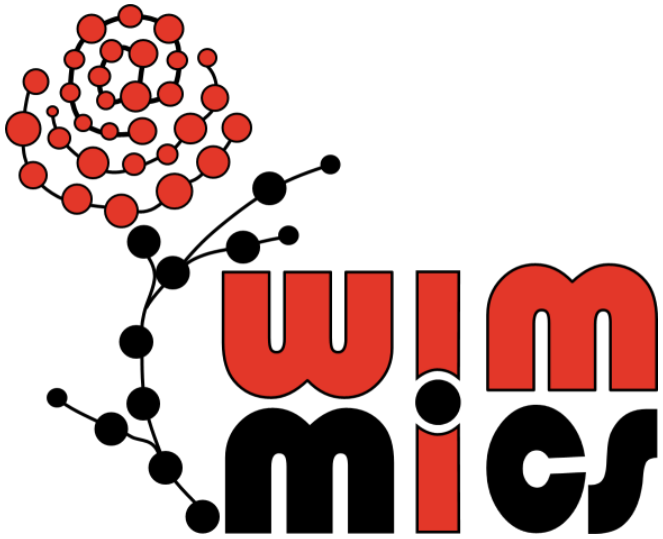


Web-Instrumented Man-Machine Interactions, Communities, and Semantics*

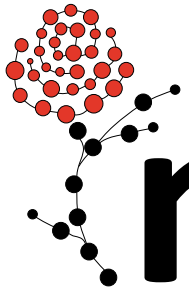
a proposal for a joint research team between INRIA Sophia Antipolis – Méditerranée and I3S (CNRS and University Nice Sophia Antipolis).

(*) "wimmics" comes from "wimi", a variety of roses.

previously in Wimmics…

• First document	11 July 2010	(v01)
• First submission to BCP	22 September 2010	(v11)
• First revision with BCP	1 February 2011	(v15)
• Meeting and review with BCP	3 March 2011	(v15)
• Revision + short & long versions	12 June 2011	(v17)
• Medium presentation GLC pole	1 July 2011	(v17)
• Revision and review with BCP	6 July 2011	(v17)
• Review by I3S	8 July 2011	(v17)
• Go from Inria	19 July 2011	(v17)
• Go from I3S	5 September 2011	(v20)
• Revision + short & long versions	9 January 2012	(v21)
• Short presentation to CP	15 March 2012	(v24)
• Long presentation to CP	12 April 2012	(v24)

you are here



members

Head (and INRIA contact): Fabien Gandon

Vice Head (and I3S contact): Catherine Faron-Zucker

Researchers:

- Michel Buffa, MdC (UNS)
- Olivier Corby, CR1 (INRIA)
- Alain Giboin, CR1 (INRIA)
- Nhan Le Thanh, Pr. (UNS)
- Isabelle Mirbel, MdC, HDR (UNS)
- Peter Sander, Pr. (UNS)
- Andrea G. B. Tettamanzi, Pr. (UNS)
- Serena Villata, RP (INRIA)

Post-doc:

- Zeina Azmeh (I3S)
- Elena Cabrio (CORDIS)

Research engineers:

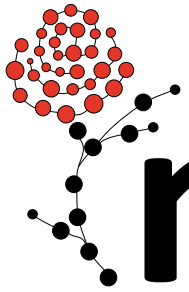
- Julien Cojan (INRIA, Ministry of Culture)
- Christophe Desclaux (Boost your code)
- Amosse Edouard (I3S)

PhD students:

1. Pavel Arapov, 1st year (EDSTIC-I3S)
2. Adrien Basse, 3rd year (UGB-INRIA)
3. Franck Berthelon, 3nd year (UNS-EDSTIC)
4. Ahlem Bouchahda, 3rd year (UNS-SupCom Tunis)
5. Khalil Riad Bouzidi, 3rd year (UNS-CSTB)
6. Luca Costabello, 2nd year (INRIA-CORDI)
7. Papa Fary Diallo, 1st year (AUF-UGB-INRIA)
8. Corentin Follenfant, 2nd year (SAP)
9. Maxime Lefrançois, 2nd year (EDSTIC-INRIA)
10. Nguyen Thi Hoa Hue, 1st year (Vietnam-CROUS)
11. Nicolas Marie, 2nd year (Bell-ALU, INRIA)
12. Rakebul Hasan, 1st year (INRIA ANR-Kolflow)
13. Oumy Seye, 2nd year, (INRIA Rose Dieng allocation)
14. Imen Tayari, 3rd year (UNS-Sfax Tunisie)

Assistants:

- Christine Foggia (INRIA)
- Sarah Choulet (I3S)



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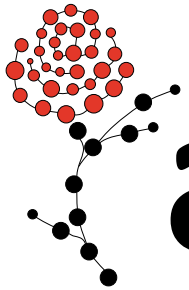
Researchers:

• Michel Buffa, MdC (UNS)	**social web, semantic web, tools and applications**
• Olivier Corby, CR1 (INRIA)	**knowledge engineering, semantic web, graph-based KR**
• Catherine Faron-Zucker, MdC (UNS)	**graph-based KRR, semantic web, e-learning**
• Fabien Gandon, CR1, HDR (INRIA)	**semantic web, knowledge modeling, social web, w3c**
• Alain Giboin, CR1 (INRIA)	**psychology, ergonomics, HCI, CSCW, knowledge engineering**
• Nhan Le Thanh, Pr. (UNS)	**distributed & use-driven knowledge systems, security, mining**
• Isabelle Mirbel, MdC, HDR (UNS)	**requirement & method, information systems, semantic web**
• Peter Sander, Pr. (UNS)	**affective computing, emotion detection, (serious) games**
• Serena Villata, RP (INRIA)	**semantic web and argumentation theory, normative specification**

Wimmics: “we mix” Edelweiss and Kewi

- long collaboration (web, semantic web, graph-based formalisms, ontologies, etc.)
- complementarities (interaction design/ affective computing, triple-stores, rules / access control, etc.)
- several joint projects
- research and education



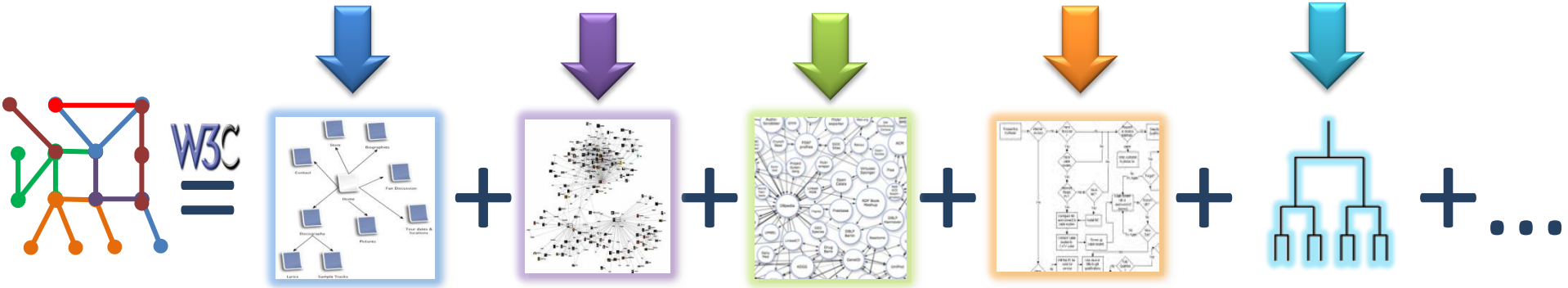
as we may *link*

System	Author(s)	Kinds of links/graph – Linked items	Linking Goal
MEMEX	V. Bush	Association links Mesh of associative trails	Memory extension with a desk able to remember associations and organize readings.
HYPERTEXT / HYPERMEDIA	T. Nelson	Link elements of documents	Digital structure to virtually organize tracks between fragments of multimedia resources
WORLD WIDE WEB	T. Berners-Lee	Link documents across the network.	Expand the structure over the internet to share it among many users.
Semantic Web	(several)	Link descriptions of resources and the schema of the descriptions	Making humans and software agents cooperate through the web
Web of Data	(several)	Linked open data on the web	Use the web as a giant blackboard for data exchanges and integration
Social Web / web 2.0	(several)	Link people, capture relations	Foster awareness, exchanges and interactions between users
Web of things & ubiquitous web		Link devices, places through their characteristics and services	Allow contextual interaction and web-augmented reality.

web landscape and graphs

(meta)data of the relations and the resources of the web

web… …sites …social …of data …of services …semantics



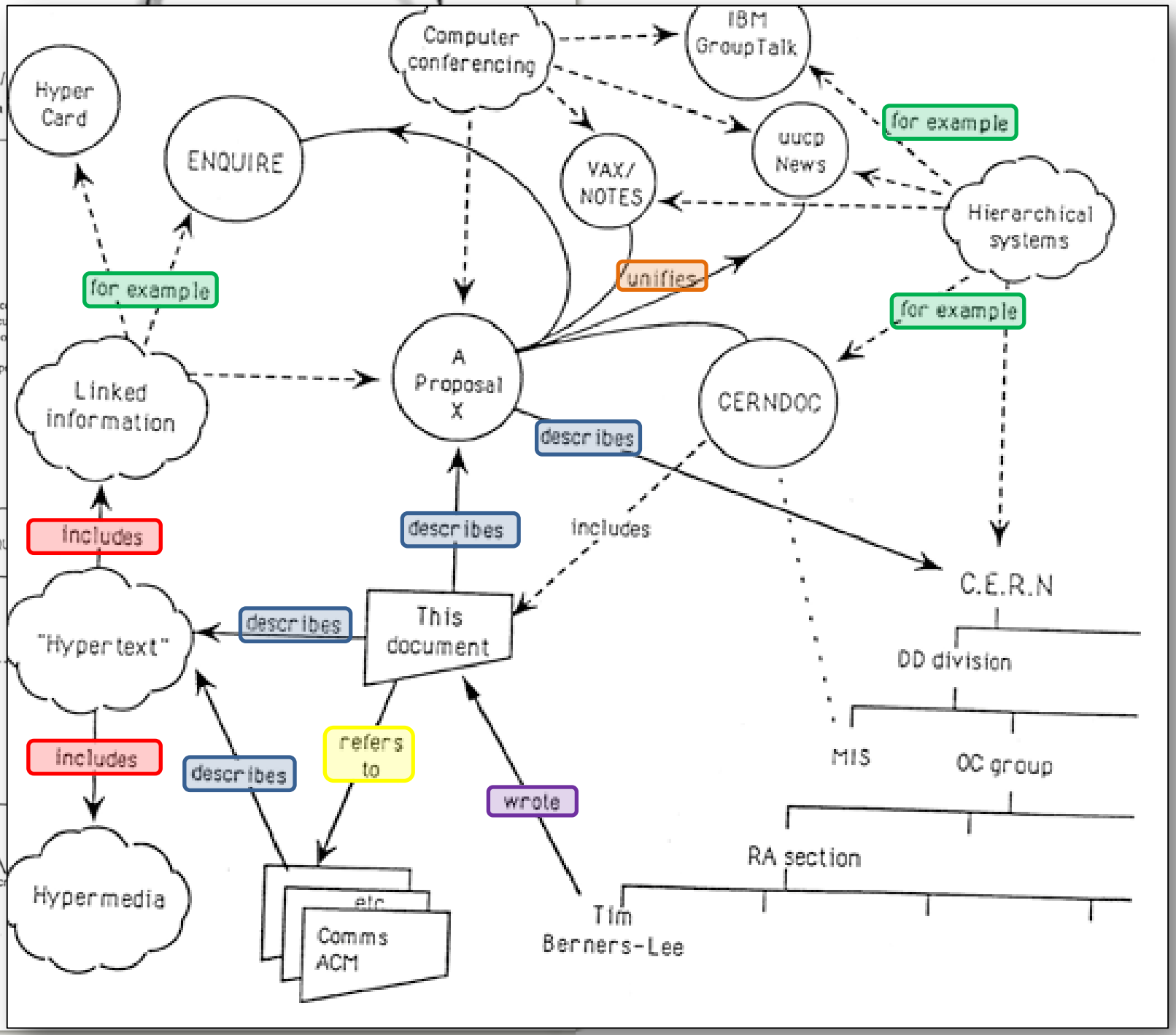
typed graphs | web (graphs) | networks (graphs) | linked data (graphs) | workflows (graphs) | schemas (graphs)

CERN DD/

Information

This proposal c
CERN. It discu
solution based o

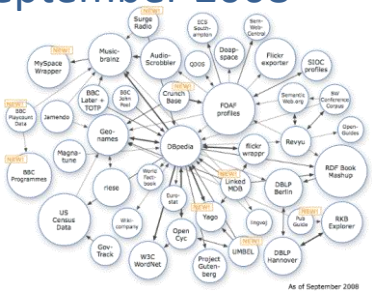
Keywords: Hyp
control



May 2007

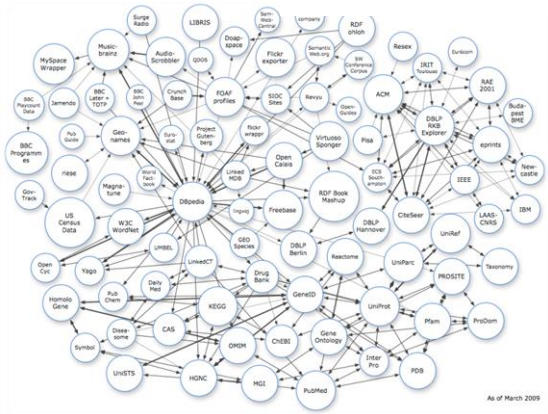
April 2008

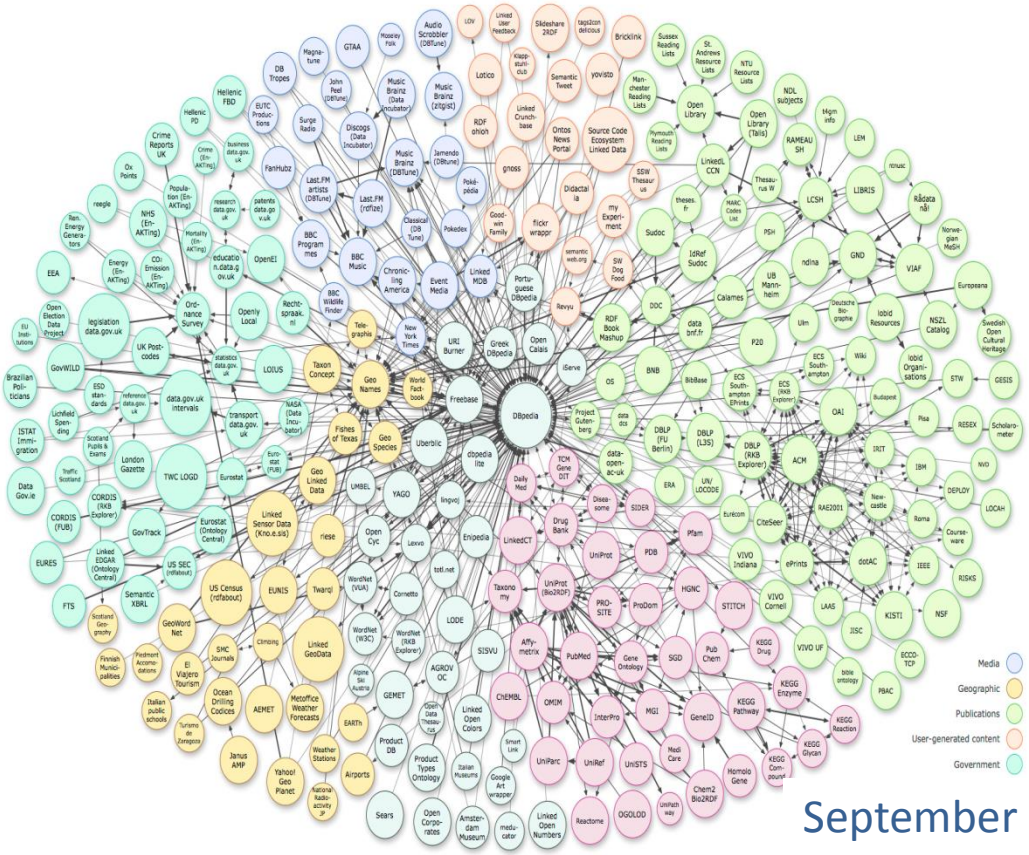
September 2008



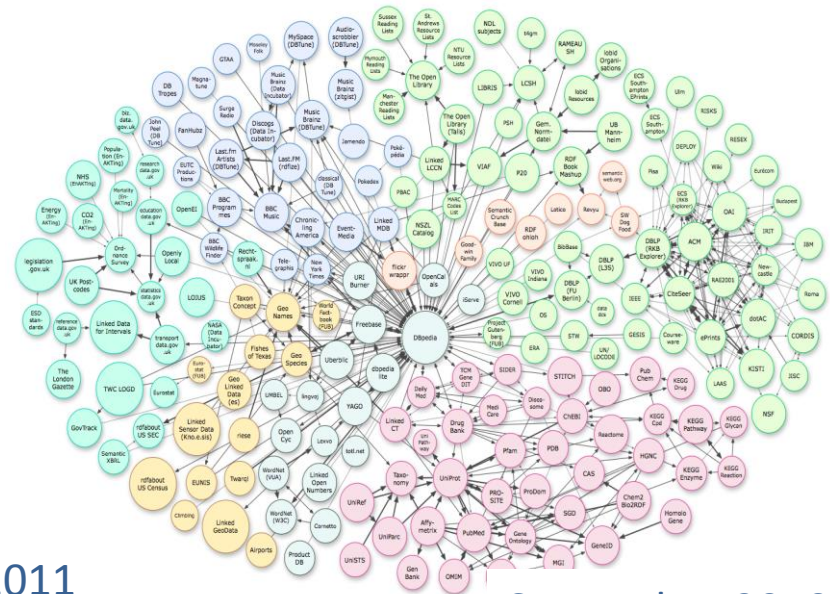
Linked Open Data

March 2009





September 2011

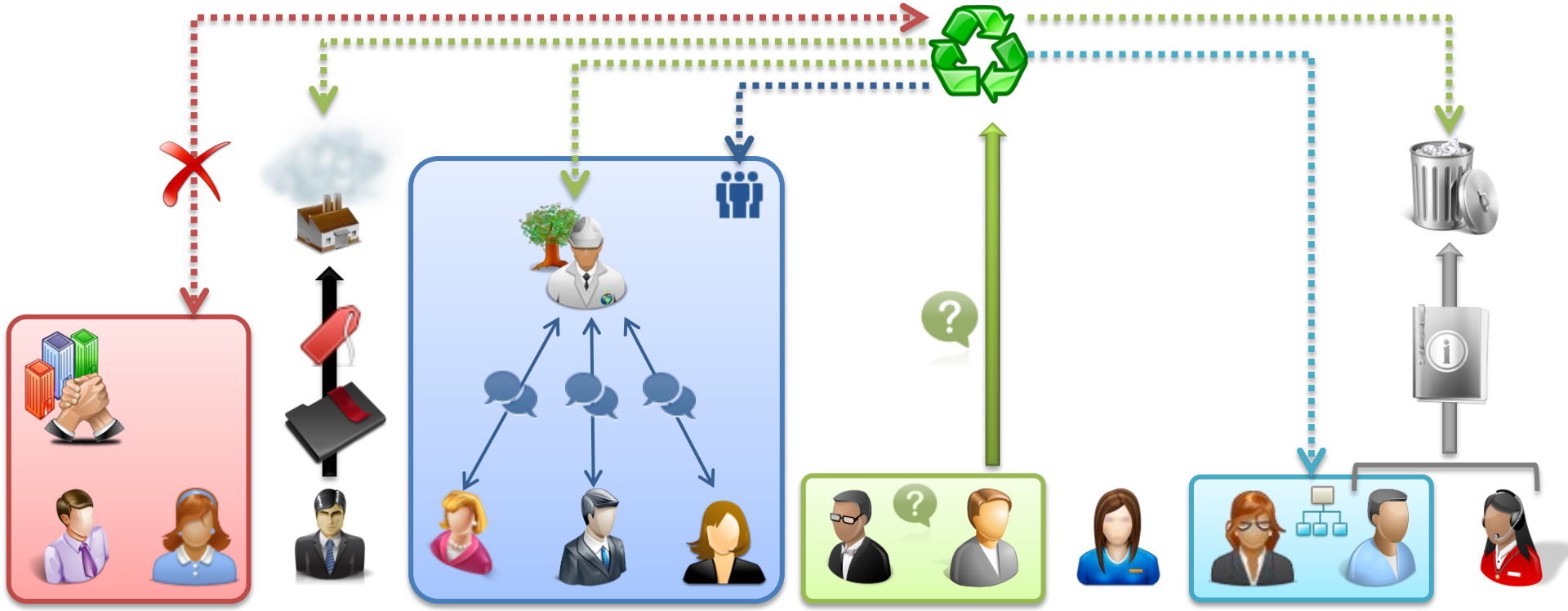


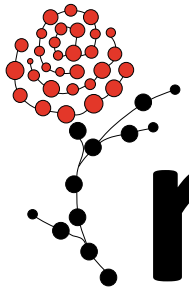
September 2010

Linking Open Data cloud diagram, by Richard Cyganiak and Anja Jentzsch. http://lod-cloud.net/

research problem

socio-semantic networks: combining formal semantics and social semantics on the web





research fields

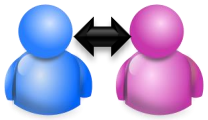
socio-semantic networks: combining formal semantics and social semantics on the web

- web-supported epistemic communities
- model and support actors, actions & interactions
- graph-based representation & reasoning

challenges

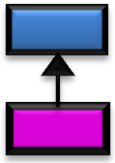
analyzing, modeling, formalizing and implementing graph-based social semantic web applications for communities

❶ multidisciplinary approach for analyzing and modeling



- the many aspects of intertwined information systems
- communities of users and their interactions

❷ formalizing and reasoning on these models



- new analysis tools and indicators
- new functionalities and better management

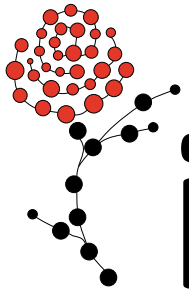
main research axes and questions

Interactions

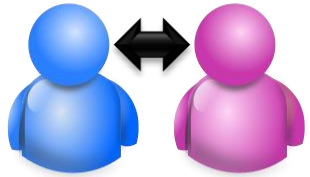
- Improve interactions with systems getting more and more complex?
- Reconcile formal stable semantics & negotiable social semantics?
- Reconcile local contexts and global world-wide virtual machine?

Typed graphs

- What kind of formalism is the best suited for SSW models?
- Analyze typed graph structures and their interactions?
- Support different graph life-cycles, calculations & characteristics?

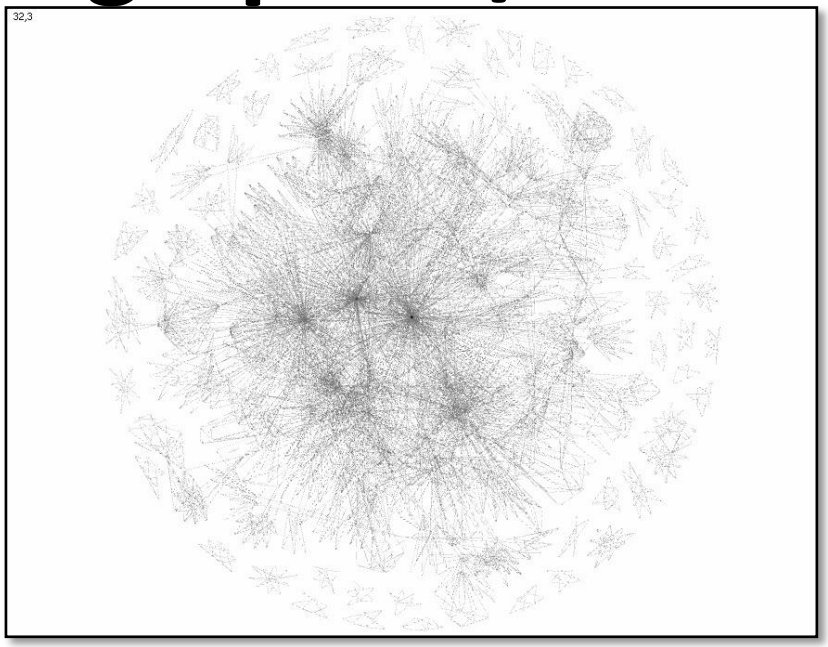


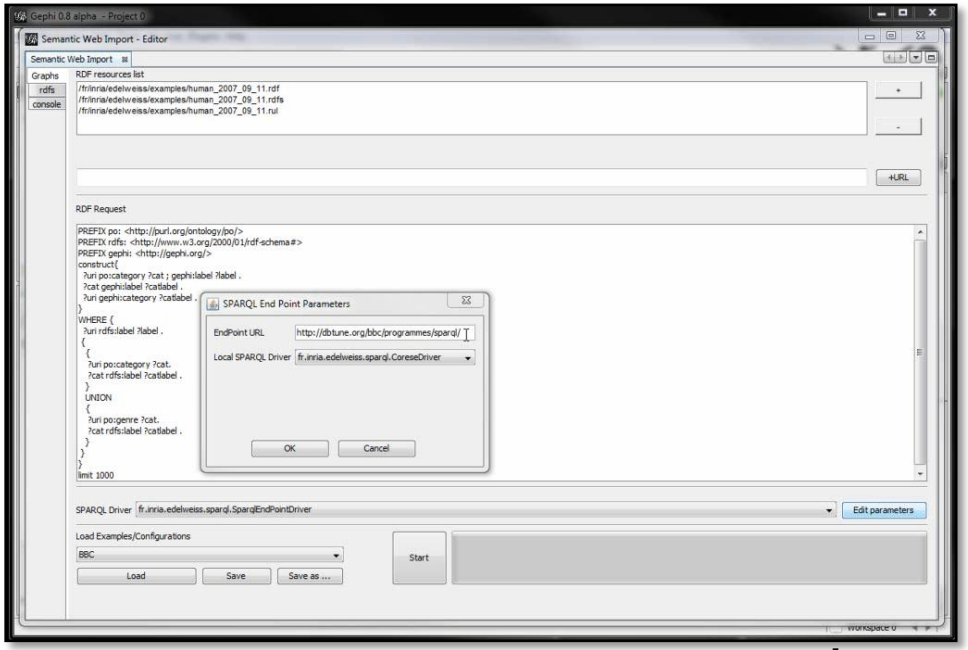
interactions



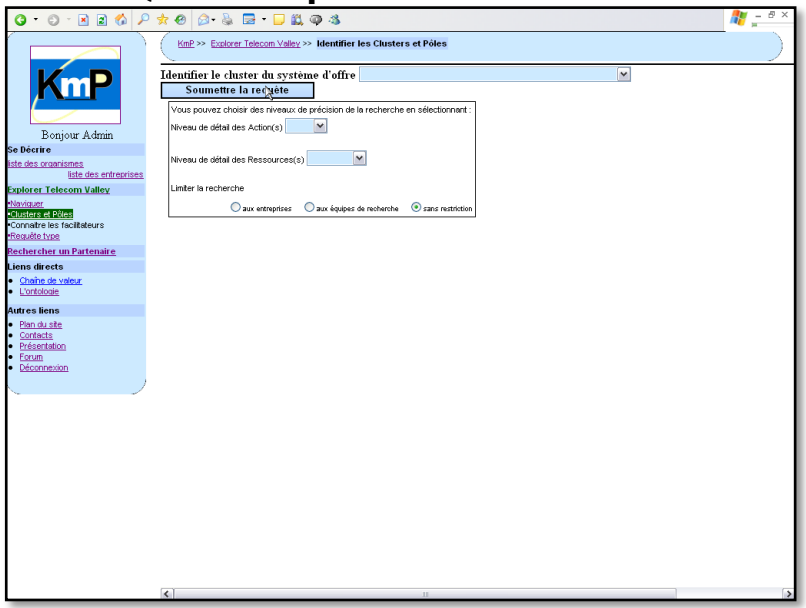
- analyzing & modeling communities and interactions through social semantic web app.
- interacting with dynamic semantic web app.

graph of/in interaction

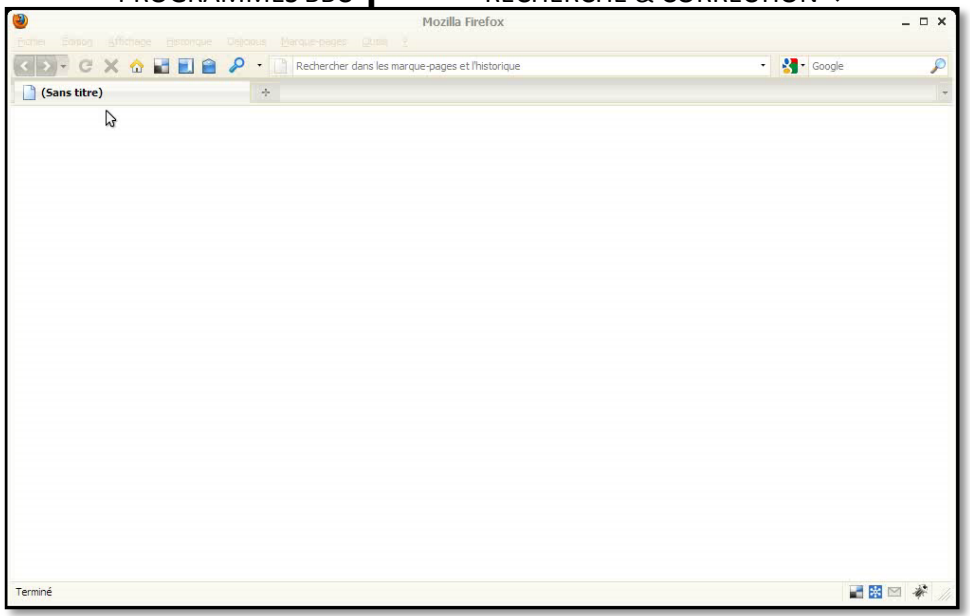


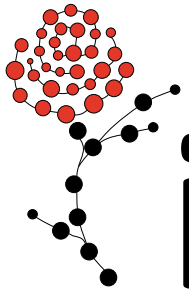


THÉMATIQUES ADEME ↑ TELECOM VALLEY SOPHIA ↓



PROGRAMMES BBC ↑ RECHERCHE & CORRECTION ↓





interactions

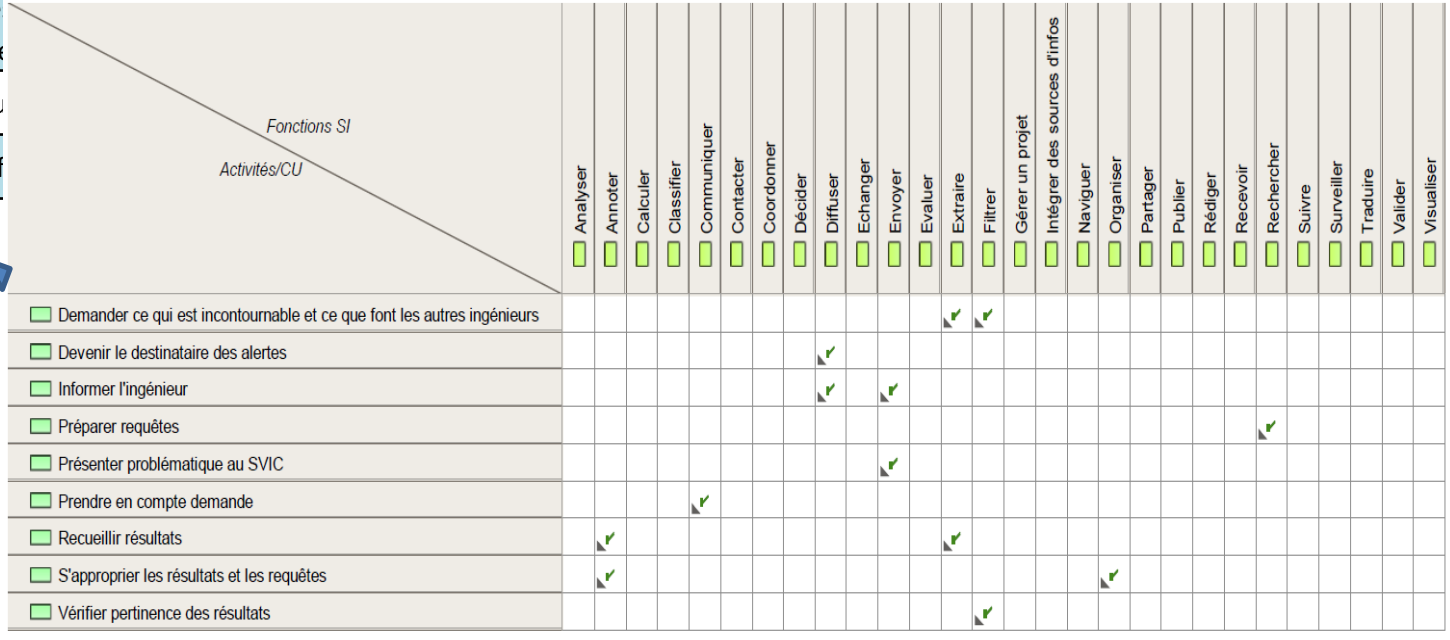
improve interactions with systems getting more and more complex?

- *requirement models in RDFS to support understanding and interoperability*
- *argumentation theory for requirement engineering to improve participant awareness and support decision-making*
- *adapt Personas to include relational and emotional aspects*
- *ontology-based modeling of users and communities*
- *incremental formalization from CSCW and HCI*

convergence matrix

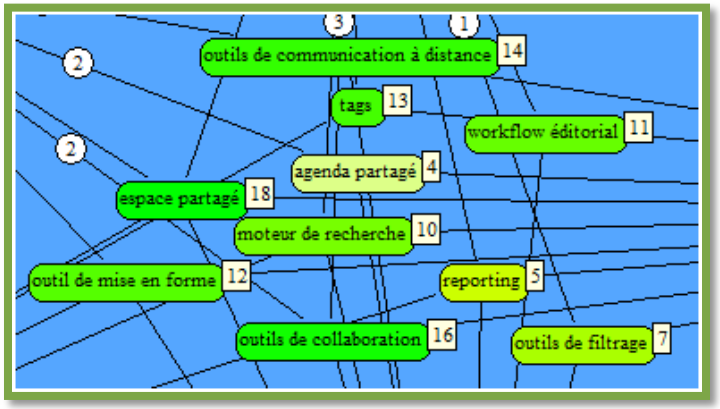
detections of needs or redundancies in key scenarios

Etapes des scénarios	Fonctionnalités identifiées	Fonctions SI
Présenter problématique au SVIC	Mailing, Q&A	Envoyer
Demander ce qui est incontournable et ce que font les autres ingénieurs	Consultation d'experts	Extraire, filtrer
Prendre en compte demande	Workflow, Outils de collaboration	communiquer
Préparer requêtes	Moteur de recherche, équation de recherche	rechercher
Recueillir résultats	Abonnement, push…	Extraire, annoter
Vérifier pertinence des résultats	Analyses, outils de filtrage	filtrer
Informer l'ingénieur	Me vid	
S'approprier les résultats et les requêtes	Equ	
Devenir le destinataire des alertes	Diff	



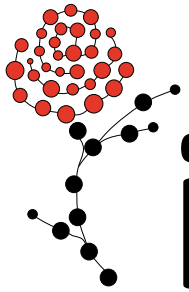
proposing functionalities & prototypes

Frequent functionalities and dependencies



Prioritization of functionalities

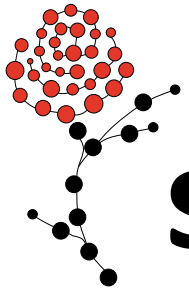
Exigences /	Sous-tâches envisagées	Fonctionnalités candidates	Fréquence
Construction collaborative de documents (Workflow rédactionnel partagé)	- Espace partagé de **co-construction** de documents (synthèses, rapports, feuilles de route, bulletins de veille…) - Mécanisme de valorisation / reconnaissance du travail accompli	- Espace partagé - Outils de collaboration - Workflow éditorial - Outils de mise en forme - Mesure de la confiance/notoriété (e-réputation) - Évaluation de contenu	18 16 13 12 1 1
Repérer et représenter les expertises (interne & externe car lien avec les industriels fort!)	- Profil qui fait quoi **auto-taggué** - Stockage et qualification des contacts - Suivre l'évolution dans le temps des expertises - Se représenter le réseau d'experts/de contacts (**proximité thématique**) - Métriques sur la capacité à partager/créer du lien social (**personnes frontières**)	- Mise en forme : visualisations avancées, graphiques et cartographie - Localisation de personnes / d'experts - Filtrage - Gestion profils utilisateurs - Questions/réponses	12 8 7 4 2
Créer ses propres services et indicateurs (pour le « métier d'ingénieur de services »)	- Créer ses propres services - Créer ses propres indicateurs (traçage et suivi des infos & des événements) - Relier les documents à leurs auteurs - **Alertes** sur les activités des autres - Optimiser la transversalité (**liens tout azimut**)	- Création de tableaux de bord - Web services / Mashups - Tags/bookmarks - Alertes - Abonnements/RSS - Analyse et visualisation des réseaux sociaux	3 1 13 2 2 2



interactions

reconcile formal stable semantics & negotiable social semantics?

- *develop "collective personas" and compare to "collaboration personas"*
- *participatory sketching and prototyping to design interfaces for visualizing and manipulating representations of collectives*
- *mixed representations containing social semantic representations (e.g. folksonomies) and formal semantic representations (e.g. ontologies)*
- *study the operations that allow us to couple and exchange knowledge between mixed representations*
- *consider compatible linguistic approaches to interact with a knowledge base using different languages or jargons*



social interaction design

- **reconciling semantic Web and social Web approaches** in Web-oriented design

	Semantic Web	Social Web
User participation	Low	High
Formality	High	Low
Inferential capabilities	High	Low

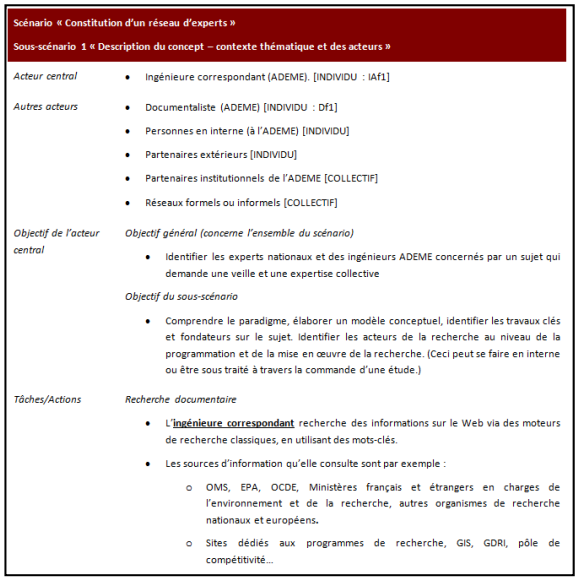
- **articulating developers' and users' representations and operating modes** making them interoperable

	Developers	Users
Representations	Formal	Informal
Operating modes	Logics of functioning	Logics of use

mockup design in context

development of collaborative and participatory design methods, articulating scenarios, storyboards and mockups of user interfaces (ongoing)

Scenario	*Storyboard*	*Mock-up*



Scénario « Constitution d'un réseau d'experts »

Sous-scénario 1 « Description du concept – contexte thématique et des acteurs »

Acteur central
- Ingénieure correspondant (ADEME). [INDIVIDU : IAf1]

Autres acteurs
- Documentaliste (ADEME) [INDIVIDU : Df1]
- Personnes en interne (à l'ADEME) [INDIVIDU]
- Partenaires extérieurs [INDIVIDU]
- Partenaires institutionnels de l'ADEME [COLLECTIF]
- Réseaux formels ou informels [COLLECTIF]

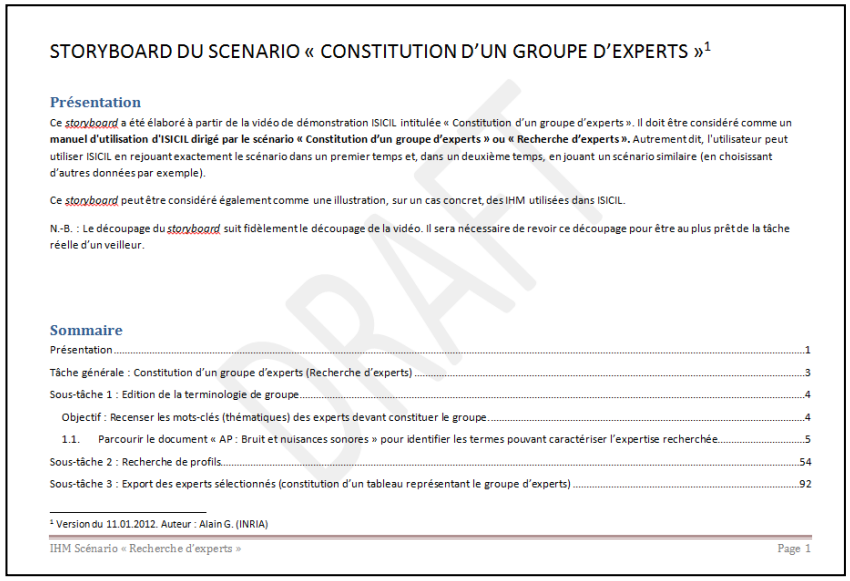
Objectif de l'acteur central

Objectif général (concerne l'ensemble du scénario)
- Identifier les experts nationaux et des ingénieurs ADEME concernés par un sujet qui demande une veille et une expertise collective

Objectif du sous-scénario
- Comprendre le paradigme, élaborer un modèle conceptuel, identifier les travaux clés et fondateurs sur le sujet. Identifier les acteurs de la recherche au niveau de la programmation et de la mise en œuvre de la recherche. (Ceci peut se faire en interne ou être sous traité à travers la commande d'une étude.)

Tâches/Actions

Recherche documentaire
- L'**ingénieure correspondant** recherche des informations sur le Web via des moteurs de recherche classiques, en utilisant des mots-clés.
- Les sources d'information qu'elle consulte sont par exemple :
  - OMS, EPA, OCDE, Ministères français et étrangers en charges de l'environnement et de la recherche, autres organismes de recherche nationaux et européens.
  - Sites dédiés aux programmes de recherche, GIS, GDRI, pôle de compétitivité…



STORYBOARD DU SCENARIO « CONSTITUTION D'UN GROUPE D'EXPERTS »[1]

Présentation

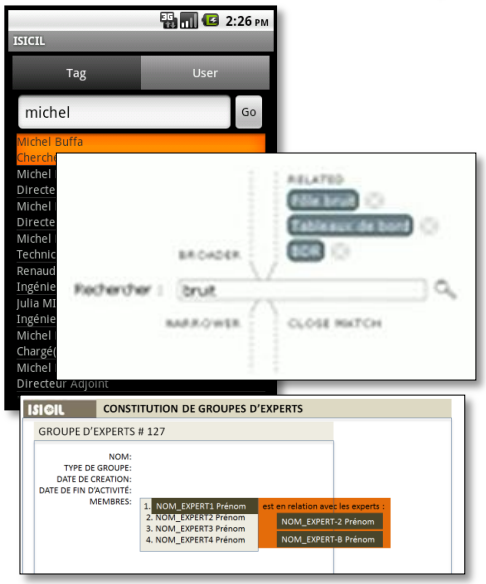
Ce *storyboard* a été élaboré à partir de la vidéo de démonstration ISICIL intitulée « Constitution d'un groupe d'experts ». Il doit être considéré comme un **manuel d'utilisation d'ISICIL dirigé par le scénario « Constitution d'un groupe d'experts » ou « Recherche d'experts ».** Autrement dit, l'utilisateur peut utiliser ISICIL en rejouant exactement le scénario dans un premier temps et, dans un deuxième temps, en jouant un scénario similaire (en choisissant d'autres données par exemple).

Ce *storyboard* peut être considéré également comme une illustration, sur un cas concret, des IHM utilisées dans ISICIL.

N.-B. : Le découpage du *storyboard* suit fidèlement le découpage de la vidéo. Il sera nécessaire de revoir ce découpage pour être au plus prêt de la tâche réelle d'un veilleur.

Sommaire

[1] Version du 11.01.2012. Auteur : Alain G. (INRIA)

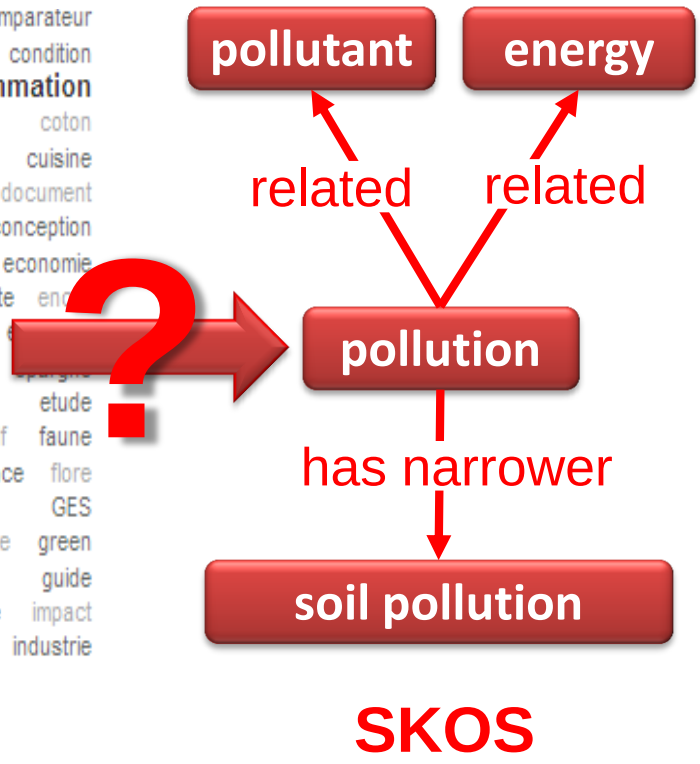


e.g. structuring folksonomy

web 2.0

flat folksonomies

thesaurus

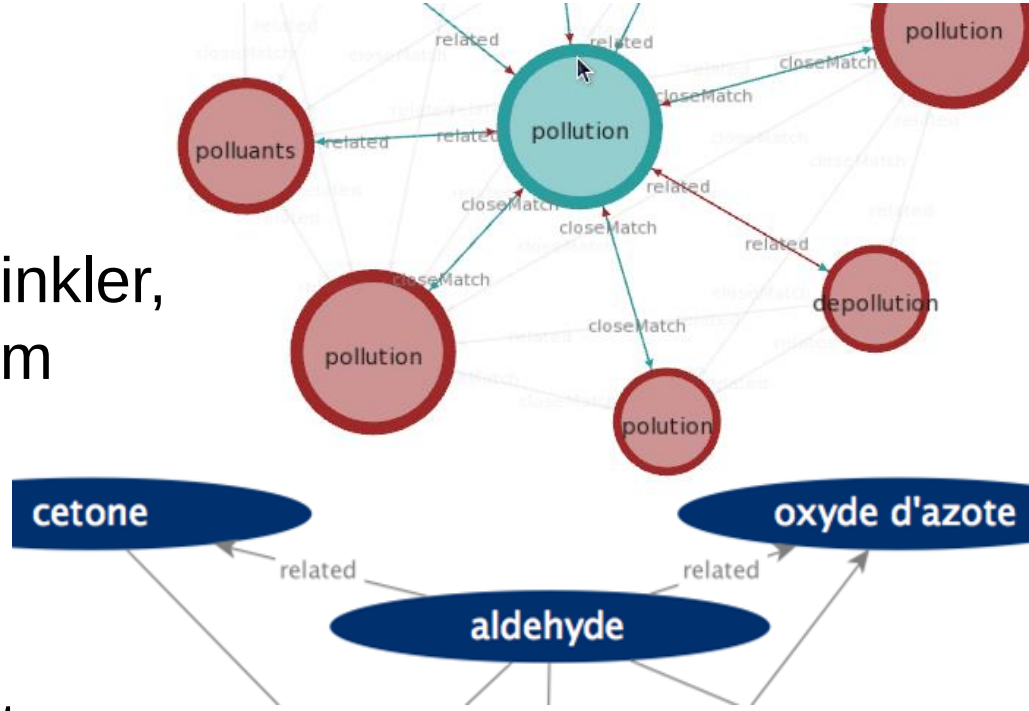


SKOS

e.g. combining metric spaces

edition distances

Monge-Elkan Soundex, JaroWinkler, asymmetry Monge-Elkan Qgram

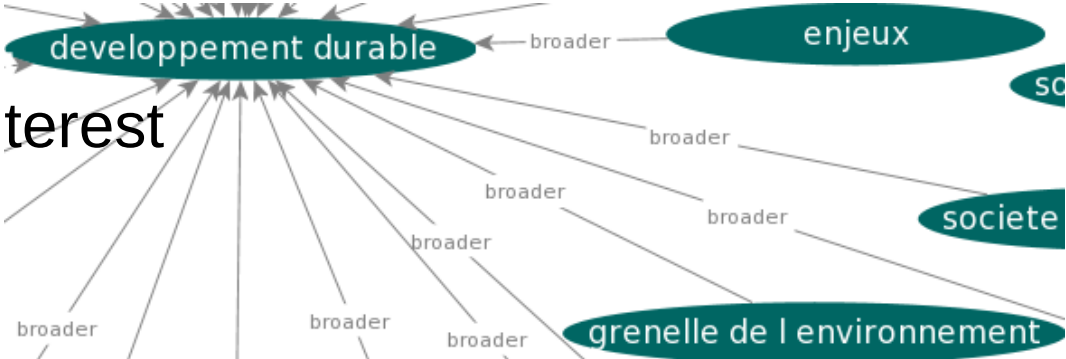


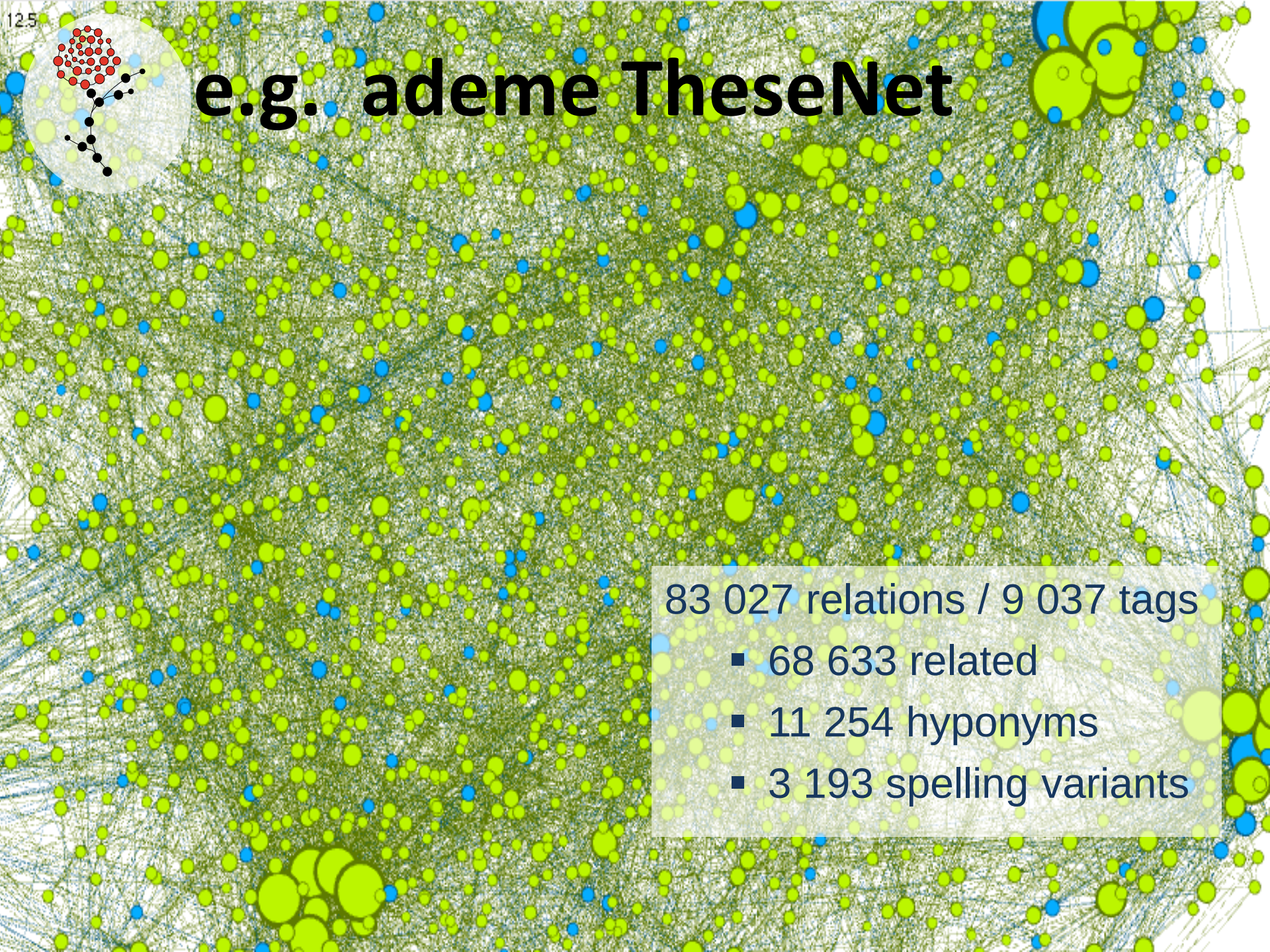
contextual metric

cosinus vector of co-occurring tags

social metrics

inclusion of communities of interest



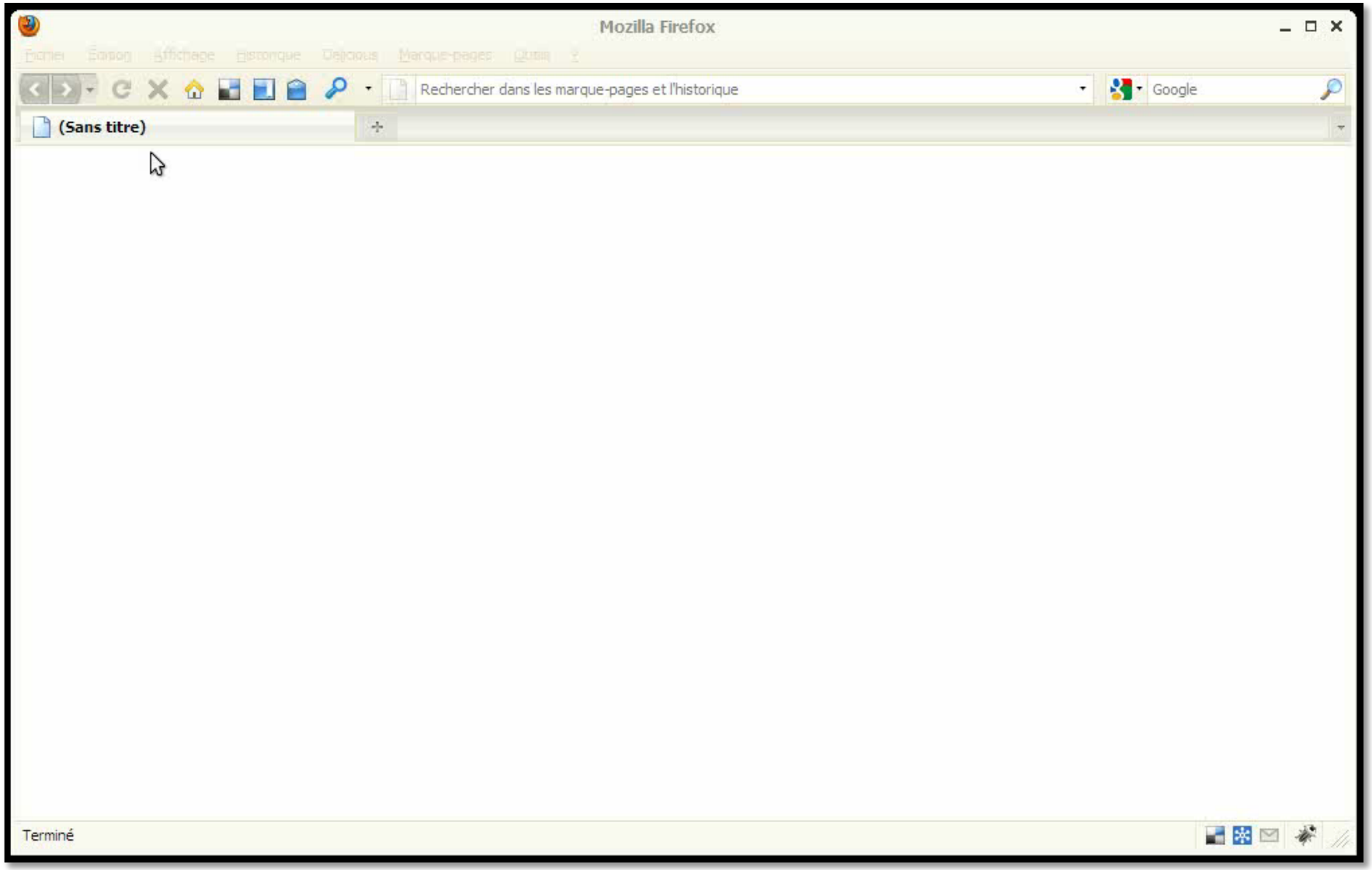


e.g. ademe TheseNet

83 027 relations / 9 037 tags

- 68 633 related
- 11 254 hyponyms
- 3 193 spelling variants

e.g. search & feedback



Sweet Wiki - Mozilla Firefox

Fichier Edition Affichage Aller à Marque-pages Outils ?

http://localhost:8080/wiki/data/Courses/CoursesHome.jsp

Gmail Les serveurs de l'ESSI

Sweet Wiki

Edit this page |

Logged as Jeremy - Disconnect

Semantic WEb Enabled Technology Wiki

WorkSpace

- Courses
- Main
- Users
- All users
- Sand Box
- Search

Create Page

Name

Web

Users

Create this page

Java Courses

Basic courses

Classes and inheritance : **ClassesAndInheritance**

JavaSerialization

Advanced

Gui : **JavaGui**

Collection : **JavaCollection**

working with beans : **JavaBeans**

sounds : **JavaSounds**

RMI : **JavaRmi**

Keywords

- JavaCourses(1)

See Also

Tags' informations

Category :

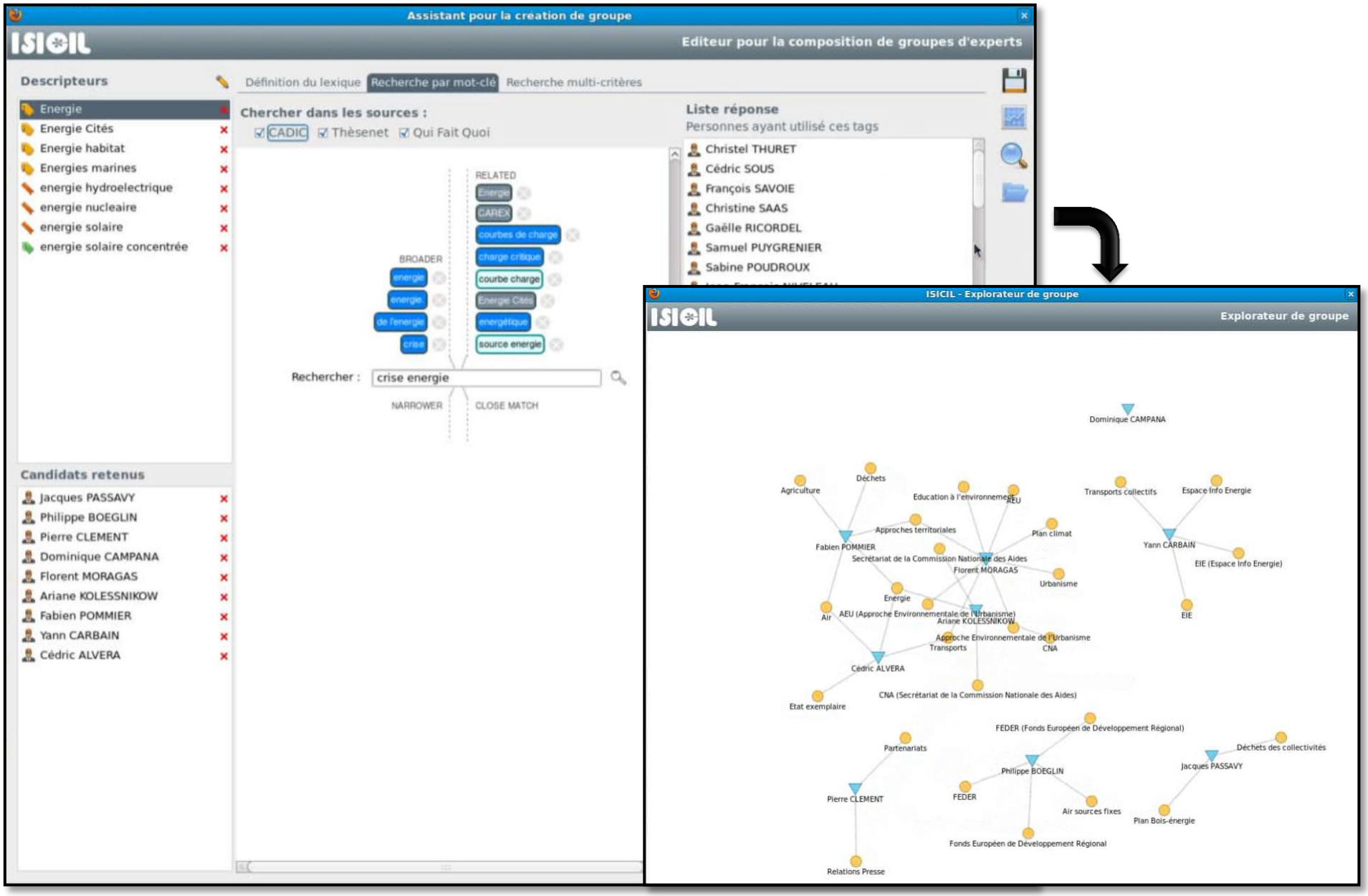
Related tags :

Page

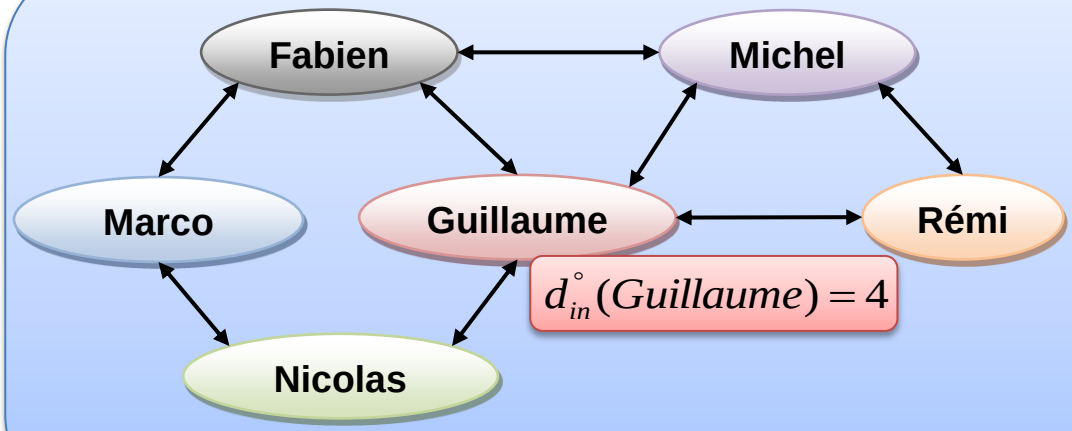
- Author : admin
- Web : Courses
- Last

Terminé

search & navigation in info. networks

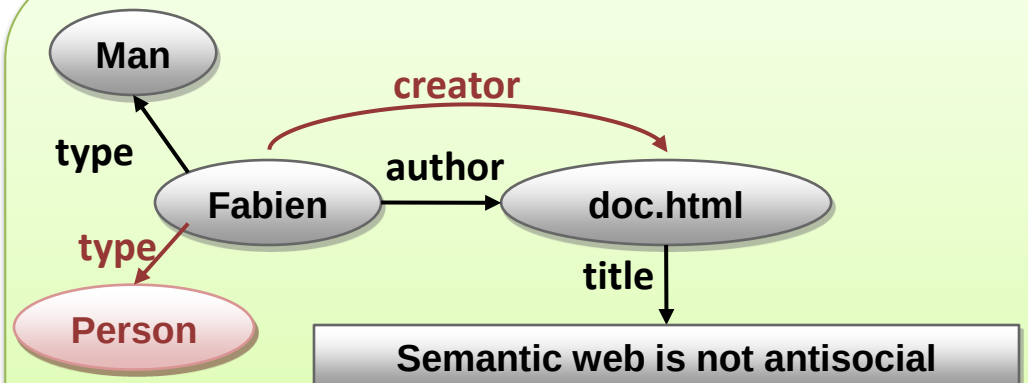


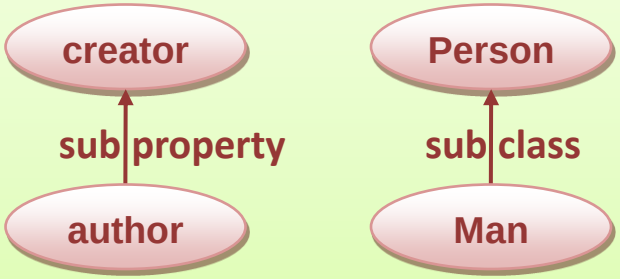
e.g. typing sociograms



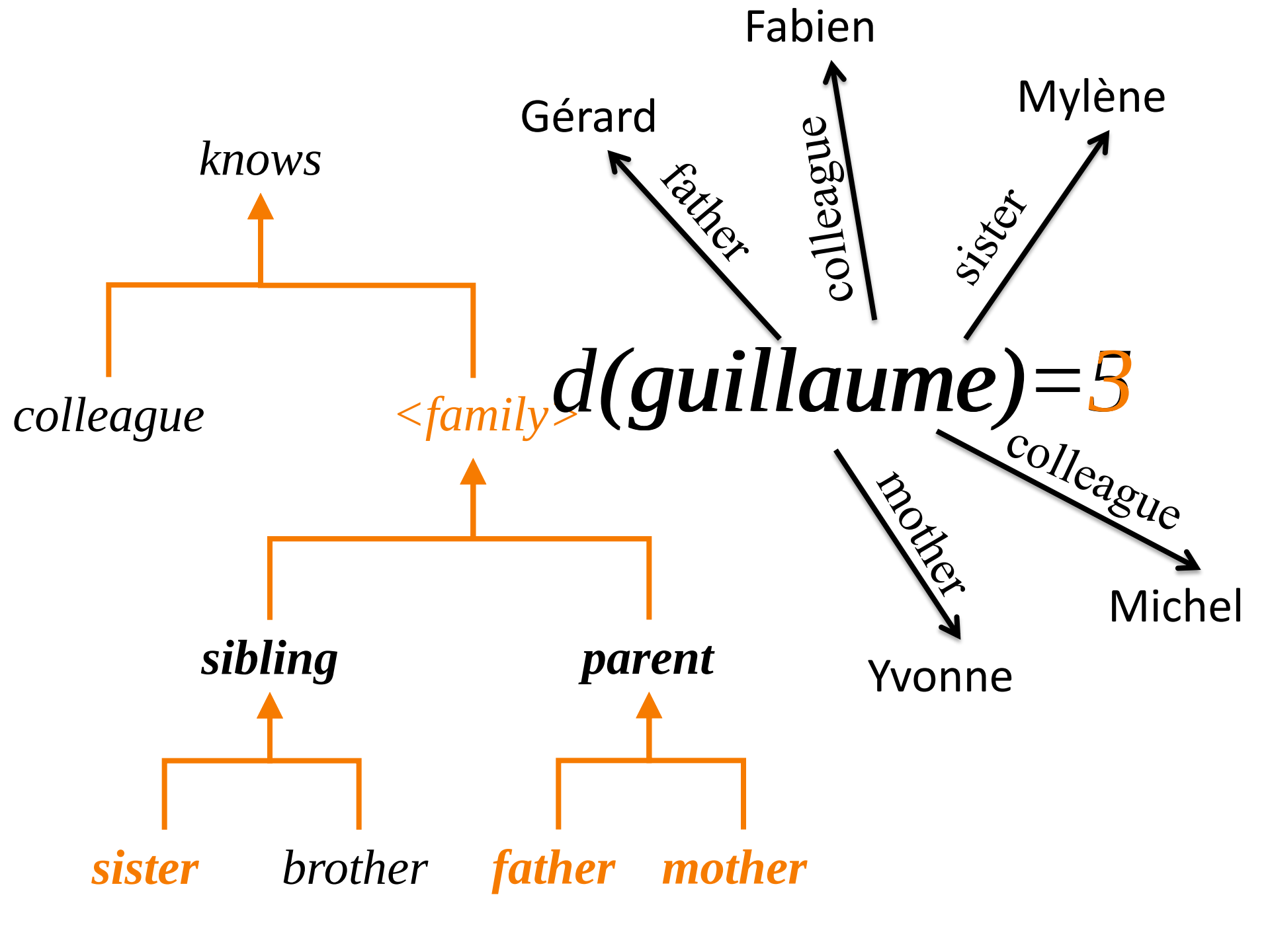
$$d^{\circ}_{in}(p) = |\{x; rel(x, p)\}|$$

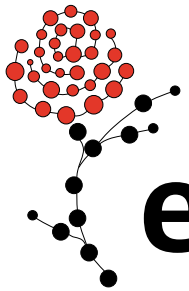
social network analysis





semantic web


knows
colleague
<family>
sibling
parent
sister
brother
father
mother
Fabien
Gérard
Mylène
father
colleague
sister
d(guillaume)=3
mother
colleague
Yvonne
Michel



e.g. parameterized analysis

SNA indices	SPARQL formal definition
$nb^{actor}_{<type>}(G)$	`select merge count(?x) as ?nbactor from <G> where{ ?x rdf:type param[type] }`
$nb^{actor}_{<rel>}(G)$	`select merge count(?x) as ?nbactors from <G> where{ {?x param[rel] ?y} UNION{?y param[rel] ?x} }`
$nb^{subject}_{<rel>}(G)$	`select merge count(?x) as ?nbsubj from <G> where{ ?x param[rel] ?y }`
$nb^{object}_{<rel>}(G)$	`select merge count(?y) as ?nbobj from <G> where{ ?x param[rel] ?y }`
$nb^{relation}_{<rel>}(G)$	`select cardinality(?p) as ?card from <G> where { { ?p rdf:type rdf:Property filter(?p ^ param[rel]) } UNION { ?p rdfs:subPropertyOf ?parent filter(?parent ^ param[rel]) } }`
$Comp_{<rel>}(G)$	`select ?x ?y from <G> where { ?x param[rel] ?y }group by any`
$D_{<rel,dist>}(y)$	`select ?y count(?x) as ?degree where { {?x (param[rel])*::$path ?y filter(pathLength($path) <= param[dist])} UNION {?y param[rel]::$path ?x filter(pathLength($path) <= param[dist])} }group by ?y`
$D^{in}_{<rel,dist>}(y)$	`select ?y count(?x) as ?indegree where{ ?x (param[rel])*::$path ?y filter(pathLength($path) <= param[dist]) }group by ?y`
$D^{out}_{<rel,dist>}(y)$	`select ?x count(?y) as ?outdegree where { ?x (param[rel])*::$path ?y filter(pathLength($path) <= param[dist]) }group by ?x`
$g_{<rel>}(from,to)$	`select ?from ?to $path pathLength($path) as ?length where{ ?from sa (param[rel])*::$path ?to }group by ?from ?to`
$Diam_{<rel>}(G)$	`select pathLength($path) as ?length from <G> where { ?y s (param[rel])*::$path ?to }order by desc(?length) limit 1`
$nb^{g}_{<rel>}(from,to)$	`select ?from ?to count($path) as ?count where{ ?from sa (param[rel])*::$path ?to }group by ?from ?to`

$nb^{g}_{<rel>}(b, from, to)$	`select ?from ?to ?b count($path) as ?count where{ ?from sa (param[rel])*::$path ?to graph $path{?b param[rel] ?j} filter(?from != ?b) optional { ?from param[rel]::$p ?to } filter(!bound($p)) }group by ?from ?to ?b`
$C^{c}_{<rel>}(y)$	`select distinct ?y ?to pathLength($path) as ?length (1/sum(?length)) as ?centrality where{ ?y s (param[rel])*::$path ?to }group by ?y`
$B_{<rel>}(b, from, to)$	`select ?from ?to ?b (count($path)/count($path2)) as ?betweenness where{ ?from sa (param[rel])*::$path ?to graph $path{?b param[rel] ?j} filter(?from != ?b) optional { ?from param[rel]::$p ?to } filter(!bound($p)) ?from sa (param[rel])*::$path2 ?to }group by ?from ?to ?b`

$$B_{<rel>}(b,x,y) = \frac{nb^{g}_{<rel>}(b,x,y)}{nb^{g}_{<rel>}(x,y)}$$

```
:= select ?from ?to ?b
   (count($path)/count($path2)) as
   ?betweenness where{
   ?from sa (param[rel])*::$path ?to
   graph $path{?b param[rel] ?j}
   filter(?from != ?b)
   optional { ?from param[rel]::$p ?to}
   filter(!bound($p))
   ?from sa (param[rel])*::$path2 ?to
   }group by ?from ?to ?b
```

ipernity.com dataset in RDF

61 937 actors & 494 510 relationships

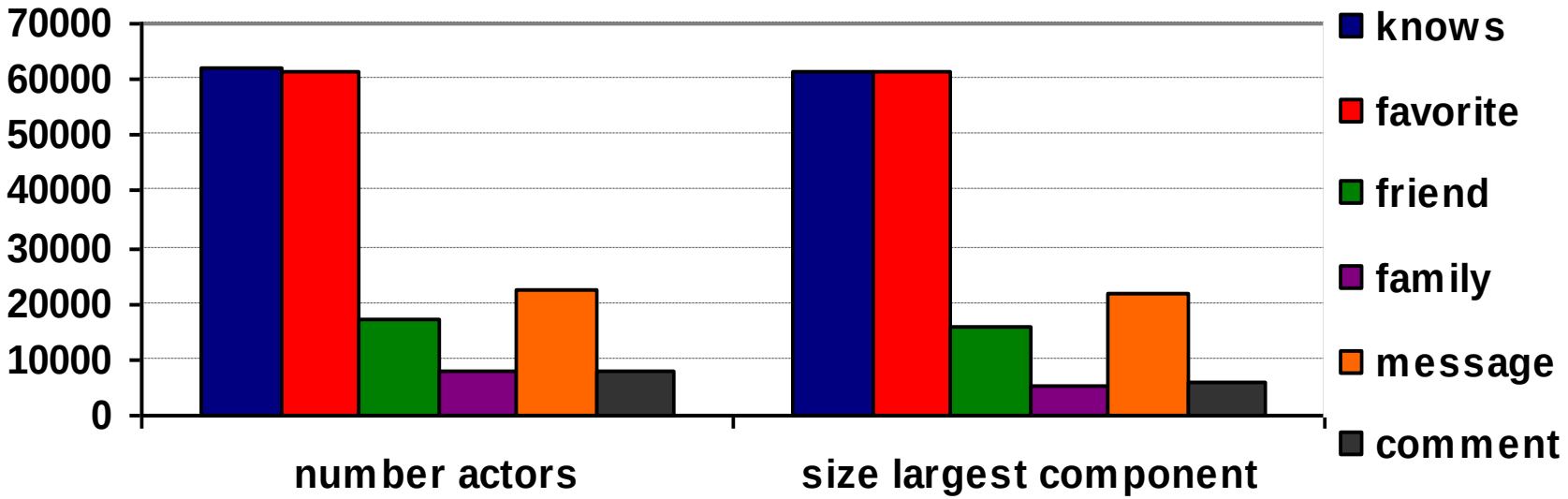
–18 771 family links between 8 047 actors

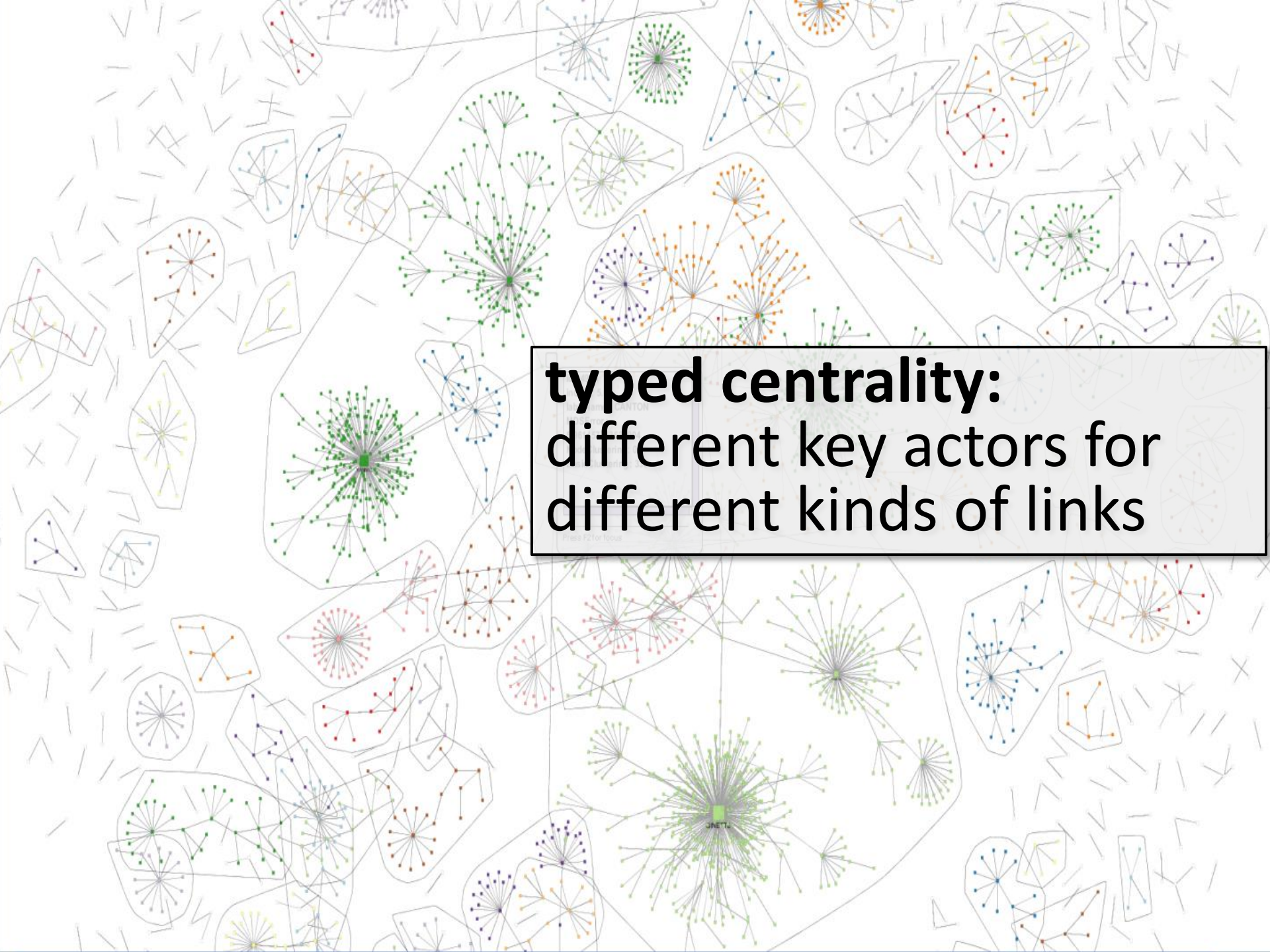
–136 311 friend links implicating 17 441 actors

–339 428 favorite links for 61 425 actors, etc.

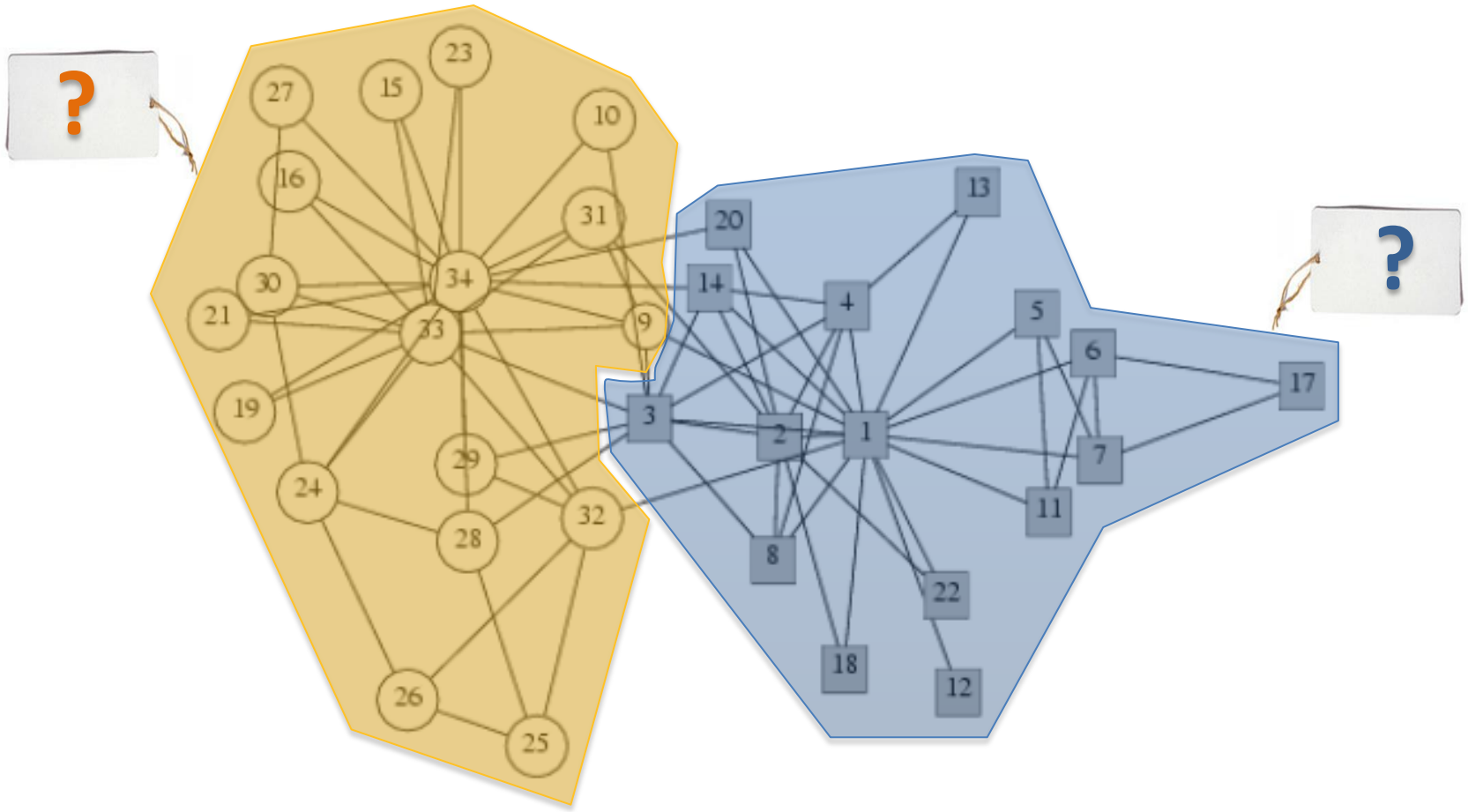
existence of a largest *component* in all sub networks

"the effectiveness of the social network at doing its job" [Newman 2003]

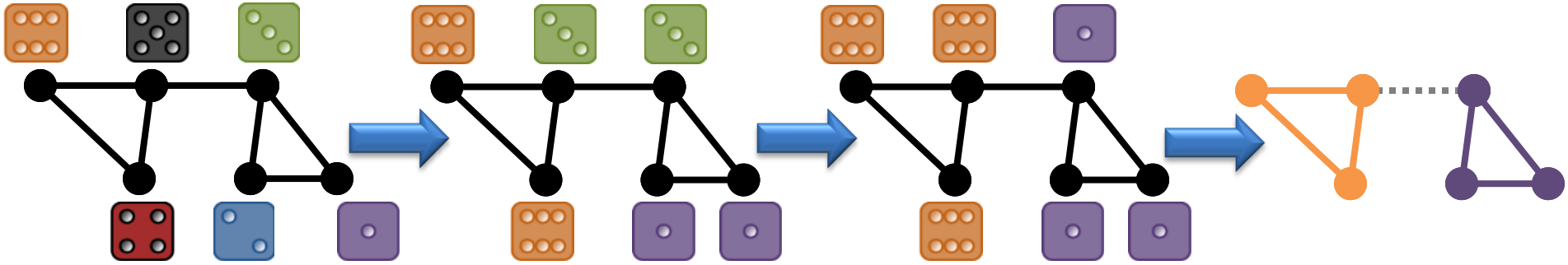



typed centrality:
different key actors for
different kinds of links

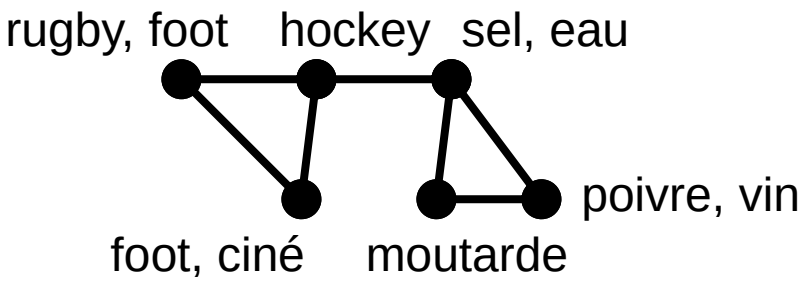
detecting AND labeling communities

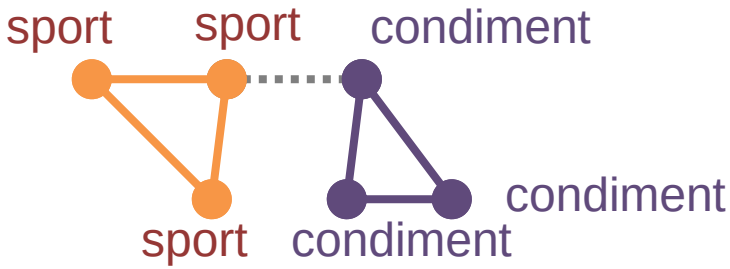


e.g. semantic propagation



from RAK/LP to SemTagP





applied to Ademe Ph.D. network

- 1 853 agents

  1 597 academic supervisors

  256 ADEME engineers.

- 13 982 relationships

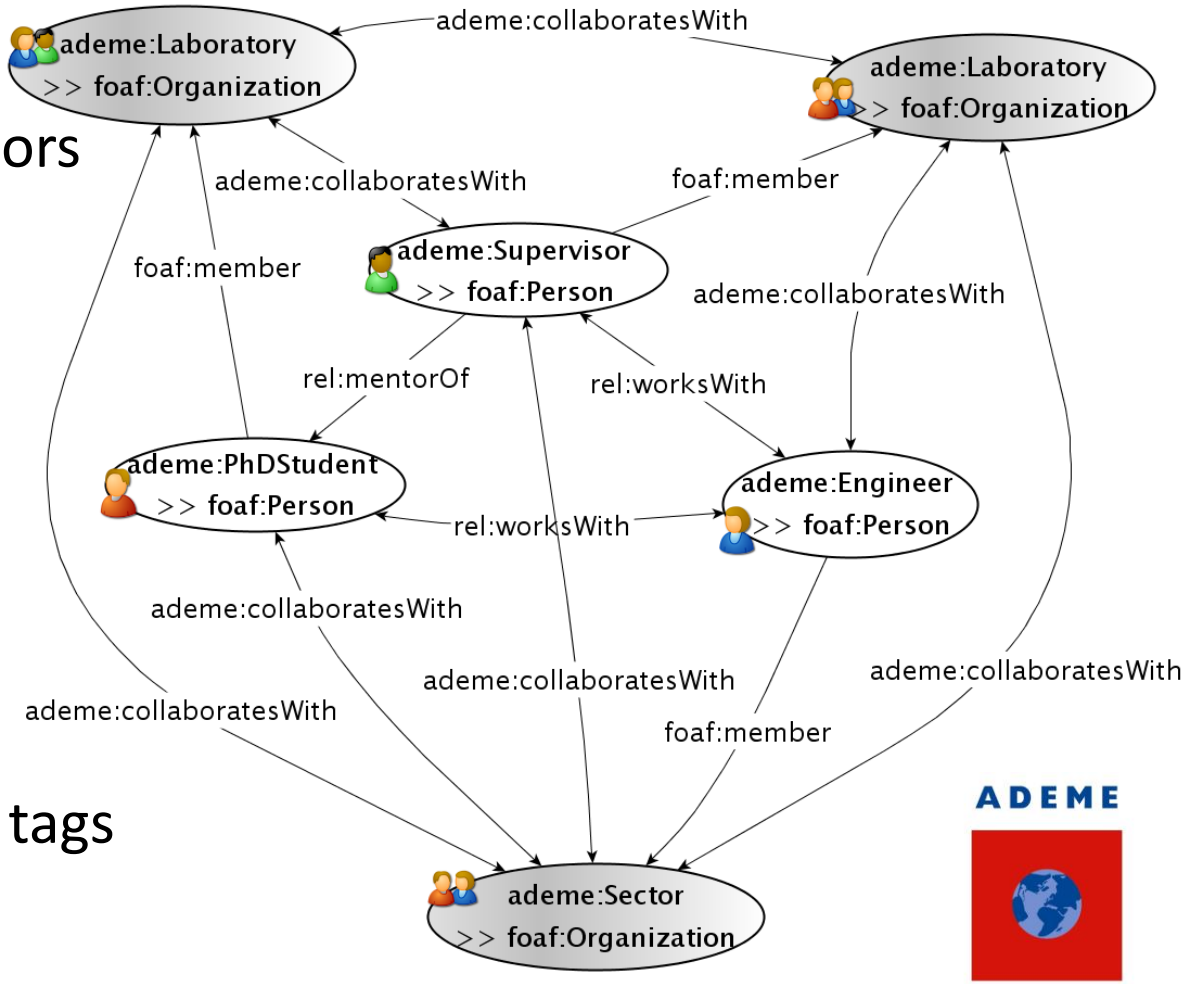
  10 246 rel:worksWith

  3 736 rel:colleagueOf

- 6 583 tags

- 3 570 skos:narrower

  relations between 2 785 tags

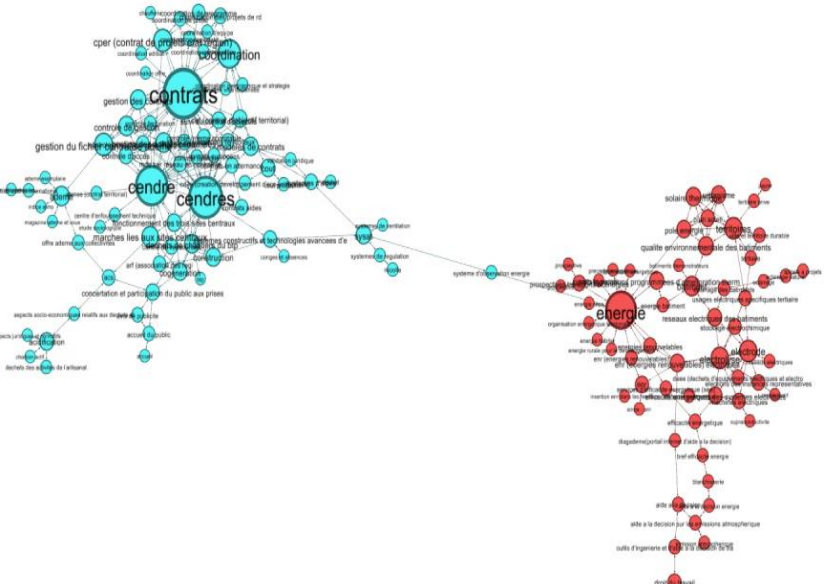


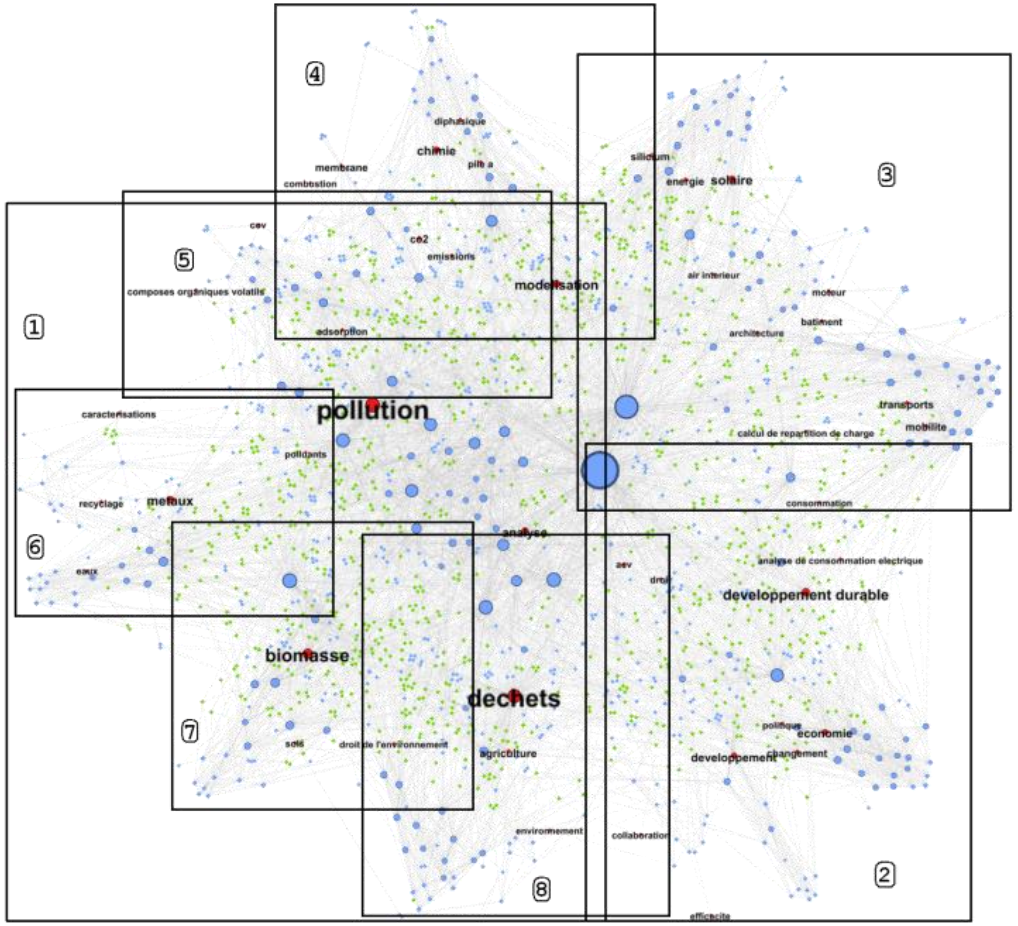
ADEME

Agence de l'Environnement
et de la Maîtrise de l'Energie

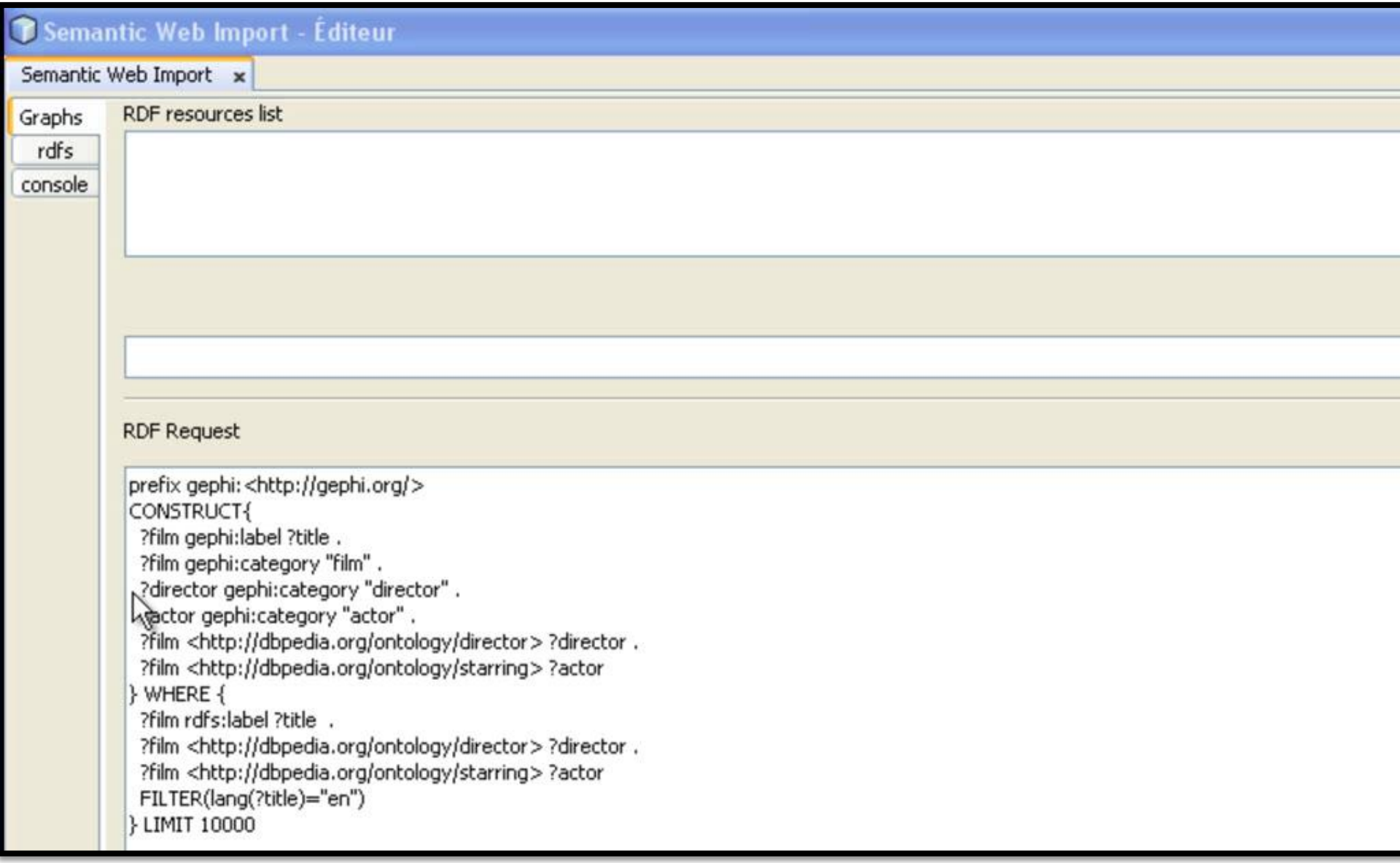
ex. Ademe

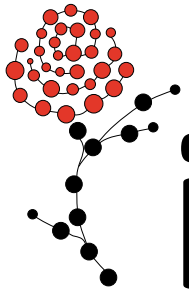
1 pollution ; 2 développent durable ;
3 énergie ; 4 chimie ; 5 pollution de l'air ;
6 métaux ; 7 biomasse ; 8 déchets.





Plugin Gephi





interactions

reconcile local contexts and global world-wide virtual machine?

- *to develop ontology based and rule based models merged with RDF representations of context*
- *to adapt operations on social semantic web applications, to extend them by taking into account the context and other parameters*
- *modularity through named graphs, graph annotation and SPARQL extensions to take context into account when managing accesses*
- *to empirically study interaction with joint use of techniques for analyzing human behaviors and techniques for analyzing machine operations*

mobile access to web of data

Mobile

&

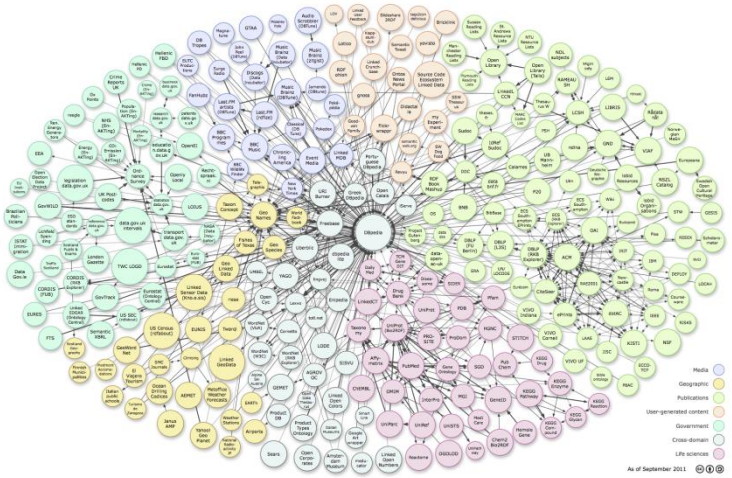
Web of Data

&

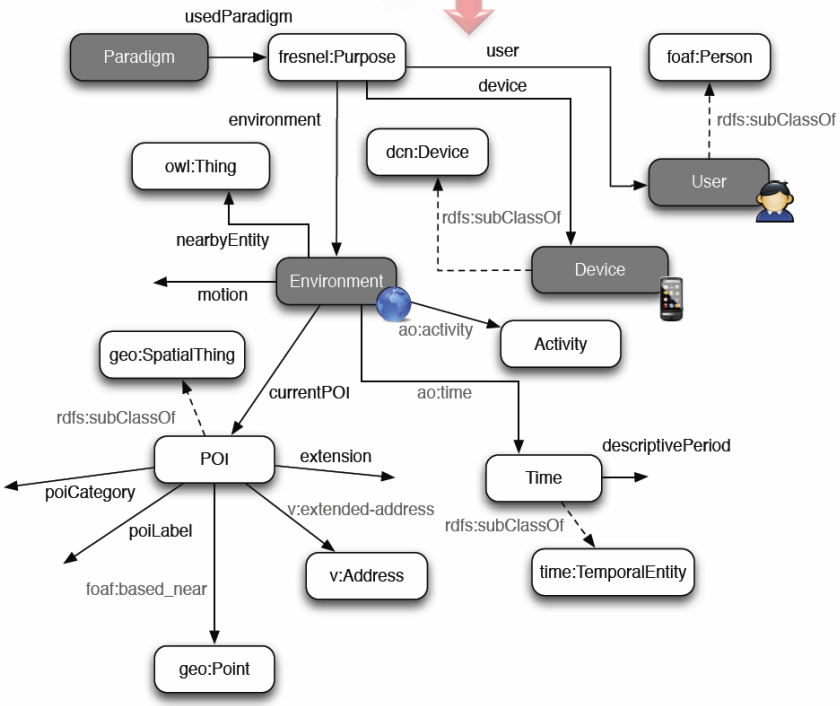
Context

&

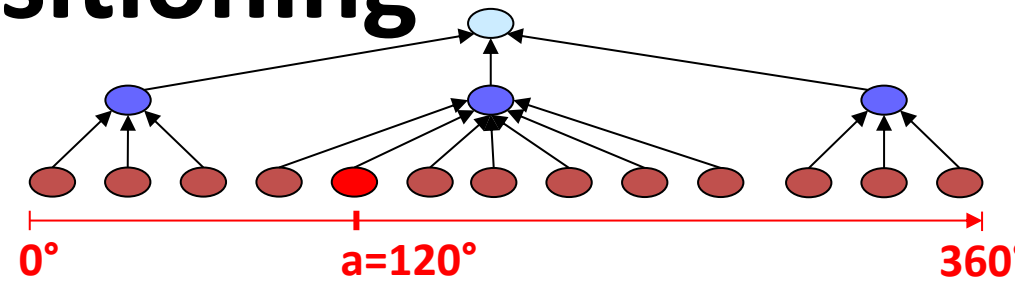
Interaction

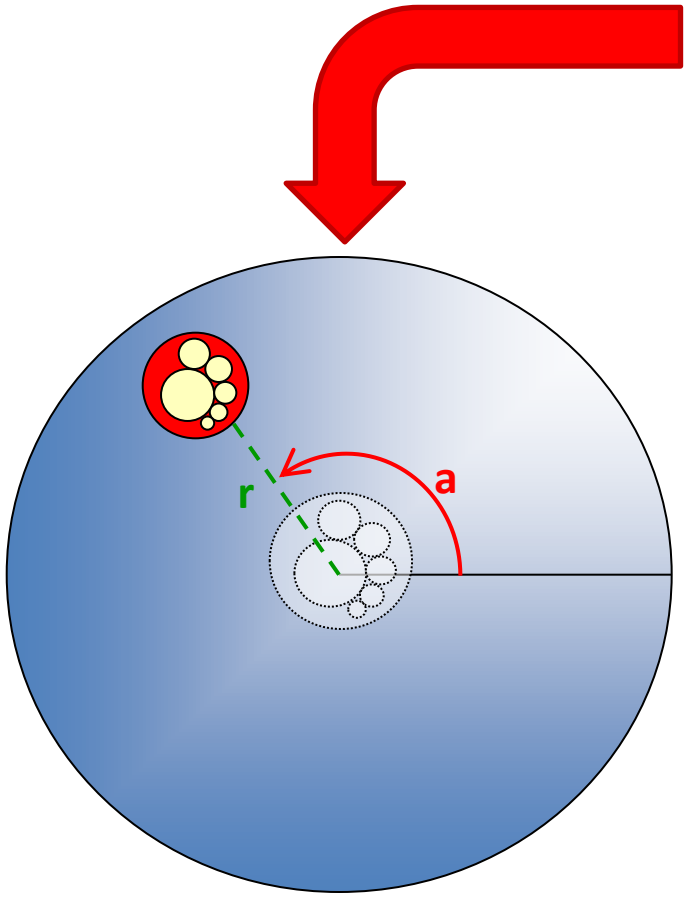


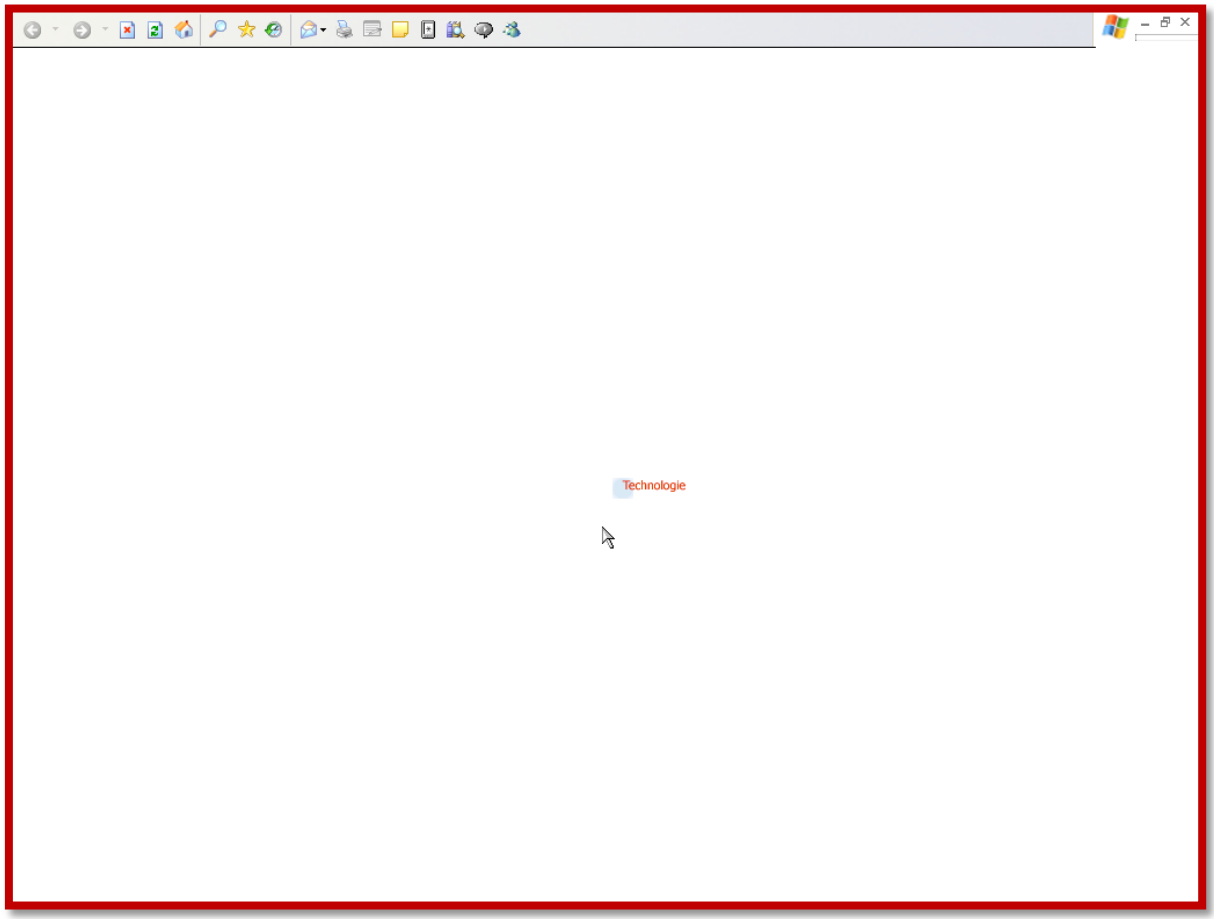
prissma



e.g. semantic positioning







Bonjour Admin

Se Décrire
liste des organismes
liste des entreprises
Explorer Telecom Valley
•Naviguer
•Clusters et Pôles
•Connaitre les facilitateurs
•Requête type
Rechercher un Partenaire
Liens directs
- Chaîne de valeur
- L'ontologie

Autres liens
- Plan du site
- Contacts
- Présentation
- Forum
- Déconnexion

Identifier le cluster du système d'offre

Soumettre la requête

Vous pouvez choisir des niveaux de précision de la recherche en sélectionnant :

Niveau de détail des Action(s)

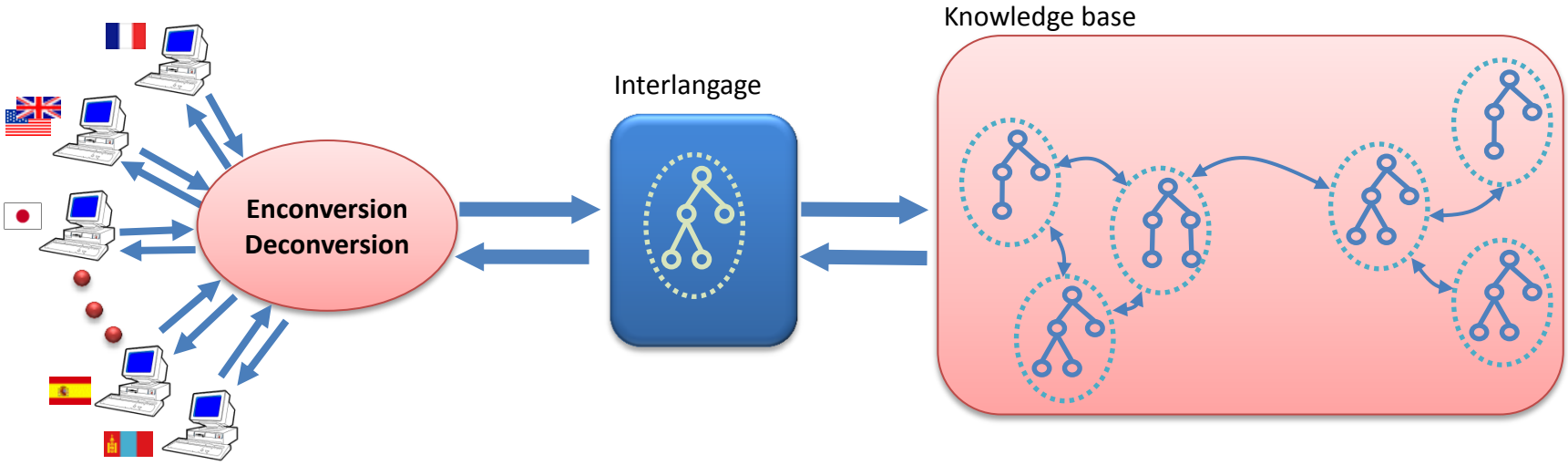
Niveau de détail des Ressources(s)

Limiter la recherche

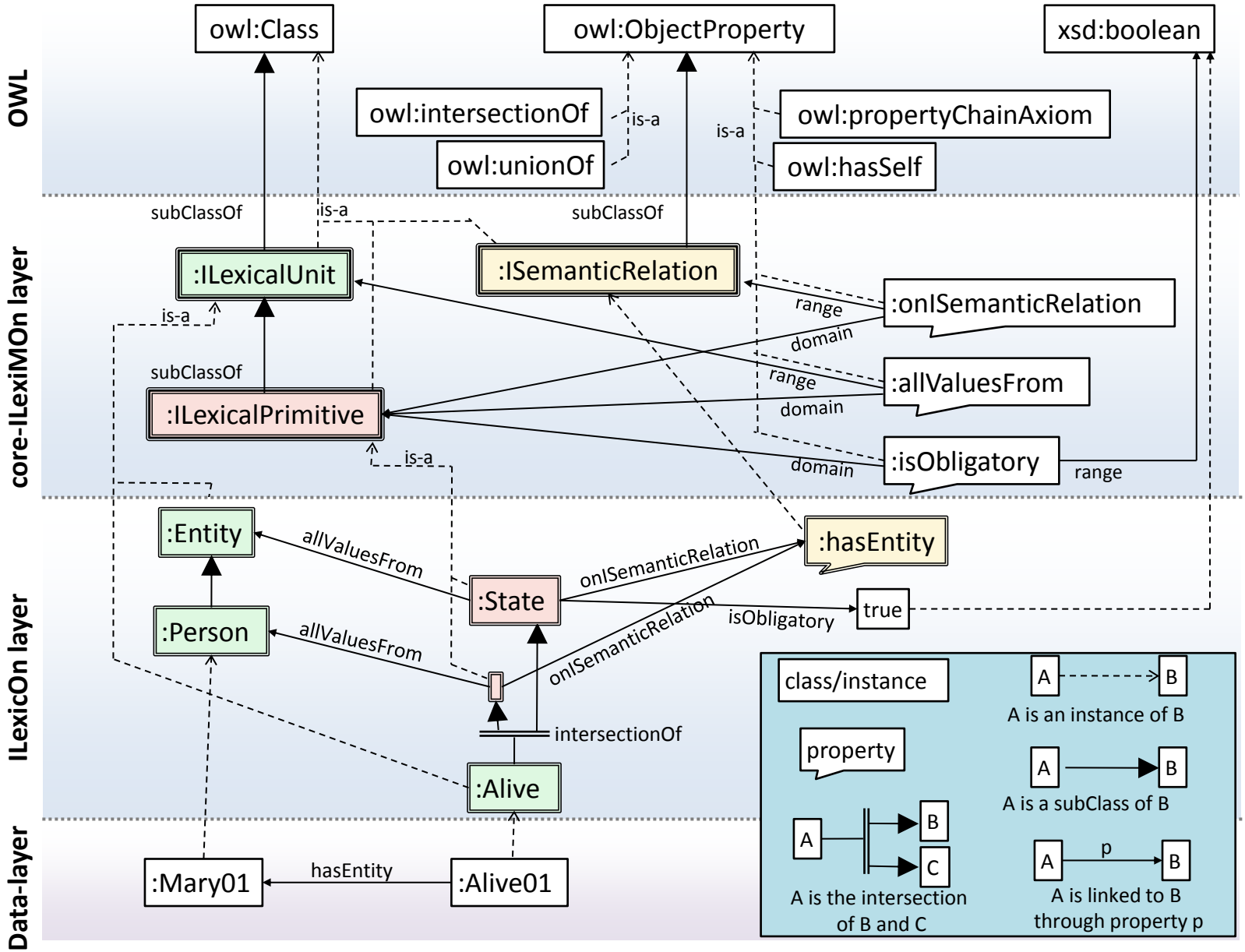
aux entreprises | aux équipes de recherche | sans restriction

collaborative and multilingual access to the web of data

- metalingual content & semantic web (thesaurus, schemas, triple store)
- natural interaction for annotation, query & edition
- WS ⊕ CWL/UNL

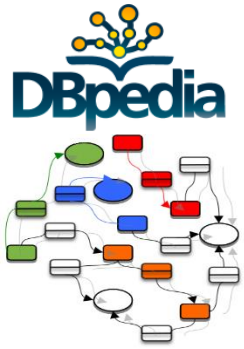


linking linguistic and semantic models



« MARY IS ALIVE »

question answering over linked data



Relational Patterns extraction

Pattern repository

owner(Thing, Thing)

```
[R:Person] purchased the [D:Thing]
[D:Thing] owner [R:Thing]
[D:Thing] was bought by [R:Thing]
```

starring(Work, Person)

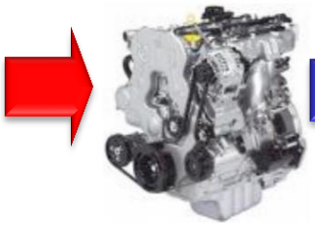
```
[D:Work], played by [R:Person]
[D:Work] stars [R:Person]
[D:Work] film stars [R:Person]
```

Who is starring in Batman Begins?

EAT and NE recognition: Stanford NER+ DBpedia

Query pattern

[Person] *is starring in* [Movie]*?*



ENTAILMENT ENGINE/ SIMILARITY ALGORITHM

```
select * where {
dbpr:Batman_Begins dbp:starring ?v  .
OPTIONAL {?v rdfs:label ?l
          filter(lang(?l)="en")} }
```

Christian Bale, Michael Caine, …

QALD-2 Open Challenge:

	total	answered	right	partially right	precision	recall	f-measure
Groovy Answering	100	74	44	17	0.79	0.8	0.79
SemSeK	100	80	32	7	0.44	0.48	0.46
Alexandria	100	25	5	10	0.43	0.46	0.45
MHE	100	97	30	12	0.36	0.4	0.38
QAKis	100	35	11	4	0.39	0.37	0.38

main research axes and questions

Interactions

Improve interactions with systems getting more and more complex?

Reconcile formal stable semantics & negotiable social semantics?

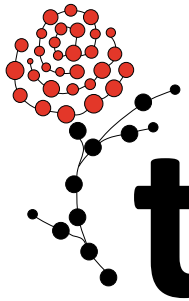
Reconcile local contexts and global world-wide virtual machine?

Typed graphs

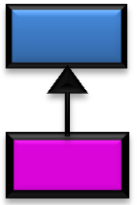
What kind of formalism is the best suited for SSW models?

Analyze typed graph structures and their interactions?

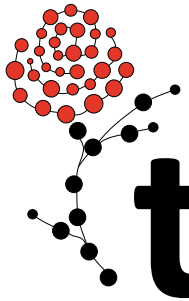
Support different graph life-cycles, calculations & characteristics?



typed graphs



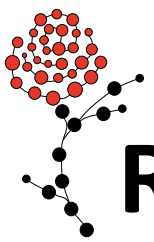
- formalizing models and implementing social semantic web applications
- calculating on heterogeneous typed graphs of the web



typed graphs

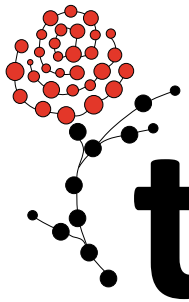
what kind of formalism is the best suited for such models?

- to specify formalisms and systematically evaluate their implementation in real applications
- abstraction of knowledge representation models following conceptual graphs and semantic networks approaches
- dissociate semantics from languages and parameterize operators



RIF-SPARQL: a RIF dialect using SPARQL

RIF-BLD	SPARQL
P(n1 -> v1, ..., nn -> vn))	[a rif:NamedArgs ; rif:name P ; rif:arity n ; rif:n1 v1 ; ... rif:nn vn]
P(t1, ... tn)	[a rif:Positional ; rif:name P ; rif:arity n ; rif:arg1 t1 ; ... rif:argn tn]
l1 = l2	Filter(l1= l2)
?x1 = ?x2	Filter(?x1 = ?x2)
?x = l	Filter(?x = l)
l= External(P(t1 ... tn))	Filter(l = τ(External(P(t1 ... tn))))
?x= External(P(t1... tn))	Filter(?x = τ(External(P(t1 ... tn))))



typed graphs

analyze typed graph structures and their interactions?

- to extend abstract graph model to cover as many features as possible of SPARQL 1.1 and RIF
- to specify new operators in terms of graph manipulations in an abstract graph machine.
- to extend the graph operators of our abstract model to integrate approximation, clustering and analysis operations
- to adapt structural metrics of social analysis to take into account the types in the graphs
- to study spreading algorithms and extend them to work on typed graphs in particular to propose type-based propagation functions

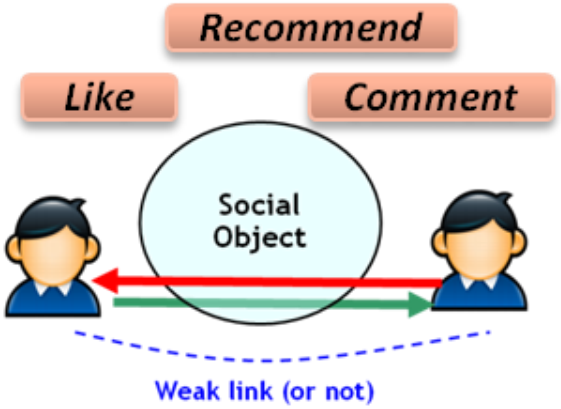
e.g. typed proximity centrality

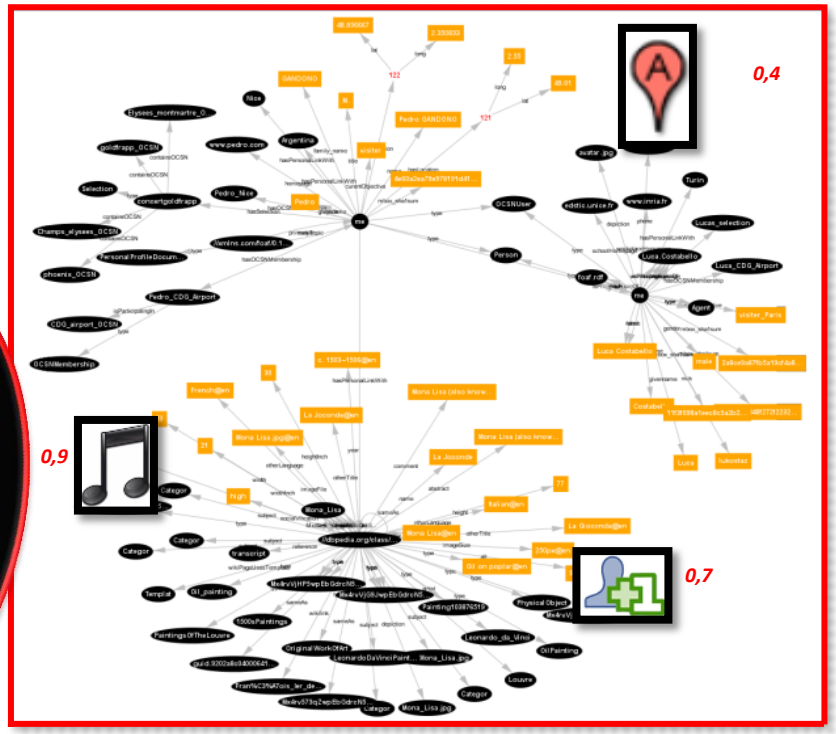
$$C^{c}_{<knows*/worksWith>}(k) = \left[\sum_{x \in E_G} length\left(g_{<knows*/worksWith>}(k, x) \right) \right]^{-1}$$

```
select distinct ?y ?to (pathLength($path) as ?length)
                       ((1/sum(?length)) as ?centrality)
where{ ?y s (foaf:knows*/rel:worksWith)::$path ?to
}group by ?y
```

contextual notification

propagation of interests for suggestion





$$a(i, n+1, t) = \frac{w_s * s(i, n+1, t) + \sum_{j, e_{i,j}} \left[w_p\left(l\left(e_{i,j}\right), t\right) * a(j, n, t) \right]}{w_s + \sum_{j, e_{i,j}} w_p\left(e_{i,j}\right)}$$

matchmaking by abduction

discover and qualify the best possible match for a demand

Terminological Axioms (TBox $\mathcal{T}$).

- Concept Inclusion Axiom ($C \sqsubseteq D$), ex. Hotel $\sqsubseteq$ Accommodation
- Concept Equivalence Axiom ($C \equiv D$), ex. Hotel5Stars $\equiv$ Accommodation $\sqcap \exists$isClassified.$5Stars$

Assertions (ABox $\mathcal{A}$) .

- Concept Assertions ($a : C$), ex. $Negresco$: Hotel5Stars
- Role Assertions($\langle a, b \rangle : R$), ex. $\langle Negresco, 5Stars \rangle$: isClassified

Role box $\mathcal{R}$.

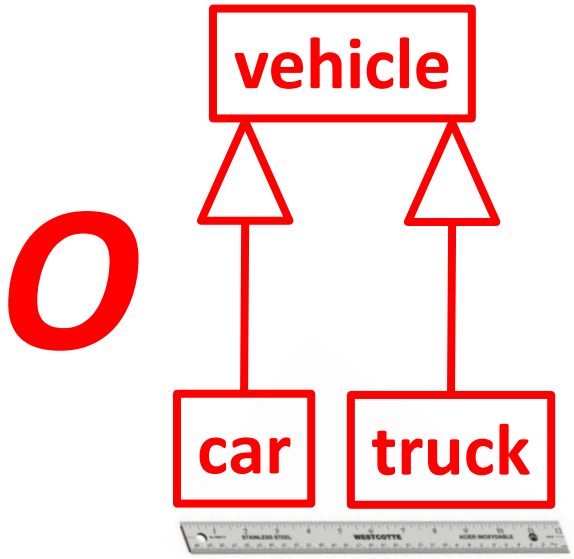
- Role Inclusion Axiom ($R \sqsubseteq S$), ex. isClassified5Stars $\sqsubseteq$ isClassified
- Role Transitivity, ex Transitive(isComposedOf).

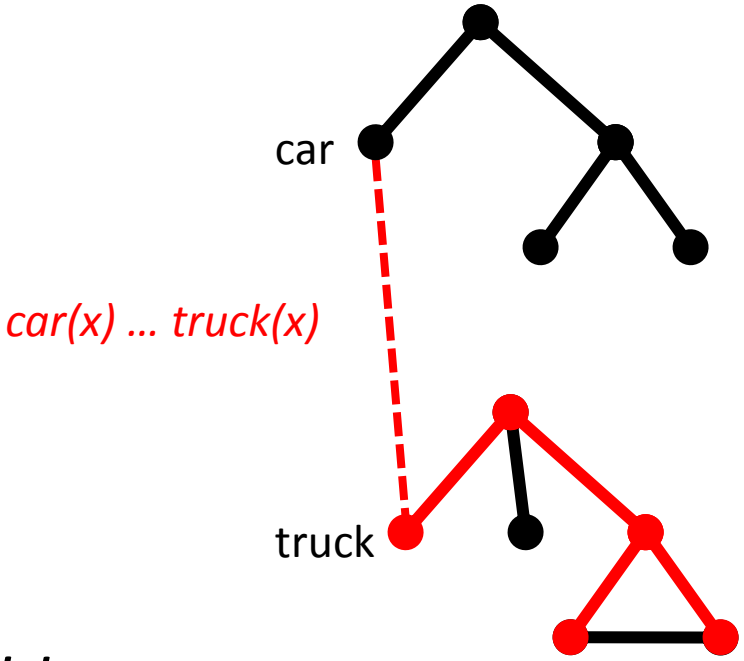
Abduction.

Ex: *All* Hotels *are* Accommodations; $Negresco$ *is an* Accommodation

Then, $Negresco$ *is a* Hotel (!)

e.g. controlled approximation



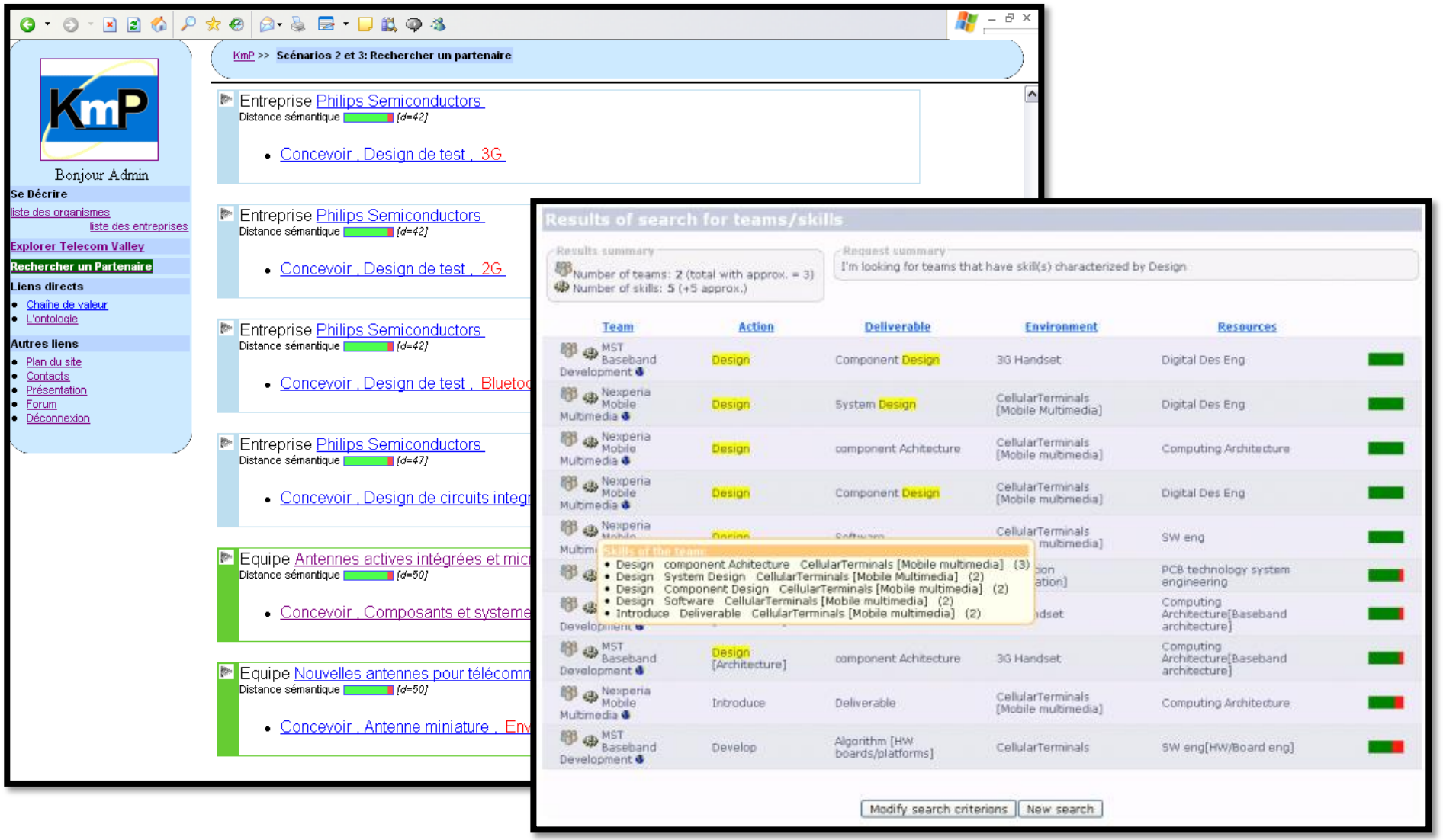


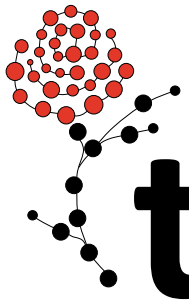
$t_1(x) \Rightarrow t_2(x) \quad \rightarrow \quad d(t_1,t_2) < \text{threshold}$

$$\forall (t_1,t_2) \in H_c{}^2 \text{ let } dist(t_1,t_2) = \min_{\{t \geq t_1, t \geq t_2\}} \left(l_{H_c}(t_1,t) + l_{H_c}(t_2,t) \right)$$

$$\forall (t_1,t_2) \in H_c{}^2; t_1 \leq t_2 \text{ let } l_{H_c}(t_1,t_2) = \sum_{\{t \in \langle t_1,t_2 \rangle, t \neq t_1\}} \left[\frac{1}{2^{depth(t)}} \right]$$

e.g. approximated search



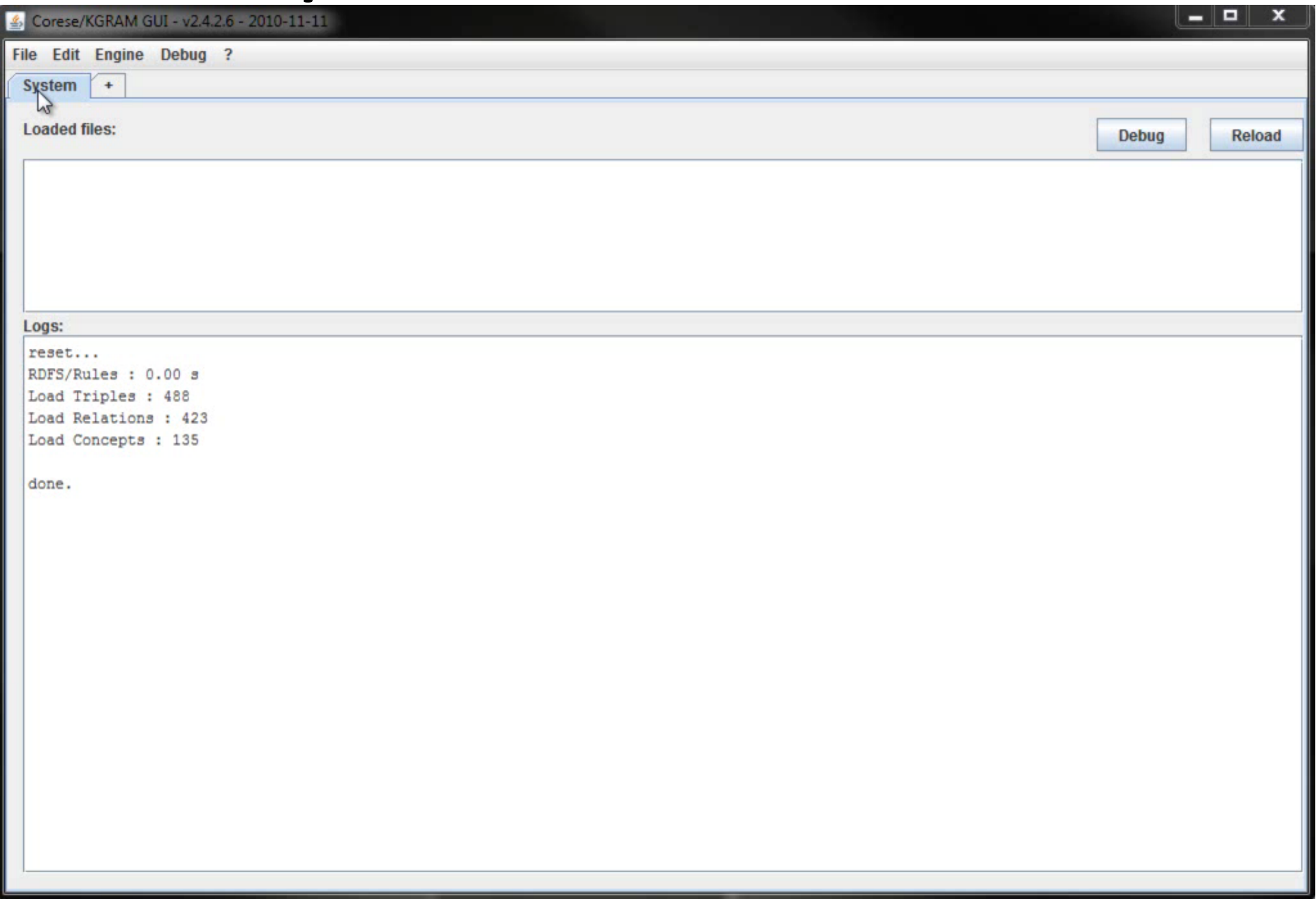


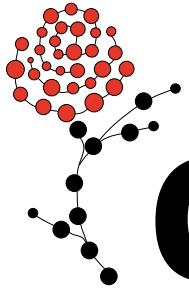
typed graphs

support different graph life-cycles, calculations & characteristics?

- declarative representation of workflows of operations in RDF
- to combine with standards like SPARQL 1.1 to support heterogeneous operations on possibly heterogeneous and distributed data
- to study the handling of graphs with different semantics relying on an abstract graph model & an abstract graph virtual machine
- to support temporal reasoning to identify trends, mine temporal propagation, track behavioral patterns
- to port and extend previous work on automated explanation in expert systems to explain results and failures

CORESE/ KGRAM

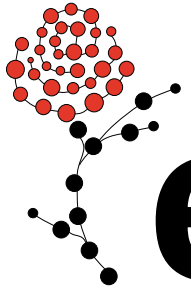




corese/kgram

- Semantic Web Factory: RDF/S, SPARQL 1.1 Query & Updade, Inference Rules
- Open Source CeCILL-C
- Knowledge Graph Abstract Machine with 3 Proxies (Producer, Matcher, Evaluator)

3 ANR, 2 RNRT, 1 region project, 4 european project,
4 industry grants, 10 academic grants,
>30 applications, 23 PhD, 9 edu. Institutions, etc.



e.g. extensions

- XML and XPath sources

```
select * where {  ?x c:authorOf ?doc
filter( xpath(?doc, "/book[title='1Q84']") ) }
```

- path variables and length

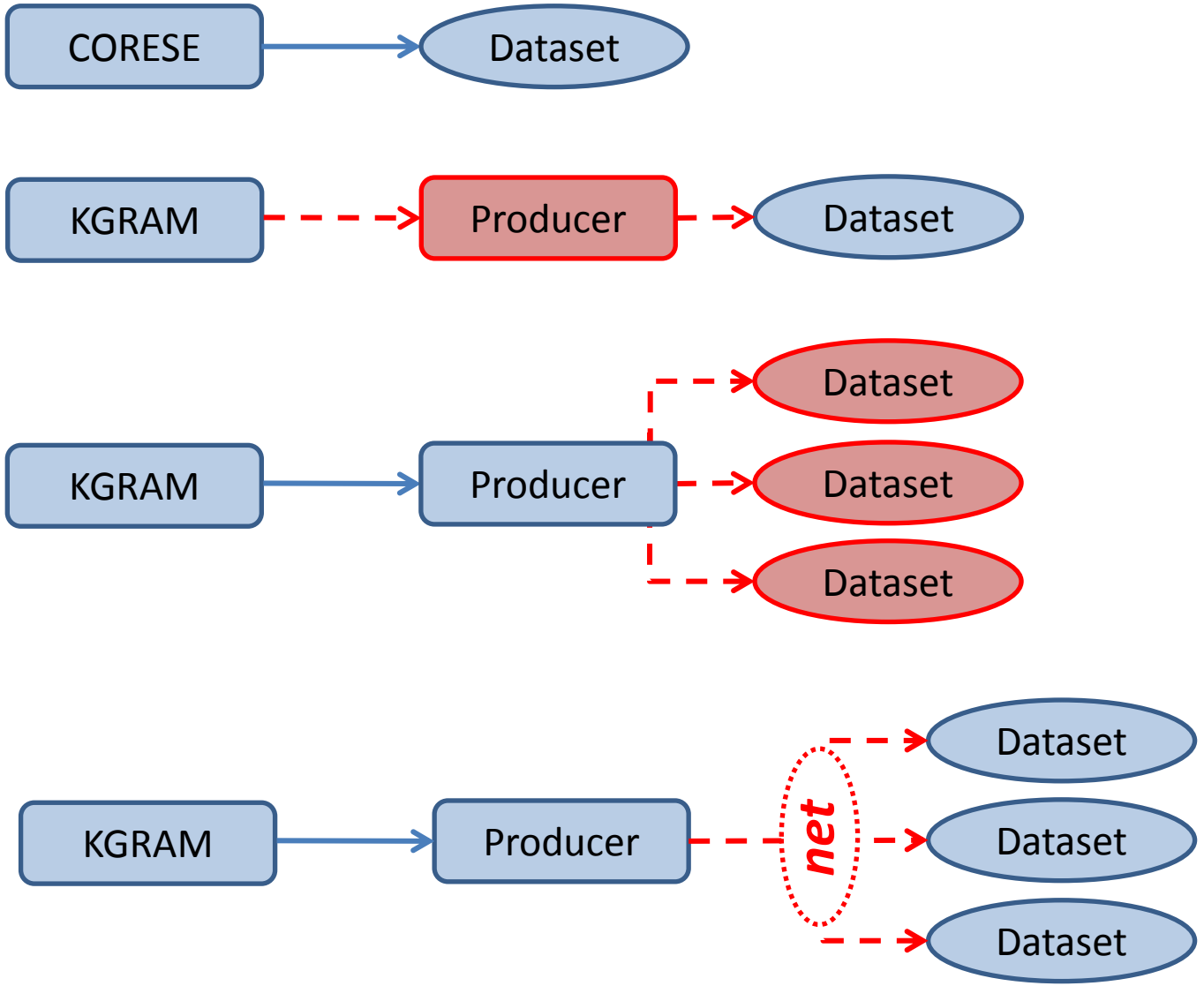
```
select ?x ?y (min (pathLength($path)) as ?min)
where { ?x foaf:knows+::$path ?y } group by ?x ?y
```

- approximate search

```
select more * (kg:similarity() as ?sim) where {
    ?x rdf:type c:Engineer ; c:authorOf ?doc .
    ?doc rdf:type c:TechReport ; c:topic c:Java }
```

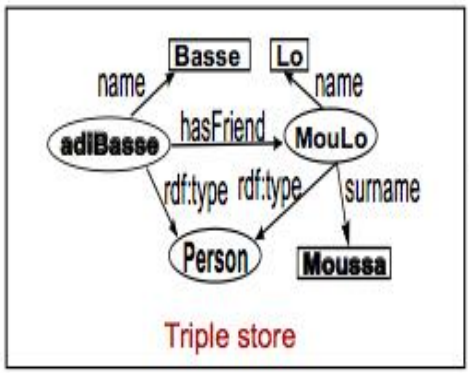
c:Tutorial

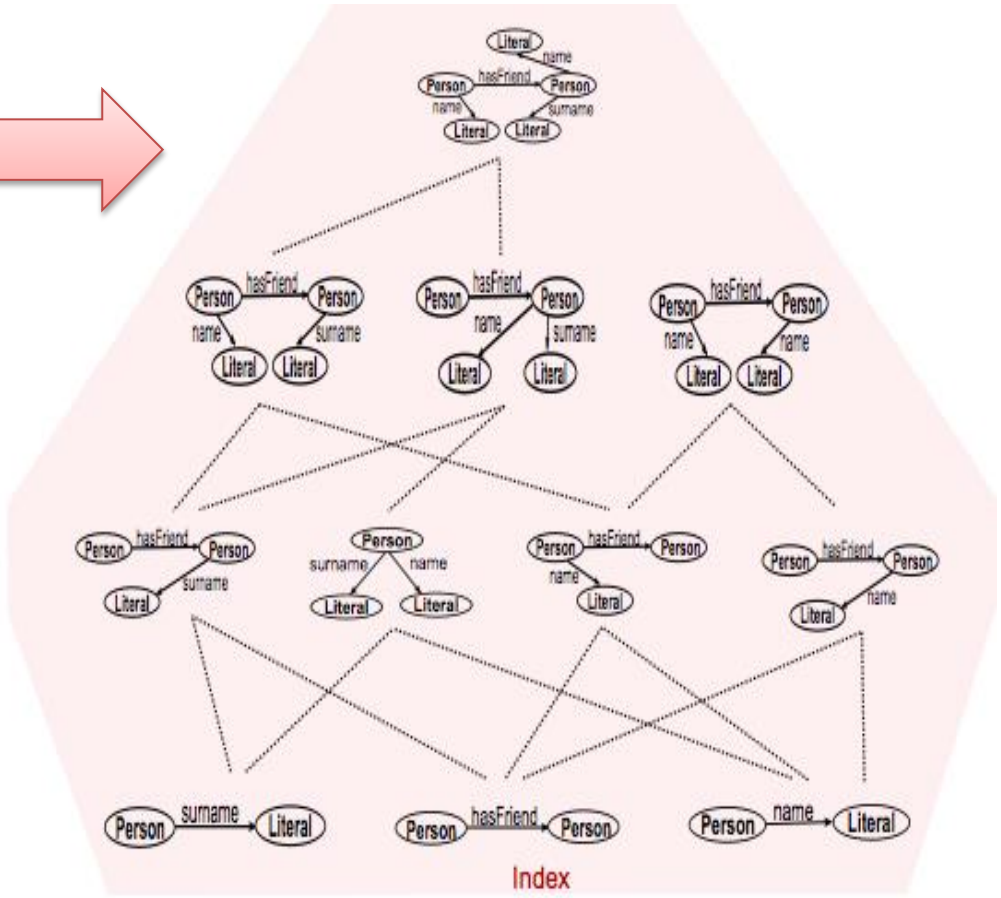
e.g. evolutions



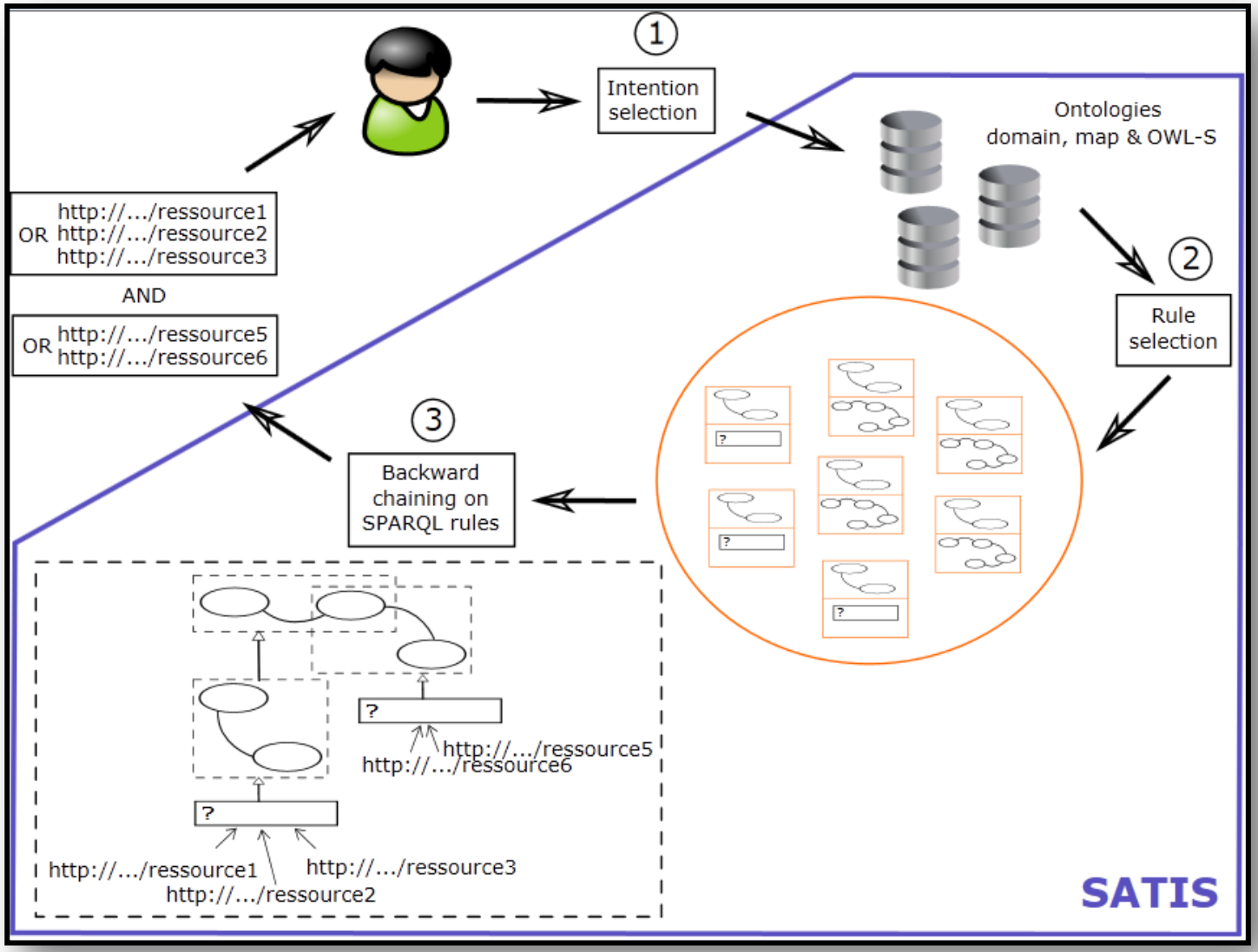
inductive index creation for a triple store

- characterize distributed RDF sources
- incremental index generation and maintenance

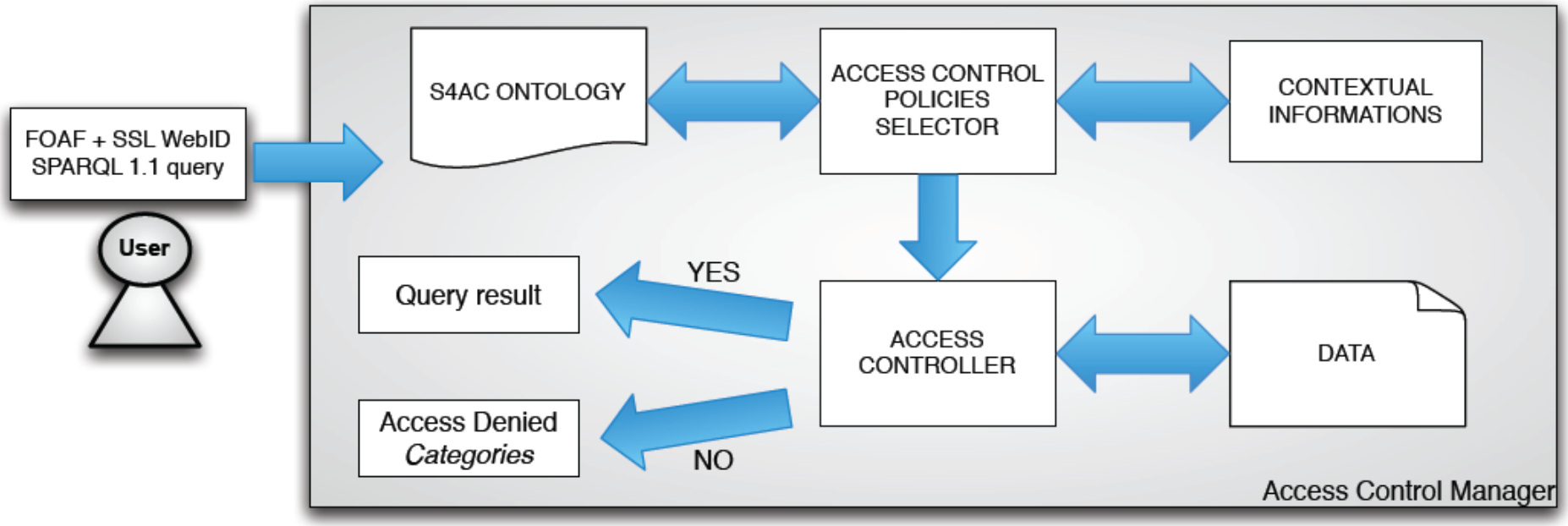




SATIS: from end-user's requirements to web services retrieval

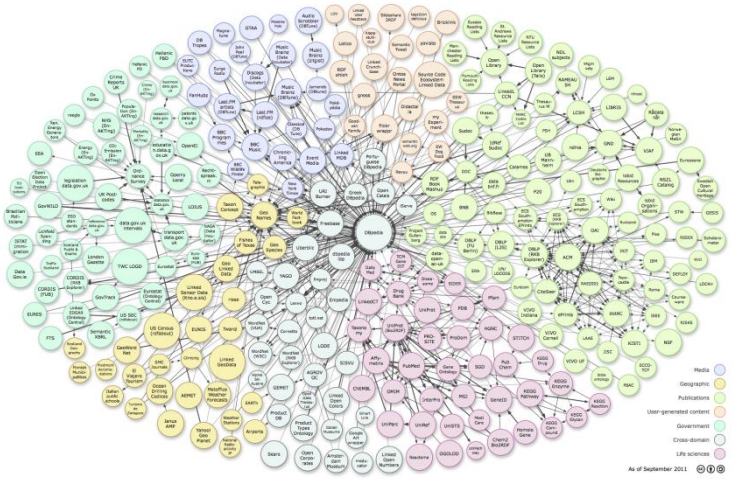


Access Control Model and Licences for Linked Data



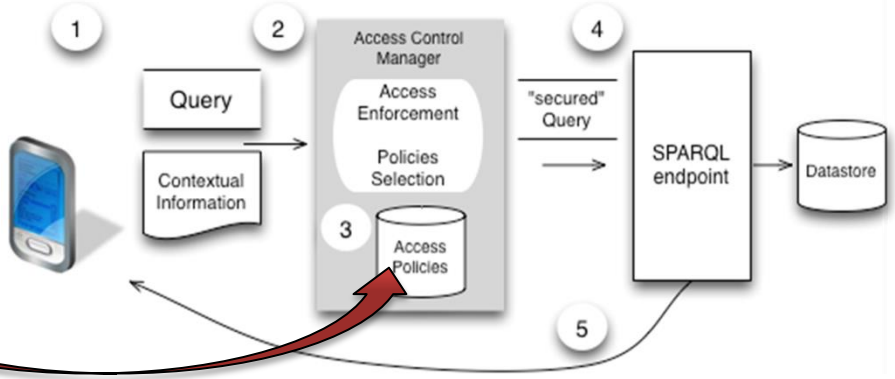

```
ASK { ?resource dcterms:creator
      ?provider .
      ?provider rel:memberOf ?g .
      ?user rel:memberOf ?g }
```

socio-semantic access control



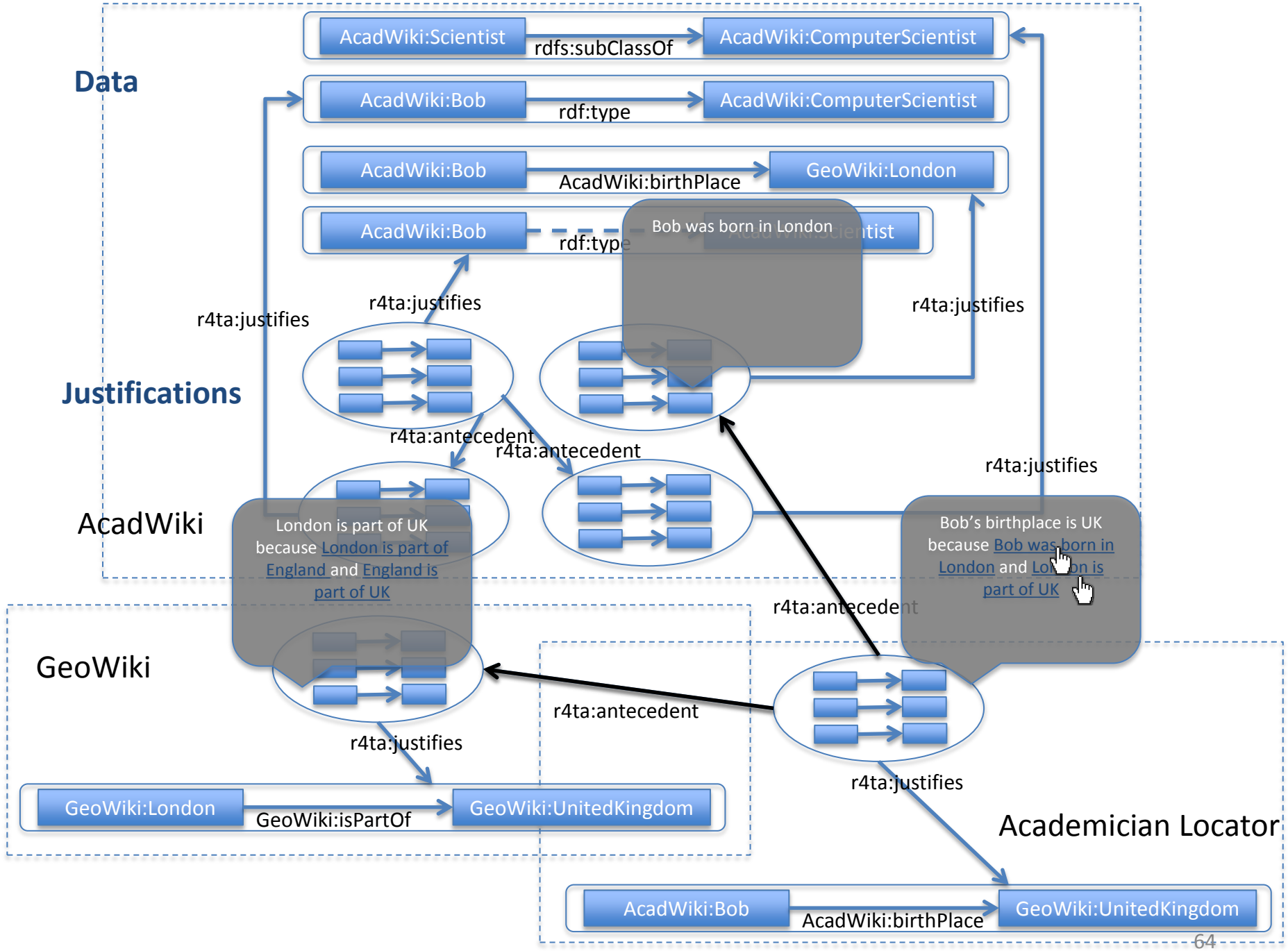
e.g. only my colleagues
working on the same subject

```
ASK{ ?res dcterms:creator ?prov .
     ?prov rel:hasColleague ?user .
     ?prov foaf:interestedBy ?topic .
     ?user foaf:interestedBy ?topic }
```



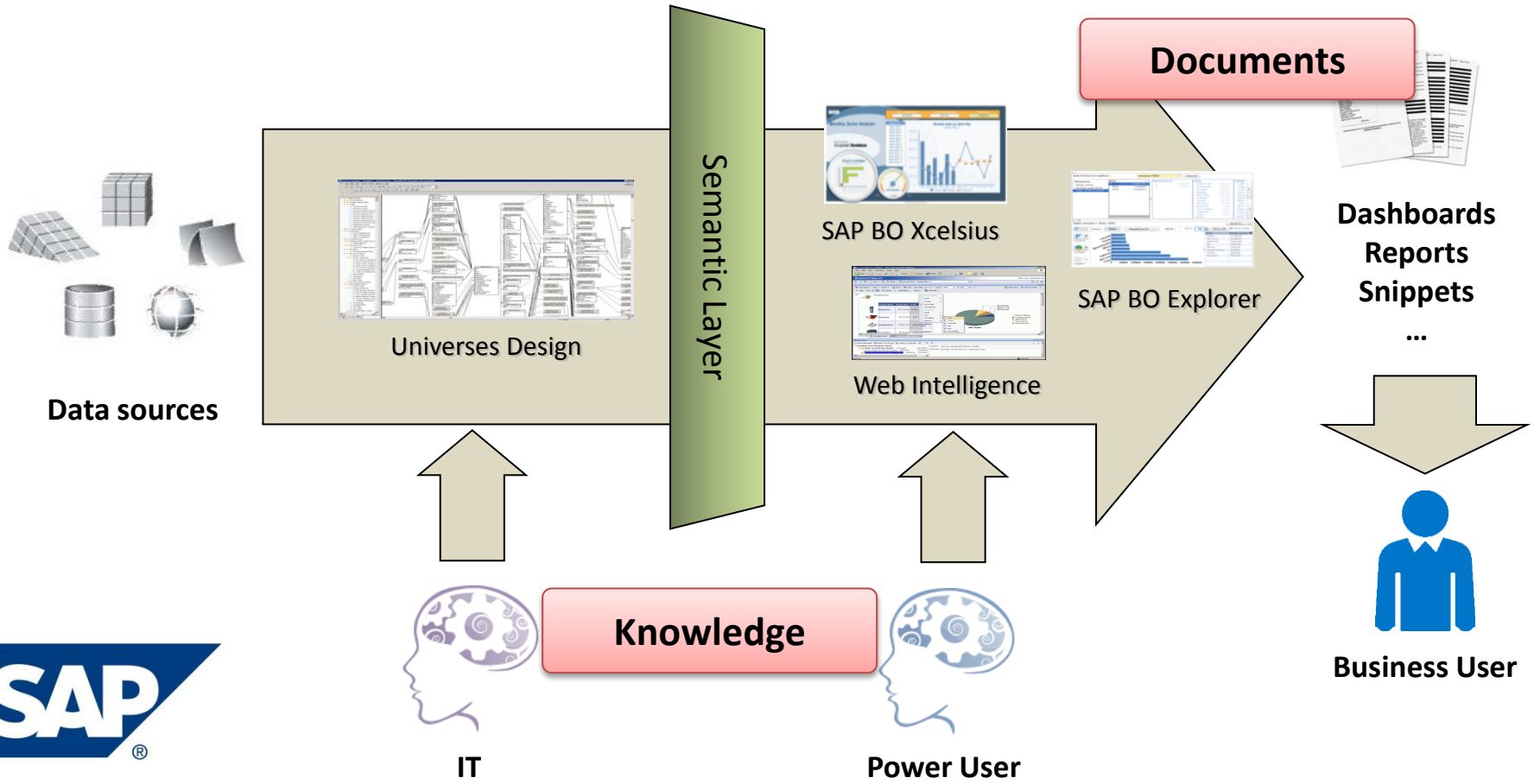
opening query-solving mechanisms

- explain results & failures & performances
- Justification: metadata about conclusion
- Ratio4TA: a vocabulary to represent justifications
- Linked justifications using the LOD principles


Data
AcadWiki:Scientist
rdfs:subClassOf
AcadWiki:ComputerScientist
AcadWiki:Bob
rdf:type
AcadWiki:ComputerScientist
AcadWiki:Bob
AcadWiki:birthPlace
GeoWiki:London
AcadWiki:Bob
rdf:type
Bob was born in London
r4ta:justifies
r4ta:justifies
r4ta:justifies
Justifications
r4ta:antecedent
r4ta:antecedent
r4ta:justifies
AcadWiki
London is part of UK because London is part of England and England is part of UK
Bob's birthplace is UK because Bob was born in London and London is part of UK
r4ta:antecedent
GeoWiki
r4ta:antecedent
r4ta:justifies
r4ta:justifies
GeoWiki:London
GeoWiki:isPartOf
GeoWiki:UnitedKingdom
Academician Locator
AcadWiki:Bob
AcadWiki:birthPlace
GeoWiki:UnitedKingdom

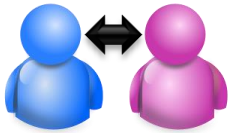
Semantic Web & *Business Intelligence*

- reintegrate reports and traces of BI in the workflows
- RDF models and extraction from reports
- representation and querying for new reports



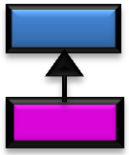
approach

modeling actors, actions and interactions



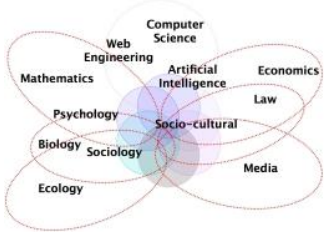
- Design methodologies
- User-centric design and interaction
- Model collective structures and relations
- Human-web and human-web-human interactions

graph-based knowledge representation, reasoning and operationalization



- Representing knowledge with graph formalisms
- Querying and reasoning with graph operators
- Composing and integrating sources and operators
- Context-based representation and reasoning

synergies and research intersection in web sciences



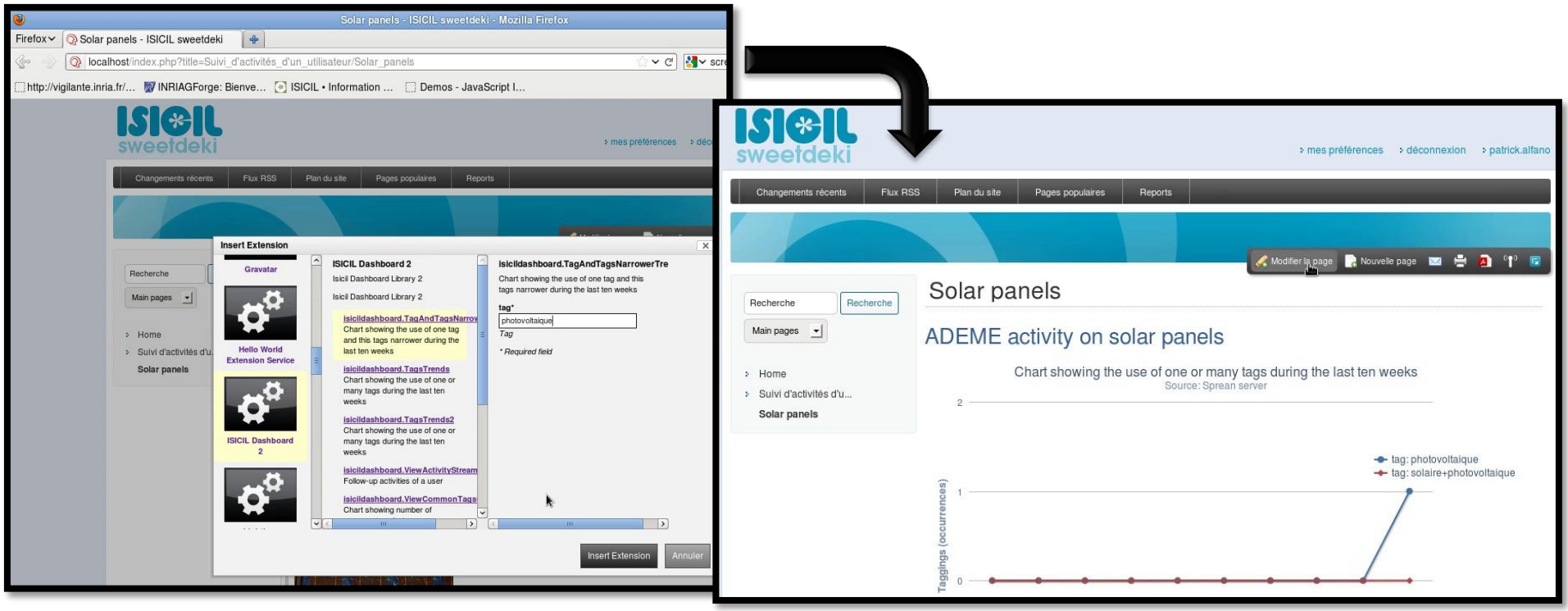
- Cooperative Web-based Information Systems
- Representing users and interactions with graphs
- Heterogeneous shared web graphs
- Notification, monitoring, watch and surveillance on dynamic networks
- Interacting with the inner machinery

Deployment environment: web applications, web standards, web science.

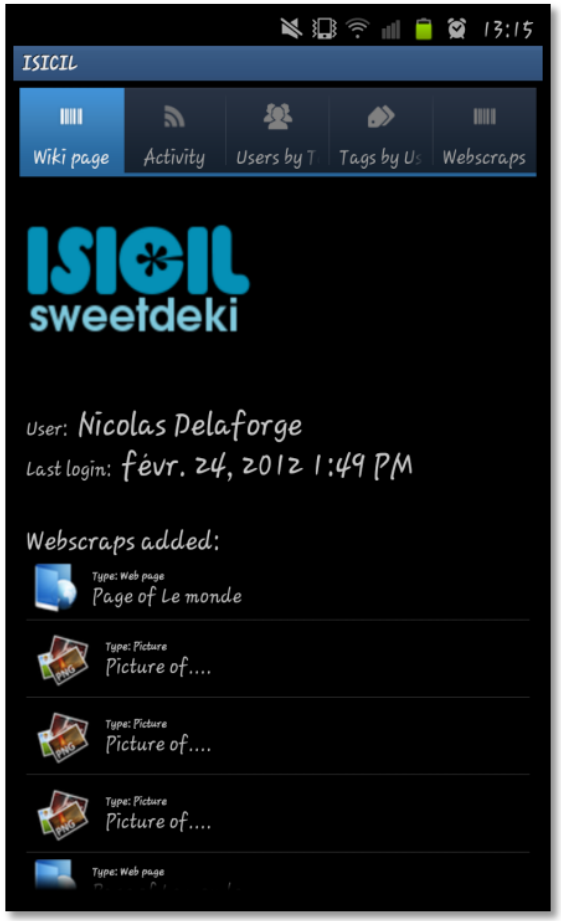
Application scenarios: assisting online epistemic communities in one ubiquitous web.

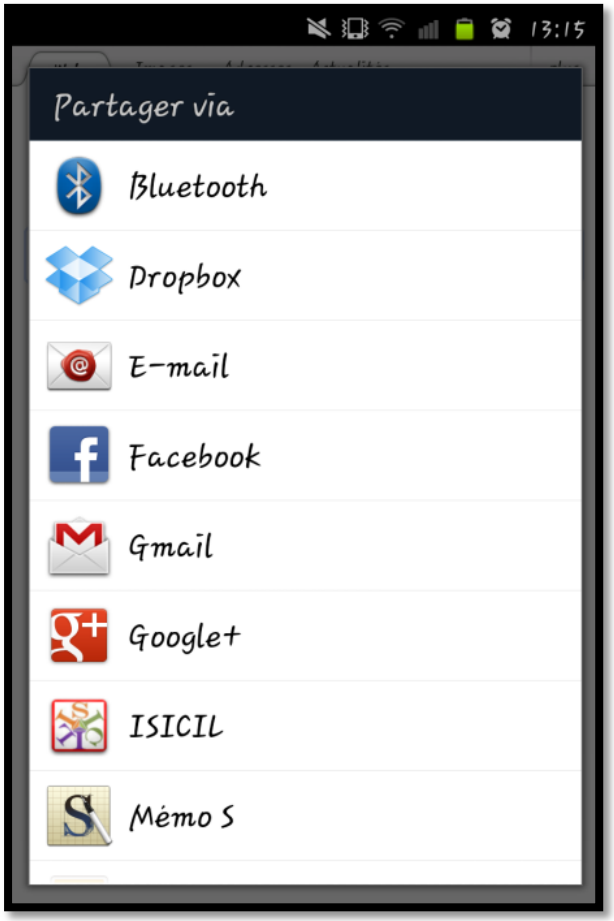
SweetDeki : a semantic wiki extending an industrial open source software

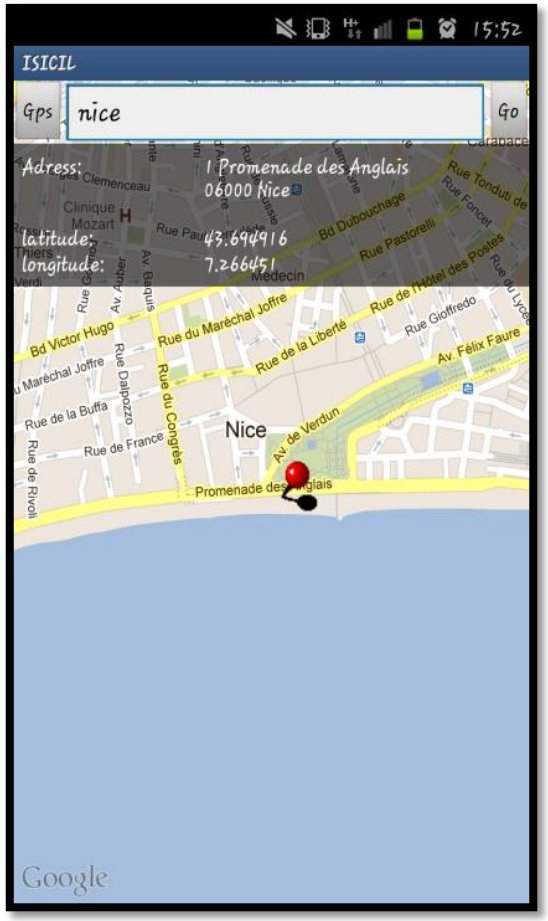
- Tracks user activity, feeds the social network graph
- Common model for users/resources/tags
- RDFa injection in pages and reports



integrating with new web platforms







undergoing PhD

1. Pavel Arapov: Semantic application wikis, UNS
2. Adrien Basse: Graph Index for distributed queries, Univ. Gaston Berger, Senegal
3. Franck Berthelon: Detecting emotional states in Serious Games, UNS
4. Ahlem Bouchahda: A semantic approach to secure data base accesses, with SupCom Tunis
5. Khalil Riad Bouzidi: Management of technical and regulatory knowledge, with CSTB
6. Luca Costabello: Mobile access to the Web of Data, INRIA
7. Corentin Follenfant: Semantic Web and Business Intelligence, with SAP
8. Rakebul Hasan : explaining distributed query on the semantic web (ANR-Kolflow)
9. Maxime Lefrançois: Collaborative Management of Interlingual Knowledge, UNS
10. Nicolas Marie: context/interest querying for the web of data, Alcatel-Lucent Bell Labs
11. Thi Hoa Hue Nguyen : Schema checking and orchestration of SPARQL queries, Vietnam-CROUS
12. Oumy Seye: Rules for the Web of Data, Lirima, Univ. Gaston Berger, Senegal
13. Imen Tayari : Representing, annotating and detecting emotions in multimodal signals , with Sfax Tunisie

projects

isicil.inria.fr (ANR)

- enterprise social networking
- business intelligence, watching, monitoring
- communities of interest, of practice, of experts

datalift.org (ANR)

- from raw public data to interlinked data and schemas
- a platform and documentation to assist the process
- validation on real datasets

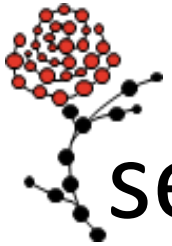
kolflow.univ-nantes.fr (ANR)

- reduce the overhead of communities building knowledge
- federated semantic: distributed blackboard for man-machine coop.

dbpedia.fr (Ministry of Culture)

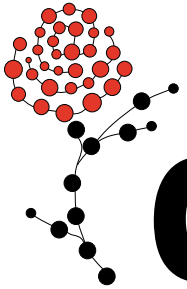
- extract and publish data and facts from French version of wikipedia

. . . Labex UCN@SOPHIA



semanticpedia.org
French-speaking DBpedia

- Extract data from French speaking wikipedia
  - Reliable extraction and SPARQL end-point
  - Augment extraction and mappings
  - Monitor quantity and quality
  - Extend to other sources e.g. Wiktionary
- Results (February, Alpha testing)
  - 125 588 538 extracted triples in RDF
  - 2 400 queries on average per day



diffusion

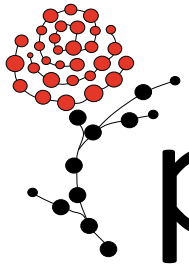
Master IFI: from KIS to Web

- gradual changes to the courses
- then replace the master by a new one

Standardization participation

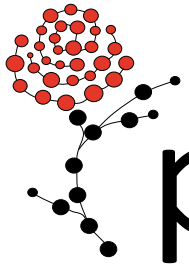
- Working groups: RDF 1.1, SPARQL 1.1
- INRIA Advisory Committee Representative

Open-source and CeCILL-C free software



positioning

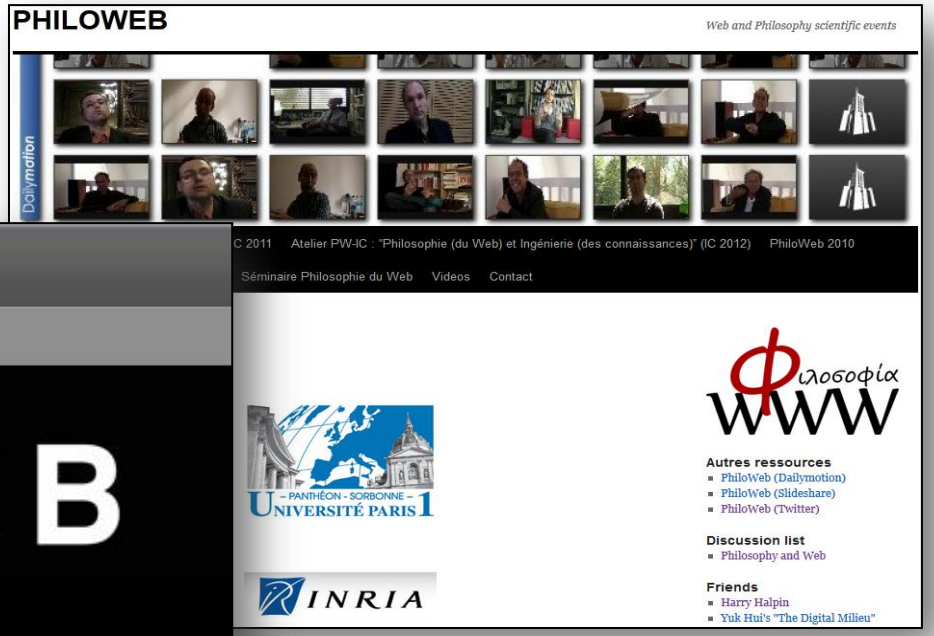
- **graph-based approaches**
  LIRMM (GraphIK), LINA (COD), IRIT (IC^3), Laval (LIC)
  abstract model and operators, virtual machine, social
- **other formalisms**
  Exmo, Orpailleur, Leo, Karlsruhe, Vrije, Politecnica Madrid, Musen Lab, Manchester, DERI, STI2, Trento, KMT Salzburg, KMI, ICS-Forth,
  graphs, social, interaction
- **data and knowledge based systems**
- **interaction design and knowledge systems**
- **social network analysis**
- **semantic requirement engineering**

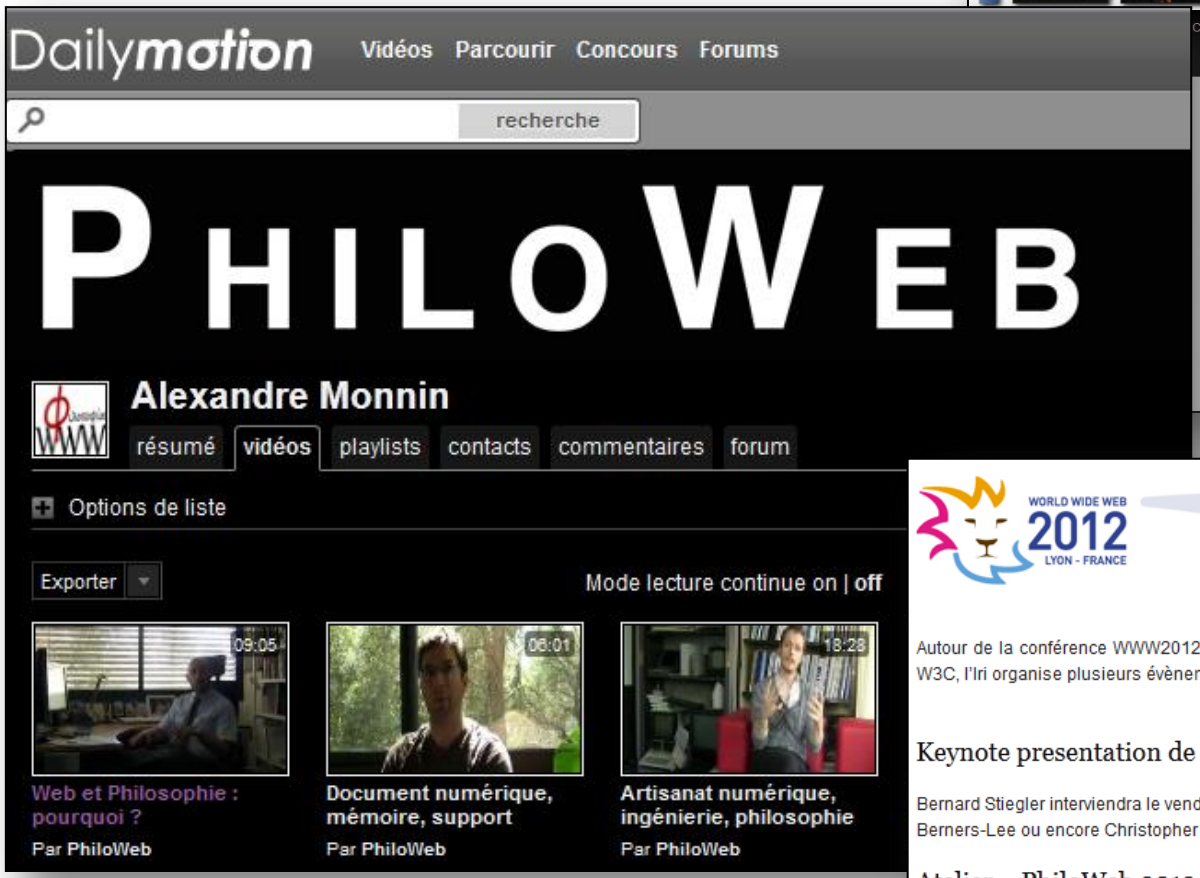


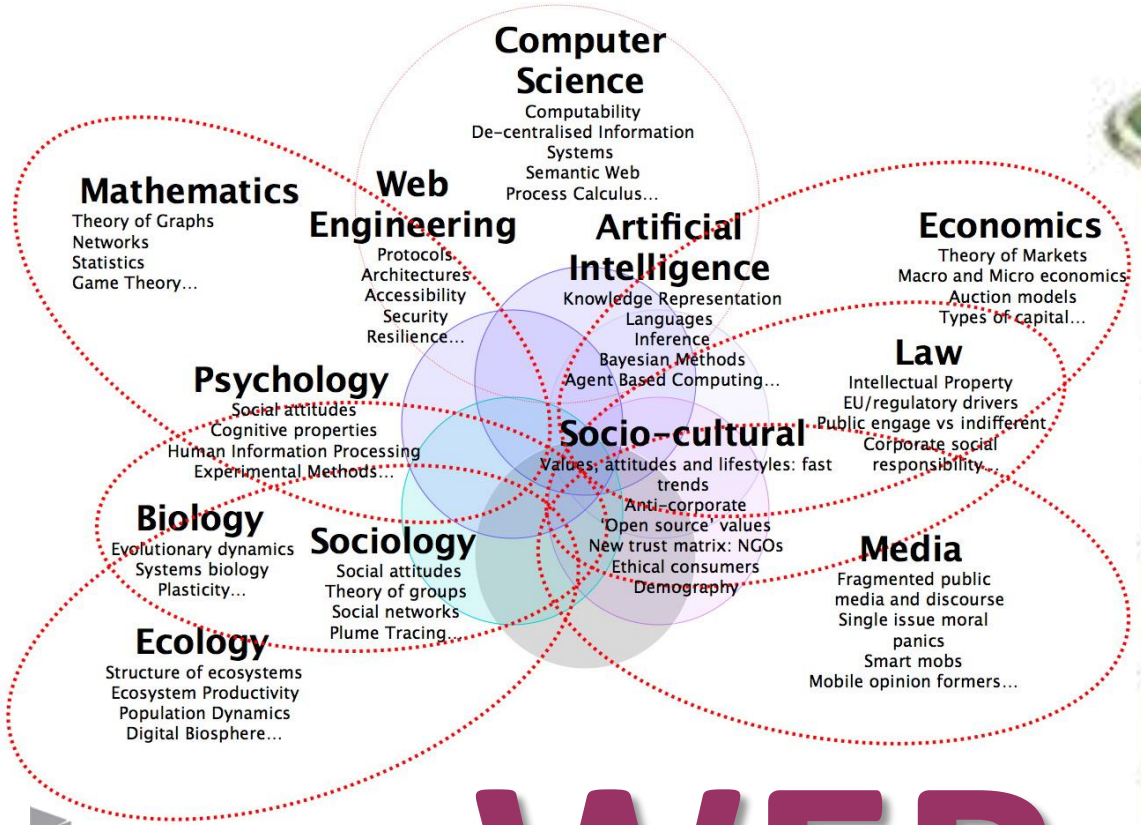
partnerships

- UTT (Tech-CICO), Troyes
- Ministry of Culture
- Alcatel-Lucent Bell Labs
- SAP
- GDF/Suez
- Ipernity
- Orange
- Philips Semiconductors
- IFP, BRGM and EADS
- Semantic Systems (Spain), LivingSolids (Germany), Estanda (Spain) and ItalDesign (Italy) **ETC.**

INRIA & Sorbonne

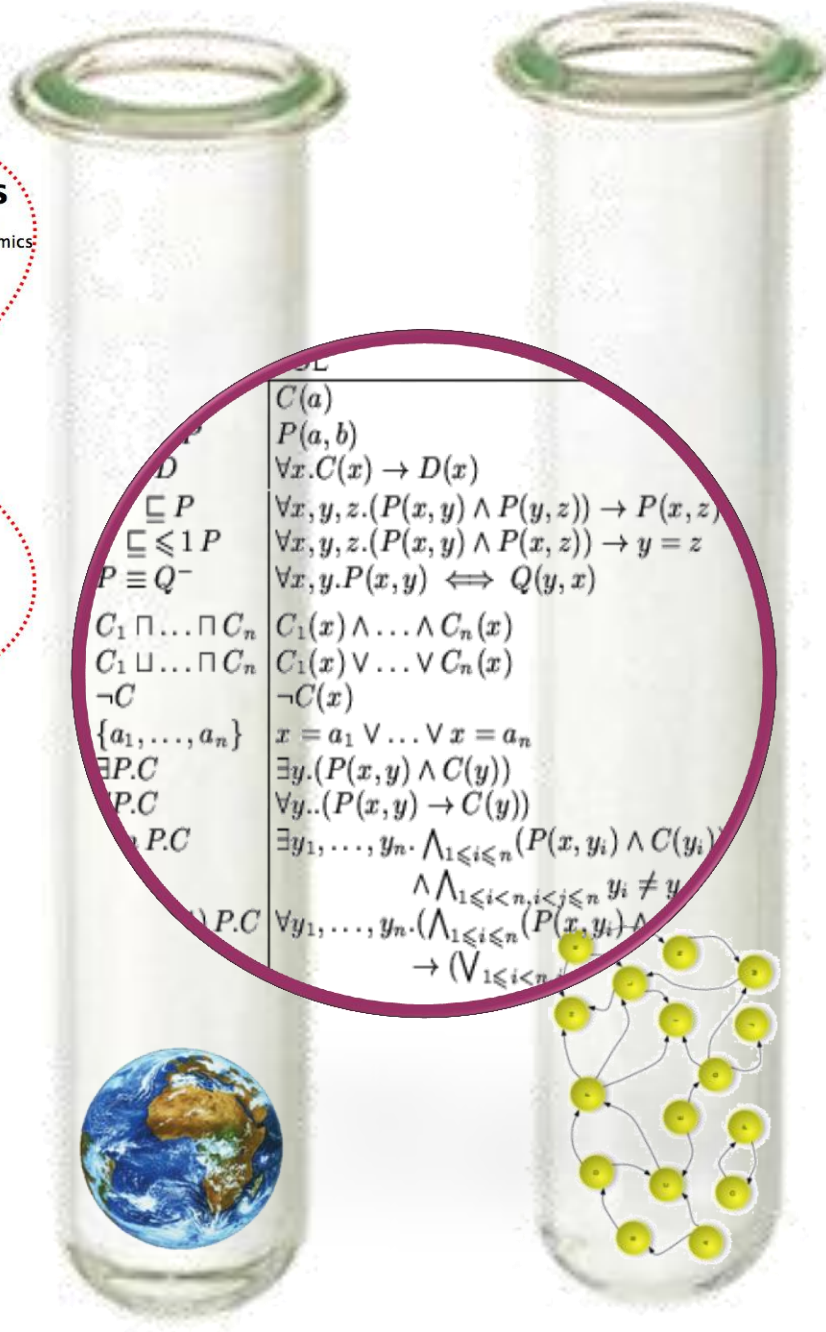


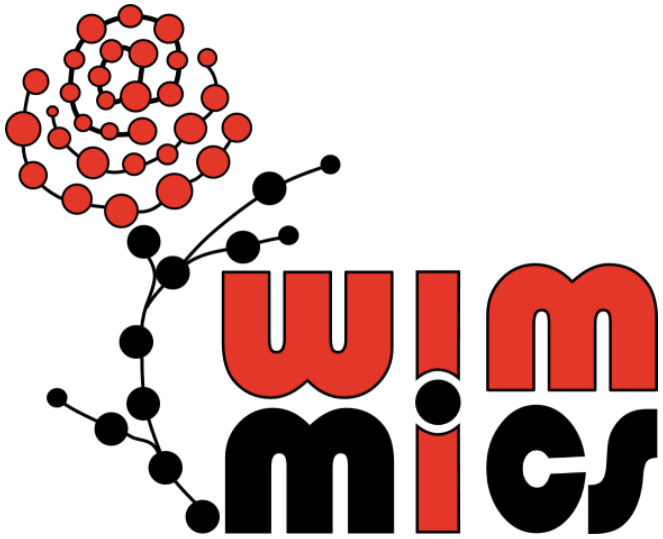




WSRI
web science research initiative

WEB science





Web-Instrumented Man-Machine Interactions, Communities, and Semantics*

a proposal for a joint research team between INRIA Sophia Antipolis – Méditerranée and I3S (CNRS and University Nice Sophia Antipolis).

(*) "wimmics" comes from "wimi", a variety of roses.