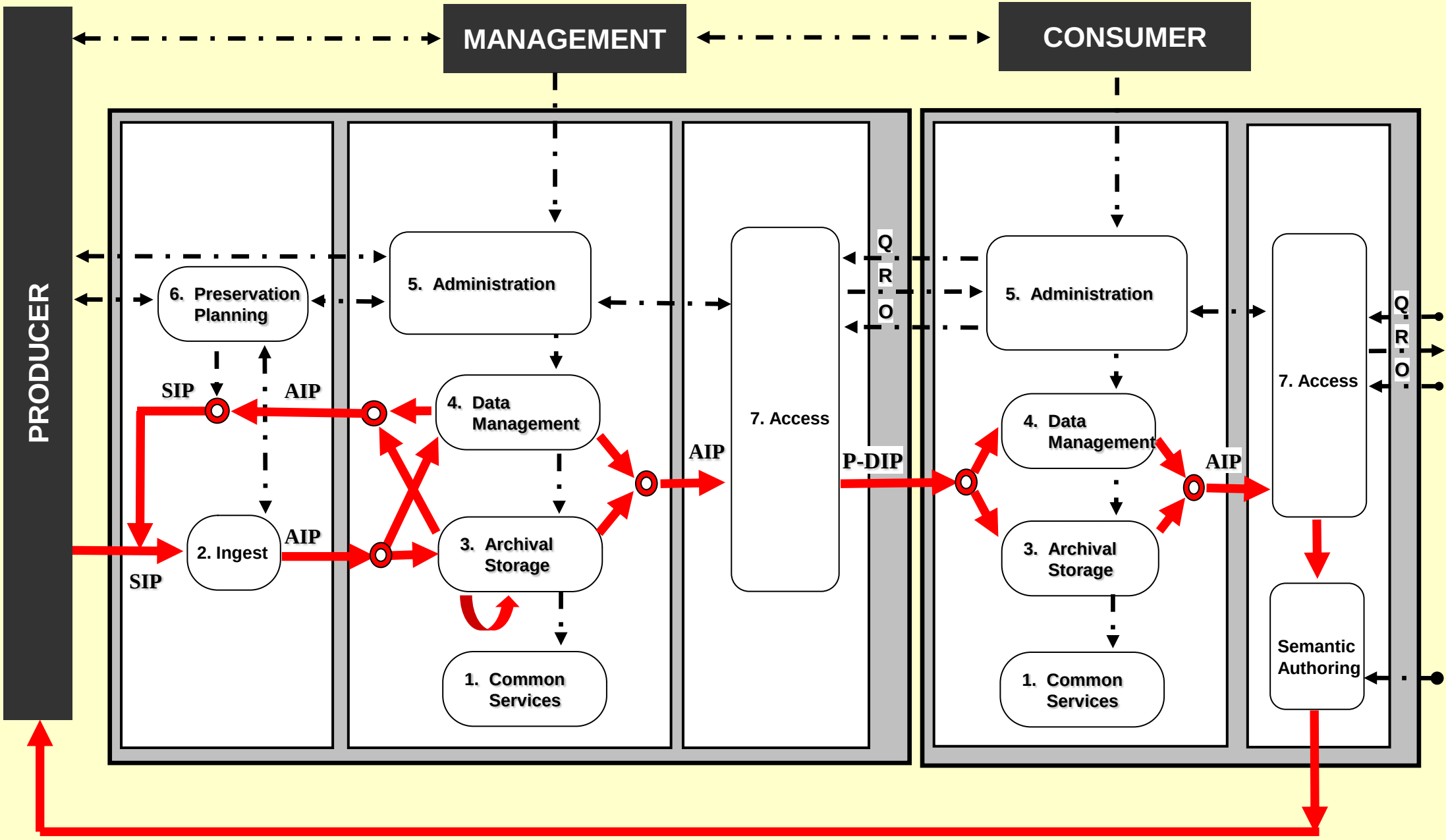
Representations of items, however closely related, are called orthogonal, when they can be modified independently from each other to achieve a particular intention

Example: Some of the data carriers (such as USB stick; CD-R; HDD) are orthogonal with the files and folders they carry.

INTEROPERABILITY LAYERS



The compatibility with the OAIS model (ISO 14 721)



EMWRT-V PROGRAMME

"Let's manage the KNOWLEDGE"

09H45 - 10H00 : Welcome of the participants

10H00 – 10H20 : Opening of the EMWRT IV

Adding semantics to the AV contents: from words to interactions? (Bruno BACHIMONT – UTC Compiègne)

10H20 – 11H10 : The dynamic relations between the logical and knowledge layers

- **The semantic breakthrough in Standards … a work in progress (Jean-Pierre EVAIN – EBU)**
- **Implementation and Practical cases of DMS-1, the link with semantic technology (Maarten Verwaest – MediaMap)**
- **A rich View in audiovisual distributed architectures (Steny Solitude – Perfect memory)**

11H10 – 12H15 : The knowledge base

- **From semantic to ontology: towards the management of the knowledge (Guy MARECHAL – TITAN)**
- **The "GAMELAN" Project: Tracking the provenance to ensure interoperability (Jerome BARTHELEMY – IRCAM)**

Demonstrations of the MediaMap project

- **Semantic data base & Finite State Machines & Computation farm (Franck Casado – MEMNON)**
- **The serendipity search (Julien LAW-TO – Exalead)**

12H15 – 12H30 : Q & A & Conclusions (Roger ROBERTS – TITAN)

12H30 – 14H00 : Lunch

… You just need to cross the road to attend IBC-2009 when opening !