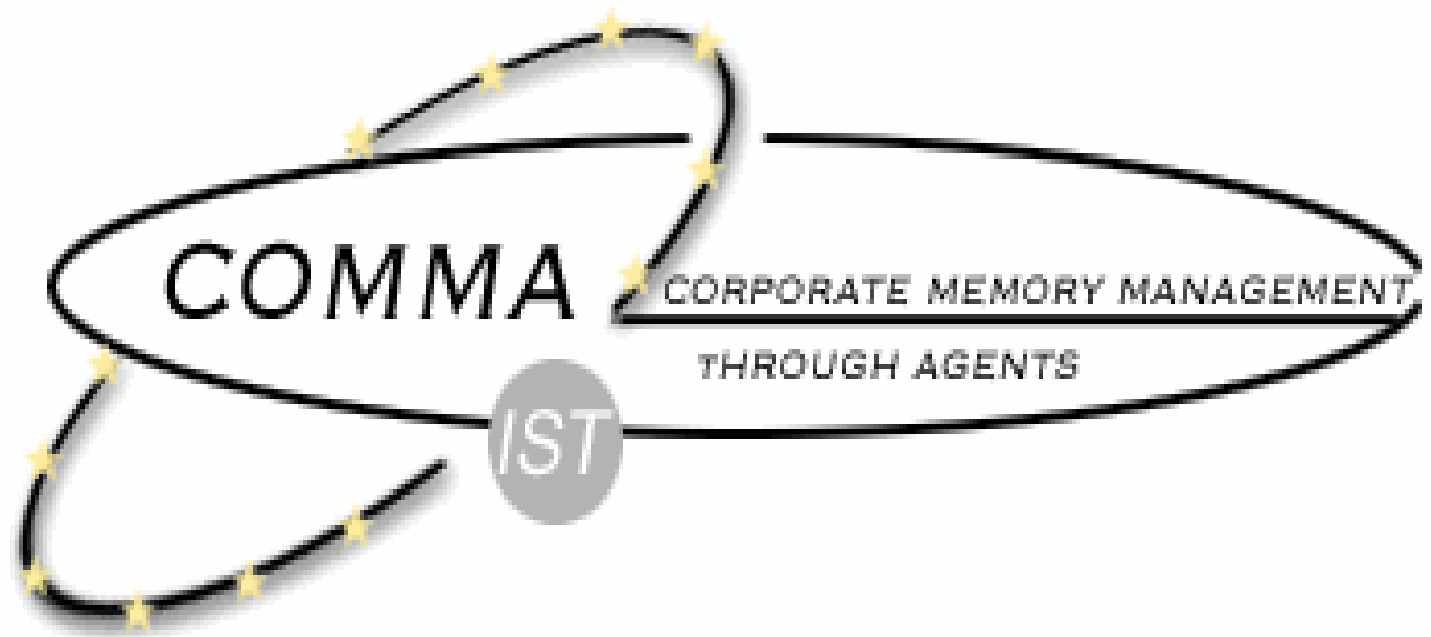


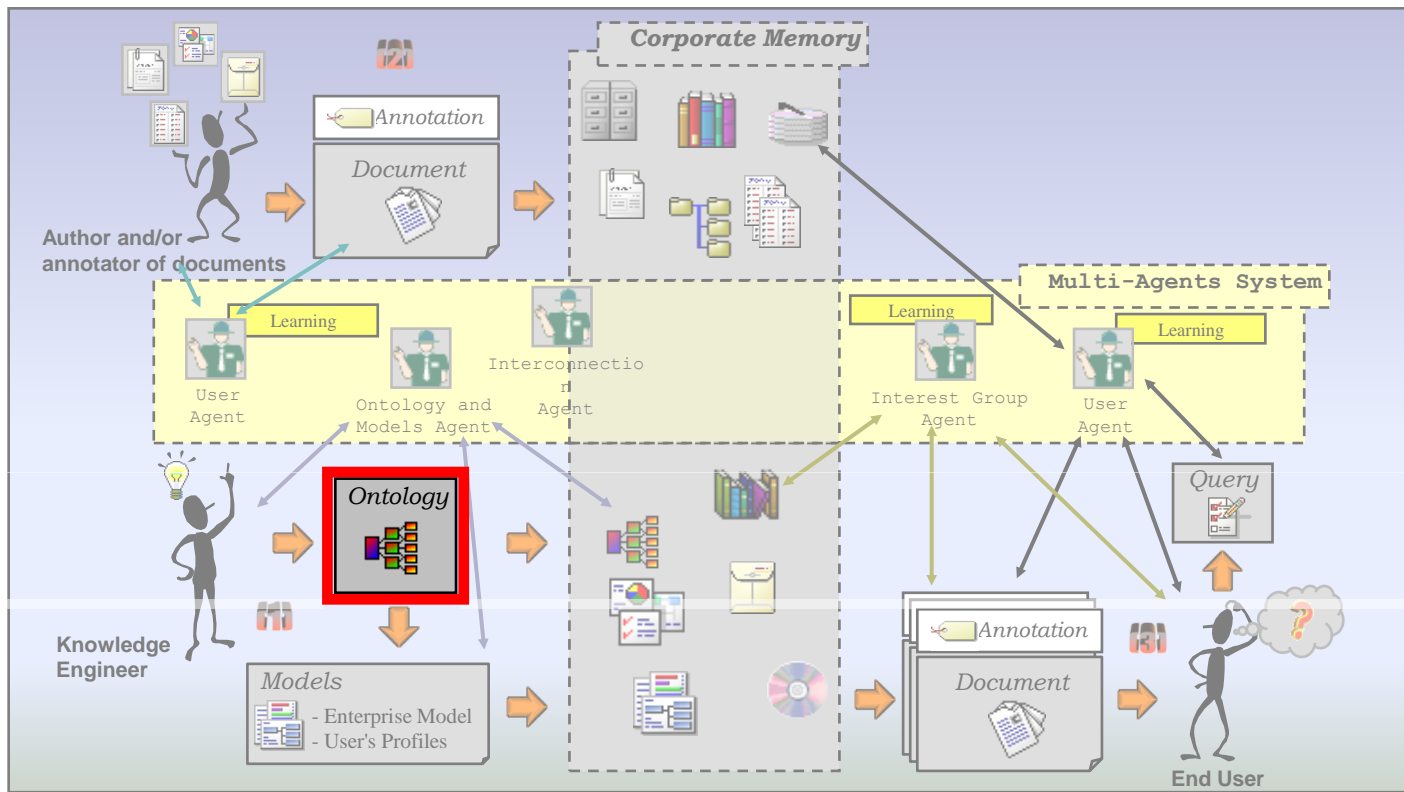
O'CoMMA Experience in Ontology Engineering for a Multi-Agents Corporate Memory System



❖ What is it ? IST Project - Funded by E. C.

❖ What for ? Provide a corporate memory management framework (2 scenarios)

- ▶ Assistance of integration of newcomers
- ▶ Support technology monitoring process



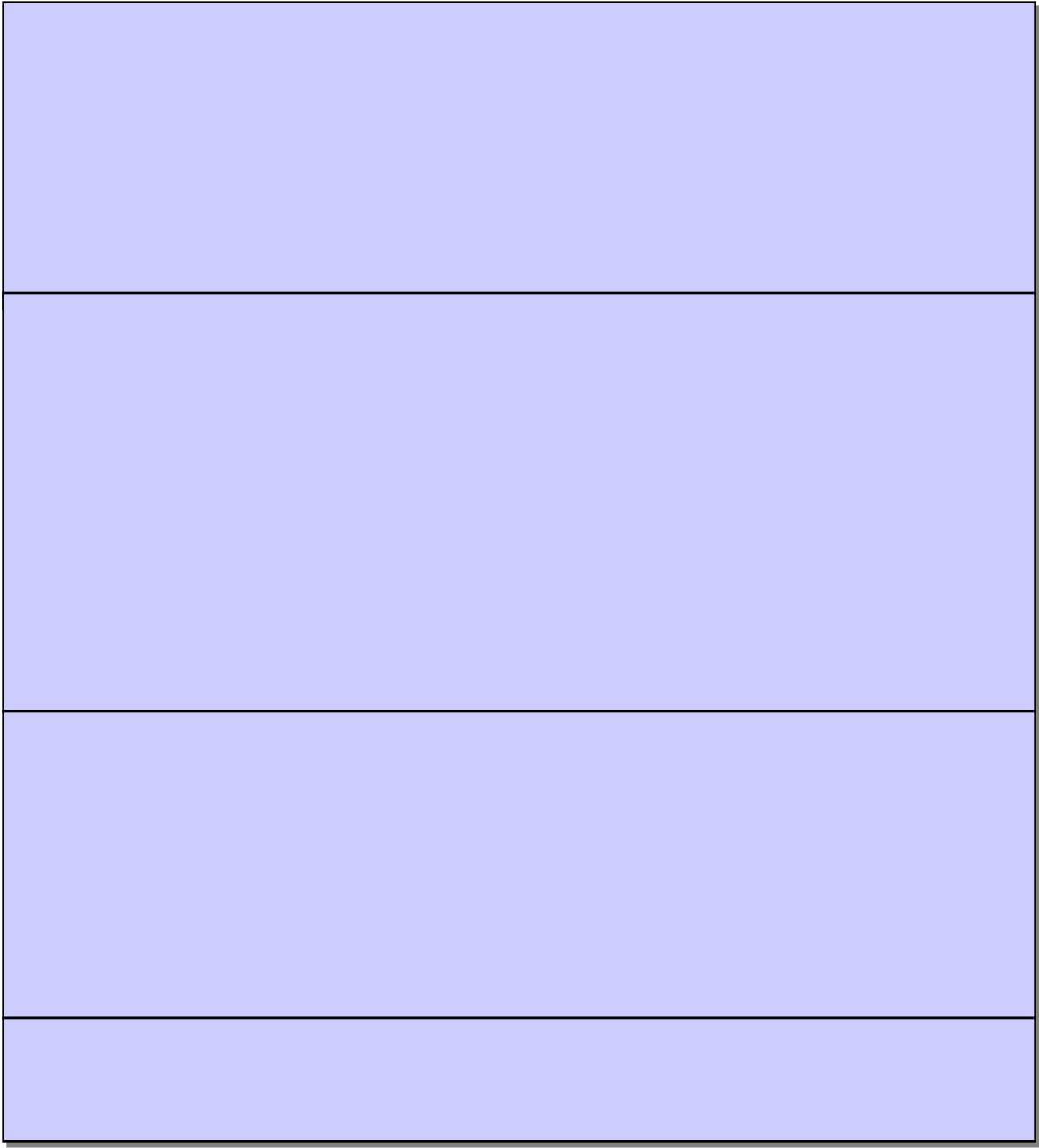
❖ Use of an ontology in CoMMA :

- ▶ Component of the memory
- ▶ C.V. for models, annotations and queries
- ▶ Agent communication
- ▶ **O'CoMMA**

❖ RDF : Resource Description Framework

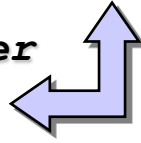
- ▶ Comes with RDF Schema
- ▶ RDFS is Limited - Extension *iff* necessary

❖ Toward a Corporate Semantic Web



(a) Scenarios and data-collection

(a') Reuse & other sources



13.1.1 The scenarios

13.1.2 The scenarios

Interviewer (1): ... explain what is ... your role at the agency?

Employee (1): ... Well ah right ... In fact I am, I work as a commercial assistant for C and S ... So I have to treat what they do themselves and ...

Interviewer (2): Who are these two persons?

Employee (1): So it is the director assistant, and it is a management assistant. In fact we work the three of us ah for the good working order of ATCO, then everything which is ah administration, orders, new contracts etc. and myself I essentially take care of, of all the paperwork ah, a bit less interesting may be ...

Interviewer (2): And what is the exact title of the position, of your position?

Employee (1): Basically I describe myself as ah commercial assistant. Uh, yes, so, or else, what do I do exactly ... so you I take care of everything which is administrative, at first I take in well I take care of of 'the set of people who come in the company and which are coming at ATCO ... and then everything which is papers, application forms, ah, and so on ... Leads and kinds of things, the other things that neither C nor S do ... (silence)



Name, Vorname		Geburtsdatum		Geburtsort	
Name		Geburtsdatum		Geburtsort	
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Scenarios

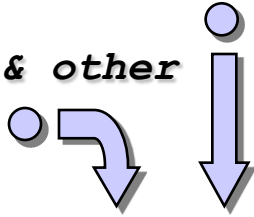
Interviews

Observations

Documents

(a) Scenarios and data-collection

(a') Reuse & other sources



(b) From semi-informal to semi-formal

Scenarios

• **Scenario analysis:** The main actor focuses on task or mobile activities. The technology and system context is used to describe scenarios. Scenario-based design is a design approach that uses scenarios as a design tool.

3.14 The TM table

• **Task analysis:** Another way to capture use is to capture it through a task analysis. This is done by observing the user performing the task and recording the steps they take to complete it. This is often done by having the user perform the task while a researcher observes and records the steps.

3.15 The scenario

• **The scenario:** The scenario is a description of a specific situation and a description of the actions that are taken to resolve it. It is often used to describe a problem and the steps that are taken to solve it.

Interviews

• **Interviewer (1):** [Silence?] Well, to start with, could you ... ah ... explain what is ... your role at the agency?

• **Employee (E1):** ... Well ah right ... In fact I am, I work as a **commercial assistant**, so I have to **manage what we do ourselves** and ...

• **Interviewer (2):** Who are these two persons?

• **Employee (E1):** So, **in the director's assistant**, and **in a management assistant**. In fact we work the three of us ah for the good working order of ATCO, then everything which is in **administration**, **orders**, **new users**, **etc.**, and myself I essentially take care of **all the paperwork**, and I find less interesting my job ...

• **Interviewer (2):** And what is the exact title of the position, of your position?

• **Employee (E1):** **Ahah!** I describe myself as **an administrative assistant**. Oh, yes, so, or else, what do I do exactly ... no you take care of everything which is administrative. At first I **try to well take care of of 'the end of people who come in the morning** ... **well, the computer, the ATCO** ... and then everything which is **proper, various forms**, ah, and so on ... Leads out heads of things, the other things that neither C nor S do ... [Silence]



Documents

Name	Vorname	Geburtsdatum	Geburtsort	PLZ	Strasse	Telefon
PR001
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PR008
PR009
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PR023
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PR026
PR027
PR028
PR029
PR030

Relation	Domain	Range	View	Super Relation	Other Terms	Natural Language Definition	Sy	Tr	Re	Pr
Manage	Organizational Entity;	Organizational Entity;	Organization	Relation	;	Relation denoting that an Organizational Entity		Tr		EO
Attribute	Domain	Range Type	View	Super Relation	Other Terms	Natural Language Definition	Pr			
Designation	Thing	Class	View	Super class	Other Terms	Natural Language Definition	Pr			
Family Name	Person	Thing	Top-Level;	;	;	Whatever exists animate, inanimate or abstraction.	Us			
Mobile Number	Person	Event	Top-Level; Event;	Thing;	;	Thing taking place, happening, occurring; usually recognized as important, significant or unusual	Us			
Title	Document	Gathering	Event;	Event;	;	Event corresponding to the social act of a group of Persons assembling in one place	Us			

❖ Candidate terms :

- ▶ Synonymous / ambiguous
- ▶ Proposition of definitions (academic)
- ▶ Terminological level in conceptual structure & usefulness of NLP tools

❖ Three approaches :

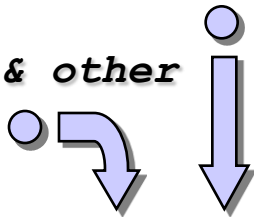
- ▶ Top-Down / Bottom-Up / Middle-Out
- ▶ Three complementary perspectives

❖ Continuum Informal → Formal :

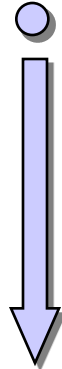
- ▶ Textual (Informal)
- ▶ Tables (semi-informal → semi-formal)
- ▶ RDF-RDFS (formal, use taxonomy)

(a) Scenarios and data-collection

(a') Reuse & other sources



(b) From semi-informal to semi-formal



(c) RDFS

134 The TD table
134.1 The scenario
134.2 The interview

Interviewer (1): ... explain what is it... your role at the agency?
Employee (1.1): ... Well sir right... In fact I am, I work as a...
Interviewer (2): Who are these two persons?
Employee (2): ...
Interviewer (3): ...
Interviewer (4): ...
Interviewer (5): ...



Name	Vorname	Jobtitel	Abteilung	Telefon
...

Scenarios

Interviews

Observations

Documents

Relation	Domain	Range	View	Super Relation	Other Terms	Natural Language Definition	Sy	Tr	Re	Pr
Manage	Organizational Entity;	Organizational Entity;	Organization	Relation	;	Relation denoting that an Organizational Entity		Tr		EO
Attribute	Domain	Range Type	View	Super Relation	Other Terms	Natural Language Definition				Pr
Designation	Thing	Class	View	Super class	Other Terms	Natural Language Definition				Pr
Family Name	Person	Thing	Top-Level;	;	;	Whatever exists animate, inanimate or abstraction.				Us
Mobile Number	Person	Event	Top-Level; Event;	Thing;	;	Thing taking place, happening, occurring; usually recognized as important, significant or unusual				Us
Title	Document	Gathering	Event;	Event;	;	Event corresponding to the social act of a group of Persons assembling in one place				Us

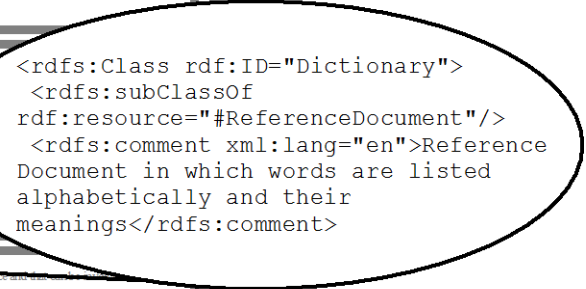
```

<rdf:Class rdfID="Something">
<rdf:comment xml:lang="en">Whatever exists animate, inanimate or abstraction. </rdf:comment>
</rdf:Class>

<rdf:Class rdfID="Entity">
<rdf:subClassOf rdfres:source="#Something"/>
<rdf:comment xml:lang="en">Thing which exists apart from other Things, having its own independent existence and that can be involved in Events. </rdf:comment>
</rdf:Class>

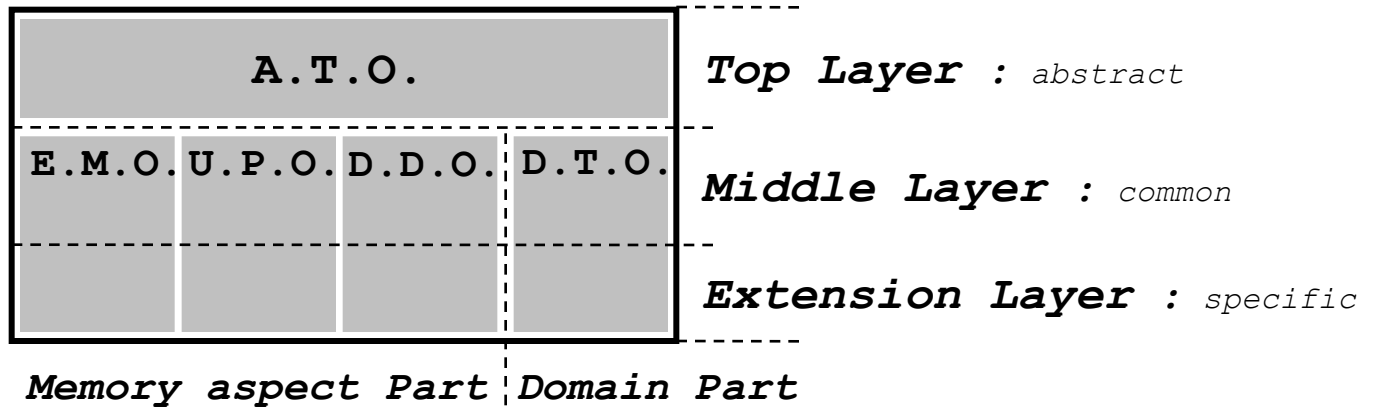
<rdf:subClassOf rdfres:source="#Something">
<rdf:comment xml:lang="en">Thing which exists apart from other Things, having its own independent existence and that can be involved in Events. </rdf:comment>
</rdf:subClassOf>

```



❖ ~**420** concepts, ~**50** relations, **12** hops

❖ **Three Layers :**



A.T.O. : Abstract Top Ontology

E.M.O. : Enterprise Modeling Ontology

U.P.O. : User Profile Ontology

D.D.O. : Document Description Ontology

D.T.O. : Domain Topic Ontology

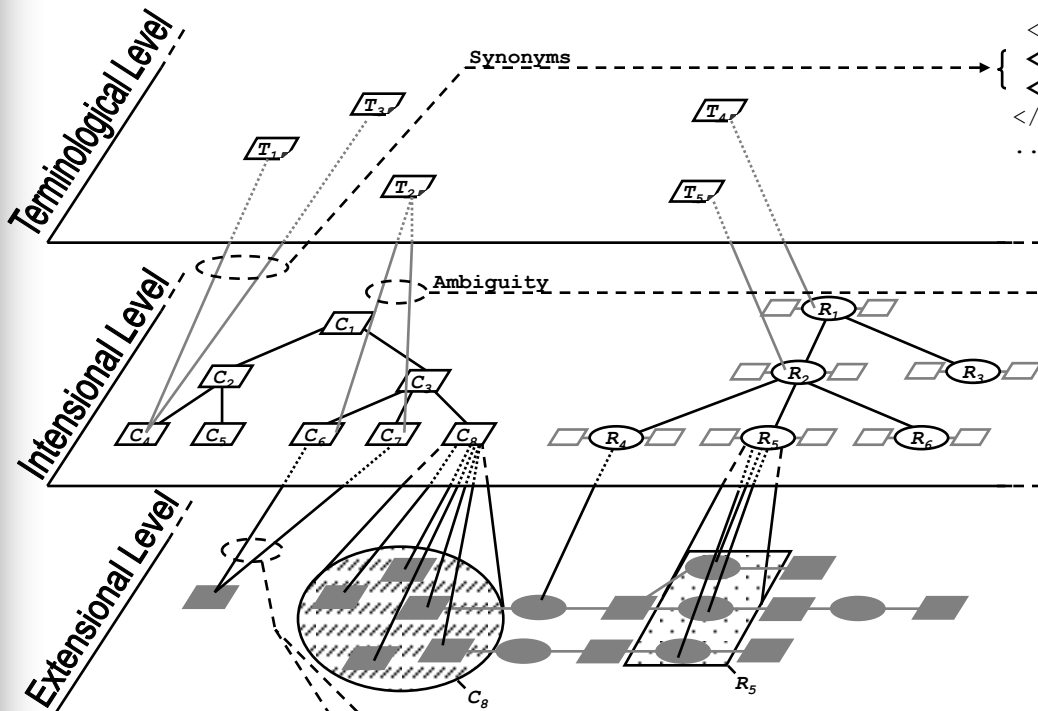
- ▶ Top : reusable/not really usable
- ▶ Middle layer :
 - Documentary corporate memory (r. memory)
 - Domain Topics (r. domain)
- ▶ Extensions : usable/not really reusable

❖ Appropriateness of RDFS :

```

...
<rdfs:Class rdf:ID="Department">
  <rdfs:subClassOf rdf:resource="#OrganizationPart"/>
  <rdfs:comment xml:lang="en">
    Organization part which is a sub division of of a
    Research Direction, corresponding to sub interest
    field e.g mobile transmission
  </rdfs:comment>
  <rdfs:label xml:lang="en">department</rdfs:label>
  <rdfs:label xml:lang="en">division</rdfs:label>
</rdfs:Class>
...

```



```

...
<rdfs:Class rdf:ID="E-Mail">
  <rdfs:subClassOf rdf:resource="#Mail"/>
  <rdfs:comment xml:lang="en">
    Mail sent in electronic format over a
    computerized world-wide communication system
  </rdfs:comment>
  <rdfs:label xml:lang="en">e-mail</rdfs:label>
  <rdfs:label xml:lang="en">electronic mail
    </rdfs:label>
  <rdfs:label xml:lang="en">mail</rdfs:label>
</rdfs:Class>
...
<rdfs:Class rdf:ID="PostMail">
  <rdfs:subClassOf rdf:resource="#Mail"/>
  <rdfs:comment xml:lang="en">
    Mail transmitted via the post office
  </rdfs:comment>
  <rdfs:label xml:lang="en">mail</rdfs:label>
  <rdfs:label xml:lang="en">post mail</rdfs:label>
</rdfs:Class>
...

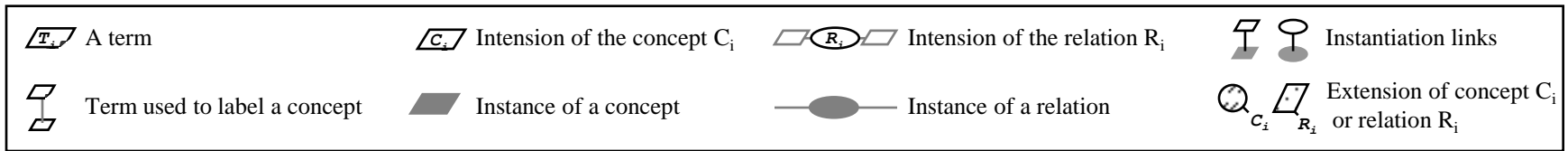
```

Multi-Instanciation

```

<CoMMA:Memo rdf:about="http://www.inria.fr/comma.rtf"/>
<CoMMA:E-Mail rdf:about="http://www.inria.fr/comma.rtf"/>

```



❖ Need for extension :

formal definitions for concepts / properties

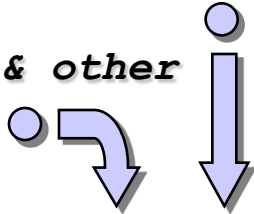
- ▶ Multi-modal (redundancy / common know.)
- ▶ Newcomer (fuzzy / tunable)
Today - Hiring date < 2 months
- ▶ Colleague (term, concept, property, defined)

❖ Need for interfaces :

- ▶ Hide top: not interest. & p.b. of commitment
low levels = day-to-day consensus
- ▶ Profiles and terminology in browsing
- ▶ Terminology & several languages/jargons

(a) Scenarios and data-collection

(a') Reuse & other sources



Scenarios

Interviewer (1): (laugh) Well, to start with, could you ... explain what it is ... your role at the agency?

Employee (1): ... Well uh right ... In fact I am, I work as a consultant for C and S ... So I have to create ... the do themselves and ...

Interviewer (2): Who are these two persons?

Employee (2): So ... in the director assistant ... and he is a management assistant ... In fact we work the three of us ... for the good working order of ATCC, where everything which is in administration comes ... see www.atcc.com ... and myself I essentially take care of all the www.atcc.com ... it's less interesting may be ...

Interviewer (2): And what is the exact title of the position, of your position?

Employee (2): I should I describe myself as an www.atcc.com assistant ... Uh, yes, so, or else, what do I do exactly ... see you take care of everything which is administrative. At first I www.atcc.com ... well I take care of ... 'Oh, of course, uh, come to the phone ... see www.atcc.com ... ATCC ... and then everything which is proper, www.atcc.com ... ah, and so on ... I work in the field of things, the other things that neither C nor S do ... (laugh)

Interviews

Interviewer (1): (laugh) Well, to start with, could you ... explain what it is ... your role at the agency?

Employee (1): ... Well uh right ... In fact I am, I work as a consultant for C and S ... So I have to create ... the do themselves and ...

Interviewer (2): Who are these two persons?

Employee (2): So ... in the director assistant ... and he is a management assistant ... In fact we work the three of us ... for the good working order of ATCC, where everything which is in administration comes ... see www.atcc.com ... and myself I essentially take care of all the www.atcc.com ... it's less interesting may be ...

Interviewer (2): And what is the exact title of the position, of your position?

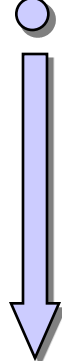
Employee (2): I should I describe myself as an www.atcc.com assistant ... Uh, yes, so, or else, what do I do exactly ... see you take care of everything which is administrative. At first I www.atcc.com ... well I take care of ... 'Oh, of course, uh, come to the phone ... see www.atcc.com ... ATCC ... and then everything which is proper, www.atcc.com ... ah, and so on ... I work in the field of things, the other things that neither C nor S do ... (laugh)



Documents

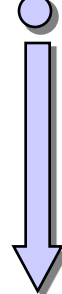
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(b) From semi-informal to semi-formal



Relation	Domain	Range	View	Super Relation	Other Terms	Natural Language Definition	Sy	Tr	Re	Pr
Manage	Organizational Entity;	Organizational Entity;	Organization	Relation	;	Relation denoting that an Organizational Entity		Tr		EO
Attribute	Domain	Range Type	View	Super Relation	Other Terms	Natural Language Definition		Pr		
Designation	Thing	Class	View	Super class	Other Terms	Natural Language Definition		Pr		
Family Name	Person	Thing	Top-Level;	;	;	Whatever exists animate, inanimate or abstraction.		Us		
Mobile Number	Person	Event	Top-Level; Event;	Thing;	;	Thing taking place, happening, occurring; usually recognized as important, significant or unusual		Us		
Title	Document	Gathering	Event;	Event;	;	Event corresponding to the social act of a group of Persons assembling in one place		Us		

(c) RDFS



```

<rdf:Class rdf:ID="Something">
  <rdf:comment xml:lang="en">Whatever exists animate, inanimate or abstraction. </rdf:comment>
</rdf:Class>

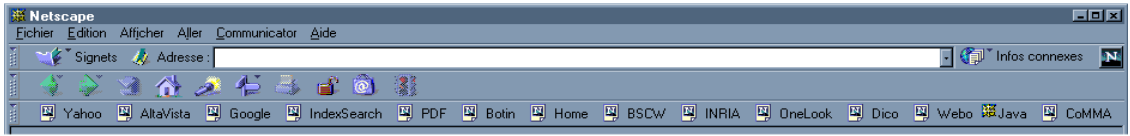
<rdf:Class rdf:ID="Something">
  <rdf:comment xml:lang="en">Whatever exists animate, inanimate or abstraction. </rdf:comment>
  <rdf:label xml:lang="en">Thing</rdf:label>
  <rdf:label xml:lang="en">Something</rdf:label>
  <rdf:label xml:lang="en">Anything</rdf:label>
  <rdf:label xml:lang="fr">Chose</rdf:label>
</rdf:Class>

<rdf:Class rdf:ID="Entity">
  <rdf:subClassOf rdf:resource="#Something"/>
  <rdf:comment xml:lang="en">Thing which exists apart from other Things, having its own independent existence and that can be involved in Events. </rdf:comment>
</rdf:Class>

<rdf:subClassOf rdf:resource="#Something">
  <rdf:comment xml:lang="en">Thing which exists apart from other Things, having its own independent existence and that can be involved in Events. </rdf:comment>
  <rdf:label xml:lang="en">Something</rdf:label>
</rdf:subClassOf>
  
```

<rdfrs:Class rdf:ID="Dictionary">
 <rdfrs:subClassOf
 rdf:resource="#ReferenceDocument"/>
 <rdfrs:comment xml:lang="en">Reference Document in which words are listed alphabetically and their meanings</rdfrs:comment>

(d) Browsing and using






❖ Terminological access to the ontology :

Searching for a concept :





Look for terms : in English



Possible Matches :

The search was done in the terminology ()
Click on the  to get to see the corresponding concept.
Click on the  to get to see the corresponding relation.

Number of matches for the term "**person**": 4

-  [has for personal interest](#) : has for personal interest,
 -  [PDA](#) : PDA, P.D.A., personal digital assistant,
 -  [person](#) : person, human, human being,
 -  [personal homepage](#) : personal homepage,
-

New search on terms : in English

❖ Select a Concept (in English) :

person : person, human, human being,

Inherits from : [@thing](#) [@entity](#) [@role entity](#) [@manageable entity](#)

Class ID : Person - [See Intances](#) - [See available relations on that concept](#)

Switch to -  - 

Natural Language definition :

Living Entity belonging to mankind, an individual human being.

More general notion : (8)

- ⊙ [manageable entity](#) : manageable entity,
- ⊙ [administration able entity](#) : administration able entity,
- ⊙ [activity able entity](#) : activity able entity,
- ⊙ [living being](#) : living being, living entity,
- ⊙ [interest able entity](#) : interest able entity,
- ⊙ [situable entity](#) : situable entity,
- ⊙ [groupable entity](#) : groupable entity,
- ⊙ [gathering entity](#) : gathering entity,

More precise notions : (4)

- ⊙ [integration process actor](#) : integration process actor,
- ⊙ [professional](#) : professional,
- ⊙ [student](#) : student,
- ⊙ [technology monitoring actor](#) : technology monitoring actor,

New search on terms : in English

❖ Select a Concept (in French) :

personne : personne, humain, etre humain,

Inherits from : [@chose](#) [@entite](#) [@entite de role](#) [@entite dirigeable](#)

Class ID : Person - [See Intances](#) - [See available relations on that concept](#)

Switch to -  - 

Natural Language definition :

Entite vivante appartenant a l humanite, un etre humain individuel.

More general notion : (8)

- ⊙ [entite dirigeable](#) : [entite dirigeable](#),
- ⊙ [entite capable d administrer](#) : [entite capable d administrer](#),
- ⊙ [entite capable d activite](#) : [entite capable d activite](#),
- ⊙ [etre vivant](#) : [etre vivant](#), [entite vivante](#),
- ⊙ [entite capable d etre interessee](#) : [entite capable d etre interessee](#),
- ⊙ [entite localisable](#) : [entite localisable](#),
- ⊙ [entite groupable](#) : [entite groupable](#),
- ⊙ [entite de rassemblement](#) : [entite de rassemblement](#),

More precise notions : (4)

- ⊙ [acteur de la veille technologique](#) : [acteur de la veille technologique](#),
- ⊙ [acteur du processus d integration](#) : [acteur du processus d integration](#),
- ⊙ [etudiant](#) : [etudiant](#),
- ⊙ [professionnel](#) : [professionnel](#),



New search on terms : in English

❖ Select a relation :

is interested by : is interested by,

Inherits from :

Relation ID : IsInterestedBy - [See Intances](#) -

Switch to -  - 

[**interest able entity** : interest able entity,] --(is interested by,)-- [**additional topic** : additional topic,]

Natural Language definition :
Relation denoting that an Entity is interested in a topic.

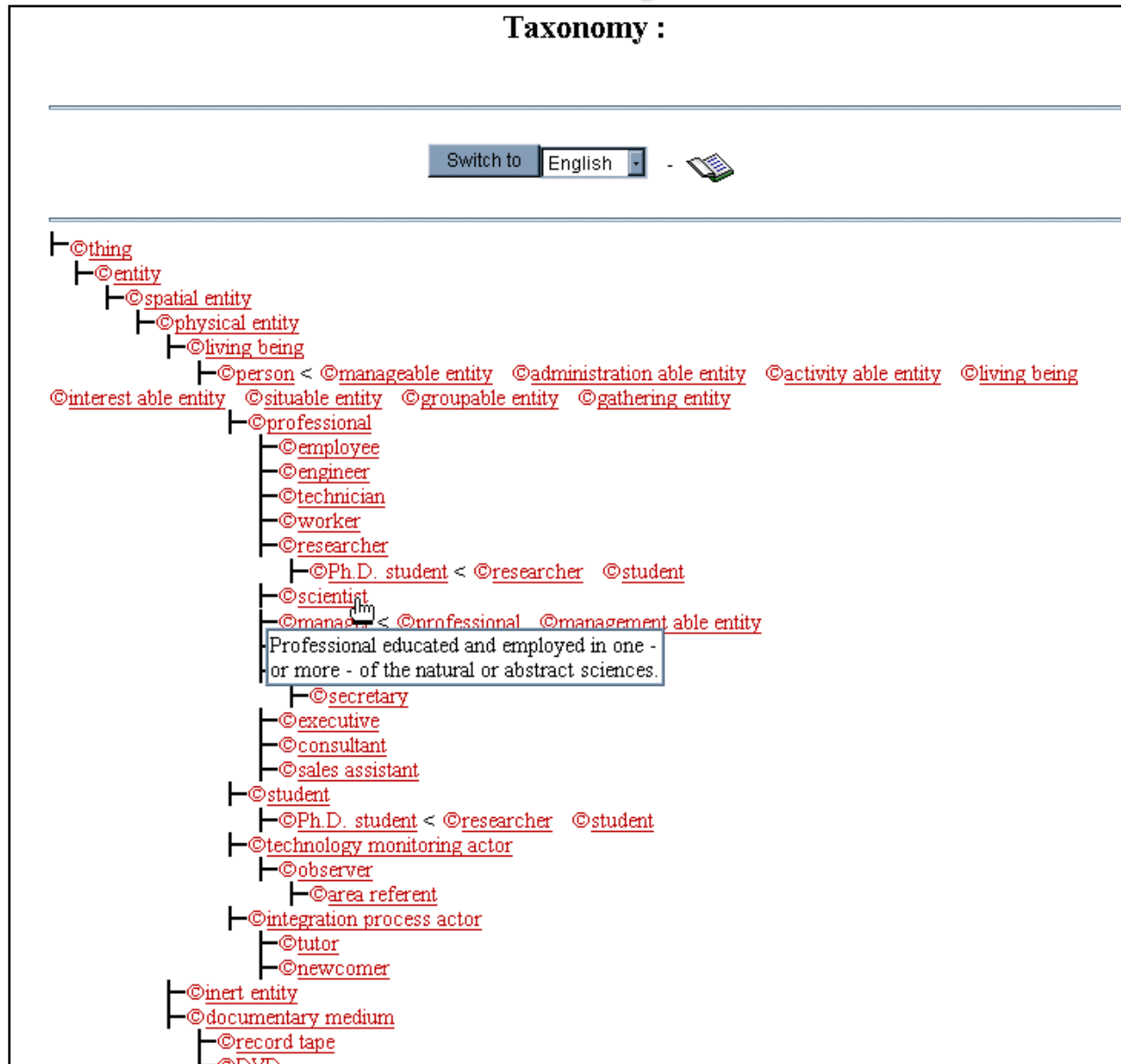
More general relation :

More precise relations : (2)

- has for personal interest** : has for personal interest,
- has for work interest** : has for work interest,


New search on terms : in English

❖ Browse the taxonomy :



❖ View terminology :

Terminology :

Switch to English - 

Term	Concept / Relation	Natural Language definition
<u>A.I.</u>	© <u>artificial intelligence</u>	Branch of computer science concerned with making computers behave like humans.
<u>A.I.F.F.</u>	© <u>AIFF</u>	Data File Format of audio documents encoded in Audio Interchange File Format.
<u>abstract</u>	© <u>abstract</u>	Document corresponding to a summary of another document.
<u>academic</u>	© <u>academic</u>	Activity of education and/or research usually affiliated to academic institution.
<u>account</u>	© <u>narration</u>	Document corresponding to an account describing incidents or events.
<u>acoustics</u>	© <u>acoustics</u>	12
<u>activity</u>	© <u>activity</u>	Entity representing a type of voluntary action.
<u>activity able entity</u>	© <u>activity able entity</u>	Entity that can have an activity.
<u>addition</u>	© <u>addition</u>	Corporate Memory Event corresponding to content added to the memory.
<u>additional topic</u>	© <u>additional topic</u>	Entity representing subjects that hold attention and possibly something one wants to discover. These topics are additional in the sense that they were not introduced or used anywhere else in the ontology but were identified as relevant for document annotation - domain concepts, general subjects... -
<u>address</u>	☒ <u>address</u>	Address of a location.
<u>administer</u>	© <u>administration</u>	Service of supervision and control of the operations or arrangement of an Organizational Entity.
<u>administer</u>	☒ <u>administer</u>	Relation denoting that an Entity -Domain- regulates the operations of an Organizational Entity -Range-.
<u>administration</u>	© <u>administration</u>	Service of supervision and control of the operations or

❖ To document the results of a query :

© **engineer** <http://www-sop.inria.fr/acacia/personnel/Fabien.Gandon/>

☒ **is interested by:**

© **knowledge engineering**

☒ **name:** GANDON

© **researcher** <http://www-sop.inria.fr/acacia/personnel/corby/>

☒ **is interested by:**

© **knowledge engineering**

☒ **name:** CORBY

© **researcher** <http://www.inria.fr/Rose.Dieng>

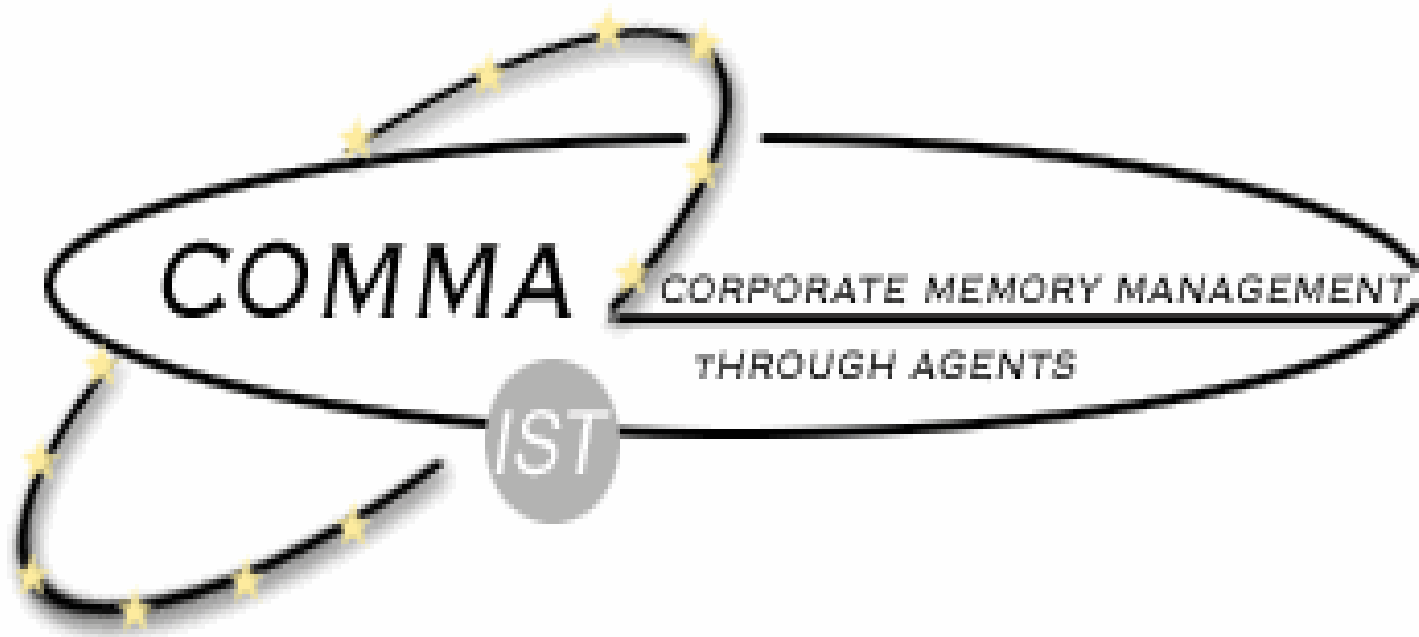
☒ **is interested by:**

© **knowledge engineering**

☒ **name:** DIENG

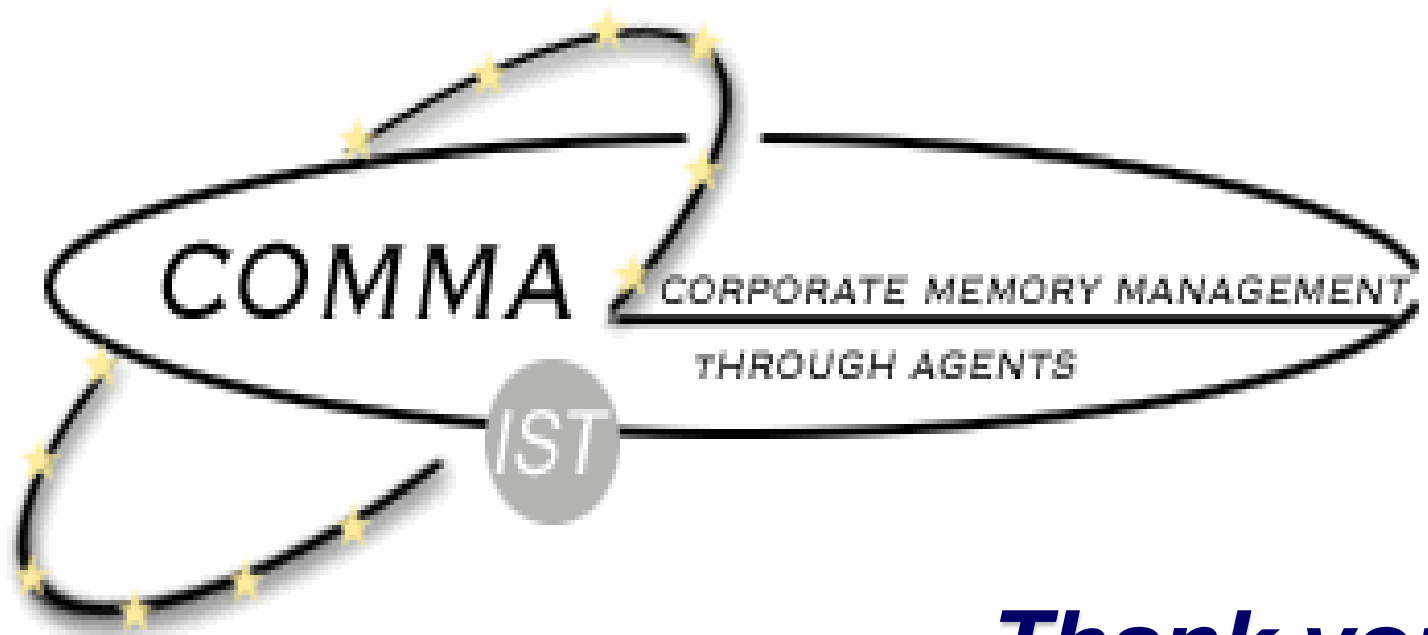
Field dealing with knowledge acquisition, representation, validation, inferencing, explanation and maintenance.

Switch to



❖ Further work...

- ▶ Query interfaces
(terminological ↔ intensional levels)
- ▶ Extension to RDFS (formal definitions)
- ▶ Inferences and Query distribution



Thank you !