

Next-Generation Design:

Interacting with the Semantic Web

Duane Degler, IPGems
www.ipgems.com

UPA 2006
Broomfield, CO, USA



What does “semantic” mean ?

Of or relating to meaning, especially meaning in language.

The American Heritage® Dictionary of the English Language, Fourth Edition

“ 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.** ”

“The Semantic Web,” *Scientific American*, Berners-Lee, Hendler, Lassila, 2001



Why ? Enabling goals . . .

The Semantic Web could solve real problems

“Common language”

Sharable articulation of purpose/relationships

Context descriptions for integration and adaptivity

Limiting information *irrelevance*

(worse than overload!)

Is it worth whatever effort may be required?



What is it ?

~

A brief overview of a complex idea



Terminology ? A brief summary . . .

- XML
- Keywords and tagging
- Taxonomy
- Ontology
- Triple (subject > predicate > object)
- RDF (resource description framework)
- OWL (web ontology language)
- Inferencing / reasoning



XML

```
<?xml version="1.0"?>
<person>
  <firstname>Fred</firstname>
  <lastname>Flintstone</lastname>
</person>
<company></company>
<address type="delivery">
  <street>12345 Main Street, #34</street>
  <city>Bedrock</city>
  <state>
    <statename>Quarry</statename>
    <stateabbrev>QR</stateabbrev>
  </state>
  <zipcode>12345</zipcode>
</address>
<order>N3-5678-04</order>
<instructions>
  If the occupant is not there, leave packages in the garden shed. Beware of dog.
</instructions>
```

What something
is – not how it
looks

Human *and*
machine
readable

Application-
independent
and flexible

Data and
content treated
the same way



Keywords and tagging

<meta>

keyword="cartoon"

keyword="tv show"

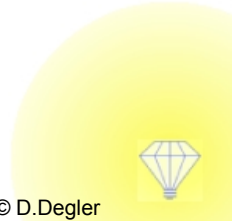
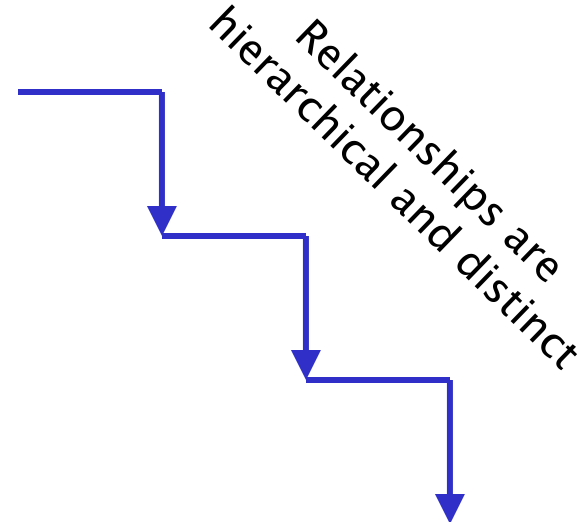
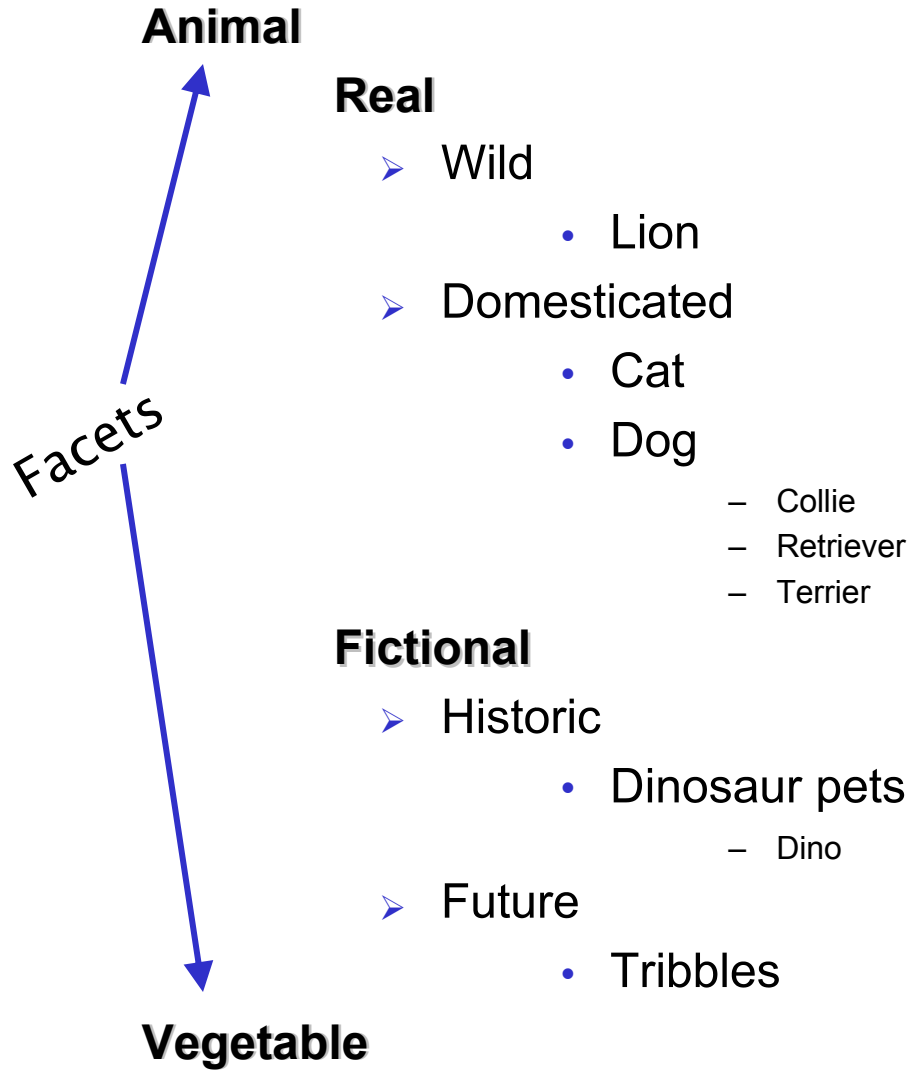
keyword="Flintstone"

Tag Cloud

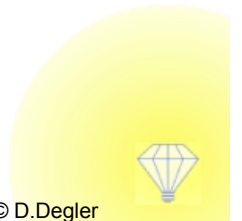
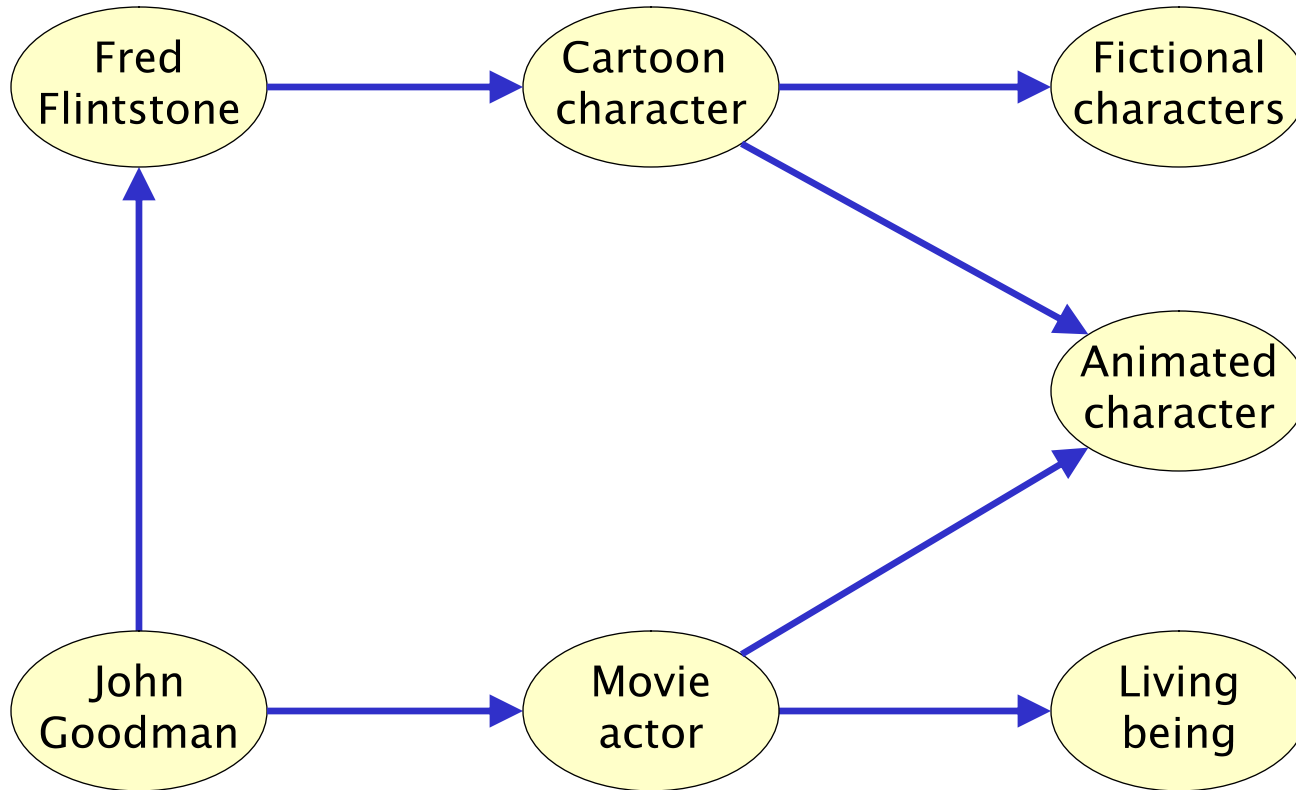
abc air al almost always american april audience best better between bob called came cast
cbs characters city come comedy cover david day daytime episode even ever family first get
go good got great **guide** guy home host january jerry john july kids know later life little live
long look love magazine mary may million movie nbc network **new** night now october own
people played prime program ratings really richard right say season see seemed seinfeld
series **show** something star still story television things think though three time told
tv two viewers war watch week weekends world years york young



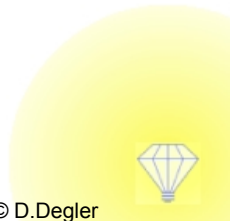
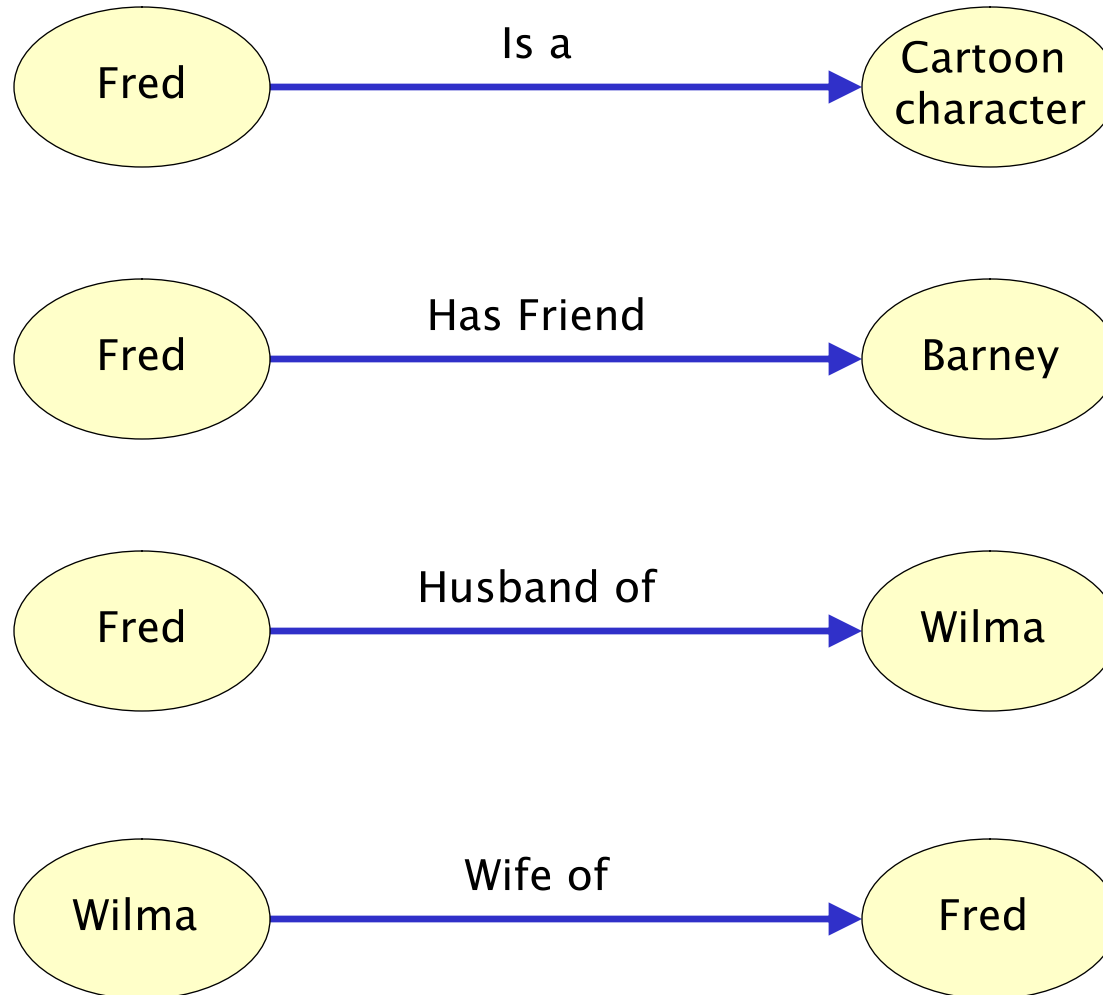
Taxonomy



Ontology

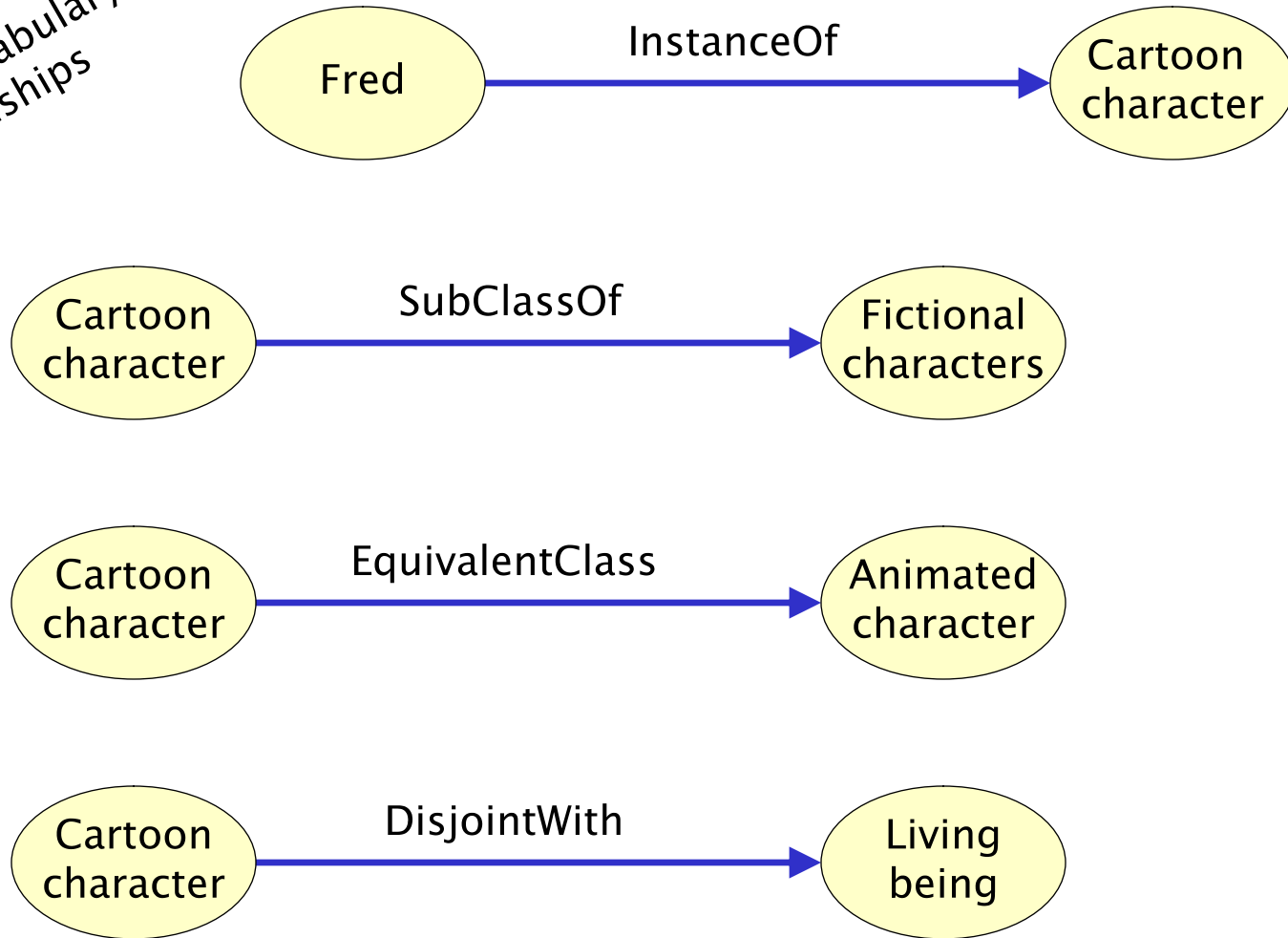


Triple: the basic building block of RDF



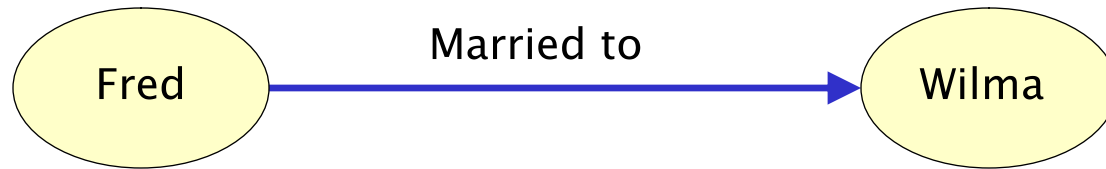
OWL: the Web Ontology Language

Controlled vocabulary
for relationships

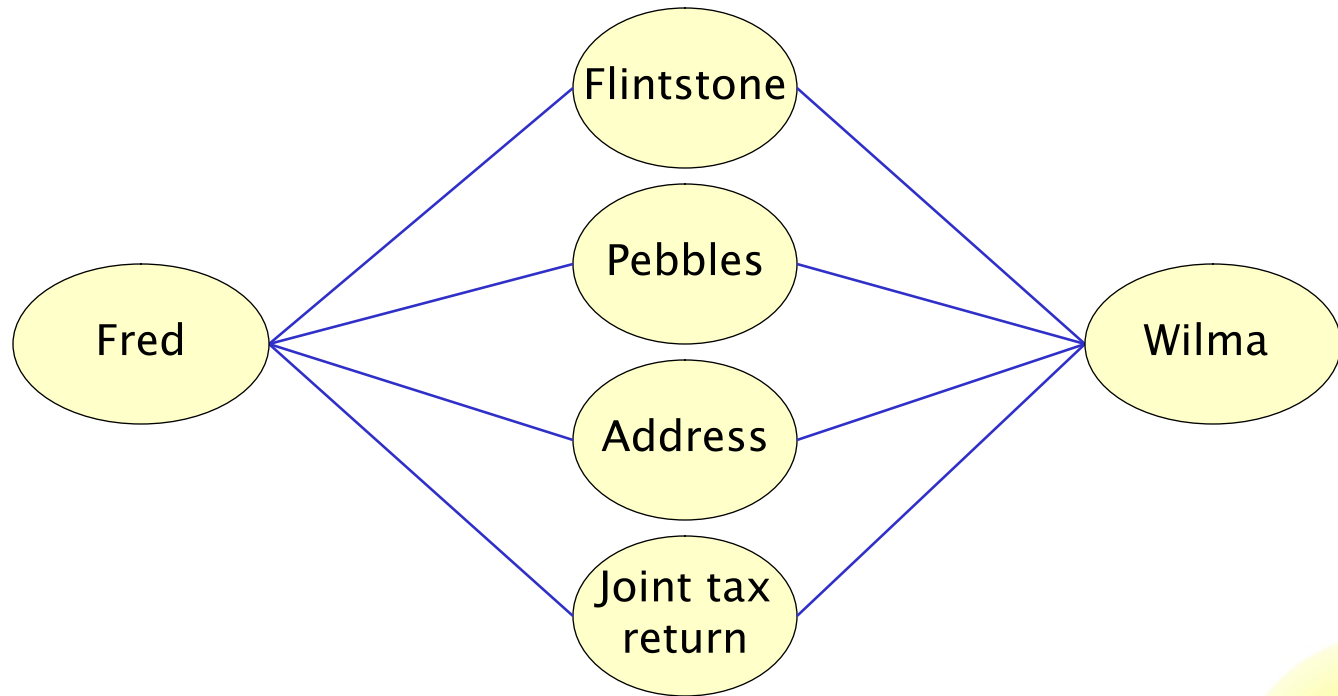


Inferencing

Explicit statement

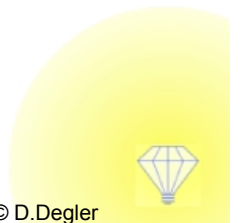


Inferred from...?

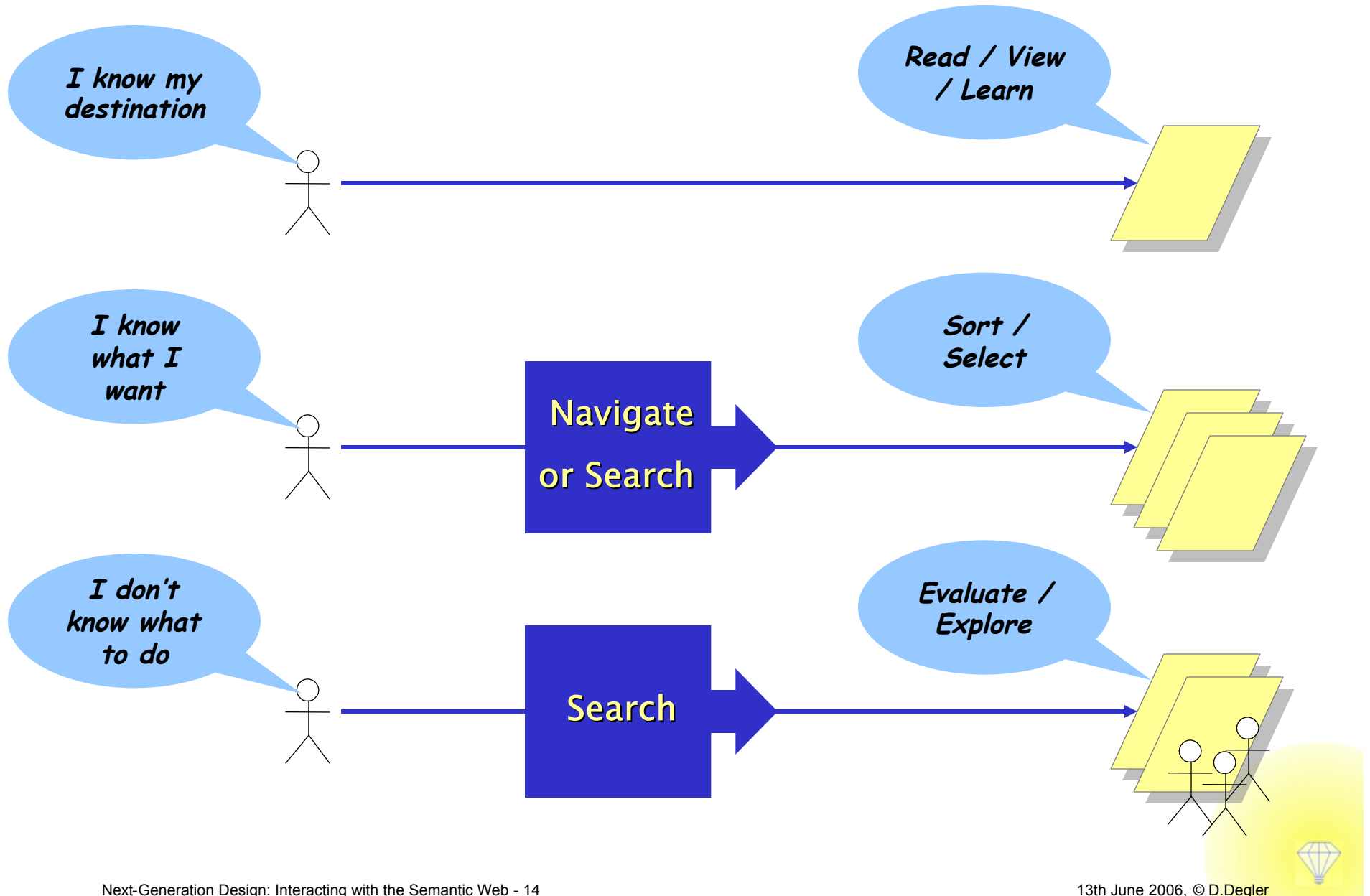


Terminology

- XML
- Keywords and tagging
- Taxonomy
- Ontology
- Triple (subject > predicate > object)
- RDF (resource description framework)
- OWL (web ontology language)
- Inferencing / reasoning



Now . . .



What do I need for HTML ?

<html>

<body>

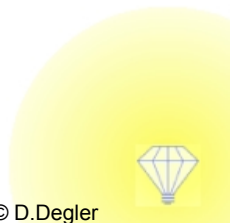
<p>

... and ...

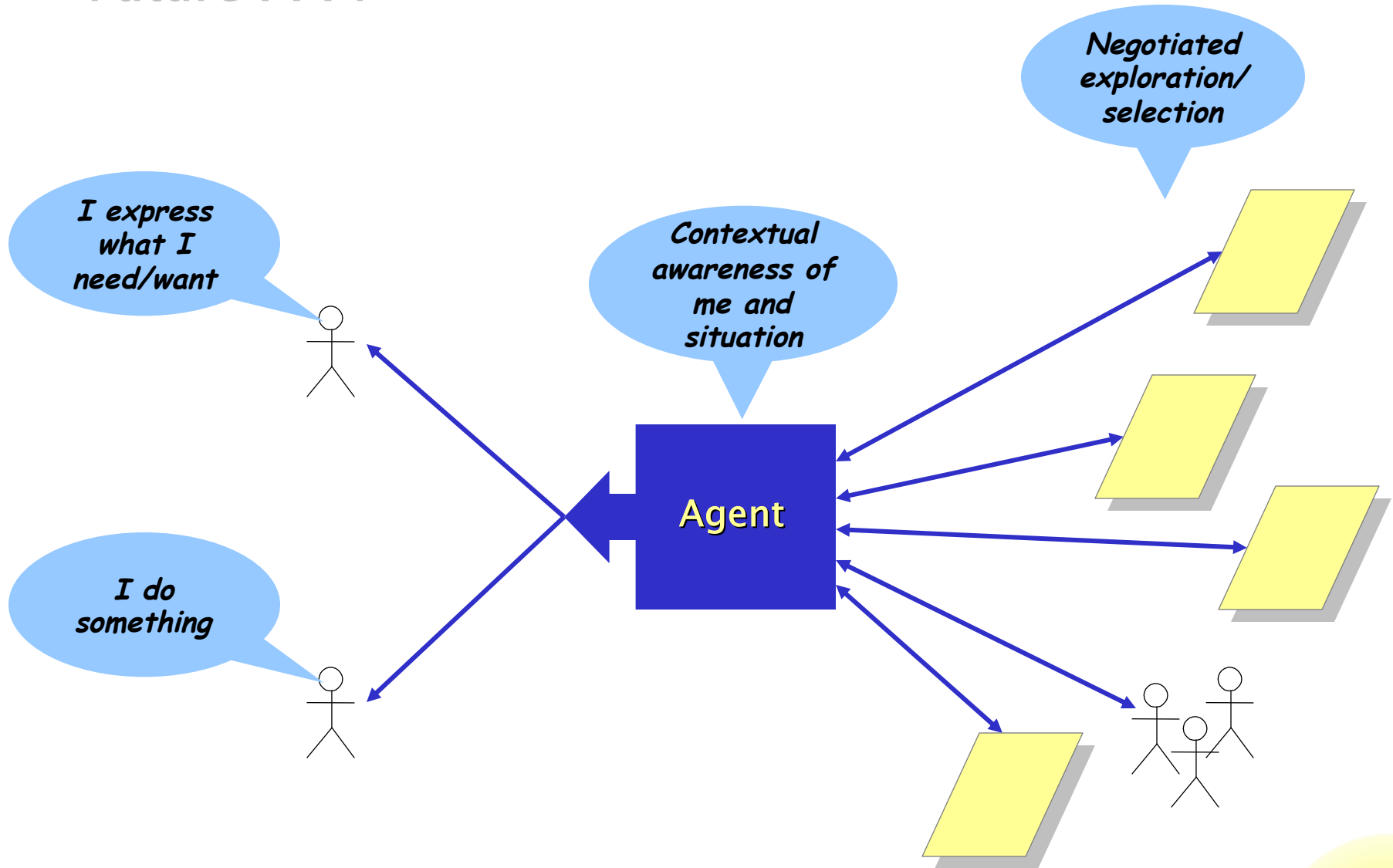
</p>

</body>

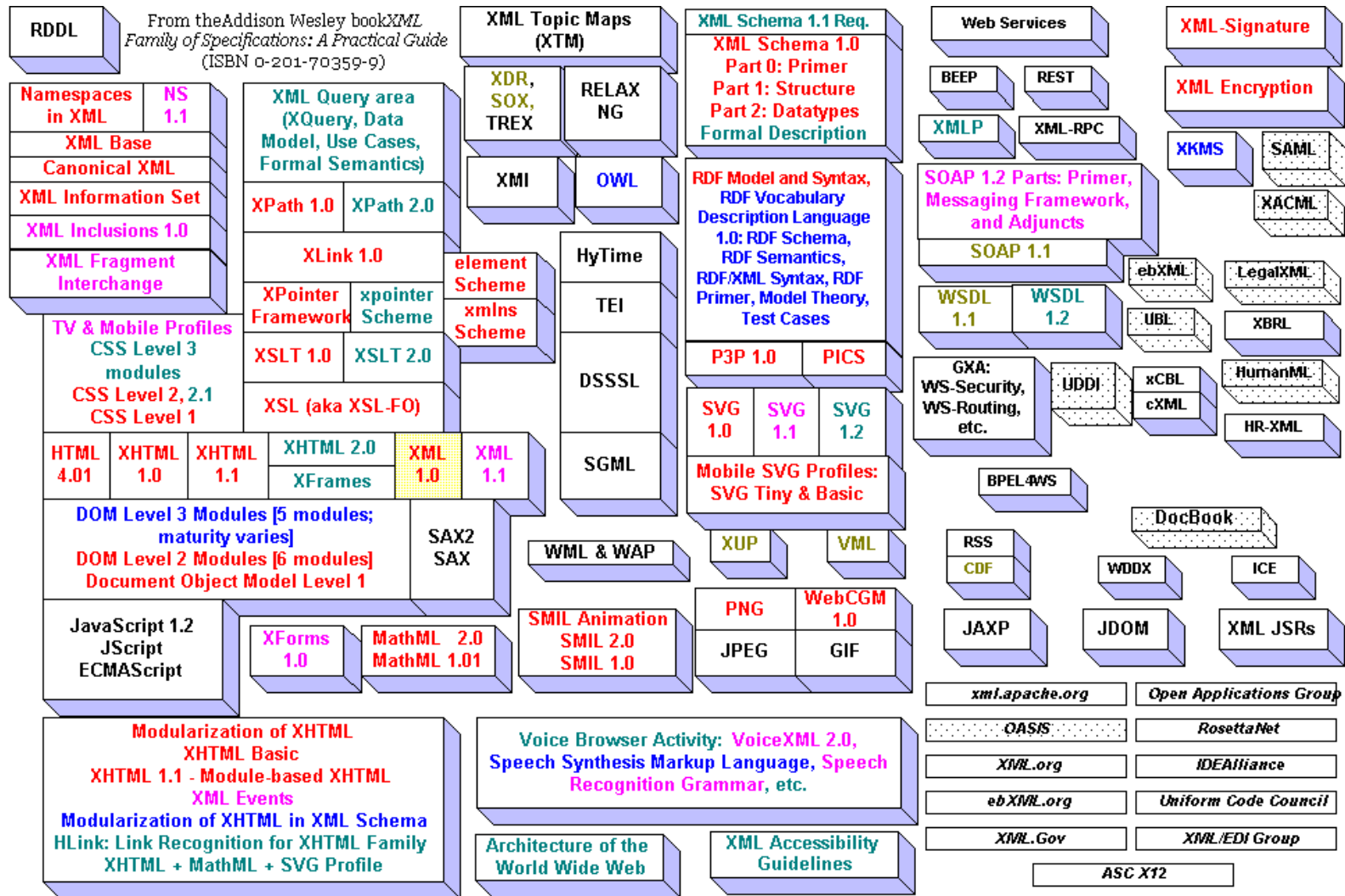
</html>



Future . . . ?



More than HTML ?



The XML Family of Specifications: The Big Picture

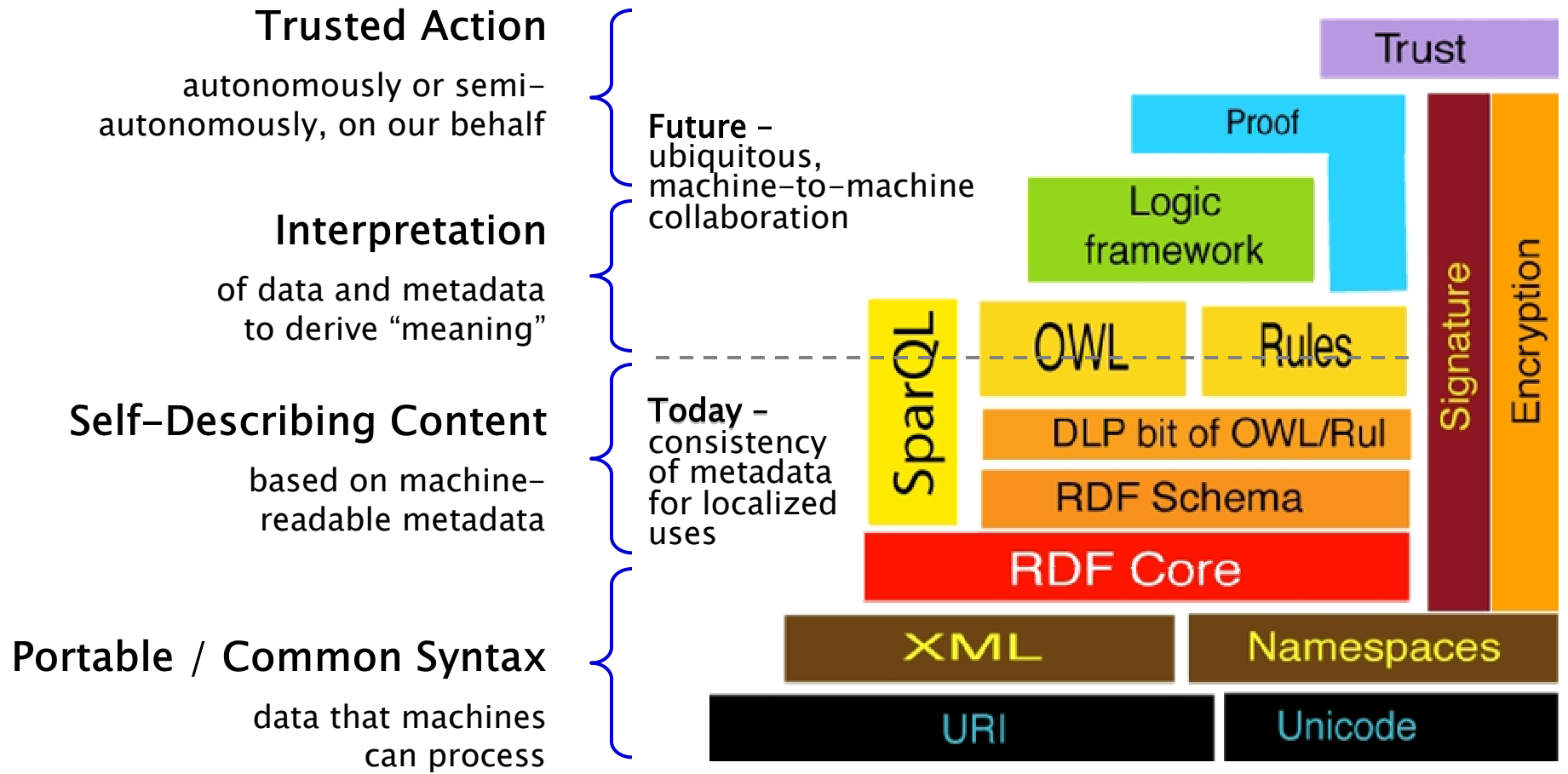
Last Updated: April 19, 2003

Recommendation	Proposed Recommendation	Candidate Recommendation	Last Call Working Draft	Working Draft	Note submitted to W3C	Not a W3C specification
----------------	-------------------------	--------------------------	-------------------------	---------------	-----------------------	-------------------------

Copyright (c) 1998-2003 Kenneth B. Sall. All Rights Reserved. <http://kensall.com/big-picture/>



Four general aspects to consider



Berners-Lee, “Putting the *Web* back in *Semantic Web*” (12). W3C. ISWC, Galway 2005.



An unpleasant possibility ?

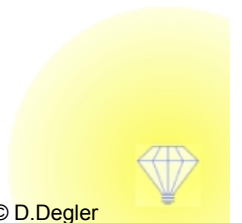
**... the more our content
behaves like *data*...**



**... the more our data begins
to behave like *content*...?**



(messy and unpredictable)



Language and Meaning

~

Our doorway to information and interaction

- **Faceted browsing**
- **Searching and filtering**
- **Viewing content**
- **Content coming to you**
- **Using and sharing vocabulary**
- **Attaching semantic metadata to content**
- **Ontology - managing the words, and...**
- **Agents**



Browsing

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Searching and Filtering

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Search challenge: compound queries

“What Greek restaurants are open after 10pm within three blocks of a movie theatre where I can see the latest Mel Gibson film?

... and can I get there in 45 minutes, with current traffic?”

“How do I process this claim for a back treatment while the patient was on vacation in Maryland? Is it subject to the new legal requirements now in effect in her home state of Texas?”

“I need to find all the information from official sources about the problems being reported in that new migraine treatment.”



Viewing Content

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Metadata overload ?

If everything's related to everything...

Flashback in American History - Columbus

Flashback

Christopher Columbus Saw Land!

October 12, 1492

Early in the morning ([time reference](#)) on October 12, 1492 ([time reference](#)), a sailor ([define](#)) looked out to the horizon ([explain](#)) from the bow ([explain](#)) of his sailing ship ([more info](#)), the *Pinta* ([see details](#)), and saw land ([define](#)). After 10 long weeks ([time reference](#)) at sea ([define](#)), from the port ([more info](#)) of Palos, Spain ([map location](#)), Columbus ([who is](#)) and his crews ([list](#)) saw the New World (r following day ([time reference](#)), 90 crew members three-ship fleet ([list](#)) set foot on the island ([define](#)) ([location](#)) in the Bahamas ([map location](#)) and plant ([show image](#)) of their sponsors ([explain](#)), King Ferdinand and Queen Isabella ([who is](#)) of Spain ([map location](#)). Columbus continued his exploration ([explain](#)), discovering ([explain](#)) other lands ([list](#)).

Text borrowed from Library of Congress: "America's Library" web site http://www.americanlibrary.gov/cgi-bin/page.cgi/jb/colonial/columbus_1

Christopher, explorer
...see also:
US City (OH)
US City (MS)
Space shuttle
Columbia (country)

us's
ap
g
nd



Content Coming to You

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Courtesy ?

Inensitivity might become a problem...

The image shows a calendar interface with two overlapping dialog boxes. The calendar background shows dates from Monday, May 24 to Friday, May 28, with time slots from 7 AM to 4 PM. The first dialog box, titled "Appointment Reminder Notice", contains the text: "Dr. Smith has asked for an appointment with you for 1pm tomorrow." and "FYI: your medical records database has a new entry for traces of Human Chorionic Gondaotropin. ([what's this](#))". It has three buttons: "Accept", "Reject", and "Suggest Time". The second dialog box, titled "Definitions Manager", contains the text: "Requested term: Human Chorionic Gondaotropin" and "Definition: You're pregnant". It has an "OK" button.



Using and Sharing Vocabulary

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Attaching Metadata to Content

Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Ontologies

~

Managing the words, and...

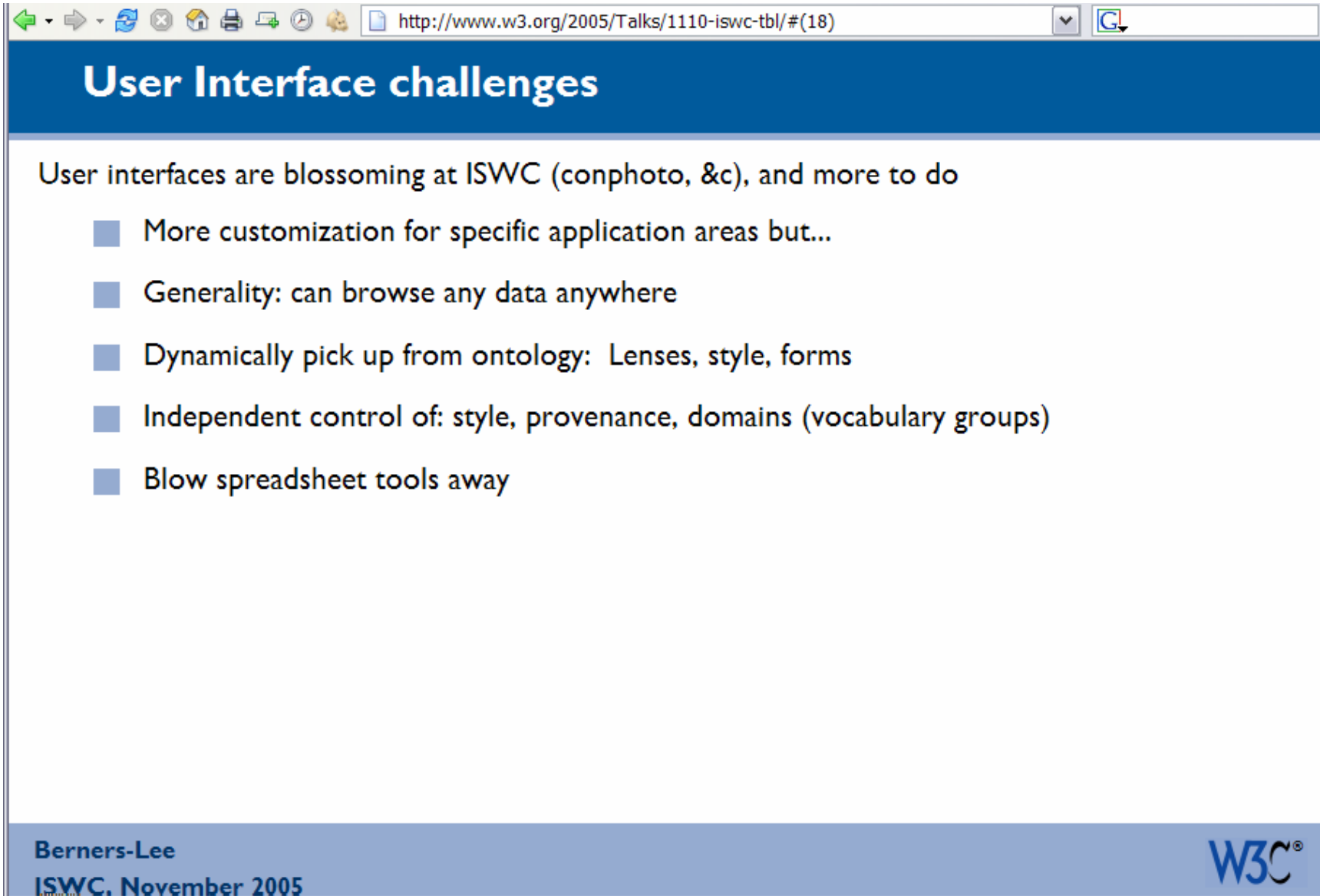
Note: example links provided in accompanying paper

www.ipgems.com/present/degler_swui_upa2006.html



Does the Semantic Web need an interface ?






The image shows a screenshot of a web browser window. The address bar at the top contains the URL [http://www.w3.org/2005/Talks/1110-iswc-tbl/#\(18\)](http://www.w3.org/2005/Talks/1110-iswc-tbl/#(18)). The main content area has a blue header with the title "User Interface challenges" in white text. Below the header, the text "User interfaces are blossoming at ISWC (conphoto, &c), and more to do" is followed by a bulleted list of five items. At the bottom of the slide, there is a footer with the text "Berners-Lee ISWC, November 2005" on the left and the W3C logo on the right.

User Interface challenges

User interfaces are blossoming at ISWC (conphoto, &c), and more to do

- More customization for specific application areas but...
- Generality: can browse any data anywhere
- Dynamically pick up from ontology: Lenses, style, forms
- Independent control of: style, provenance, domains (vocabulary groups)
- Blow spreadsheet tools away

Berners-Lee
ISWC, November 2005



Berners-Lee, "Putting the *Web* back in *Semantic Web*" (18). W3C. ISWC, Galway 2005.



How can we be sure the Semantic Web is . . .

- Better than the experience we have today
- So easy that anyone can describe themselves and their information semantically
- Able to clearly show what a ‘good’ experience is, when much of the activity is happening in the background using semantic applications and agents
 - What is “good”? Complete, understandable, transparent, semantically rich, trustable, not overwhelming?
- Able to grow organically (and with few dependencies), while also moving toward the ‘web of meaning’ idea
- Forgiving of differences in language and meaning, being clear and respectful of semantic ‘shades of gray’



Storytelling... by users and applications

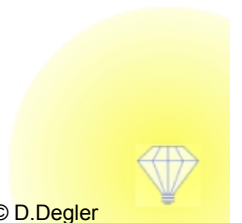
Contextualizes the need and solution

Describes process and considerations

- Exposes the thinking (logic) behind the situation
- Allows comparison with other experiences

Helps the information “stick”

Increases interest and motivation



Next-Generation Design:

Interacting with the Semantic Web

Duane Degler, IPGems
www.ipgems.com

UPA 2006
Broomfield, CO, USA

