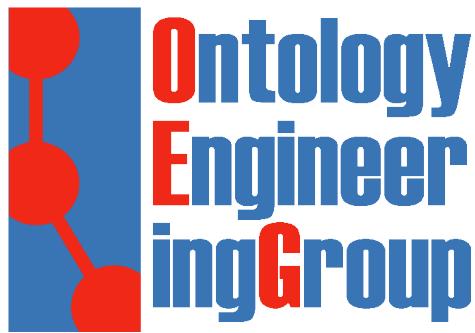


Important data about this course

- Official guide
 - <http://www.dia.fi.upm.es/masteria/uploads/Guias%20aprendizaje/2012-13/A11.%20Ingenier%C3%A3o%20ontol%C3%B3gica.pdf>
- Wiki with updated materials
 - <http://delicias.dia.fi.upm.es/wiki/index.php/MasterRD12-13>
- Contact details
 - Oscar Corcho: ocorcho@fi.upm.es
 - Asunción Gómez-Pérez: asun@fi.upm.es
 - Preferred e-mail: ontologies@delicias.dia.fi.upm.es



1. Introduction

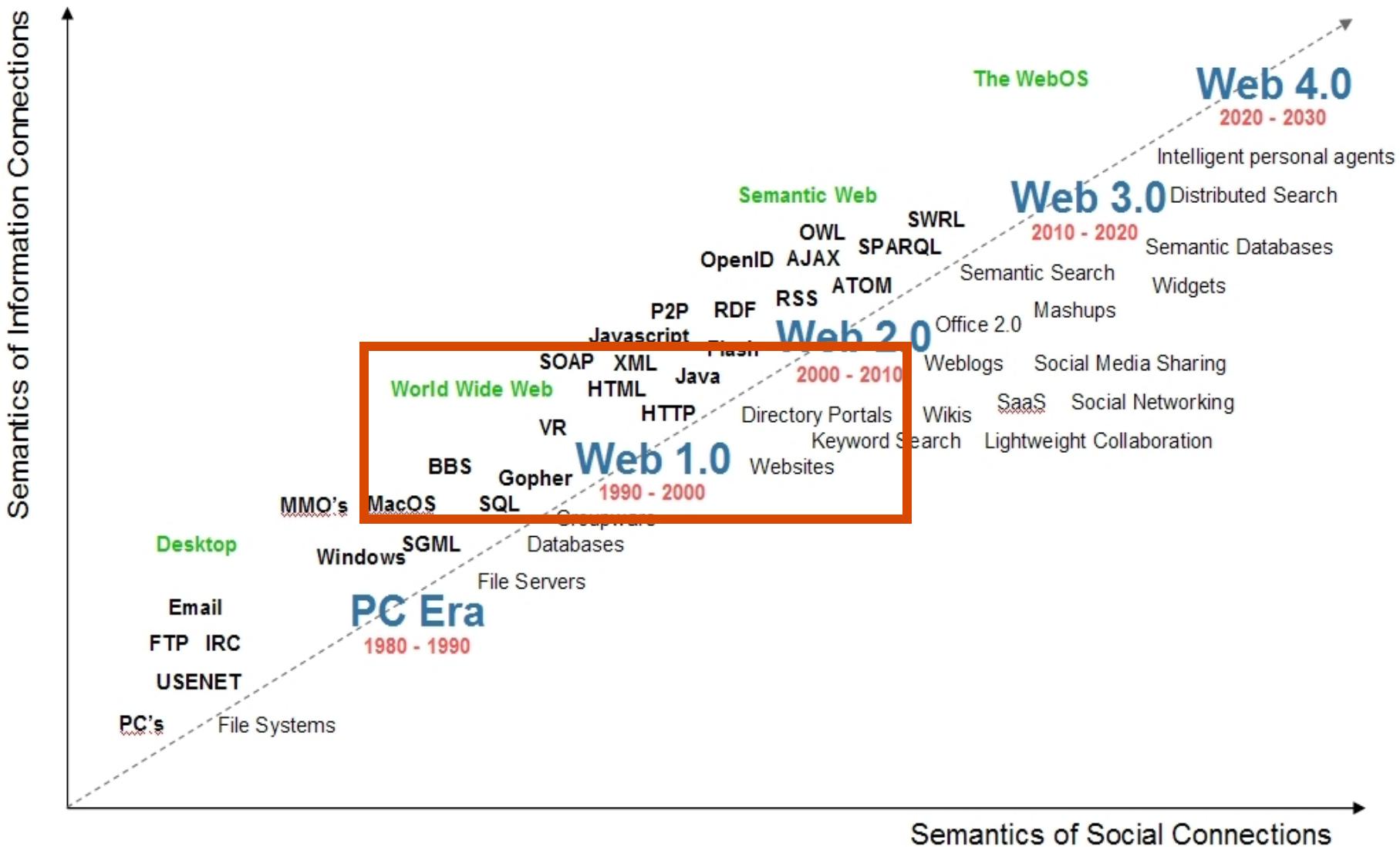
Asunción Gómez-Pérez, Oscar Corcho
{asun,ocorcho}@fi.upm.es
<http://www.oeg-upm.net>

Omtological Engineering Group
Laboratorio de Inteligencia Artificial
Facultad de Informática
Universidad Politécnica de Madrid
Campus de Montegancedo sn,
28660 Boadilla del Monte, Madrid, Spain

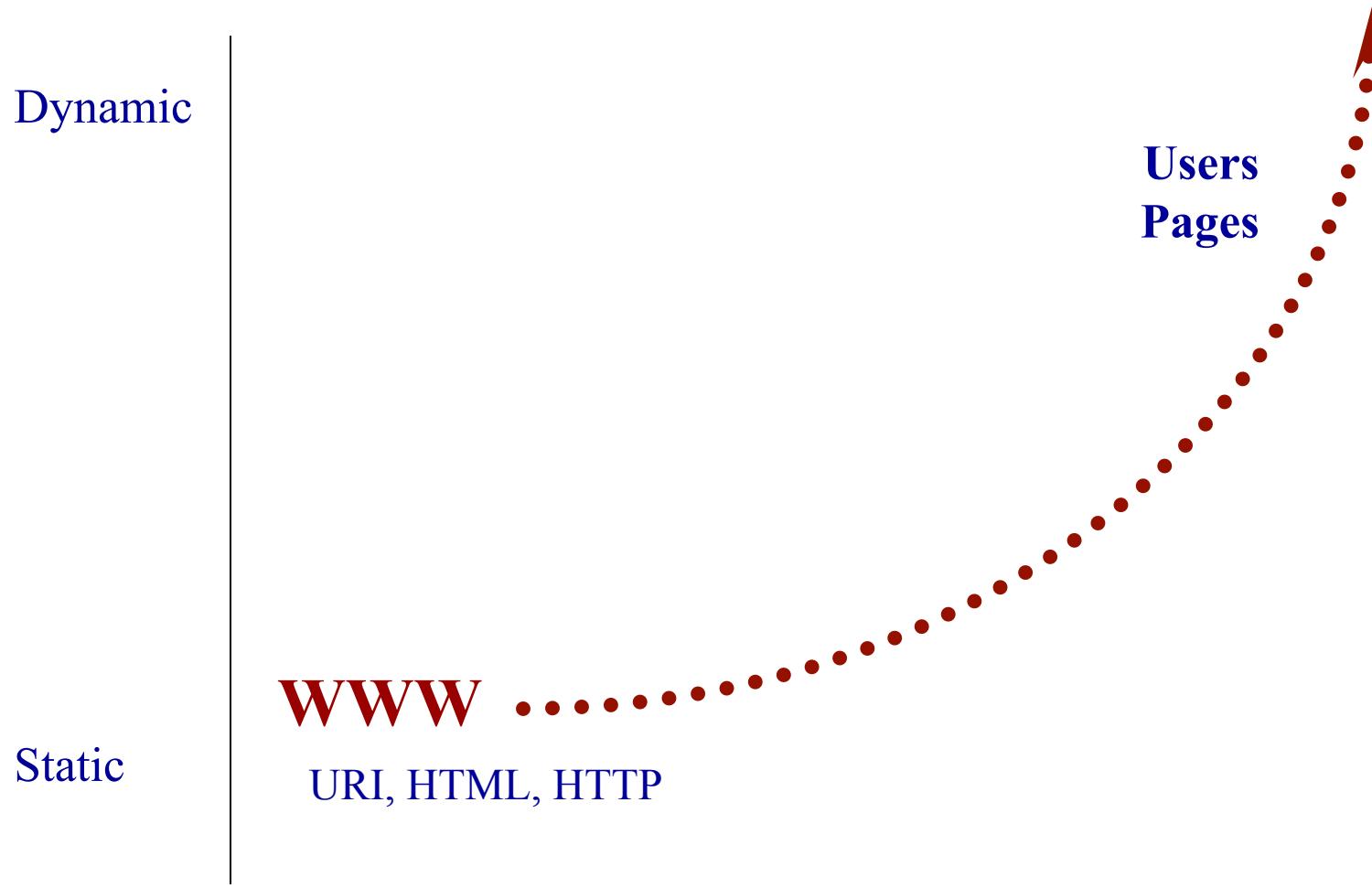
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Attribution-Noncommercial-Share Alike 3.0*

- Web
- Web 2.0
- Web 3.0 and the Semantic Web
- Linked data
- Examples of semantic applications
 - Semantic Webs
 - Corporative Semantics
 - Annotation at large scale
 - Semantic portals
 - Semantic Web Services

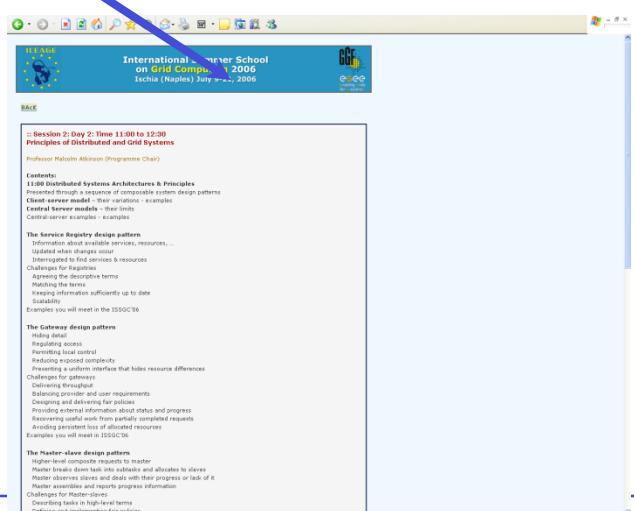
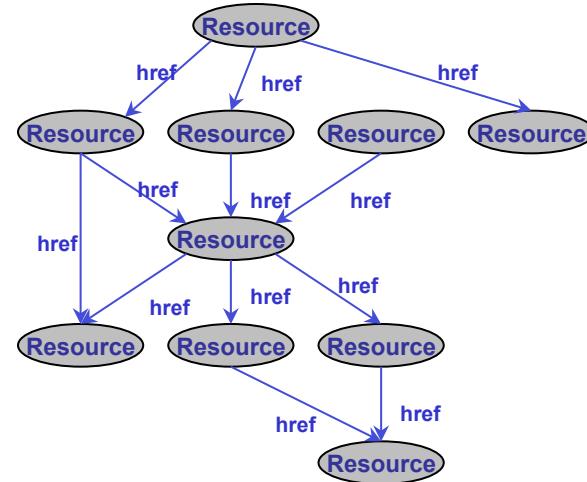
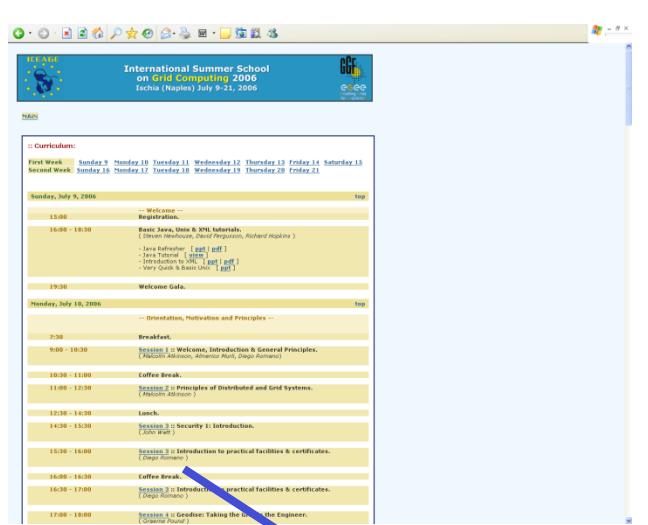
Web n+1: Roadmap



The problem: Information overload on the WEb



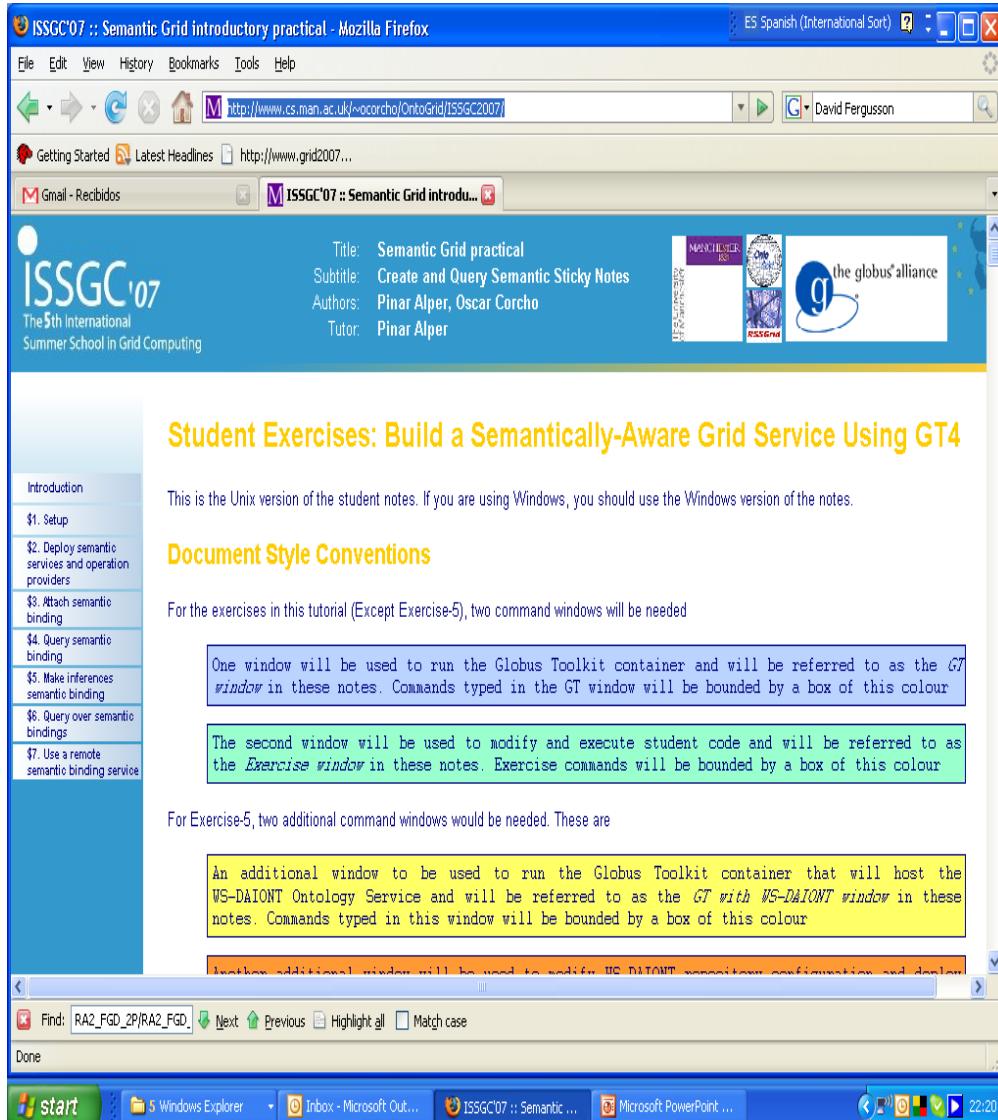
Where we are Today: the *Syntactic* Web



- A place where computers do the presentation (easy) and people do the linking and interpreting (hard).
 - Why not get computers to do more of the hard work?

What's the Problem?

- Typical web page markup consists of:
 - Rendering information (e.g., font size and colour)
 - Hyper-links to related content
- Semantic content is accessible to humans but not (easily) to computers...





المنسقة فی علم التطور :**الاسم**
آسنسيون غوميزبرز : المؤلفون
\$74.95
الكتاب : المعنی

>b>
المنسقة فی علم التطور />:>الاسم
>b>
>b>آسنسيون غوميزبرز >:>المؤلفون
>b>
>b>\$74.95
>b>
>b>الكتاب :>المعنی



Skjøte: Ontological Ingeniørarbeid
Forfatter: Overtakelse Gómez-Pérez...
Pris: 74.95€
Produkt: Bok

Skjøte: Ontological Ingeniørarbeid

Forfatter: Overtakelse Gómez-Pérez...

Pris: 74.95€

Produkt: Bok



- HTML is useful for browsing the information
- Content is language-dependent
- High cost for keeping the information up-to-date



タイトル: 存在論工学
著者: アスンシオン ゴメスペレス
価格: \$74.95
产品: 本

タイトル: 存在論工学

著者: アスンシオン ゴメスペレス...

価格: \$74.95

产品: 本



Title: Ontological Engineering
Authors: Asunción Gómez-Pérez...
Price: \$74.95
Product: Book

Title: Ontological Engineering

Authors: Asunción Gómez-Pérez...

Price: \$74.95

Product: Book

Information a machine can see...

XML allows the creation of metadata with “meaning”



Árabe



المنسقة في علم التطوير : الاسم
آسنسيون غوميز بيرز : المؤلفون
\$74.95 : السعر
الكتاب : المنتج

<الاسم><المنسقة في علم التطوير>/<الاسم>
<المؤلفون><آسنسيون غوميز بيرز>/<المؤلفون>
<السعر>\$74.95</السعر>
<الكتاب><المنتج>/<الكتاب>

Inglés



Title: Ontological Engineering
Authors: Asunción Gómez-Pérez...
Price: \$74.95
Product: Book

<Title>Ontological Engineering</Title>
<Author>Asunción Gómez-Pérez...</Author>
<Price>\$74.95</Price>
<Product>Book</Product>

¿What do the tags mean for the machine?



Solution: XML markup with “meaningful” tags?

But What About...?

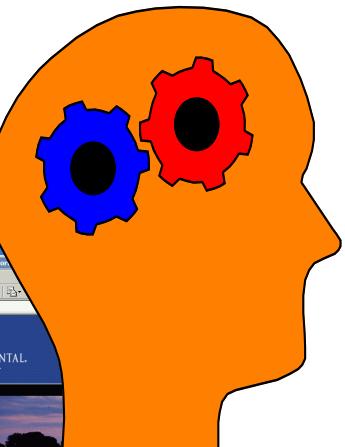
The problem of choosing information

The collage illustrates the complexity of information retrieval and interpretation. It shows how a single search term ('nemo') can lead to diverse results across different domains (e-commerce, education, science, and entertainment).

- Find the information
- Extract relevant information
- Interpretation by human users
- Synthesis



The problem of content aggregation: From Madrid to Tokyo



VIAJES IBERIA - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda

→ Atrás → Búsqueda Favoritos Multimedia

Dirección <http://www.viajesiberia.com/>

VIAJES IBERIA

Personalizada para el origen MADRID | Inicio | Perfil | Reservas/presupuestos

Vuelos Madrid, España - Frankfurt, Alemania Sábado, 17 de Enero 2004

Vuelos desde Barajas (MAD), Madrid, España a Frankfurt Int'l (FRA), Frankfurt, Alemania

Ha seleccionado Turista

LEYENDA: OP=Vuelo operado por otra compañía, R=Solicitud en curso E=Candidato para billete electrónico

Seleccionar	Vuelo	Salida	Llegada	- Escalas avión	Duración	Clase
<input checked="" type="radio"/>	Lufthansa LH 4317 E	Barajas (MAD), Madrid, España	06:20 Frankfurt Int'l (FRA), Frankfurt, Alemania	09:05 Sin escalas 320	2h45min	Turista
<input type="radio"/>	Spanair JK 8863 OP	Barajas (MAD), Madrid, España	06:20 Frankfurt Int'l (FRA), Frankfurt, Alemania	09:05 Sin escalas 320	2h45min	Turista
<input type="radio"/>	Iberia IB 3500_E	Barajas (MAD), Madrid, España	09:00 Frankfurt Int'l (FRA), Frankfurt, Alemania	11:40 Sin escalas 320	2h40min	Turista
<input type="radio"/>	Spanair JK 125	Barajas (MAD), Madrid, España	09:45 Frankfurt Int'l (FRA), Frankfurt, Alemania	12:35 Sin escalas	2h50min	Turista
<input type="radio"/>	Lufthansa LH 2581 OP	Barajas (MAD), Madrid, España	09:45 Frankfurt Int'l (FRA), Frankfurt, Alemania			
<input type="radio"/>	Iberia IB 3214_E	Barajas (MAD), Madrid, España	11:30 Frankfurt Int'l (FRA), Frankfurt, Alemania			
<input type="radio"/>	Lufthansa LH 2592 OP	Barajas (MAD), Madrid, España	12:40 Frankfurt Int'l (FRA), Frankfurt, Alemania			

The screenshot shows a Microsoft Internet Explorer window with two tabs open. The left tab displays the homepage of '東京全日空ホテル' (Tokyo All Japan Hotel) with a large image of a skyscraper and various service links like 'Fair & Event', 'Stay Plan', and 'Mall'. The right tab shows the homepage of the 'Frankfurt Hotel InterContinental Frankfurt - Microsoft Internet Explorer'. It features a large image of an airplane, the hotel's name, and a 'QUICK RESERVATIONS' form. Below the reservation form is a 'Check Availability' button. The page also includes sections for 'Hotel Reserve Page', 'Rooms & Apartments', 'Lage', 'Zimmerinformation', 'Essen & Unterhaltung', and 'Konditorei & Cafeteria'. A sidebar on the right lists 'Press Release', 'Rooms', and 'Recruit'.

- .- Content in different languages (Spanish, English, Japanese,...)
 - .- Find out relevant information from heterogeneous sources
 - .- Extract
 - .- Interpretation
 - .- Aggregation
 - .- Consistency of the information

.- Interpretation

.- Aggregation

.- Consistency of the

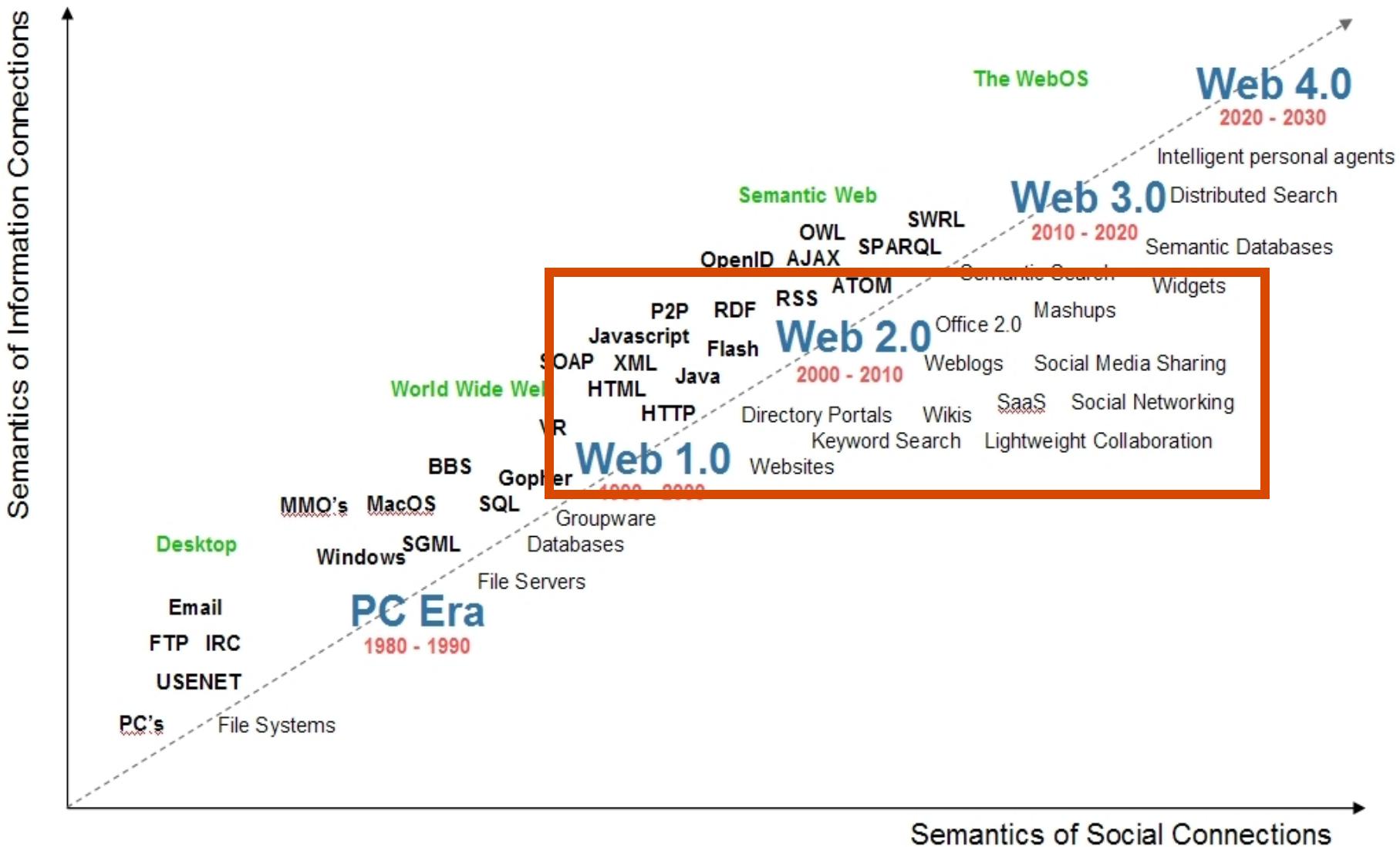
What was the Web intended to be?



“... a goal of the Web was that, if the interaction between person and hypertext could be so intuitive that the machine-readable information space gave an accurate representation of the state of people's thoughts, interactions, and work patterns, then machine analysis could become a very powerful management tool, seeing patterns in our work and facilitating our working together through the typical problems which beset the management of large organizations.”

[Berners-Lee 1996]

Web n+1: Roadmap

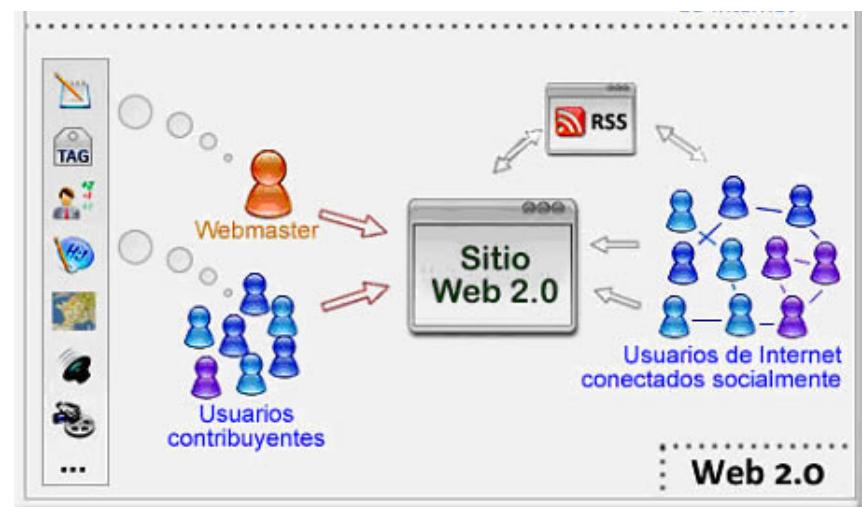


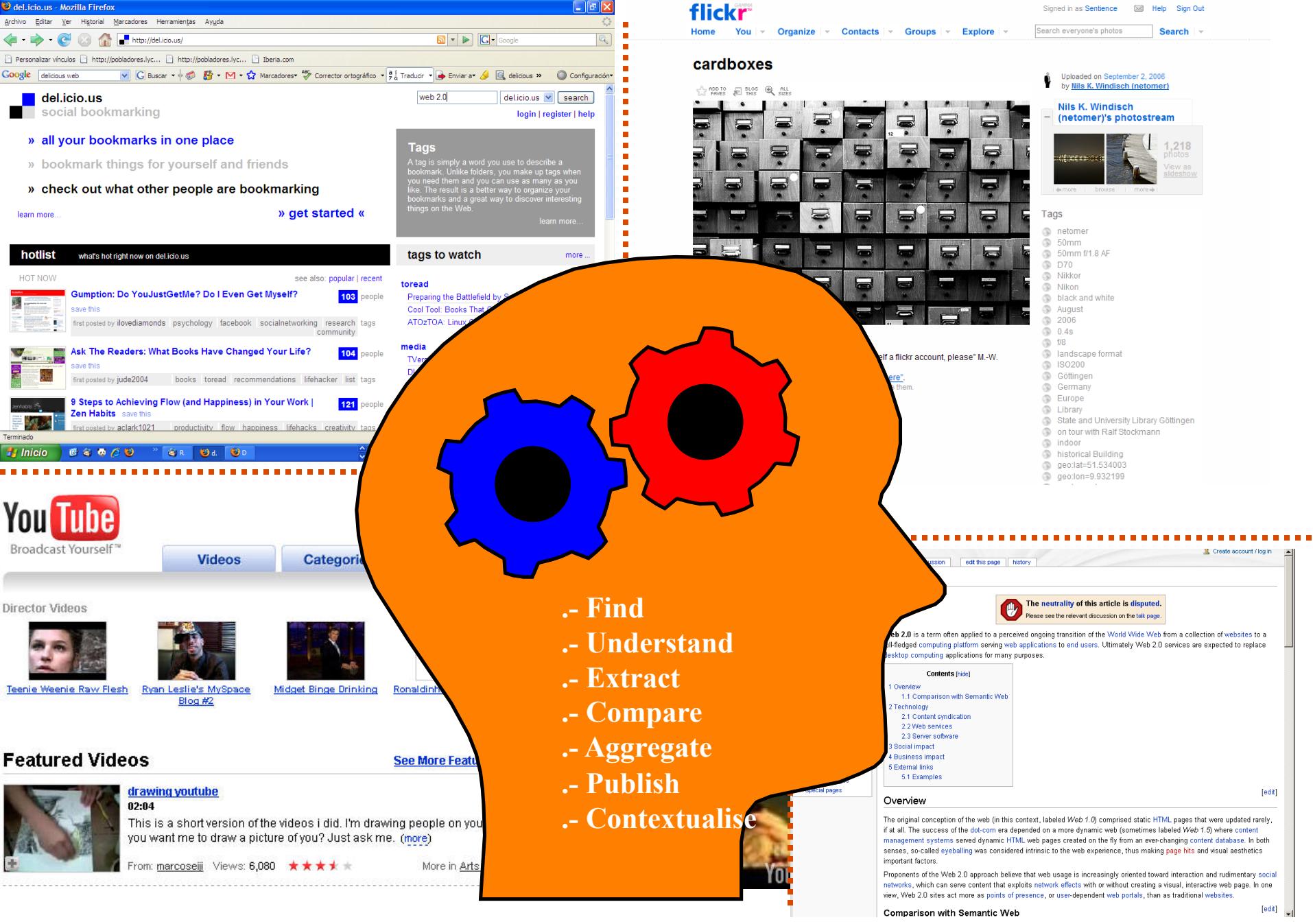
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Source: Radar Networks & Nova Spivack, 2007 – www.radarnetworks.com

Web 2.0

- **Users are both readers and writers**
 - Generate content
 - Control content
- **Ever-increasing amounts of content**
 - Dynamic content
- **Users participate**
 - Communication
 - Collaboration
- **Users add value to applications as they use it**
 - Collective intelligence by way of user participation
- **Rich user experience**
 - User-friendly interface
 - Personalized content
- **The Web as a programming platform**
 - Run applications entirely through a browser
 - Portability: software above the level of a single device
 - Openness



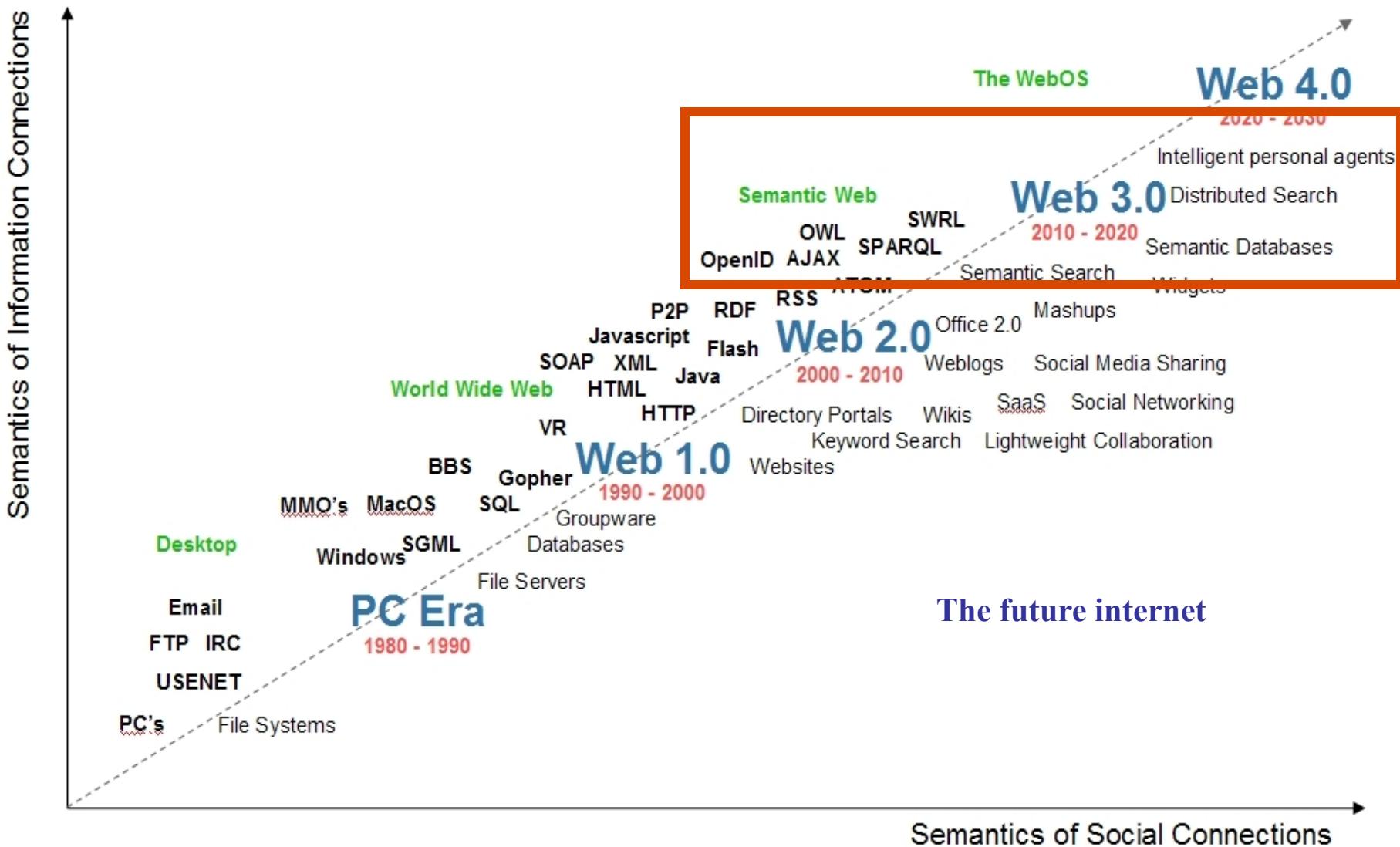


and Tim Berner-Lee [1996] sentence
is still valid for the Web 2.0



“... the machine-readable information space ...
... machine analysis could become a very
powerful management tool, ...
... facilitating our working together”

Web n+1: Roadmap

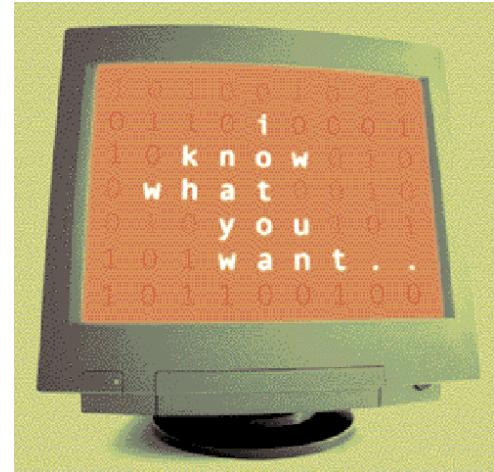


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Source: Radar Networks & Nova Spivack, 2007 – www.radarnetworks.com

Web 3.0

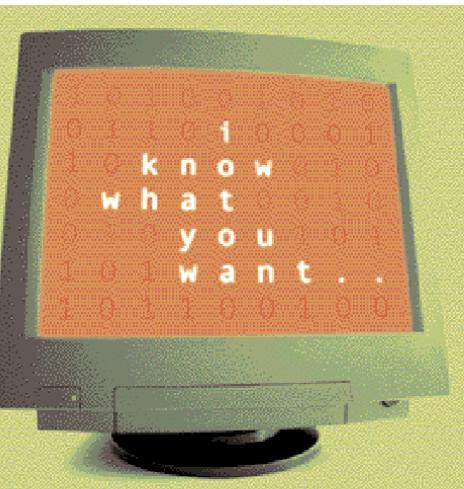
- **Intelligent Web**
 - Semantic Web technologies
 - The Data Web – a global database
 - Intelligent applications (NLP, machine learning, machine reasoning, autonomous agents)
- **Ubiquitous**
 - Broadband adoption
 - Mobile Internet access
 - Mobile devices
- **Cloud computing**
 - Software-as-a-service business models
 - Web services interoperability
 - Distributed computing (P2P, grid computing, hosted "cloud computing" server farms)
- **Openness**
 - Open APIs and protocols
 - Open data formats
 - Open-source software platforms
 - Open data (Creative Commons, Open Data License, etc.)
- **Open Identity**
 - Open identity (OpenID)
 - Open reputation
 - Portable identity and personal data



<http://lifeboat.com/ex/web.3.0>

What is the Semantic Web?

“The Semantic Web is an **extension** of the current Web in which information is given **well-defined meaning**, better enabling computers and people to work in **cooperation**. It is based on the idea of having data on the Web defined and linked such that it can be used for more **effective discovery, automation, integration, and reuse across various applications.**”



Ontologies

Anotation

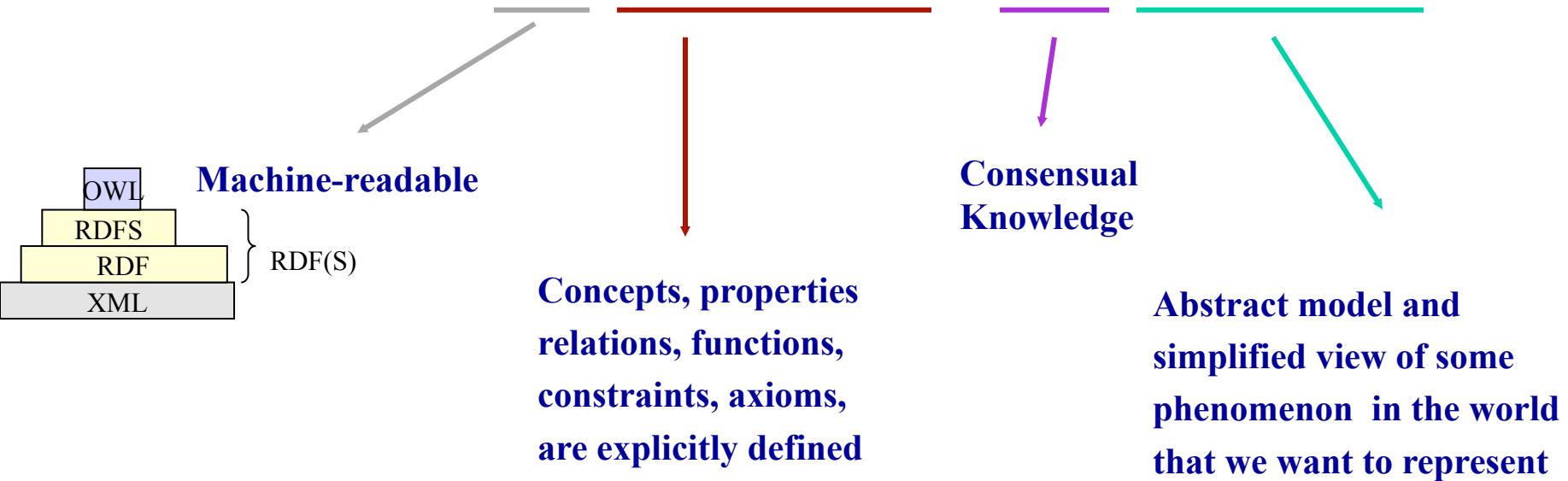
Hendler, J., Berners-Lee, T., and Miller, E.
Integrating Applications on the Semantic Web, 2002,
<http://www.w3.org/2002/07/swint.html>

Need to Add “Semantics”

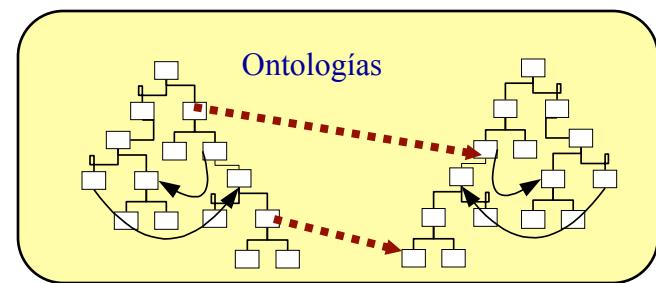
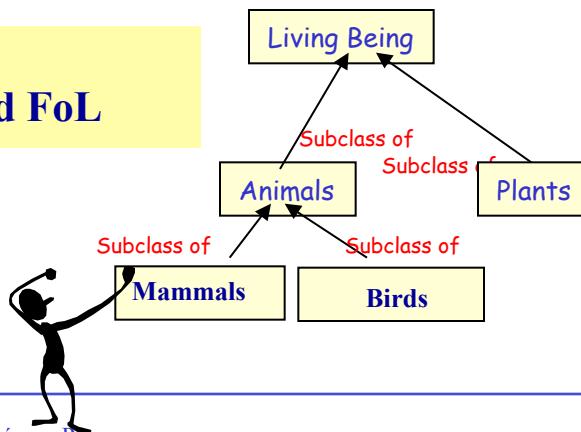
- External agreement on meaning of annotations
 - E.g., *Dublin Core* for annotation of library/bibliographic information
 - Agree on the meaning of a set of annotation tags
 - Problems with this approach
 - Inflexible
 - Limited number of things can be expressed
- Use Ontologies to specify meaning of annotations
 - Ontologies provide a vocabulary of terms
 - New terms can be formed by combining existing ones
 - “Conceptual Lego”
 - Meaning (semantics) of such terms is formally specified
 - Can also specify relationships between terms in multiple ontologies

Definition of Ontology

“An ontology is a formal, explicit specification of a **shared conceptualization**”



Frames and FoL



Ontology

VIAJES IBERIA

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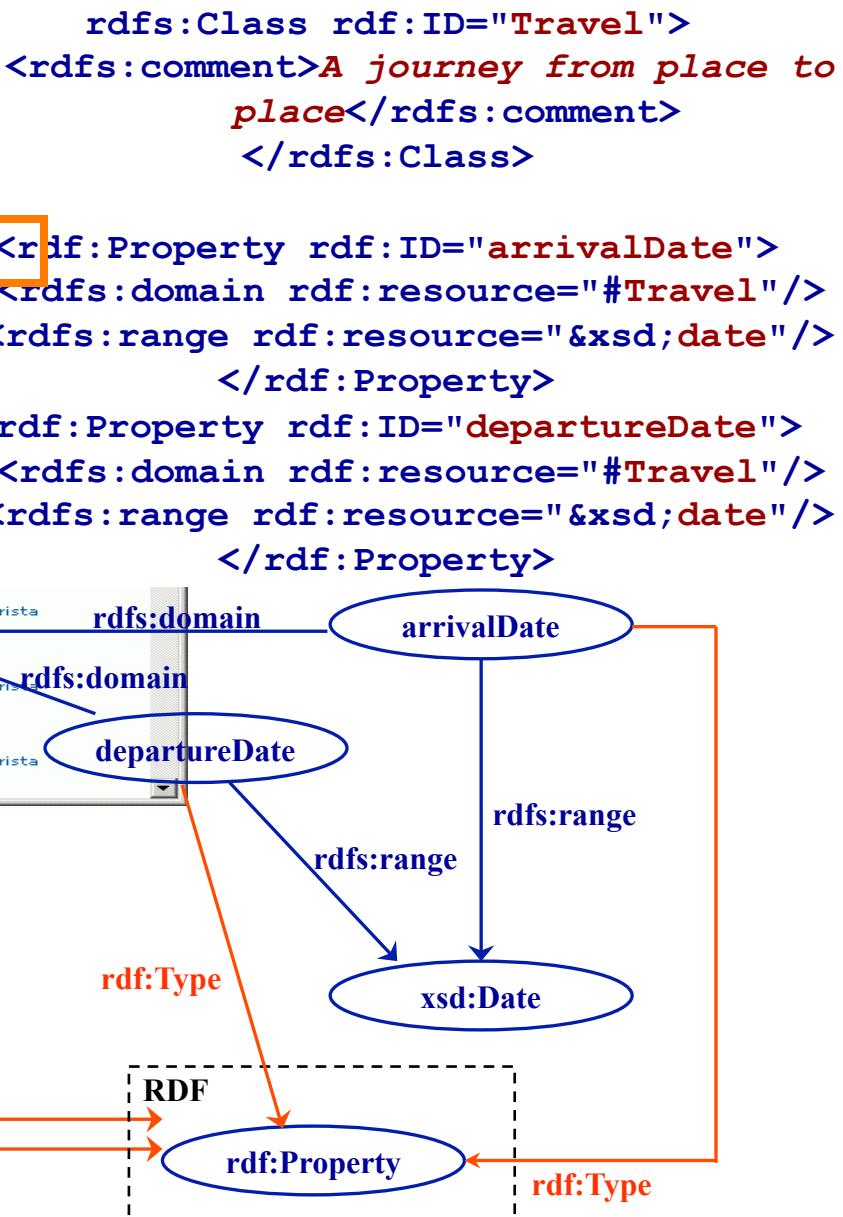
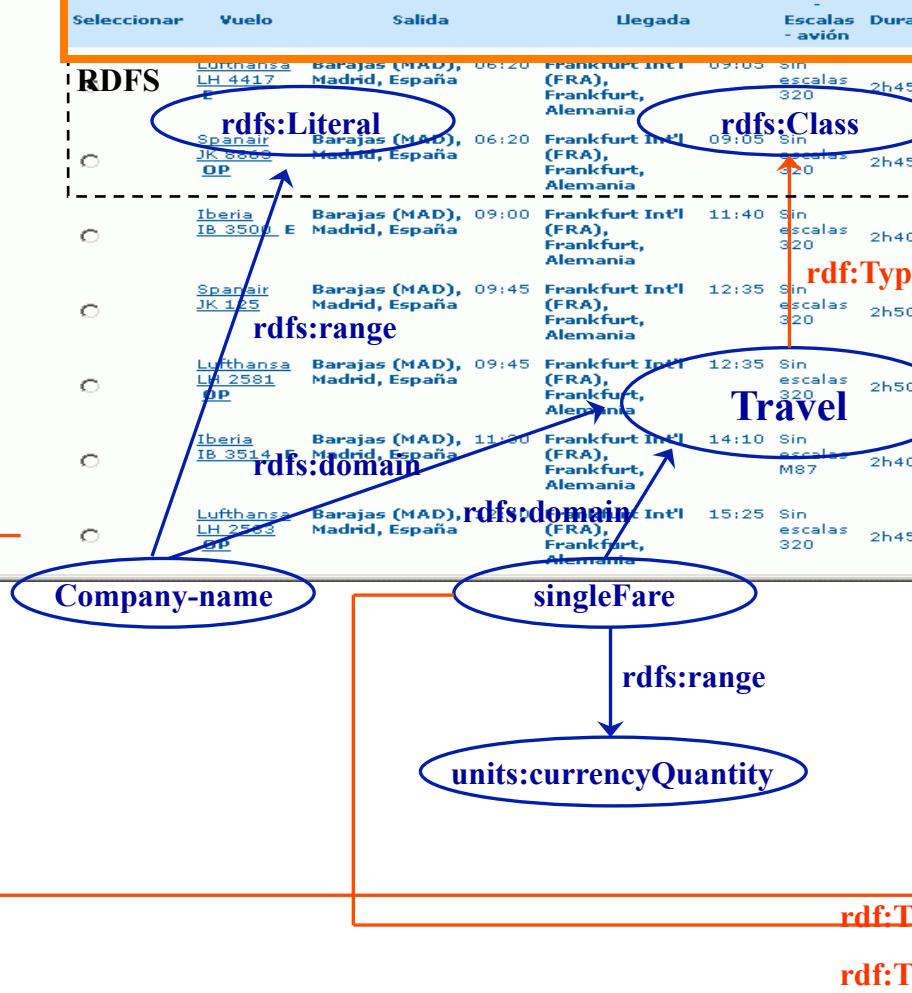
Vuelos: Madrid, España - Frankfurt, Alemania Sábado, 17 de

Vuelos desde Barajas (MAD), Madrid, España a Frankfurt Int'l (FRA), Frankfurt, Alemania

Ha seleccionado Turista

LEYENDA: OP=Vuelo operado por otra compañía, R=Solicitud en curso E=Candidato para electrónico

Seleccionar	Vuelo	Salida	Llegada	Escalas - avión	Dura-
RDFS	Lufthansa LH 4417	Barajas (MAD), Madrid, España 06:20	Frankfurt Int'l (FRA), Frankfurt, Alemania 09:05	Sin escalas 320	2h45
	Spanair JK 8866	Barajas (MAD), Madrid, España 06:20	Frankfurt Int'l (FRA), Frankfurt, Alemania 09:05	Sin escalas 320	2h45
	Iberia IB 3500	Barajas (MAD), Madrid, España 09:00	Frankfurt Int'l (FRA), Frankfurt, Alemania 11:40	Sin escalas 320	2h40
	Spanair JK 125	Barajas (MAD), Madrid, España 09:45	Frankfurt Int'l (FRA), Frankfurt, Alemania 12:35	Sin escalas 320	2h50
	Lufthansa LH 2581	Barajas (MAD), Madrid, España 09:45	Frankfurt Int'l (FRA), Frankfurt, Alemania 12:35	Sin escalas 320	2h50min
	Iberia IB 3514	Barajas (MAD), Madrid, España 11:00	Frankfurt Int'l (FRA), Frankfurt, Alemania 14:10	Sin escalas M87	2h40min
	Lufthansa LH 2583	Barajas (MAD), Madrid, España	Frankfurt Int'l (FRA), Frankfurt, Alemania 15:25	Sin escalas 320	2h45min



VIAJES IBERIA - Microsoft Internet Explorer

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Dirección http://www.viajesiberia.com/ Atención al cliente 902 116 221 ¿Quieres re...

VIAJES IBERIA

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Vuelos: Madrid, España - Frankfurt, Alemania Sábado, 17 de Enero 2004

Vuelos desde Barajas (MAD), Madrid, España a Frankfurt Int'l (FRA), Frankfurt, Alemania

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Seleccionar	Vuelo	Salida	Llegada	Escalas avión	Duración	Clase
<input checked="" type="radio"/>	Lufthansa LH 4417 E	Barajas (MAD), Madrid, España	06:20	Frankfurt Int'l (FRA), Frankfurt, Alemania	09:05 Sin escalas 320	2h45min Turista
<input type="radio"/>	Spanair JK 8863 OP	Barajas (MAD), Madrid, España	06:20	Frankfurt Int'l (FRA), Frankfurt, Alemania	09:06 Sin escalas 320	2h45min Turista
<input type="radio"/>	Iberia IB 3500 E	Barajas (MAD), Madrid, España	09:00	Frankfurt Int'l (FRA), Frankfurt, Alemania	11:40 Sin escalas 320	2h40min Turista
<input type="radio"/>	Spanair JK 1225	Barajas (MAD), Madrid, España	09:45	Frankfurt Int'l (FRA), Frankfurt, Alemania	12:35 Sin escalas 320	2h50min Turista
<input type="radio"/>	Lufthansa LH 2581 OP	Barajas (MAD), Madrid, España	09:45	Frankfurt Int'l (FRA), Frankfurt, Alemania	12:35 Sin escalas 320	2h50min Turista
<input type="radio"/>	Iberia IB 3514 E	Barajas (MAD), Madrid, España	11:30	Frankfurt Int'l (FRA), Frankfurt, Alemania	14:10 Sin escalas M87	2h40min Turista
<input type="radio"/>	Lufthansa LH 2583 OP	Barajas (MAD), Madrid, España	12:40	Frankfurt Int'l (FRA), Frankfurt, Alemania	15:25 Sin escalas 320	Turista

Metadata

Company-name

IB-4321

singleFare

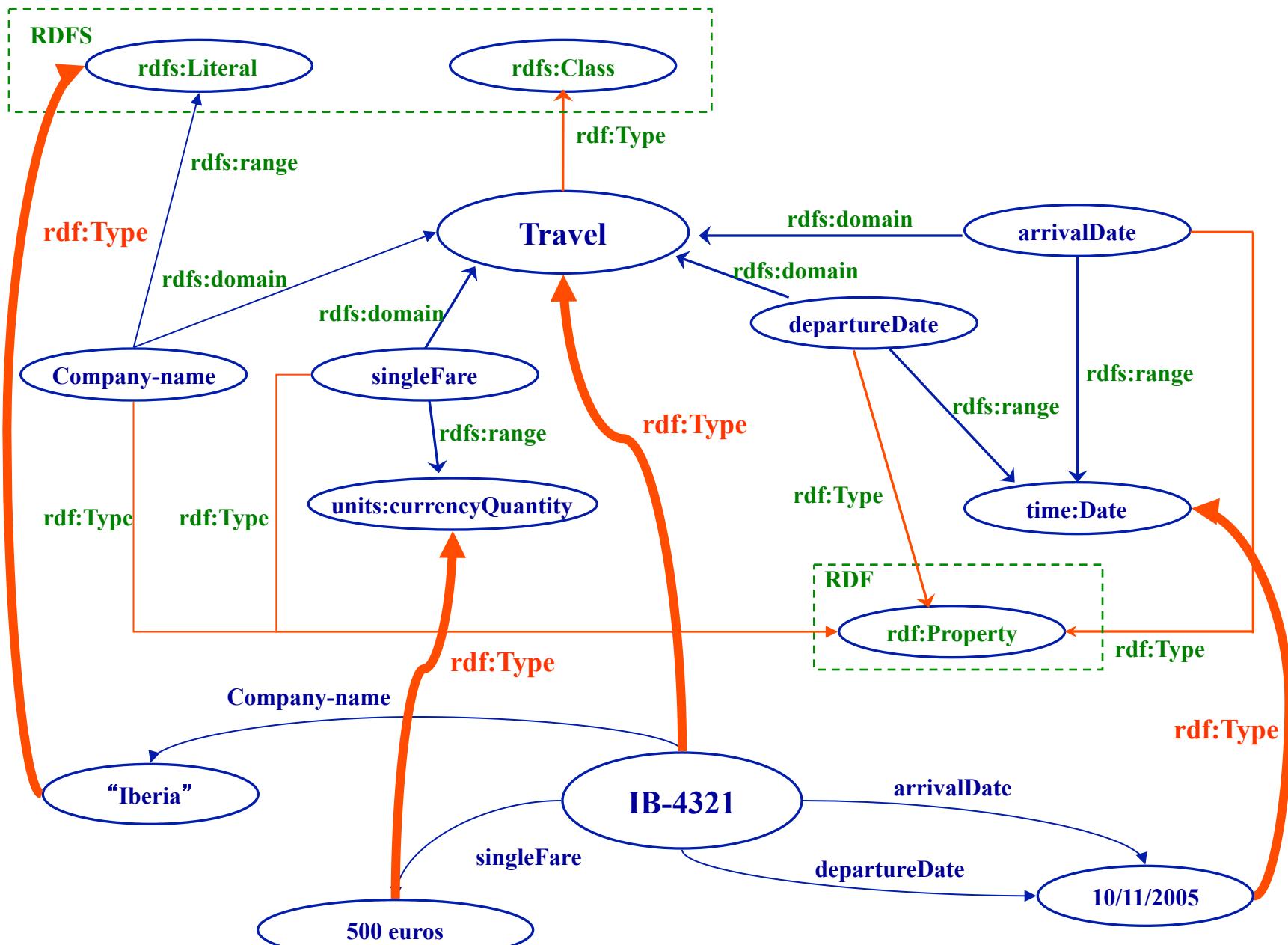
departureDate

arrivalDate

10/11/2005

```

<Travel rdf:ID="IB-4321">
  <Company-name>Iberia</Company-name>
  <singleFare>500 Euros</singleFare>
  <departureDate rdf:datatype="&xsd;date">
    2005-11-10
  </departureDate>
  <arrivalDate rdf:datatype="&xsd;date">
    2005-11-10
  </arrivalDate>
  <arrivalPlace rdf:resource="#Paris"/>
</Travel>
```



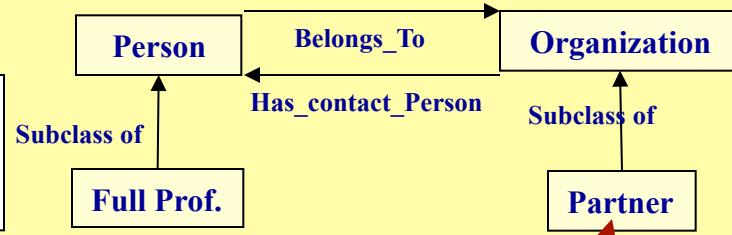
Ontologies and Metadata

Ontologies

```

xmlns:rdf='http://www.w3.org/1999/02/22-rdf-syntax-ns#'
xmlns:NS0='http://www.esperonto.net/semanticportal/RDFS/Person_Ontology#'
xmlns:NS1='http://www.esperonto.net/semanticportal/RDFS/Organization_Ontology#'

```



Instance of

Instance of

```

<rdf:Description rdf:about='Asunción Gómez-Pérez'>
<rdf:type rdf:resource='Full Prof' />
<NS0:Full_Name>A. GomezPerez</NS0:Full_Name>
<NS0:Belongs_To>UPM</NS0:Belongs_To>
<NS0:e-mail>asun@fi.upm.es</NS0:e-mail>

```

```

<rdf:Description rdf:about='UPM'>
<rdf:type rdf:resource='Partner' />
<NS1:Acronym>UPM</NS1:Acronym>
<NS1:Has_Contact_Person>Asunción Gómez-Pérez
</NS1:Has_Contact_Person>

```

Full Name	Asuncion Gomez-Perez
e-mail	asun@fi.upm.es
Photo	

Asunción Gómez-Pérez is contact person [UPM](#) (Partner).
Asunción Gómez-Pérez belongs to [UPM](#) (Partner).

Full Name	Universidad Politécnica de Madrid
Acronym	UPM
Logo	

UPM has contact person [Asunción Gómez-Pérez](#) (Associate Professor).
UPM participates in [Esperonto](#) (Project).
IIPM team is formed by :

Annotation (RDF)

Web Page

URL

<http://www.esperonto.net>

<http://www.esperonto.net>



Why not make the computers do the work?

IBXX is a flight. Its departure place is Madrid and its arrival place is Tokyo.
Madrid is an european city. Tokyo is an asian city.

The image shows four separate windows illustrating the integration of metadata and knowledge inference:

- Flight Information:** A screenshot of a travel search interface showing flight options from Madrid (Barajas) to Tokyo (Haneda) via Frankfurt. It includes departure times, arrival times, layover locations, and class information.
- Hotel Listings:** A screenshot of a hotel booking website showing results for "Bridal Fair 2004" in Tokyo. It lists various hotel names and descriptions.
- Rental Car Options:** A screenshot of a rental car website for "Hertz" in Tokyo. It shows car models, prices, and availability.
- Theater Information:** A screenshot of the "NEW NATIONAL THEATRE, TOKYO Web Site". It features a photograph of the theater interior, performance schedules, and ticketing information.

The new national theater is a theater located in Tokyo. It has performances every Saturday.

The image displays two side-by-side screenshots of websites:

- New National Theater Tokyo:** The homepage featuring a large image of the theater's interior, performance details, and a schedule for January 16th.
- Hertz Rental Cars:** The homepage for Hertz in Tokyo, showing car models, rates, and promotional offers.

Xxx is a hotel placed in Tokyo

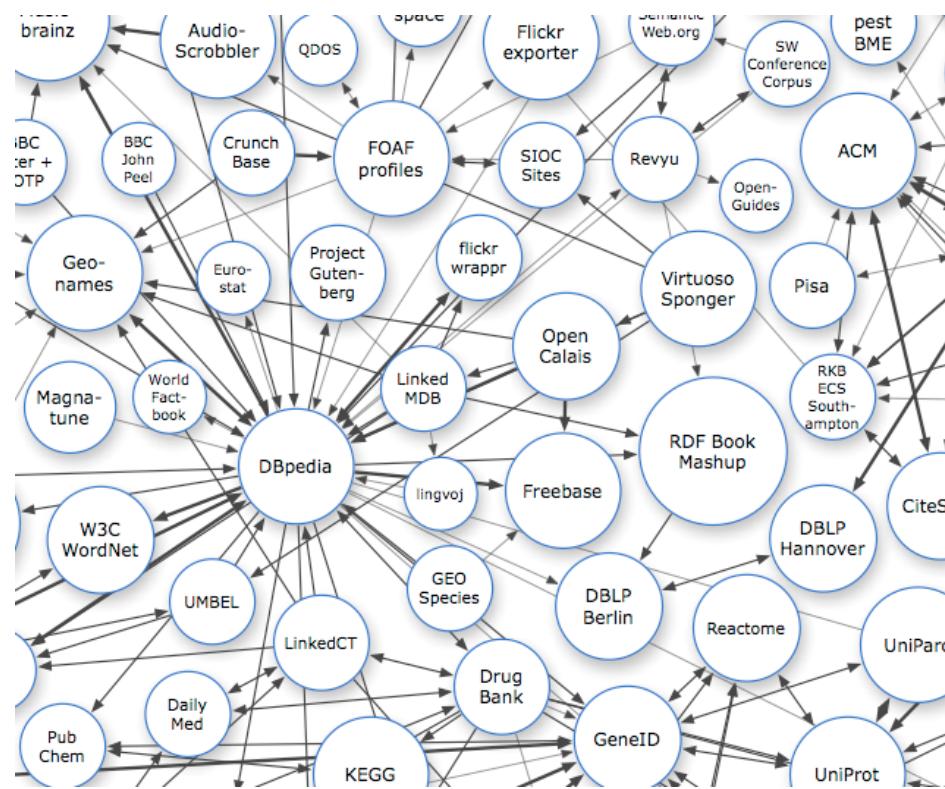
Herzt is a rental car company with luxury cars in tokyo.

- Web
- Web 2.0
- Web 3.0 and the Semantic Web
- Linked data
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What is the Web of Linked Data?

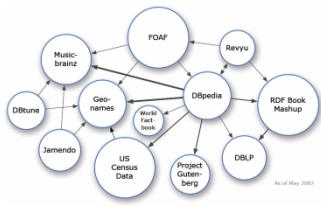
- An extension of the current Web...
 - ... where **information** is **data** given **well-defined** and **explicitly represented meaning**, ...
 - ... so that it can be **shared** and used by **humans and machines**, ...
 - ... better enabling them to work in cooperation
- How?
 - Promoting information exchange by **tagging web content** with machine processable descriptions of its meaning.
 - And **technologies** and **infrastructure** to do this
 - And **clear principles** on how to publish data



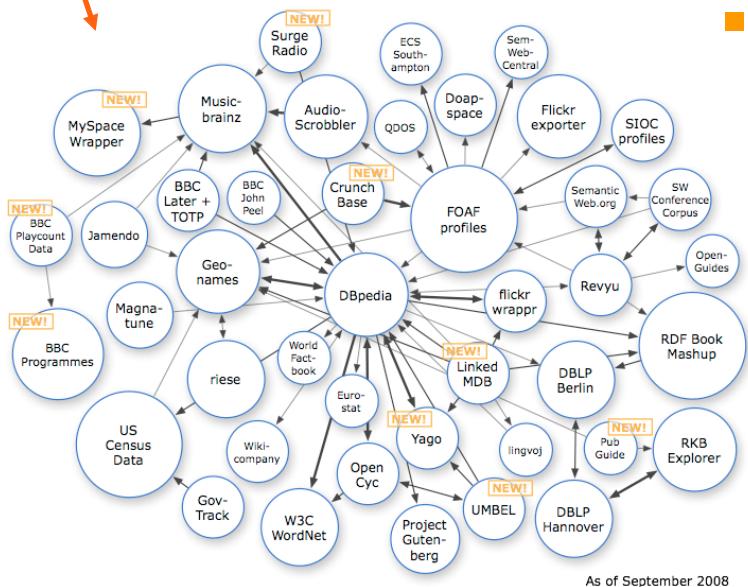
What is Linked Data?

- Linked Data is a term used to describe a recommended **best practice** for exposing, sharing, and connecting pieces of data, information, and knowledge on the Semantic Web using URIs and RDF.
 - Part of the Semantic Web
 - Exposing, sharing and connecting data
 - Technologies: URIs and RDF (although others are also important)

Linked Open Data evolution

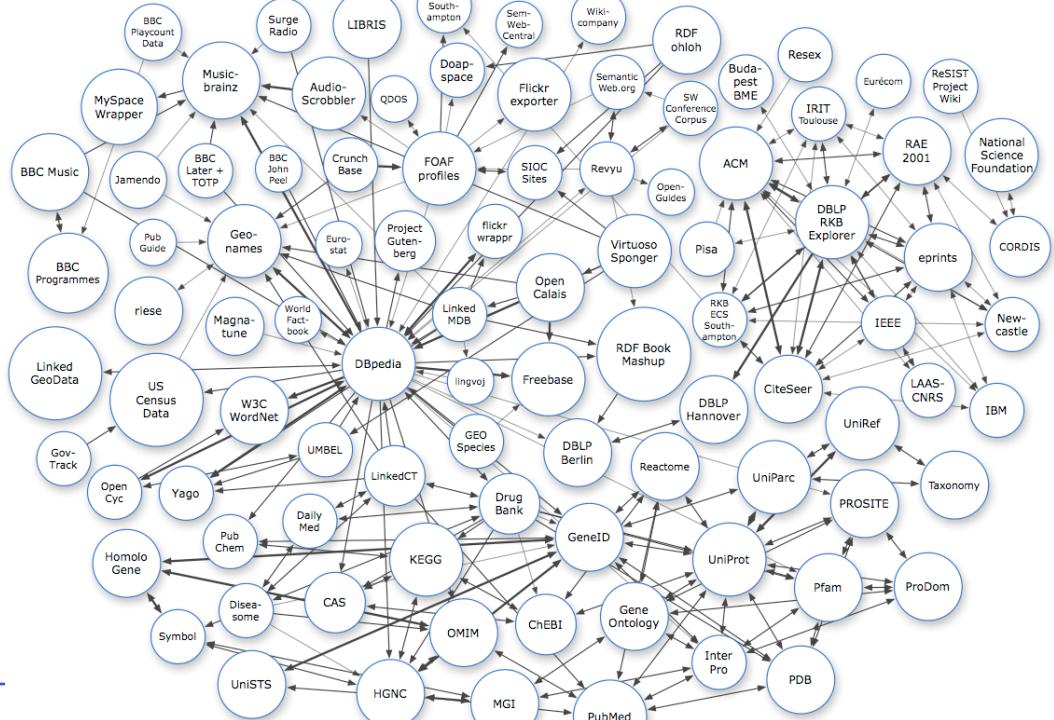


■ 2007



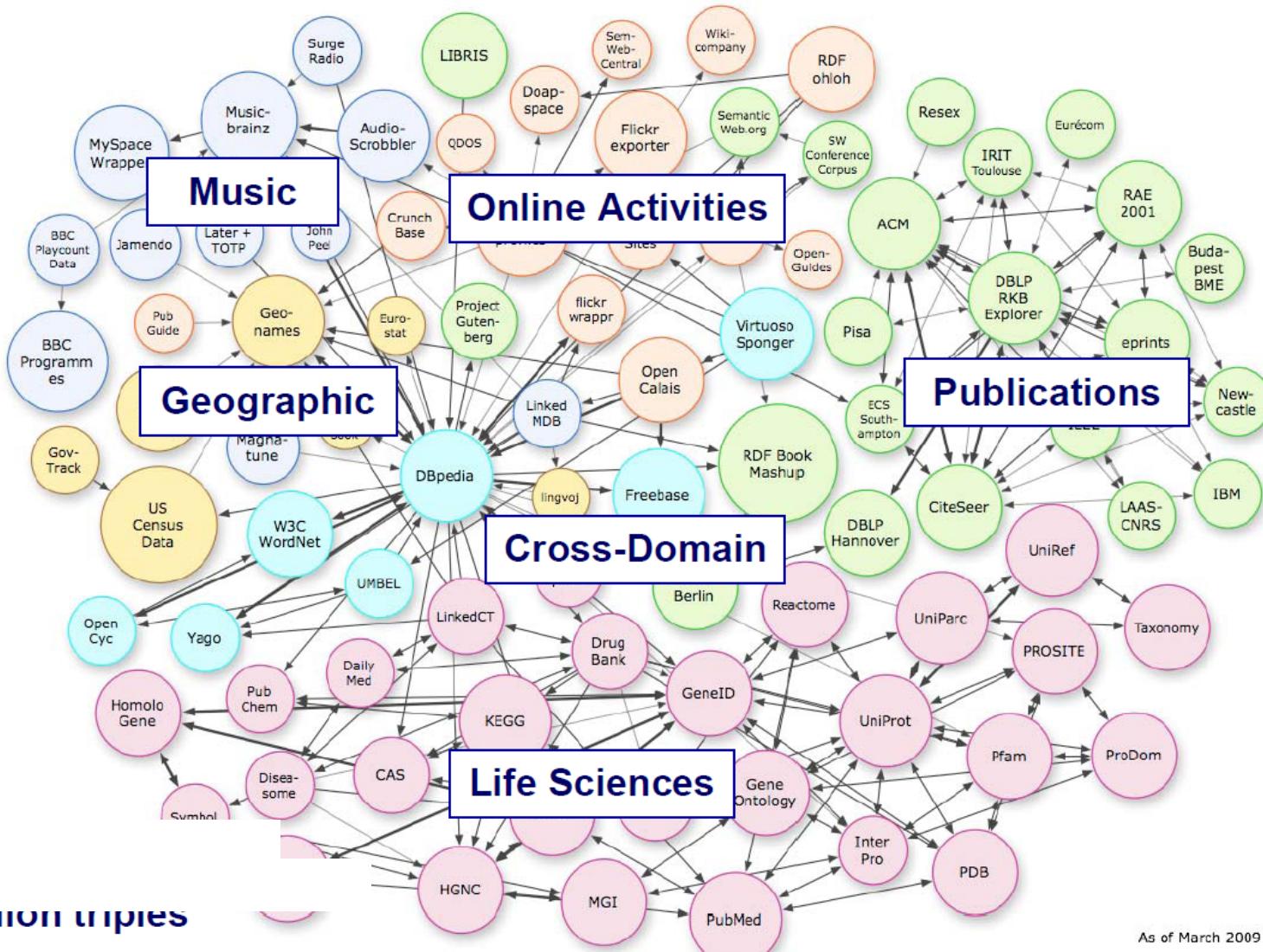
As of September 2008

2008



2009

LOD clouds



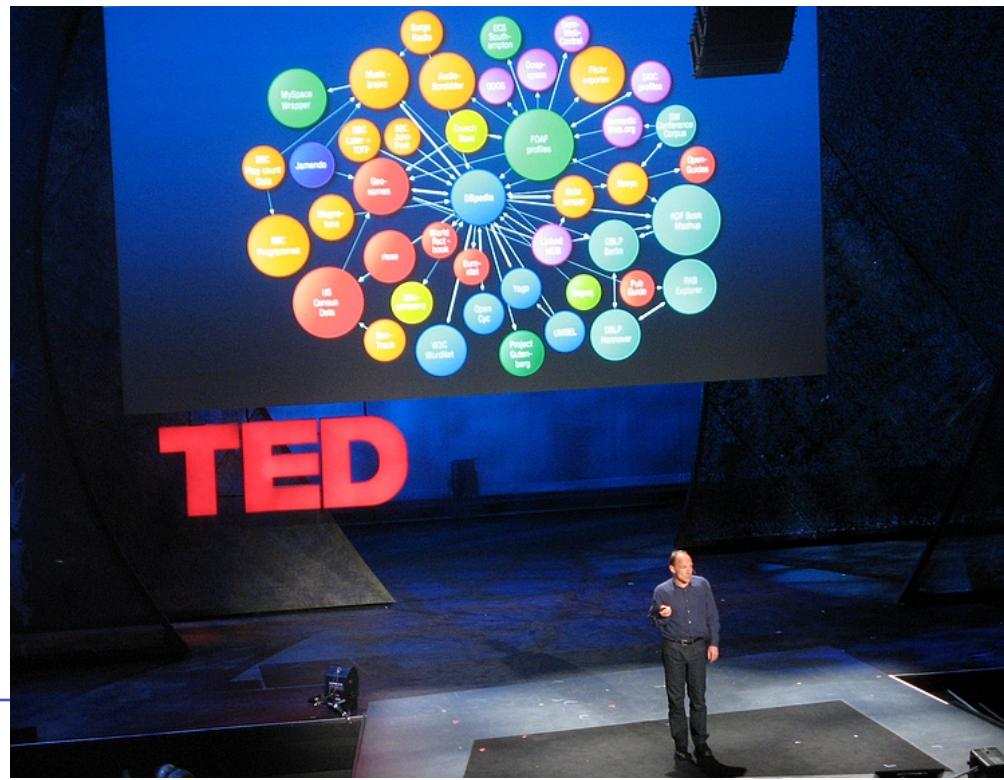
4.5 billion triples
180 million data links

As of March 2009

The four principles (Tim Berners Lee, 2006)

http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html

- 1. Use URIs as names for things
 - 2. Use HTTP URIs so that people can look up those names.
 - 3. When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)
 - 4. Include links to other URIs, so that they can discover more things.
 - <http://www.w3.org/DesignIssues/LinkedData.html>



Open Government. USA and UK

The image is a composite of several screenshots from open government websites. At the top, the US DATA.GOV homepage is shown, featuring a banner for its 1st anniversary, a cupcake icon, and a list of most popular datasets. Below it, the UK data.gov.uk homepage is displayed, with sections for 'Unlocking innovation', 'Latest datasets', 'What we do', and 'Community'. A large green overlay at the bottom right contains the words 'TOP-DOWN' and 'BOTTOM-UP'.

DATA.GOV
EMPOWERING PEOPLE

HOME DATA TOOLS COMMUNITY METRICS DIALOGUE

HAPPY 1ST ANNIVERSARY DATA.GOV data.gov.uk

Most Popular Datasets

1. U.S. Overseas Loans and Grants (Greenbook)
2. Worldwide M1+ Earthquakes, Past 7 Days
3. Latest Volumes of Foreign Relations of the...
4. Local Area Unemployment Statistics
5. Personnel Trends by Gender/Race

SEARCH OUR CATALOGS

Search our catalogs... SEARCH

HM Government

Home Blog Data SPARQL Apps Ideas Forum Wiki Resources About

Unlocking innovation

Working with UK Public Sector Information and data

Latest datasets

2 July Public servants earning over £150,000 now also covers NDPBs

25 June Costs and other data about central government websites

18 June Estimated government workforce including consultants

14 June More COINS public spending data; now covers 2005 to 2010

What we do

data.gov.uk is a key part of the Government's Transparency programme for the UK public sector as a whole. Working with Sir Tim Berners-Lee, Professor Nigel Shadbolt and Tim Steinberg and other members of the Cabinet Office Minister's new Public Sector Transparency Board this site seeks to give a way into the wealth of government data becoming available. It's under constant development and we want to work with you to make it better.

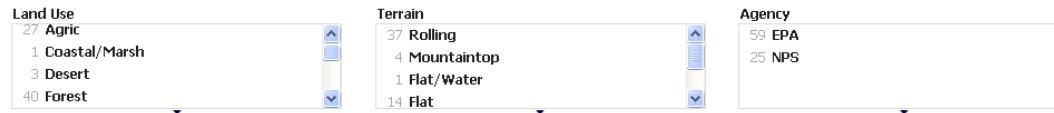
TOP-DOWN

BOTTOM-UP

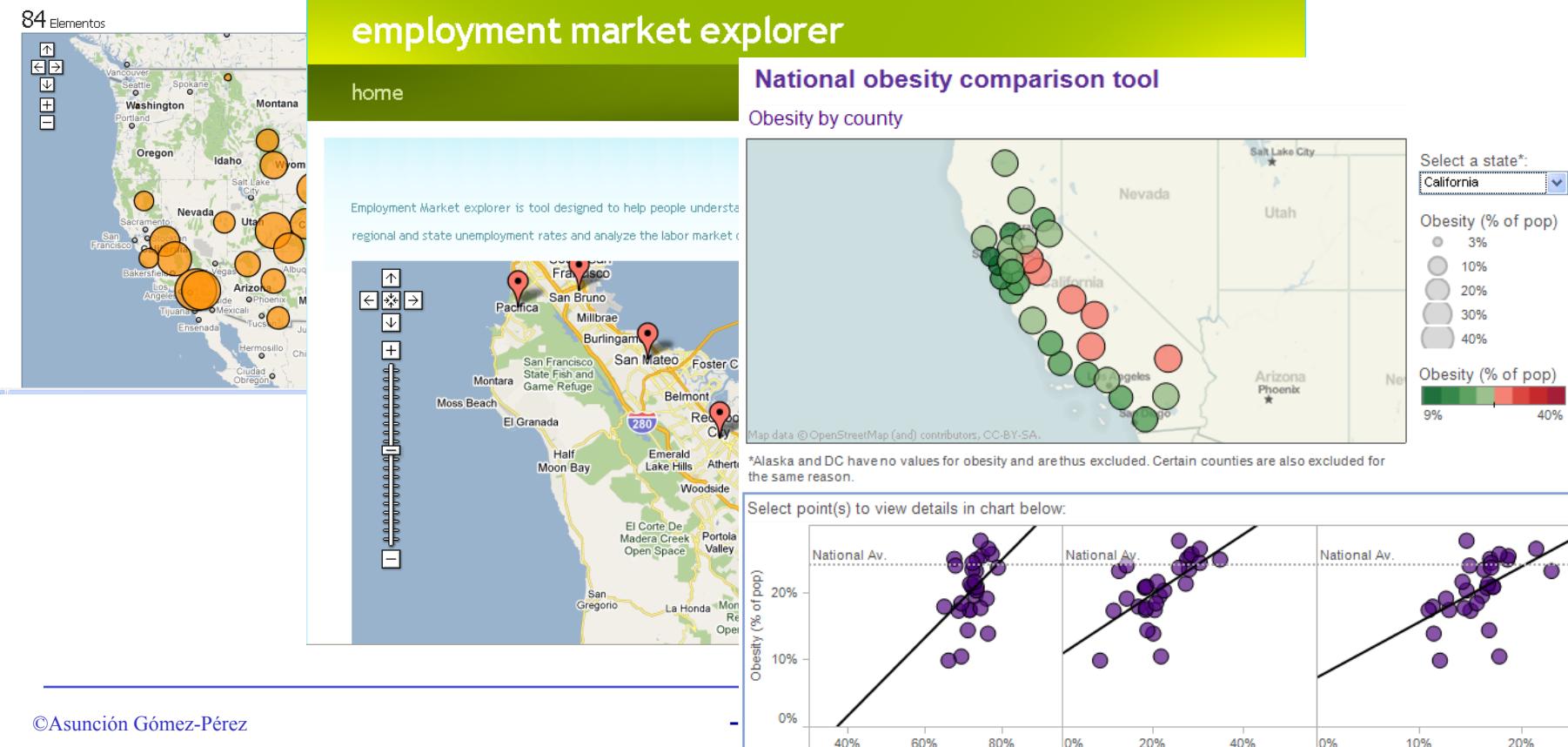
Linked Data Mashup (data.gov)

Clean Air Status and Trends (CASTNET)

Clean Air Status and Trends Network (CASTNET)

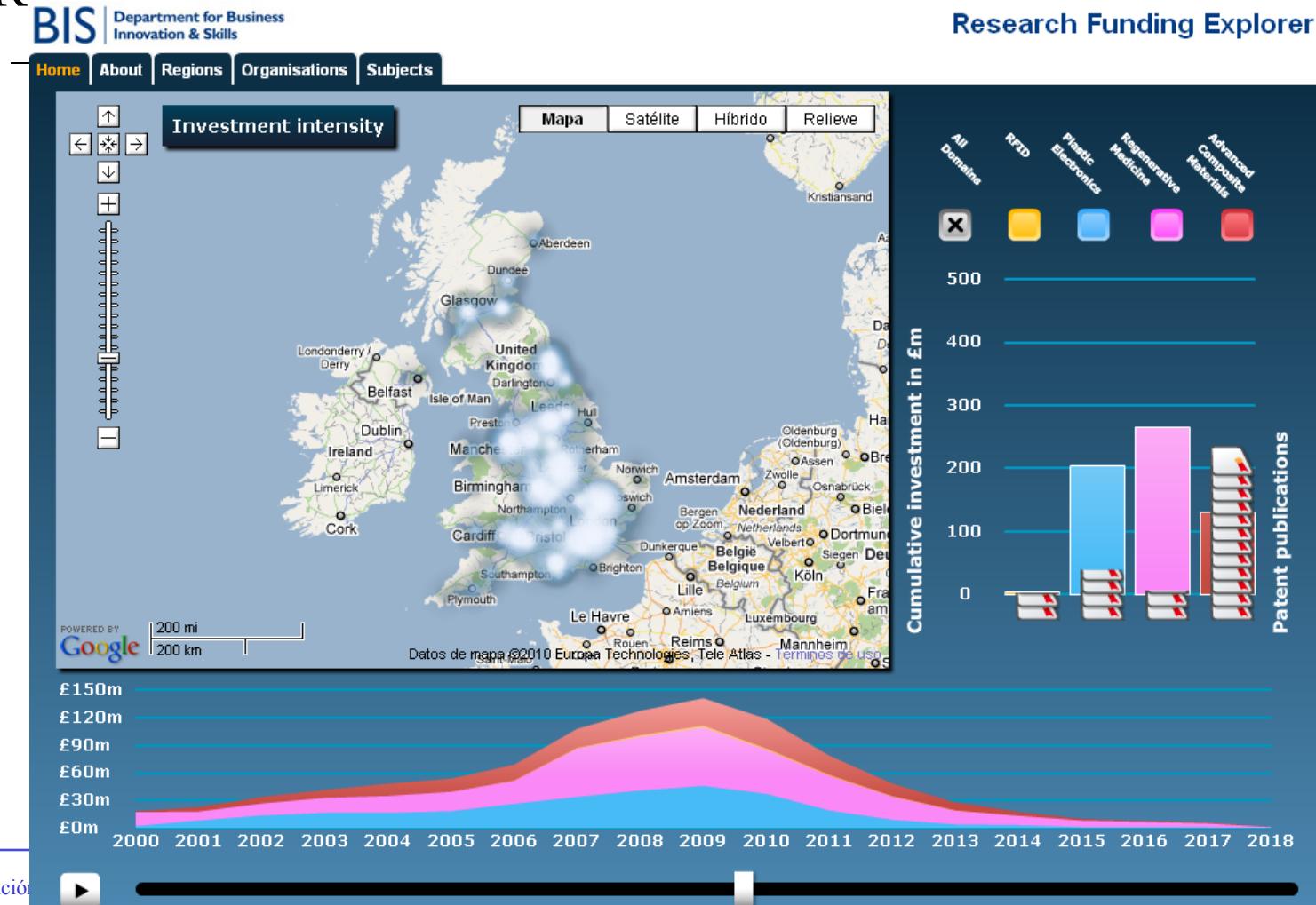


o-8-castnet.php



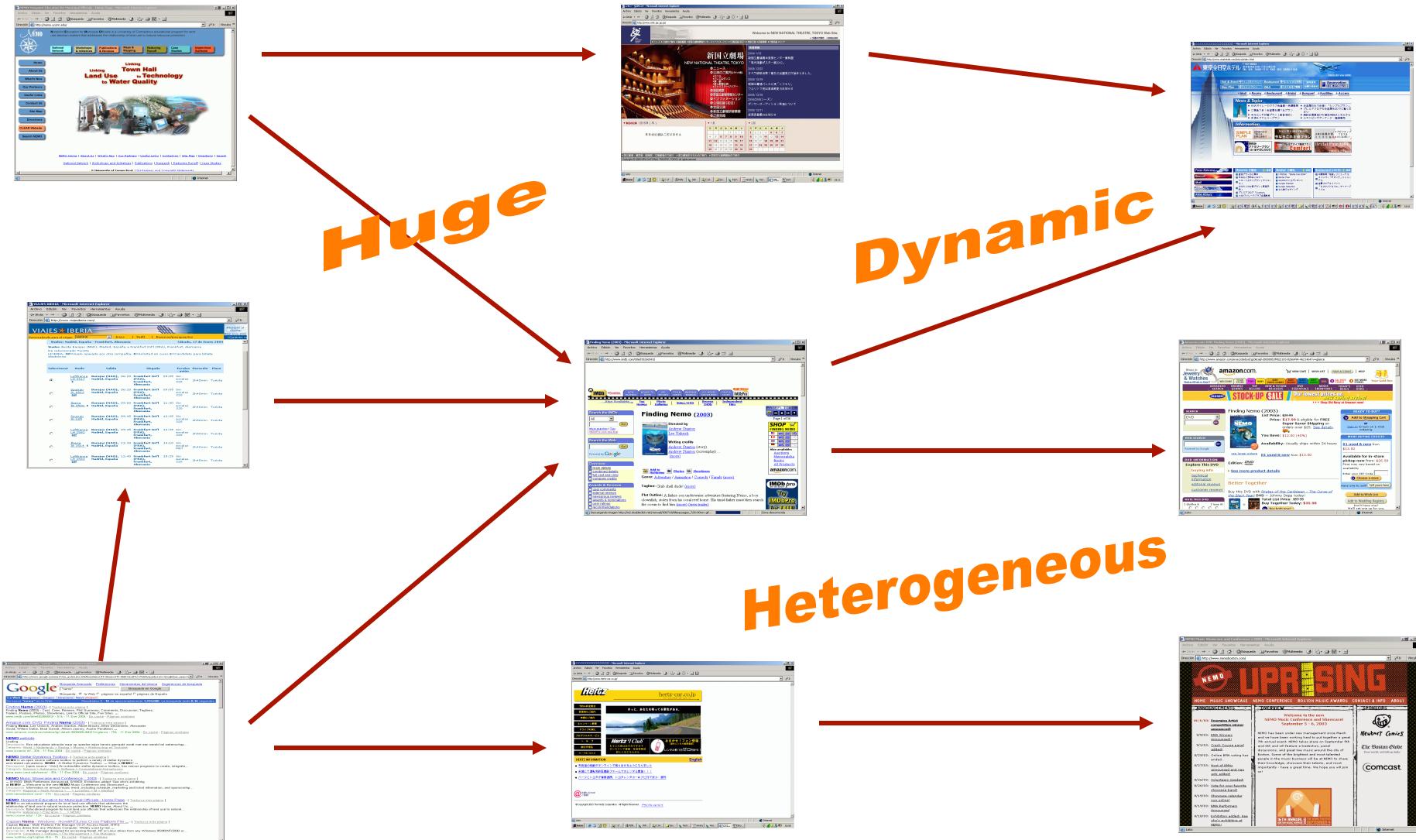
Linked Data Mashup (data.gov.uk)

- Research Funding Explorer

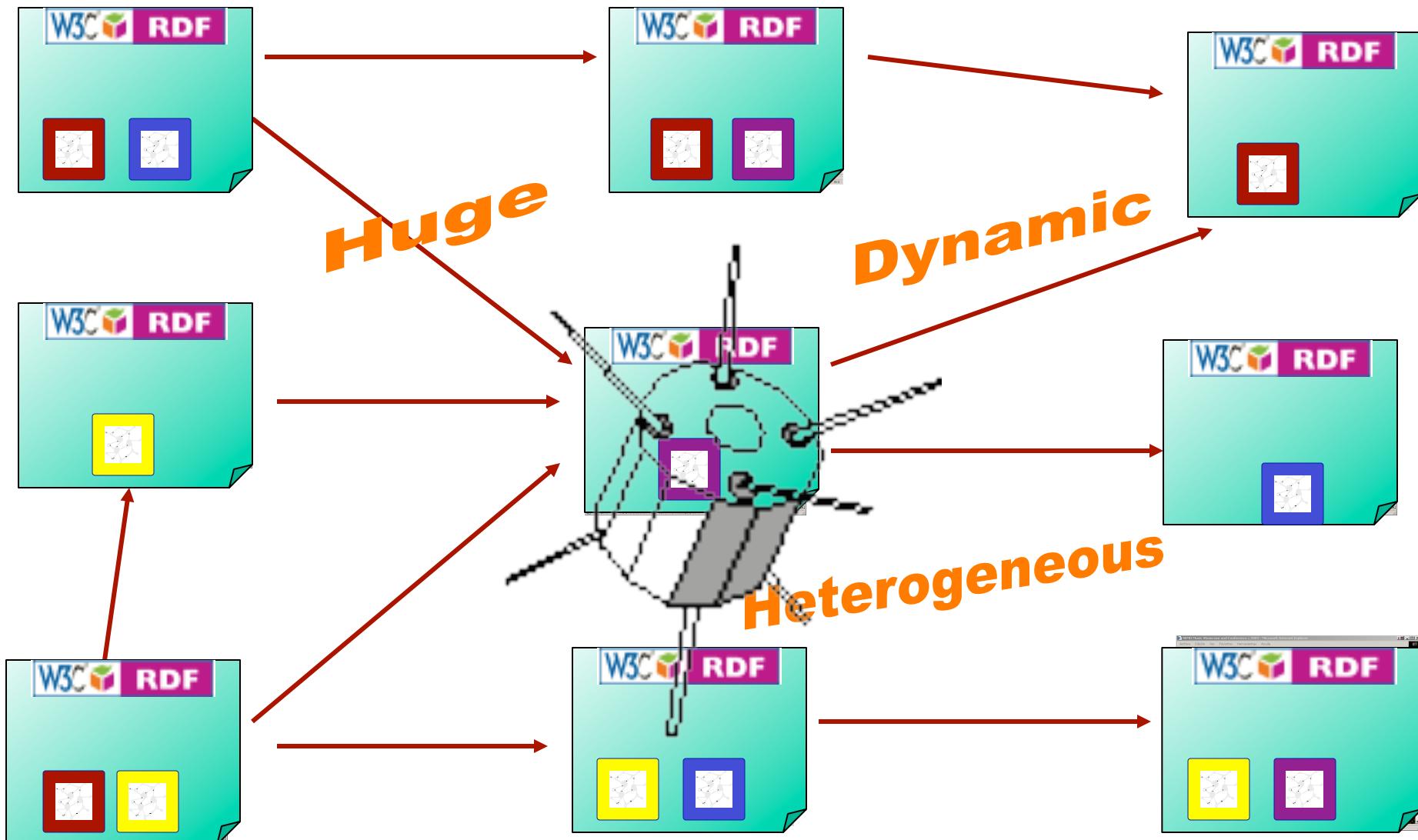


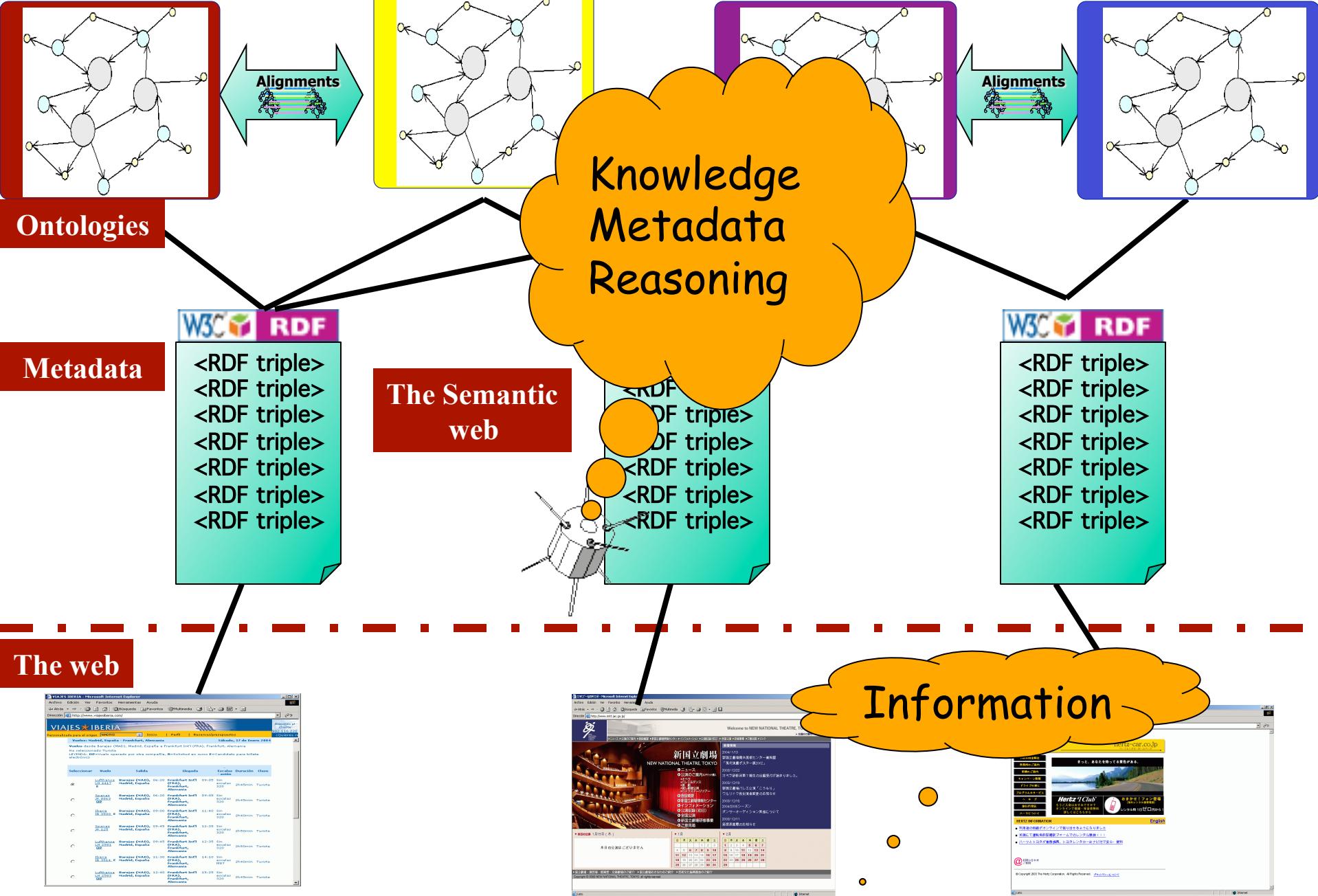
- Web
- Web 2.0
- Web 3.0 and the Semantic Web
- Examples of semantic applications
 - Semantic Webs
 - Corporative Semantics
 - Annotation at large scale
 - Semantic portals
 - Semantic Information exchange between heterogeneous data sources

The Web

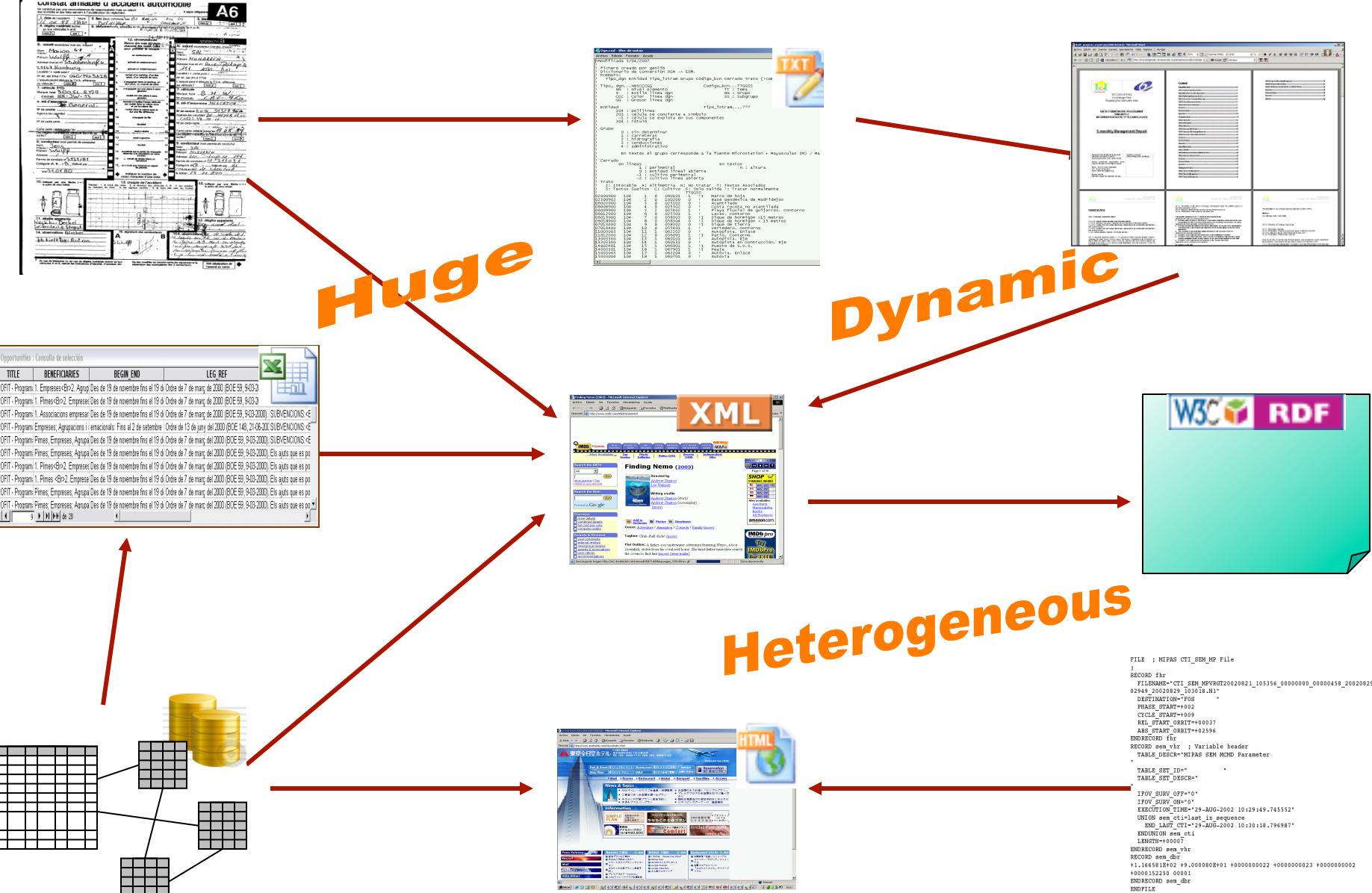


Semantic Webs

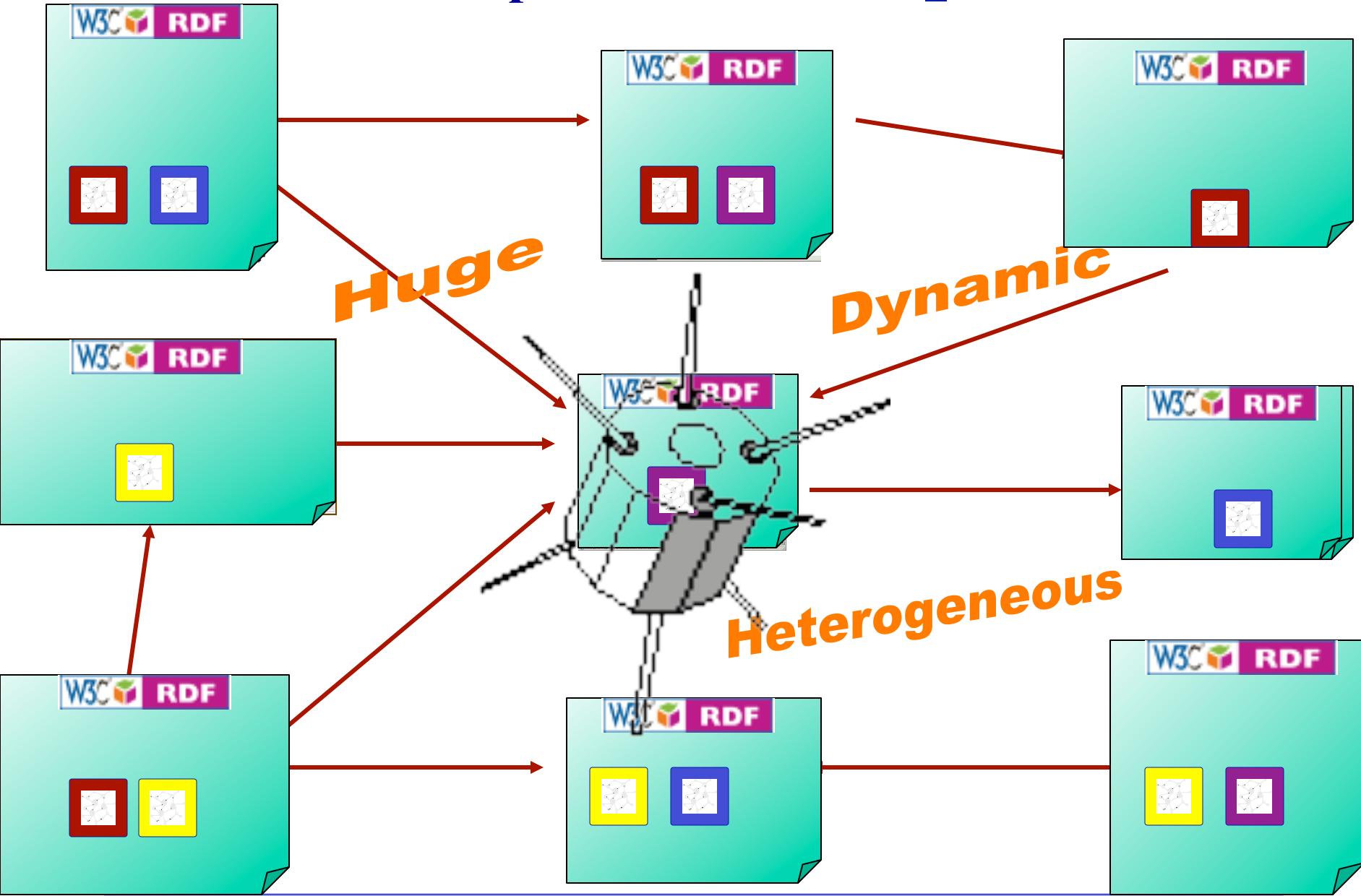


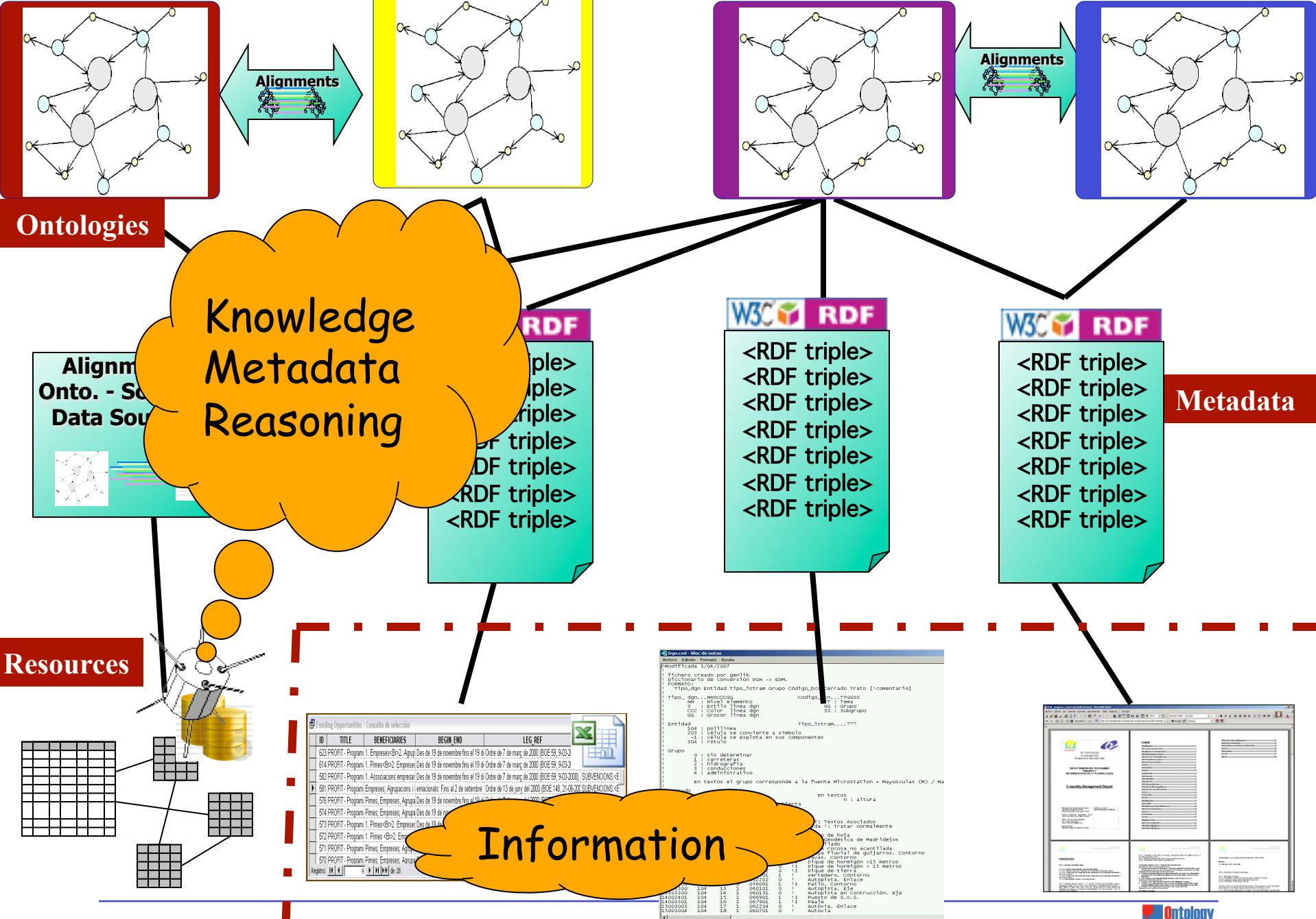


Corporative Semantics

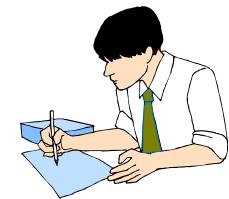


Corporative Semantics





Semantic portals



Agents



Portal Administrators
Ontologies and Software



External resources

- 47

Semantic Driven

Permission-based

User Oriented



Extranet Users



Edición de los contenidos del portal (Atributos)

KnowledgeWeb Project FP6-507482

Documentation Event Organization Person Project Administration Logout

RDFS Person

Instance of PhD Student: Angel López-Cima

Move instance to: Administrative Staff Send Continue to relations >>

Instance Name: Angel López-Cima

Instance Attribute	Range	Cardinality	Value
Full Name	String	(1,1)	Angel Lopez-Cima
Photo	Enter an URL		Angel.jpg
Email	Enter an URL		alopez@fi.upm.es
Homepage	Enter an URL		
Date	String	(1,N)	16/10/1976
City	String	(1,1)	Spain
Zip code	String	(0,1)	28660
Street Address	String	(1,1)	Campus Montegancedo, s/n
Telephone	String	(0,1)	+34 91 336 6604
Fax	String	(0,1)	+34 91 352 4819

Upload a file to Angel López-Cima.Photo:
Select a file to upload: Examinar... Enviar consulta

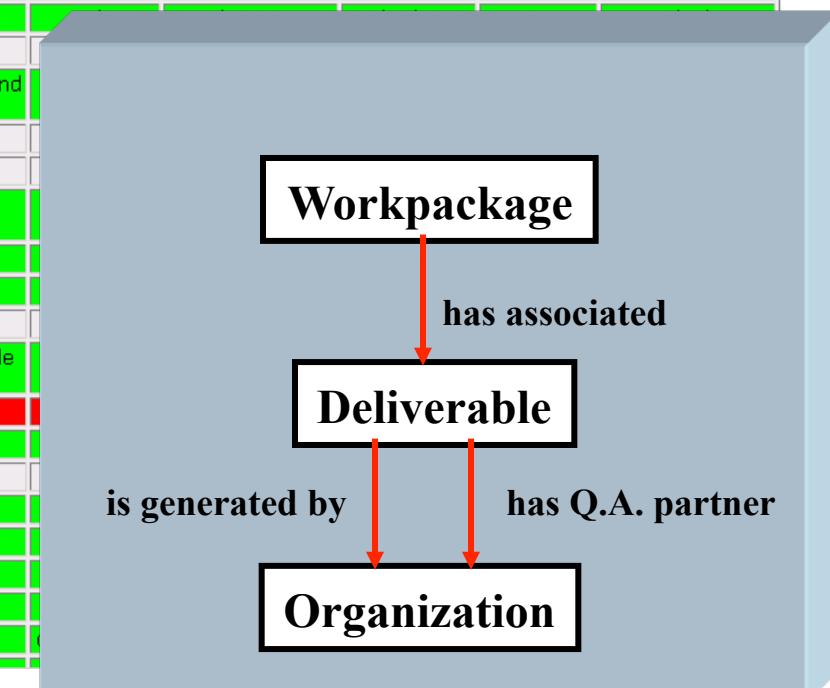
Select Date, Please... October 1976

Send Continue to relations >>

Semantic-based Visualisation

Status of the Deliverables

Workpackage	Deliverable	Generated By	Q.A. Responsibility	Delivery Date	Project Month	Status
WP1: Ontologies	D1.1: State of the art in ontologies from the SW perspective	UPM	IFI	11/08/2002	2	Final
	D1.2: Kernel Ontology Specification, Knowledge architecture	UPM	UdS	09/24/2003	27	Final
	D1.3: Ontology Workbench Specification	UPM	UniLiv	09/26/2003	27	Final
	D1.4: Ontology Alignment Solution	IFI	UPM	09/12/2003	27	Final
WP2: Window on Semantic Web languages	D2.1: State of the art on Semantic Web languages	IFI	UPM	02/17/2003	2	Final
	D2.2: Report on SW languages evolution	IFI	iSOCO	08/28/2003	30	Final
WP3: Annotation services	D3.1: State of the art on annotation tools and services	iSOCO	UdS	02/28/2003	2	---
	D3.2: Methodology for the development of wrappers and annotation tools	iSOCO	UdS	09/15/2003	10	---
	D3.3: Annotation services for static resources	iSOCO	UPM	---	10	---
	D3.4: Annotation services for dynamic resources	iSOCO	UniLiv	---	23	---
	D3.5: Annotation services for multimedia content					
	D3.6: Annotation services for web services					
WP4: Semantic indexation and routing	D4.1: State of the art on indexation, routing techniques and negotiation techniques					
	D4.2: Semantic Index Solution					
	D4.3: Routing Solution					
WP5: Multilinguality	D5.1: State of the art on multilinguality for ontologies, annotation services and user interfaces					
	D5.2: Multilinguality and ontologies					
	D5.3: Multilingualism and annotation services					
	D5.4: Multilingual user interface					
WP6: User interface and visualisation services	D6.1: State of the art on visualisation technologies feasible for the Semantic Web					
	D6.2: Ontology visualisation core services					
	D6.3: Semantic Web content visualisation services					
	D6.4: Semantic Index and Routing Monitor service					
WP7: Definition and integration	D7.1: System specification					
	D7.2: Cooperation protocol definition					
	D7.3: Application development guidelines					
	D7.4: Integration test plan					
WP8: Test case 1. Fund finder for	D8.1: Test case system specification					



Semantic markup based on many different ontologies

KMI

Search []

Home News Projects Technologies Publications People

People [People/All Members]

Members [78] [A][B][C][D][E][F][G][H][I][J][K][L][M][N][O][P][Q][R][S][T][U][V][W][X][Y][Z]

```
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<foaf:firstName>Enrico</foaf:firstName>
<foaf:surname>Motta</foaf:surname>
<foaf:phone rdf:resource="tel:+44-(0)1908-653506"/>
<foaf:homepage rdf:resource="http://kmi.open.ac.uk/people/motta">
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<foaf:topic_interest>Knowledge Management</foaf:topic_interest>
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Ontology Engineering Group. Powered by ODESeW - Mozilla Firefox

Archivo Editar Ver Historial Marcadores Herramientas Ayuda

Personalizar vínculos http://pobladores.lyc... http://pobladores.lyc... Iberia.com

Google Buscar Marcadores Corregidor ortográfico Traducir Envío a...

Configuración

Ontology Engineering Group

Home Access information Projects

Current Completed Other Projects' People

Student University Staff Past Collaborators Publications

By Date Author Subject

People (22)

Dra. Asunción de María Gómez Pérez asun@fi.upm.es Phone: 34 913367439 Fax: 34 913524819 More

Dra. Guadalupe Aguado de Cea lupe@fi.upm.es Phone: 34 913367415 Fax: 34 913565472 More

Dr. Mariano Fernández-López mfernandez@fi.upm.es Phone: 34 913366605 Fax: 34 913524819 More

Dra. Inmaculada Álvarez de Mon Reja Dra. Rosario Plaza Arache Jesús Barrasa Rodríguez

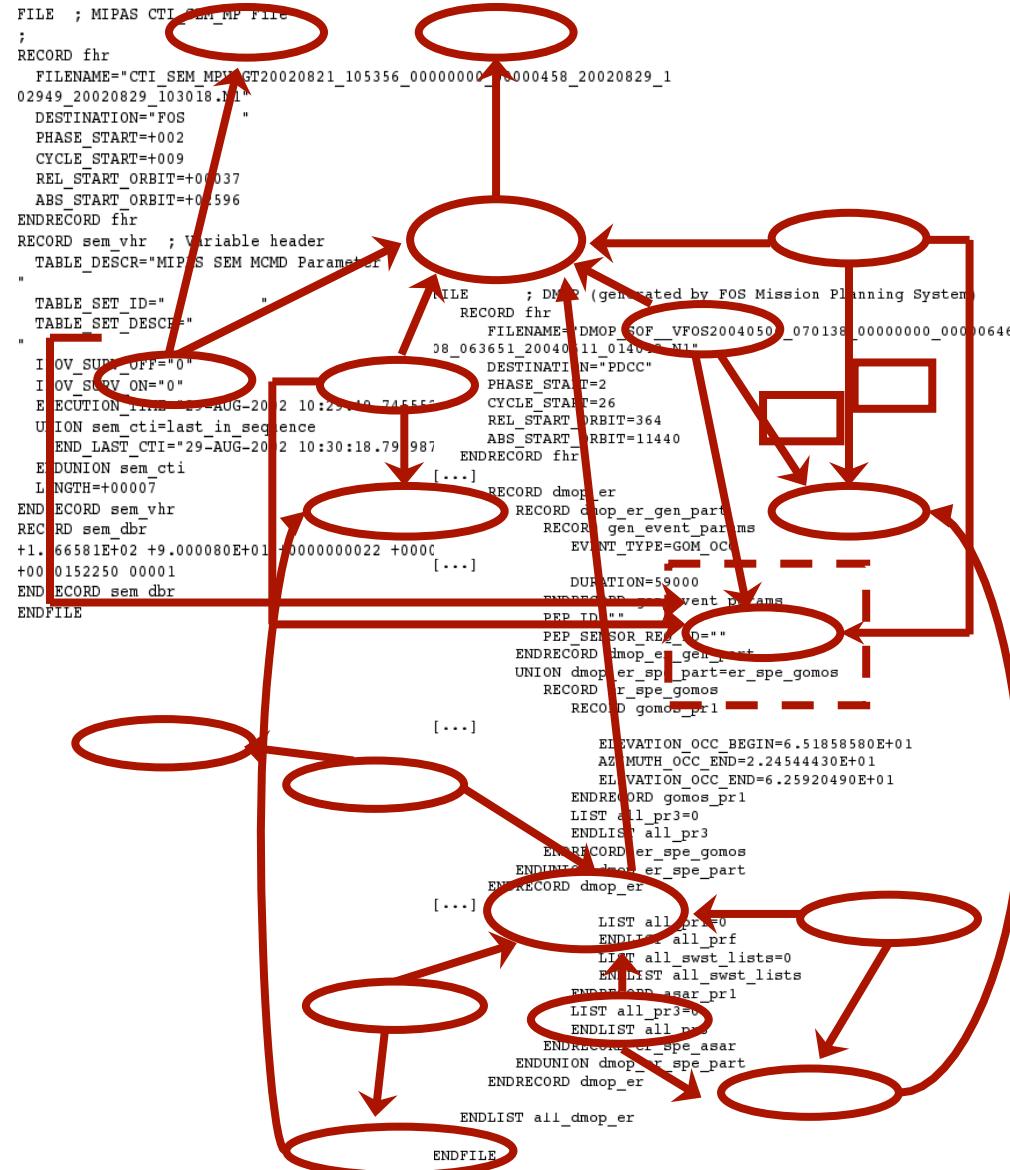
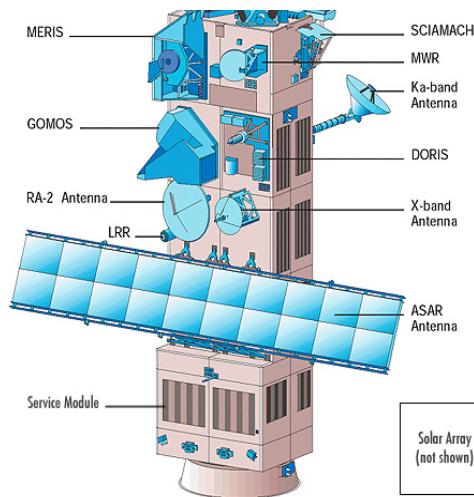
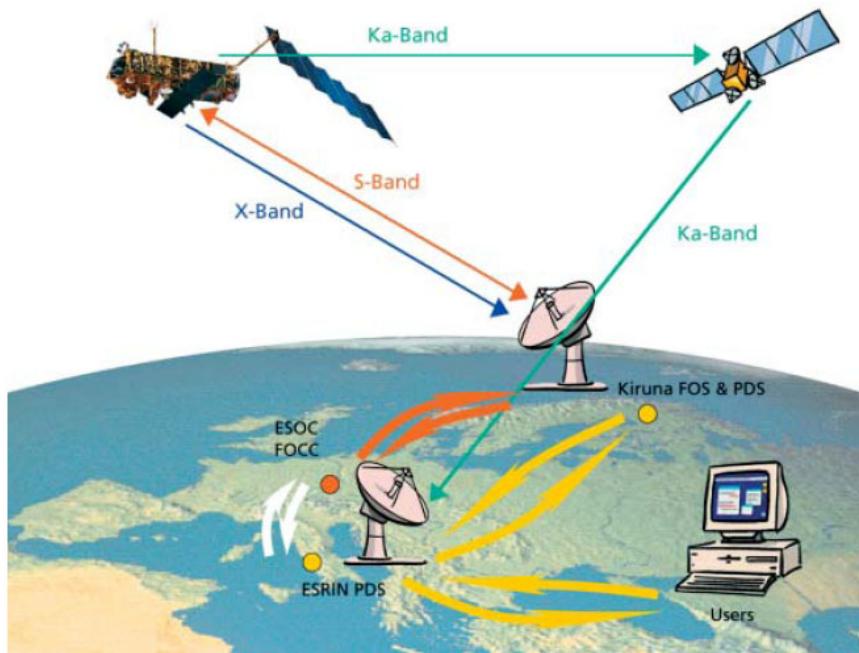
RDF Report

<rdf:Description rdf:about="Asunción Gómez_Pérez">
<rdf:type rdf:resource="Full_Professor"/>
<NS0:Name>Asunción de María</NS0:Name>
<NS0:Last_Name1>Gómez</NS0:Last_Name1>
<NS0:Last_Name2>Pérez</NS0:Last_Name2>
<NS0:DisplayName>Asunción de María Gómez Pérez</NS0:DisplayName>
<NS0:Academic_Degree>Ph.D.</NS0:Academic_Degree>
<NS0:E-mail>asun@fi.upm.es</NS0:E-mail>
<NS0:Telephone>34 913367439</NS0:Telephone>
<NS0:Fax>34 913524819</NS0:Fax>
<NS0:Address>Campus de Montegancedo</NS0:Address>
<NS0:City>Boadilla del Monte</NS0:City>
<NS0:Country>Spain</NS0:Country>
<NS0:Date_of_Birth>03/09/1967</NS0:Date_of_Birth>

José Ángel Ramos Gargantilla María del Carmen Suárez-Figueroa Miguel Esteban Gutiérrez
jaramos@fi.uma.es mcsuarez@fi.uma.es mesteban@dalitz.cs.uma.es

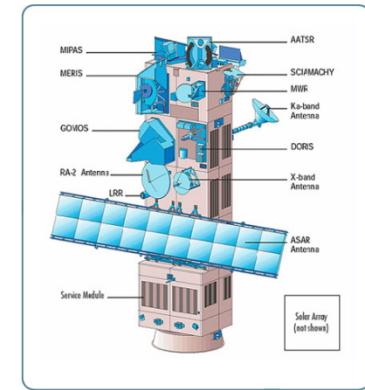
Conceptual Mismatch

Creating metadata for processing satellite information



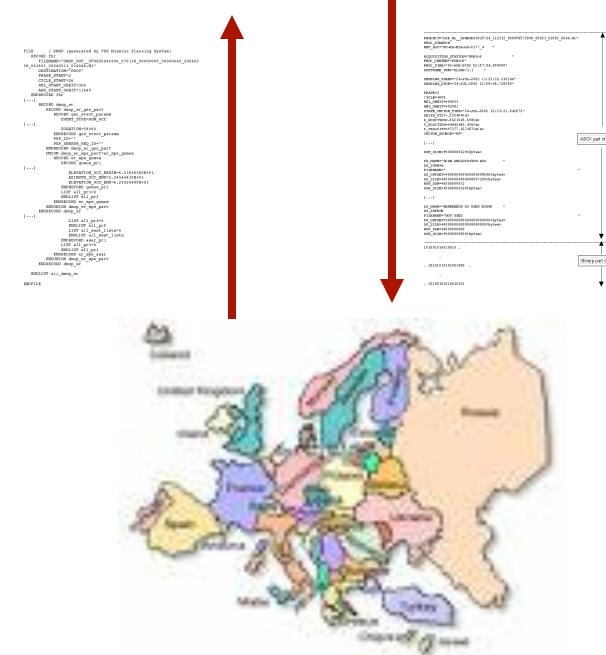
Processing satellite information

- Geographically distributed organizations
- Organizations send plans to the Envisat
- Envisat has Instruments on board that take “pictures”
- Envisat sends back information to the Earth



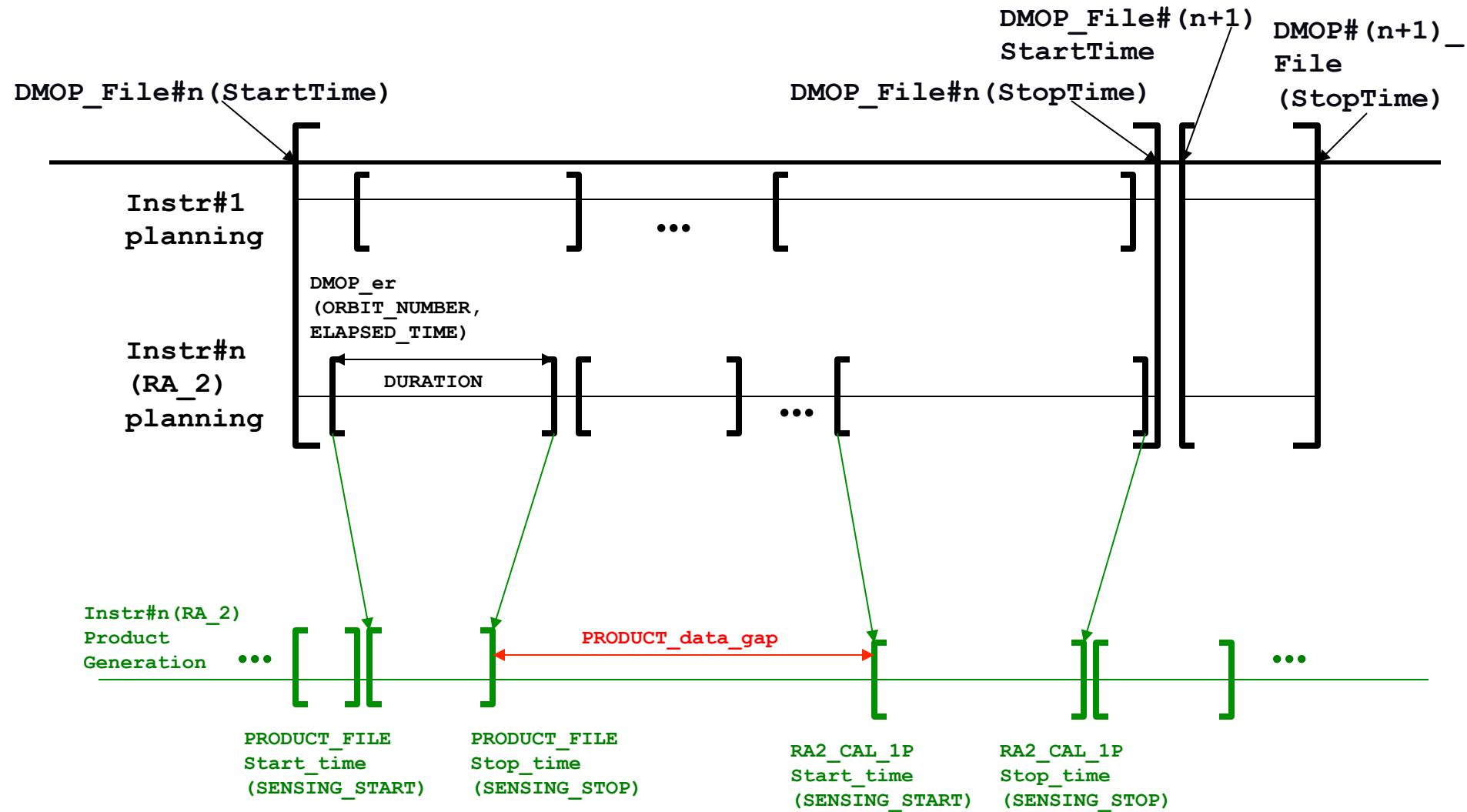
USE CASE DIMENSION:

- 1 planning file (DMOP) is generated per planning day
 - Parameters for instrument operation (taking pictures)
 - Parameters for the satellite general configuration.
 - MacroCommands (MCMD's): translation from planning
- For each DMOP file:
 - Hundreds of planning activities per instrument and instrument mode
 - Hundreds of Product files are generated per instrument and instrument mode
 - Each product file corresponds with a planning activity



Analysis needs to be carried out on the existence, contents and correlation of these files

Comparison between planning and product generation



Generating files in RDF

FILE System) ; DMOP (generated by FOS Mission Planning
RECORD ID

```

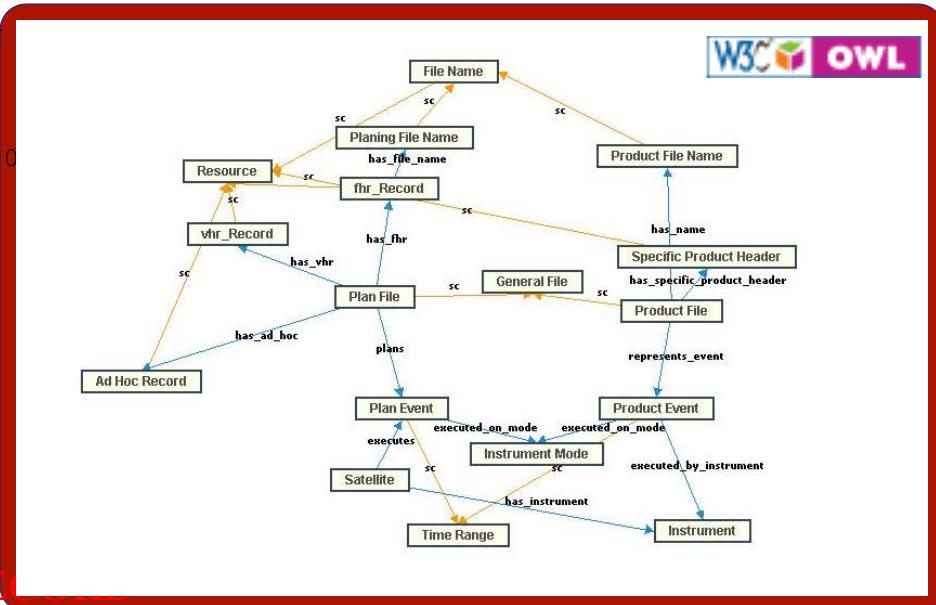
RECORD fhr
  FILENAME="DMOP_SOF_VFOS20060124_103709_00000000_000
  01215_20060131_014048_20060202_035846.N1"
  DESTINATION="PDCC"
  PHASE_START=2
  CYCLE_START=44
  REL_START_ORBIT=404
  ABS_START_ORBIT=20498

ENDRECORD fhr
.....
RECORD dmop_er
  RECORD dmop_er_gen_part
    RECORD gen_event_params
      EVENT_TYPE=RA2_MEA
      EVENT_ID="RA2_MEA_0000000002063"
      NB_EVENT_PR1=1
      NB_EVENT_PR3=0
      ORBIT_NUMBER=20521
      ELAPSED_TIME=623635
      DURATION=41627862
    ENDRECORD gen_event_params
  ENDRECORD dmop_er
ENDLIST all_dmop_er
ENDFILE

```

RECORD parameters

RECORD parameters
cor
other
s



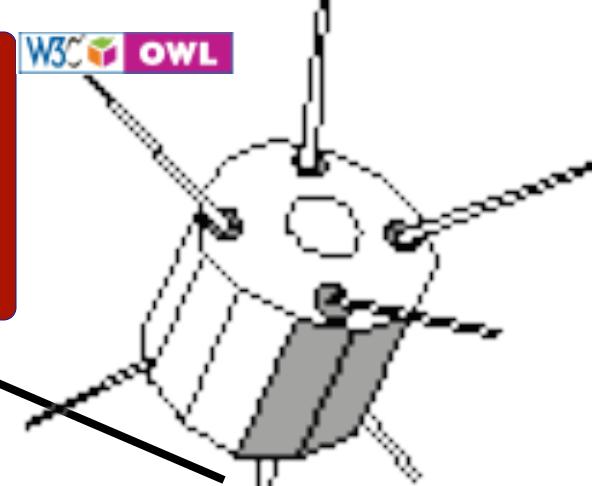
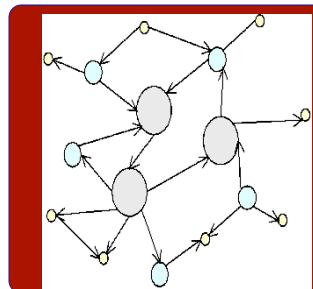
W3C OWL

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 xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
 xmlns:NS0="http://protege.stanford.edu/kb#"
 >
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<NS0:instrument_mode_id>MS</NS0:instrument_mode_id>
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<NS0:event_id>"GOM_OCC_0000000541299"</NS0:event_id>
<NS0:duration rdf:datatype="http://www.w3.org/2001/XMLSchema#int">53000</NS0:duration>
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<NS0:event_type rdf:resource="http://protege.stanford.edu/kb#10713"/>
</rdf:Description>

W3C RDF

1 Ontology

1 reference ontology for annotating all files RDF files (instances) are distributed



Distributed Metadata for Planning files

 **RDF**

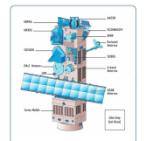
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<RDF
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Distributed Metadata for Product files

 
r
s
<RDF
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<RDF
triple>

The product files

The planning files



The diagram illustrates the internal structure of the Hubble Space Telescope's optical bench assembly. It shows the following components from top to bottom:

- WFMZ
- WFI
- SCHMIIDT
- SLR
- IRMA
- GRIS
- DALI detector
- WFC3
- UVIS
- Wide Field Camera
- Space Telescope Imaging Spectrograph
- Wide Field and Planetary Camera
- Science Instruments



GeoLinkedData

- It is an open initiative whose aim is to enrich the Web of Data with Spanish geospatial data.
- This initiative has started off by publishing diverse information sources, such as National Geographic Institute of Spain (IGN-E) and National Statistics Institute (INE)



- <http://geo.linkeddata.es>

Process for Publishing Linked Data on the Web

Identification
of the data sources

Vocabulary
development

Generation
of the RDF Data

Publication
of the RDF data

Data cleansing

Linking
the RDF data

Enable effective
discovery

