



1. Introduction

Asunción Gómez-Pérez

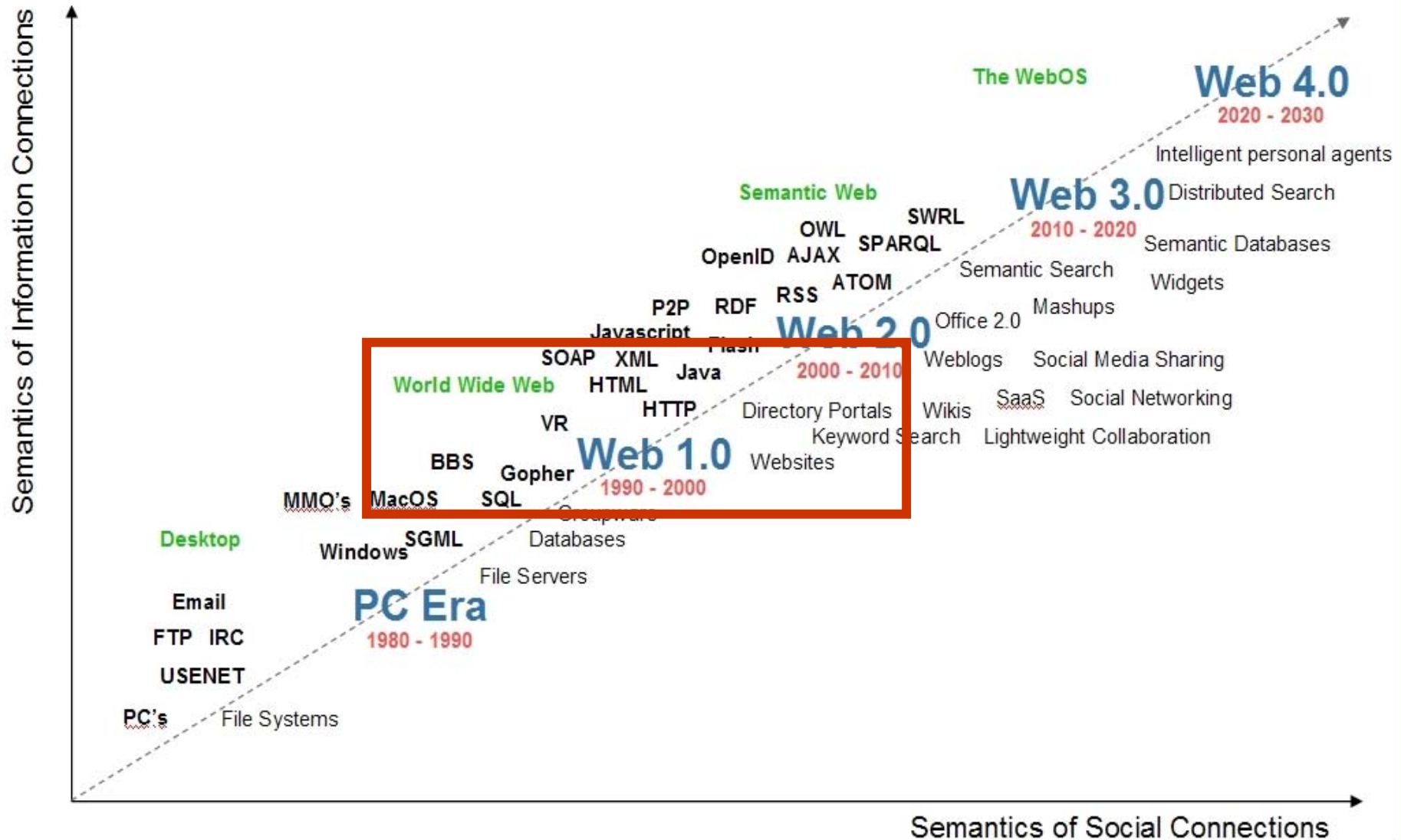
{asun}@fi.upm.es

<http://www.oeg-upm.net>

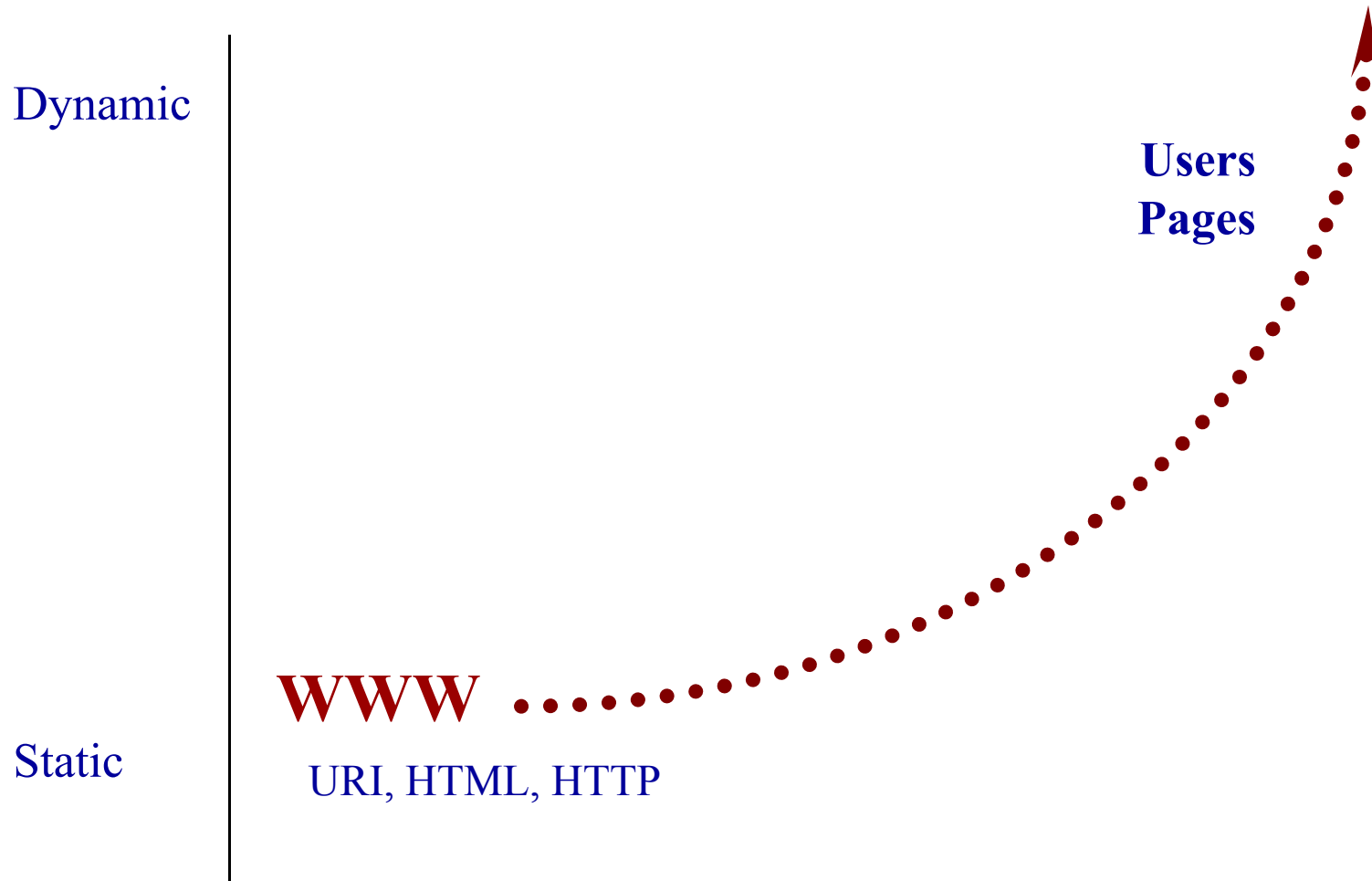
Omtological Engineering Group
Laboratorio de Inteligencia Artificial
Facultad de Informática
Universidad Politécnica de Madrid
Campus de Montegancedo sn,
28660 Boadilla del Monte, Madrid, Spain

- Web
- Web 2.0
- Web 3.0 and the Semantic Web
- Examples of semantic applications
 - Semantic Webs
 - Corporative semantics

Web n+1: Roadmap

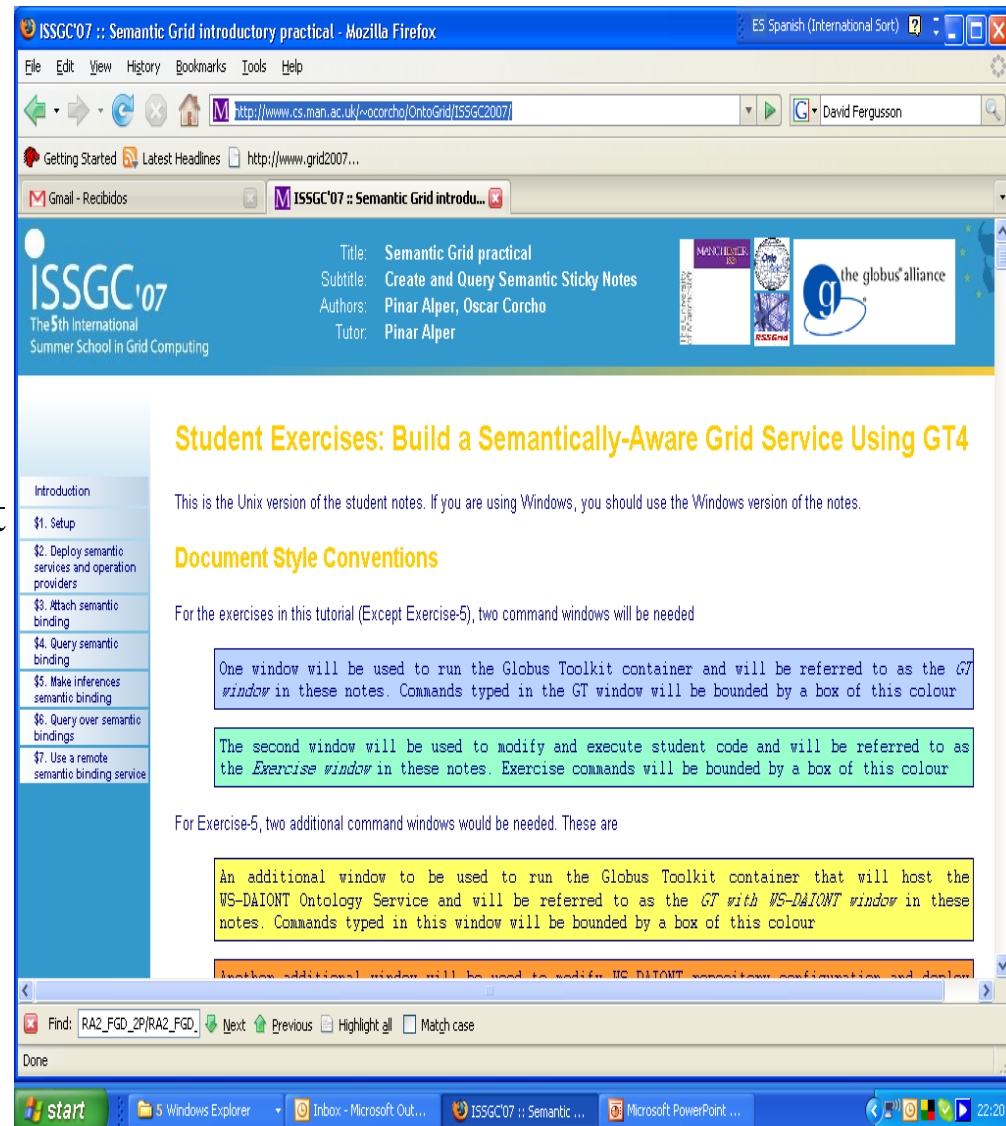


The problem: Information overload on the WEb



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...



The current Web is multilingual

Árabe



الاسم: الهندسة في علم التطور
المؤلفون: أسنسيون غومز بيرز
السعر: \$74.95
المنتج: الكتاب

الاسم: الهندسة في علم التطور

المؤلفون: أسنسيون غومز بيرز

السعر: \$74.95

الكتاب: الكتاب

Japonés



タイトル: 存在論工学
著者: アスンシオン ゴメスベレス
価格: \$74.95
産品: 本

タイトル: 存在論工学

著者: アスンシオン ゴメスベレス...

価格: \$74.95

産品: 本

Noruego



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

Skjøte: Ontological Ingeniørarbeid

Forfatter: Overtakelse Gómez-Pérez...

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Produkt: Bok

Inglés



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

Title: Ontological Engineering

Authors: Asunción Gómez-Pérez...

Price: \$74.95

Product: Book



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

Information a machine can see...

☞☞☞📄📁📄
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◆📄📄📄...

XML allows the creation of metadata with “meaning”



Árabe



الاسم: الهندسة في علم التطور
المؤلفون: أسنسيون غومز بيرز
السعر: \$74.95
المنتج: الكتاب

<الاسم/>الهندسة في علم التطور <الاسم/>
<المؤلفون/>أسنسيون غومز 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>

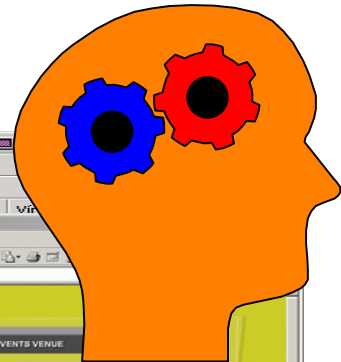
¿What do the tags **mean** for the machine?



But What About...?

`<conf>`  `</conf>`
`<date>`        `</date>`
`<place>`         `</place>`
`<introduction>`                                                                                                                                

The problem of choosing information



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

[illegible]

- The screenshot shows the homepage of the New National Theatre Tokyo. The header includes the theater's name in English: "NEW NATIONAL THEATRE, TOKYO". Below this, there are several sections: a large image of the theater's interior, a list of upcoming performances with dates and titles, and a section for ticket information. The text is primarily in Japanese, with English subtitles for the theater's name and some performance details.

- .- Interpretation
 - .- Agregation
 - .- Consistency of the

FLUGFAHRT
Automate INNENVER
FLUGFAHRT
Automate LEFZO
FLUGFAHRT
Automate
INNENVER
FLUGFAHRT
Automate RECH
FLUGFAHRT
Automate KERNER
FLUGFAHRT
Automate FACEBOOK
FLUGFAHRT
Automate STUTTGART
FLUGFAHRT

Interessenten Online
Fahrzeugofferte
Wie oder was
Kontakt

Detail
Kunden
Partner

Zugang Kunden
Passwort:
Passwort:
Passwort:
Go

Preis und Flotte für FRANKFURT FLUGHAFEN

Wachstumsplan

| Marken | Gruppe und Modelle | Neuzulassung | Wachstumsplan | Neuzulassung |
|--------|--------------------|---|---------------|--------------|
| (100) | BMW | ECM1, ECONOMY 3 TÜREN KLUSSEZ 106 244,90 € 1.1 oder abwärts | 244,90 € | 244,90 € |
| (100) | VW | CCOL, KOMFORT 5 TÜREN KLUSSEZ 106 314,97 € 1.1 oder abwärts | 314,97 € | 314,97 € |
| (100) | VW | EMB1, MITTELKLASSE MARKENKLASSE VECTRA 384,97 € 1.1 oder abwärts | 384,97 € | 384,97 € |

Preis und Flotte für FRANKFURT FLUGHAFEN

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Automate INNENVER
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Automate RECH
FLUGFAHRT
Automate KERNER
FLUGFAHRT
Automate FACEBOOK
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Automate STUTTGART
FLUGFAHRT

Interessenten Online
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|--------|--------------------|--------------------------|---------------|--------------|
| (100) | BMW | ECM1, ECONOMY 3 TÜREN | | |



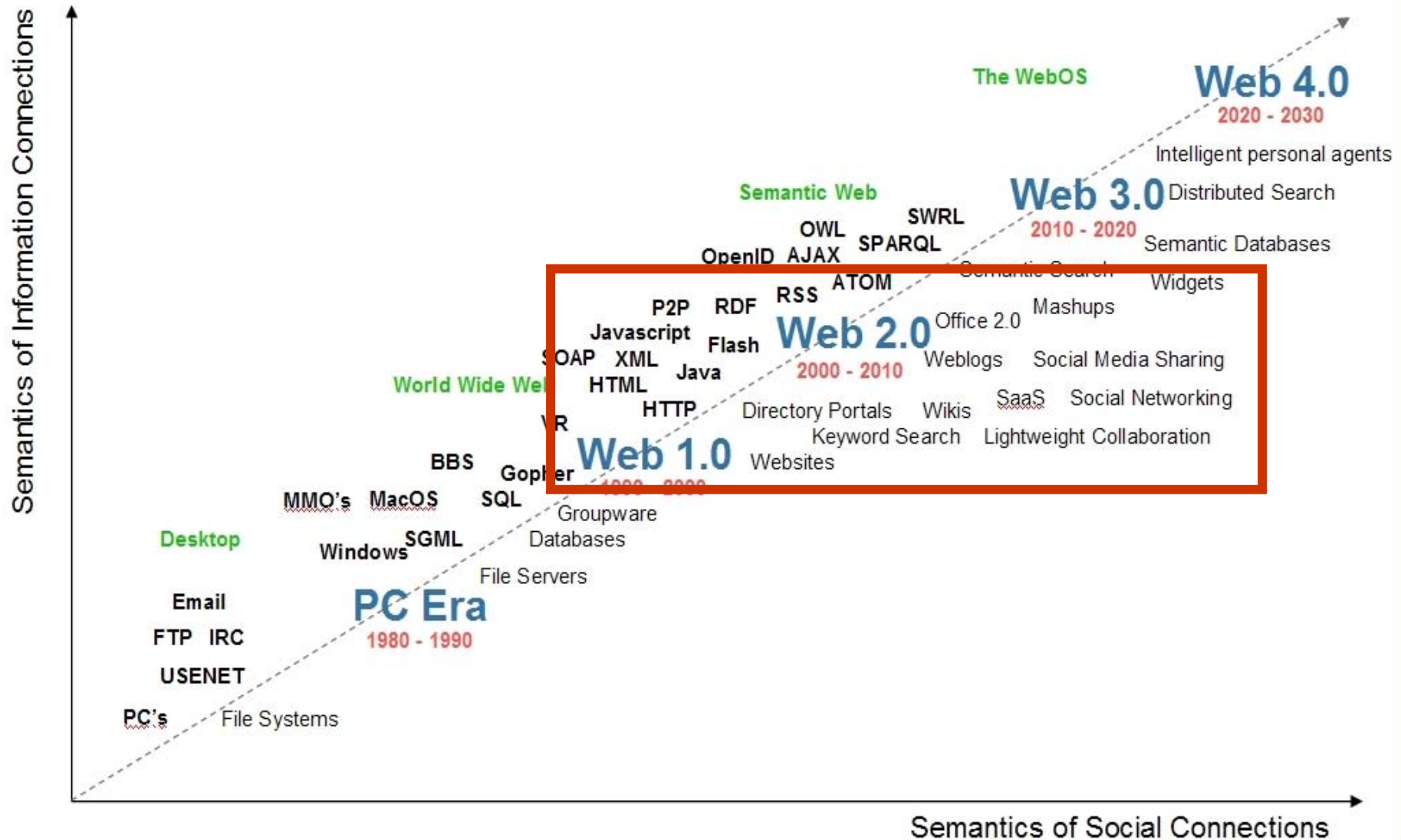
What was the Web intended to be?



“... 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.”

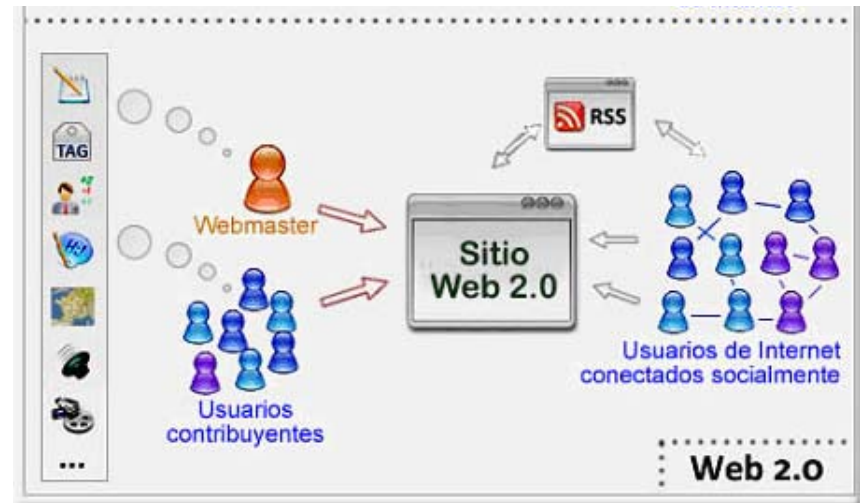
[Berners-Lee 1996]

Web n+1: Roadmap



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



del.icio.us - Mozilla Firefox

del.icio.us social bookmarking

» all your bookmarks in one place

» bookmark things for yourself and friends

» check out what other people are bookmarking

learn more... » get started «

login | register | help

Tags

A tag is simply a word you use to describe a bookmark. Unlike folders, you make up tags when you need them and you can use as many as you like. The result is a better way to organize your bookmarks and a great way to discover interesting things on the Web.

learn more...

tags to watch

more...

hotlist

what's hot right now on del.icio.us

HOT NOW

see also: popular | recent

Gumption: Do YouJustGetMe? Do I Even Get Myself? 103 people

save this

first posted by ilovediamonds psychology facebook socialnetworking research tags community

Ask The Readers: What Books Have Changed Your Life? 104 people

save this

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9 Steps to Achieving Flow (and Happiness) in Your Work | Zen Habits 121 people

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first posted by aclark1021 productivity flow happiness lifehacks creativity tags

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drawing youtube 02:04

This is a short version of the videos i did. I'm drawing people on you you want me to draw a picture of you? Just ask me. (more)

From: marcoselij Views: 6,080 ★★★★★

More in Arts

.- Encontrar
.- Comprender
Extraer
.- Comparar
.- Agregar
.- Publicar
.- Contextualizar

flickrr

Home You Organize Contacts Groups Explore

Search everyone's photos Search

cardboxes

Uploaded on September 2, 2006 by Nils K. Windisch (netomer)

Nils K. Windisch (netomer)'s photostream

1,218 photos View as slideshow

Tags

netomer 50mm 50mm f/1.8 AF D70 Nikkor black and white August 2006 0.4s f8 landscape format ISO200 Göttingen Germany Europe Library State and University Library Göttingen on tour with Ralf Stockmann indoor historical Building geo:lat=51.534003 geo:lon=9.932199

The neutrality of this article is disputed. Please see the relevant discussion on the talk page.

Web 2.0 is a term often applied to a perceived ongoing transition of the World Wide Web from a collection of websites to a full-fledged computing platform serving web applications to end users. Ultimately Web 2.0 services are expected to replace desktop computing applications for many purposes.

Contents [hide]

1 Overview

1.1 Comparison with Semantic Web

2 Technology

2.1 Content syndication

2.2 Web services

2.3 Server software

3 Social impact

4 Business impact

5 External links

5.1 Examples

Overview

The original conception of the web (in this context, labeled Web 1.0) comprised static HTML pages that were updated rarely, if at all. The success of the dot-com era depended on a more dynamic web (sometimes labeled Web 1.0) where content management systems served dynamic HTML web pages created on the fly from an ever-changing content database. In both senses, so-called eyeballing was considered intrinsic to the web experience, thus making page hits and visual aesthetics important factors.

Proponents of the Web 2.0 approach believe that web usage is increasingly oriented toward interaction and rudimentary social networks, which can serve content that exploits network effects with or without creating a visual, interactive web page. In one view, Web 2.0 sites act more as points of presence, or user-dependent web portals, than as traditional websites.

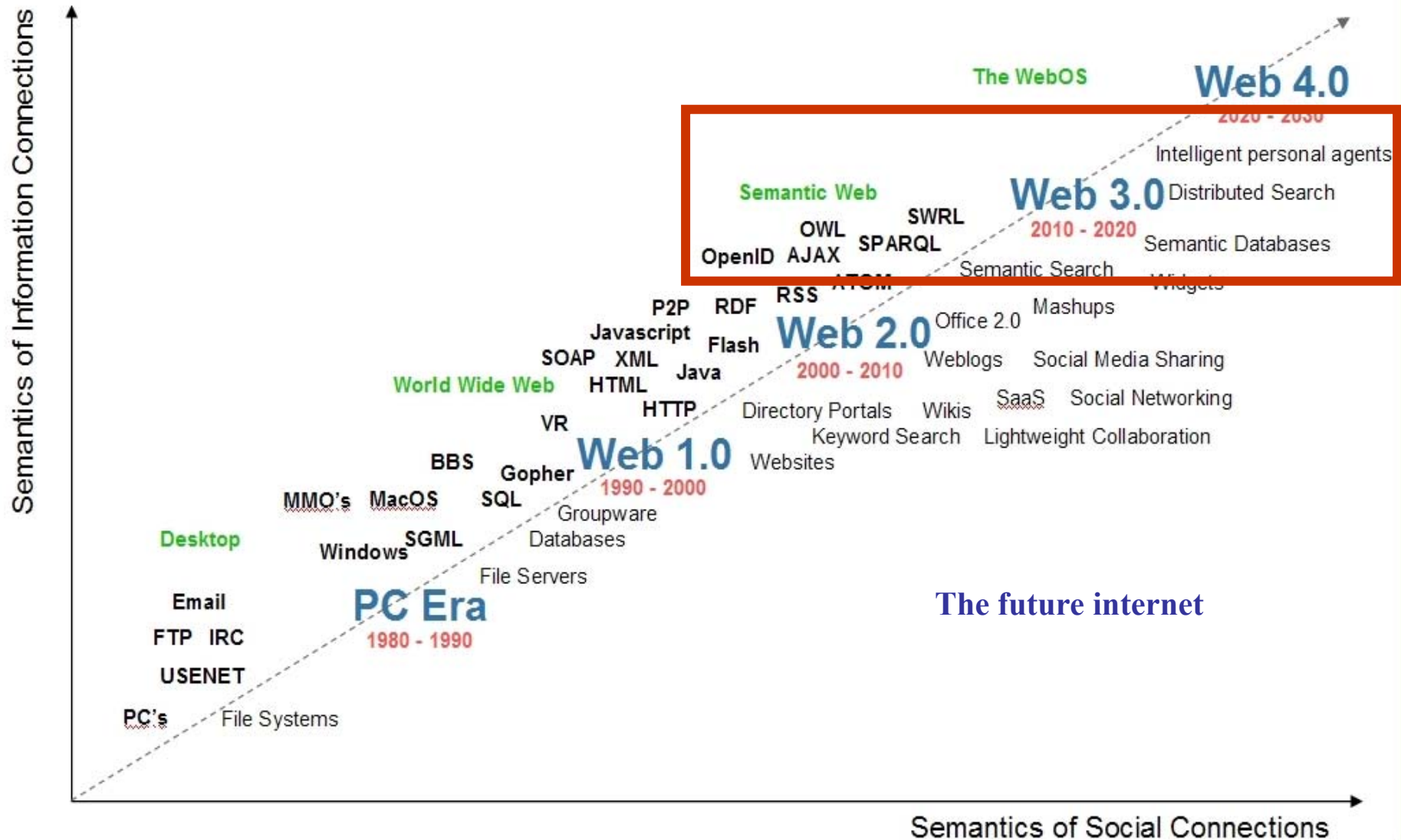
Comparison with Semantic Web

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



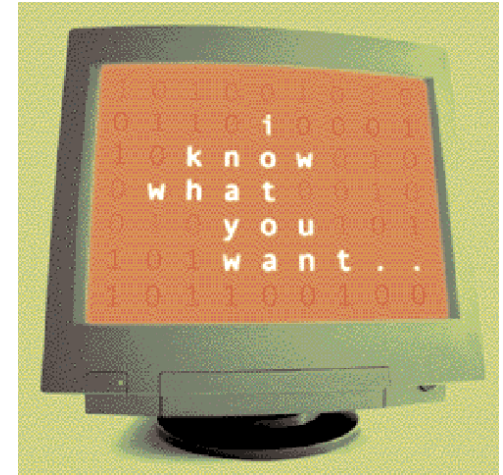
“... the machine-readable information space ...
... machine analysis could become a very
powerful management tool, ...
... facilitating our working together”

Web n+1: Roadmap



Web 3.0

- **Web Inteligente**
 - Semantic Web technologies
 - The Data Web – a global database
 - Intelligent applications (NLP, machine learning, machine reasoning, autonomous agents)
- **Conexión Ubicua**
 - Broadband adoption
 - Mobile Internet access
 - Mobile devices
- **Computación en red**
 - Software-as-a-service business models
 - Web services interoperability
 - Distributed computing (P2P, grid computing, hosted "cloud computing" server farms)
- **Tecnologías abiertas**
 - 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

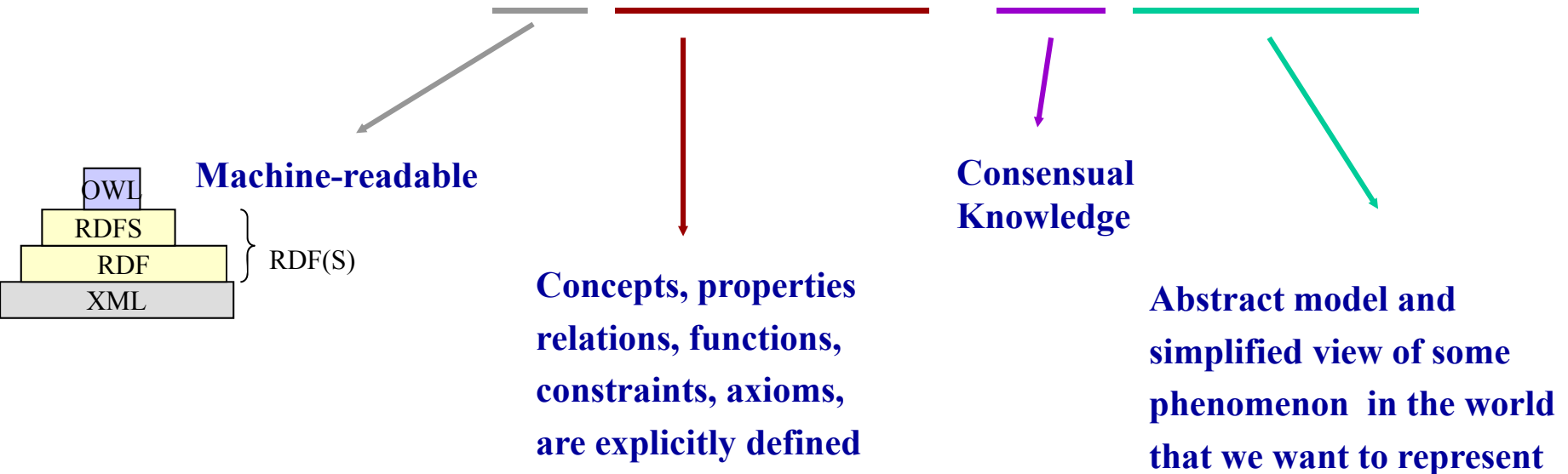
Hendler, J., Berners-Lee, T., and Miller, E.
Integrating Applications on the Semantic Web, 2002,
<http://www.w3.org/2002/07/swint.html>

Need to Add “Semantics”

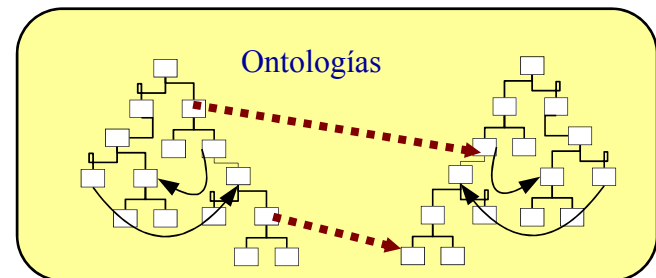
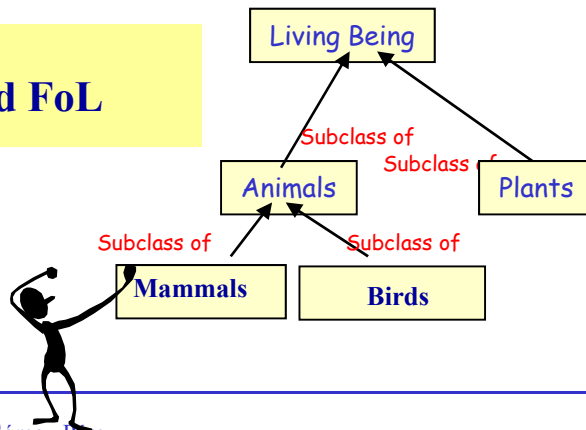
- External agreement on meaning of annotations
 - E.g., *Dublin Core* for annotation of library/bibliographic information
 - Agree on the meaning of a set of annotation tags
 - Problems with this approach
 - Inflexible
 - Limited number of things can be expressed
- Use Ontologies to specify meaning of 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



VIAJES IBERIA

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

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 |
|-----------------------|----------------------------|----------------------------------|---|-----------------------------|---------|
| <input type="radio"/> | Lufthansa LH 4417 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 09:05 Sin escalas 320 | 2h45 |
| <input type="radio"/> | Spanair JK 3000 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 09:05 Sin escalas 320 | 2h45 |
| <input type="radio"/> | Iberia IB 3500 E | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 11:40 Sin escalas 320 | 2h40 |
| <input type="radio"/> | Spanair JK 125 | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 12:35 Sin escalas 320 | 2h50 |
| <input type="radio"/> | Lufthansa LH 2581 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 12:35 Sin escalas 320 | 2h50min |
| <input type="radio"/> | Iberia IB 3514 E | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 14:10 Sin escalas M87 | 2h40min |
| <input type="radio"/> | Lufthansa LH 2583 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | 15:25 Sin escalas 320 | 2h45min |

```

rdfs:Class rdf:ID="Travel">
<rdfs:comment>A journey from place to
place</rdfs:comment>
</rdfs:Class>

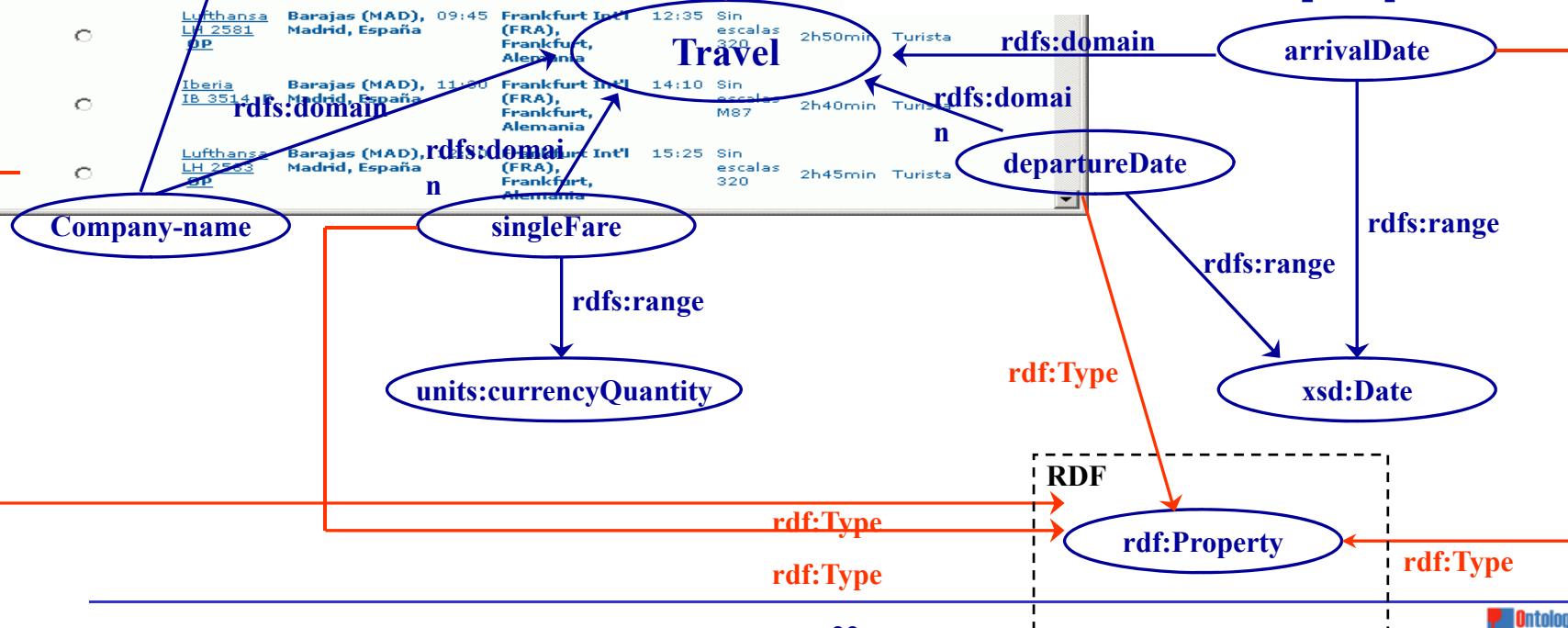
```

```

<rdf:Property rdf:ID="arrivalDate">
<rdfs:domain rdf:resource="#Travel"/>
<rdfs:range rdf:resource="&xsd:date"/>
</rdf:Property>

<rdf:Property rdf:ID="departureDate">
<rdfs:domain rdf:resource="#Travel"/>
<rdfs:range rdf:resource="&xsd:date"/>
</rdf:Property>

```



VIAJES IBERIA - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda

Atrás Búsqueda Favoritos Multimedia

Dirección http://www.viajesiberia.com/ Ir

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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

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 type="radio"/> | Lufthansa LH 4417 E | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h45min | Turista |
| <input type="radio"/> | Spanair JK 8863 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h45min | Turista |
| <input type="radio"/> | Iberia IB 3500 E | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h40min | Turista |
| <input type="radio"/> | Spanair JK 125 | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h50min | Turista |
| <input type="radio"/> | Lufthansa LH 2581 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h50min | Turista |
| <input type="radio"/> | Iberia IB 3514 E | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas M87 | 2h40min | Turista |
| <input type="radio"/> | Lufthansa LH 2583 OP | Barajas (MAD), Madrid, España | Frankfurt Int'l (FRA), Frankfurt, Alemania | Sin escalas 320 | 2h50min | Turista |

Metadata

```
<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>
```

500 euros

10/11/2005

Iberia

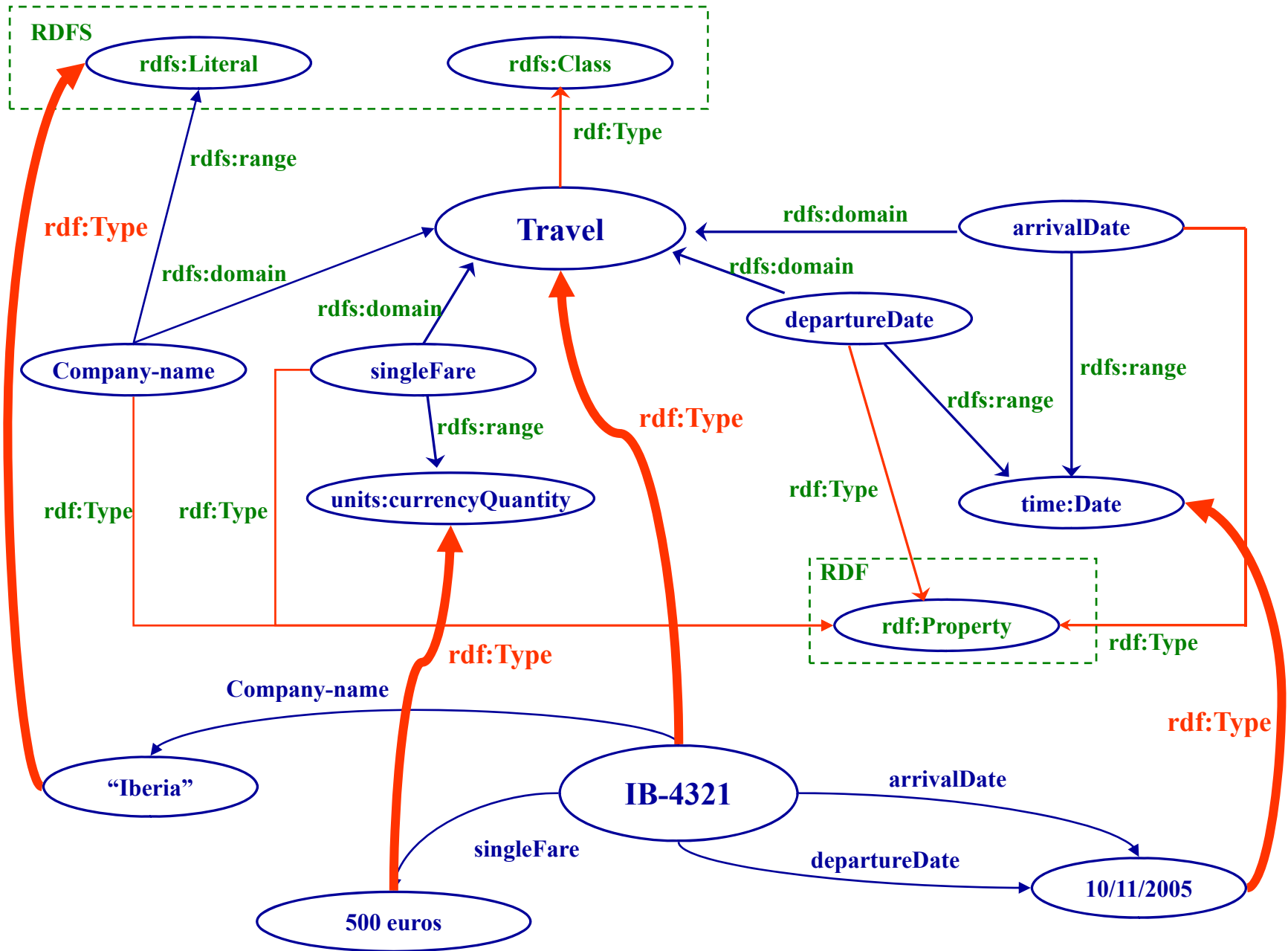
Company-name

IB-4321

arrivalDate

departureDate

singleFare

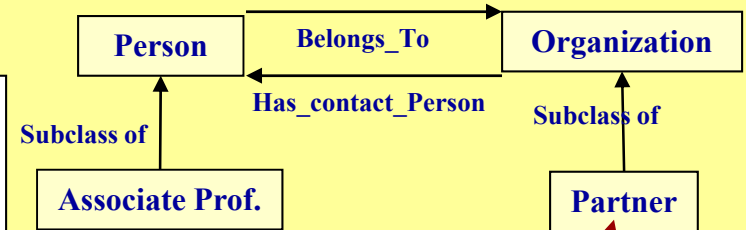


Ontologies and Metadata



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

Annotation (RDF)

```
<rdf:Description rdf:about='Asunción Gómez-Pérez'>
<rdf:type rdf:resource='Associate 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>
```

| | |
|-----------|--|
| 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).

```
<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 | Universidad Politécnica de Madrid |
| Acronym | UPM |
| Logo |  |

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

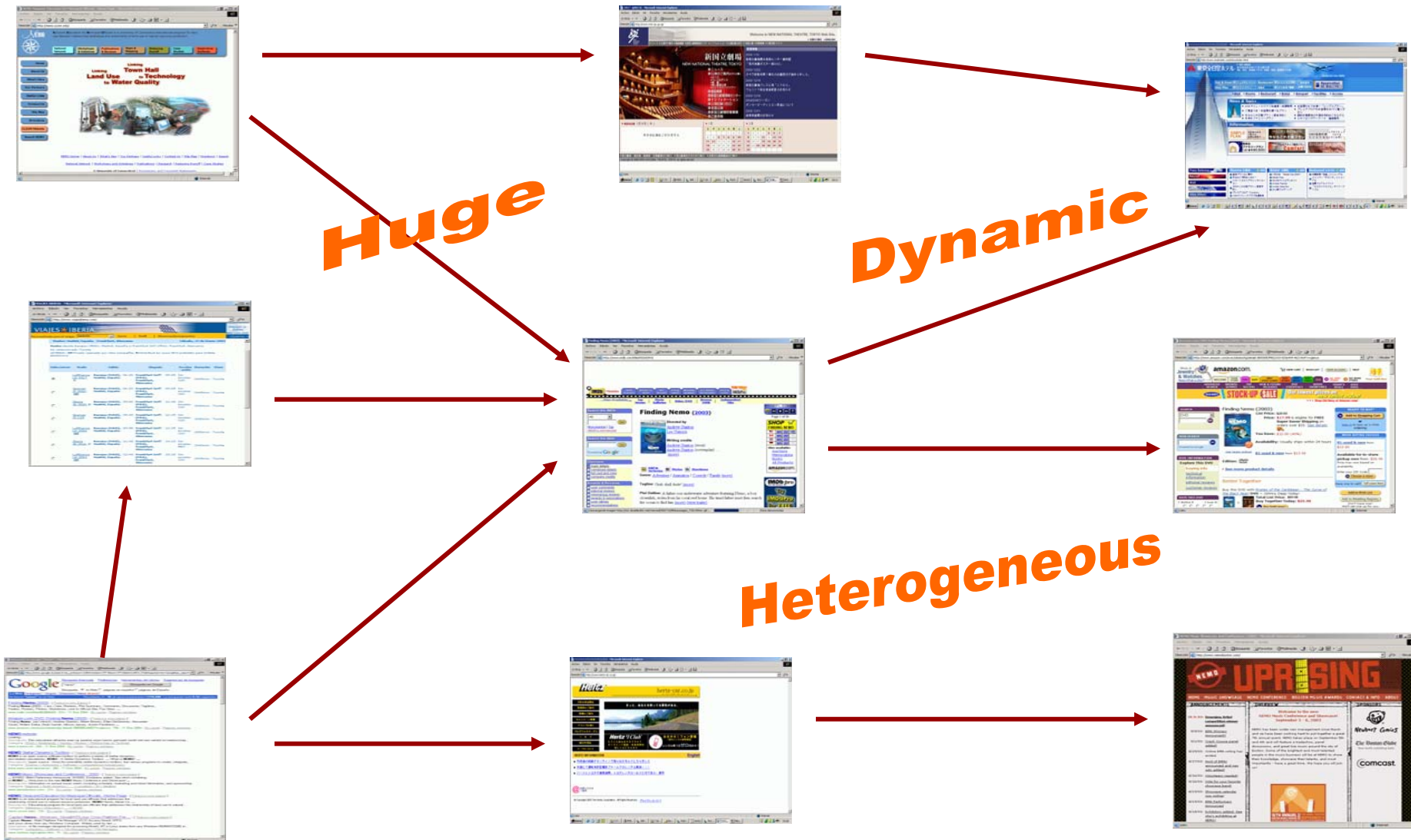
Web Page

URL <http://www.esperonto.net>

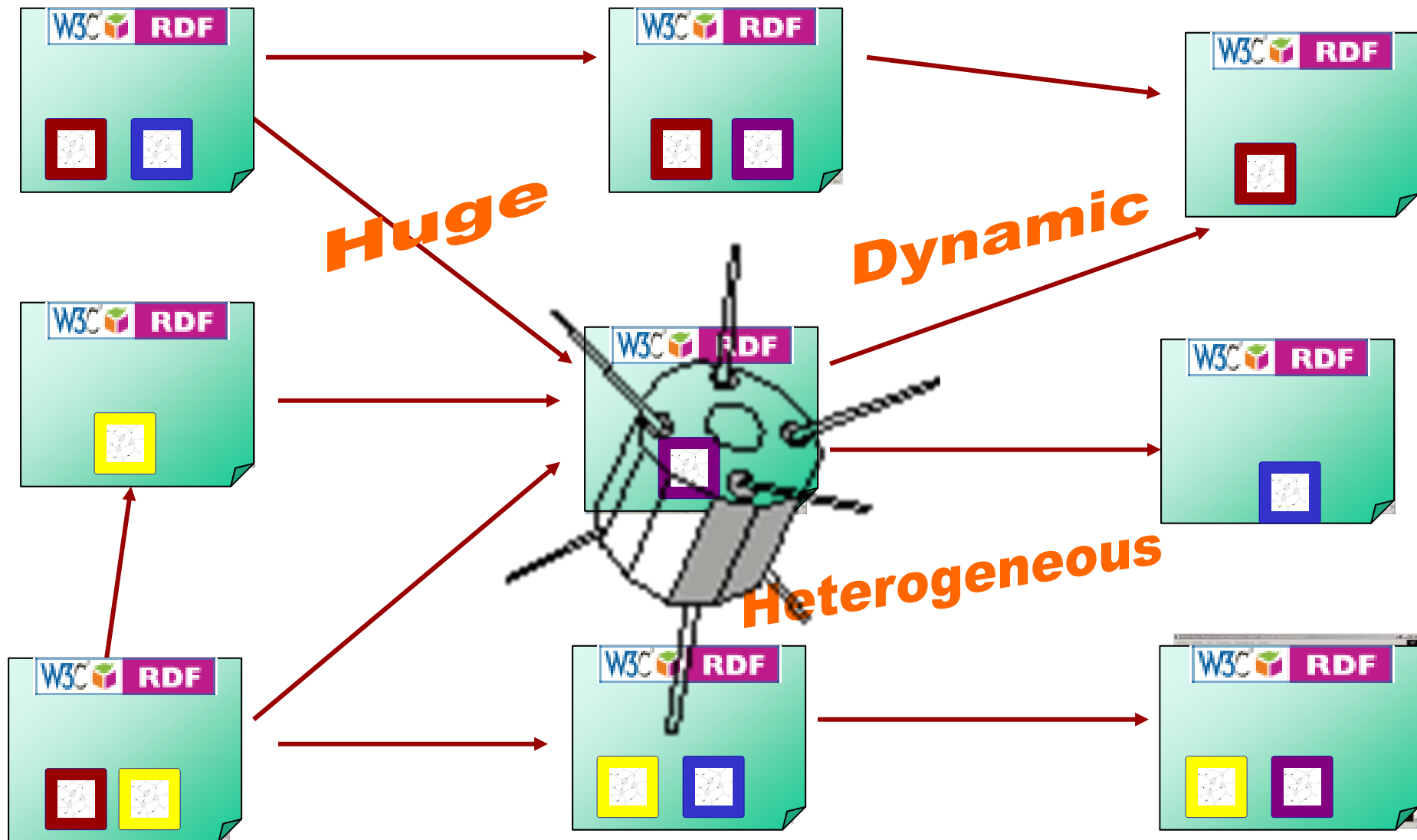
<http://www.esperonto.net>

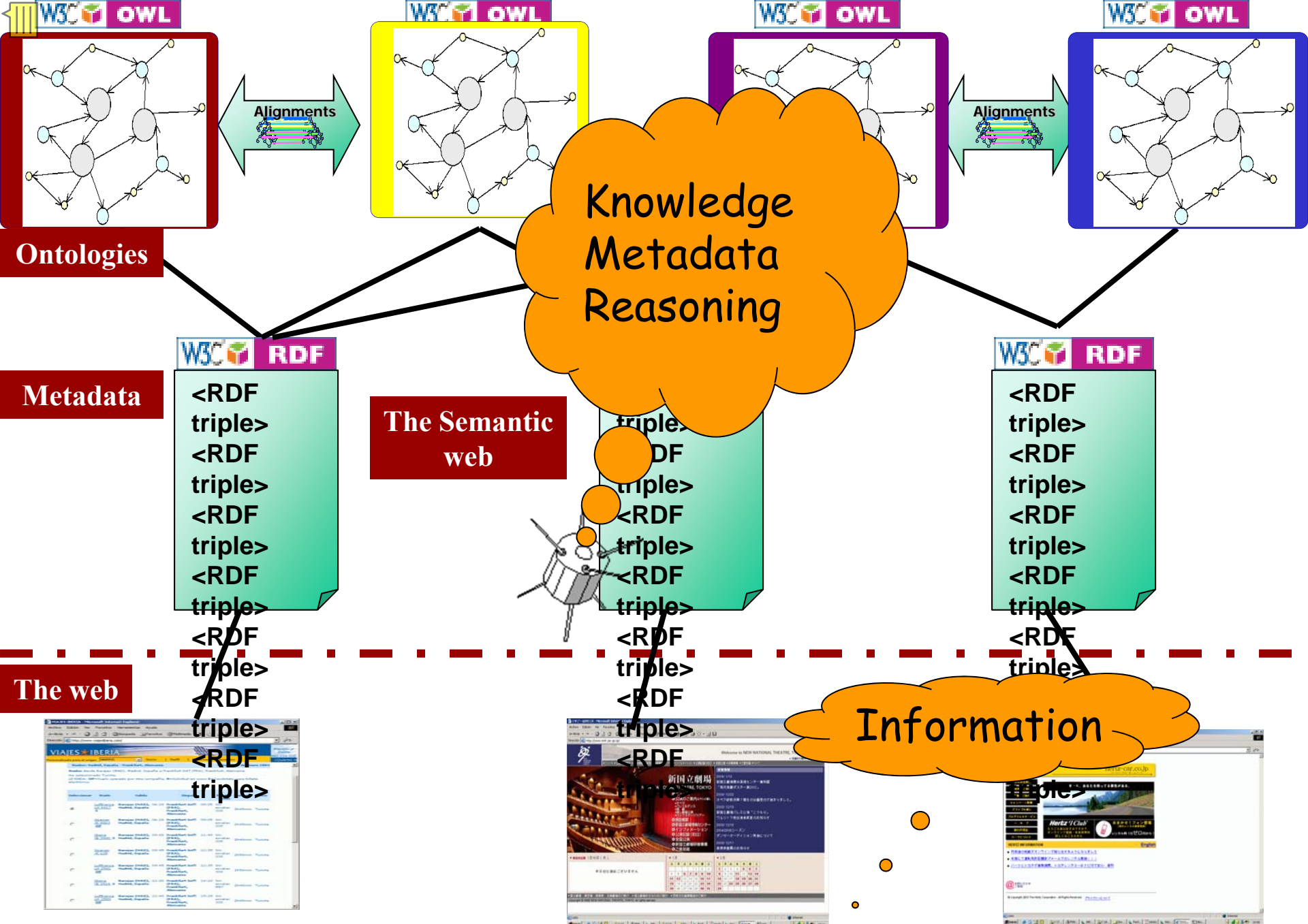
- Web
- Web 2.0
- Web 3.0 and the Semantic Web
- Examples of semantic applications
 - Semantic Webs
 - Corporative Semantics
 - Annotation at large scale
 - Semantic portals
 - Semantic Information exchange between heterogeneous data sources

The Web

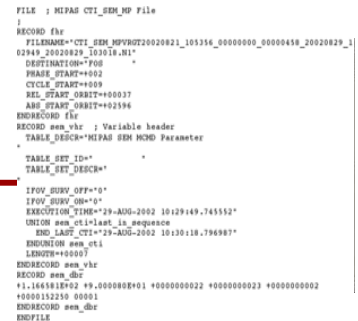


Semantic Webs





Heterogeneous



Corporative Semantics

