Integrating the Cloud into Content

Using Semantics to Enhance Content Publishing

Jamie Taylor

http://semprog.com/presentations/web20ny
What do y'all mean "Semantics"
Investigators Study Tangle of Clues on Fort Hood Suspect
By SCOTT SHANE and JAMES DAO
Investigators are trying to determine whether Maj. Nidal Malik Hasan was a terrorist driven by extremism, a troubled loner, or both.

High Costs Weigh on Troop Debate for Afghan War
By CHRISTOPHER DREW
The budget implications of President Obama’s decision about sending more troops to Afghanistan are adding pressure to limit the commitment, senior administration officials say.

Forest People May Lose Home in Kenya
By JEFFREY GETTLEMAN
Officials are gearing up to evict thousands from the Massai Forest in a conservation effort that has raised suspicions.

Books of the Times
Memoir Is Palin’s Payback to McCain Campaign
By MICHIKO KAKUTANI
Sarah Palin’s new book is part cagey spin job and part earnest autobiography. Its most compelling sections deal not with politics, but with her life in Alaska.

Travel
Sailing the Caribbean, the Frugal Way
Having no boat to call his own, the Frugal Traveler shells out $55 a day to join the crew of a schooner.

Opinion
Bono
Five Scenes, One Theme: A True if Unlikely Story
Present after the Berlin Wall fell and 20 years later.

Business
Congress to Investigate Airlines’ Fees
The additional fees that irk travelers, for the most part, are not taxed. The government says that fare increases in disguise are costing it extra revenue.
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TRAVEL

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Having no boat to call his own, the Frugal Traveler shells out $35 a day to join the crew of a schooner.

BUSINESS

Congress to Investigate Airlines' Fees
The additional fees that irk travelers, for the most part, are not taxed. The government says that fare increases in disguise are costing it extra revenue.
PageRank™
IBM

- Publicaly Listed Company
- 1 New Orchard Road
- Armonk, New York
- 0000051143
- NYSE:IBM
- 17,604,000,000 USD 2006

- Sam Palmisano
- Thomas Watson
- 1889

- 3571:Electronic Computers
- 334111:Electronic Computer Manufacturing
- Cognos
- Cross Worlds
- SANSF, ViaVoice
- Lotus Notes

- 1911

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- Sam Palmisano
- Thomas Watson
- 1889

- 3571:Electronic Computers
- 334111:Electronic Computer Manufacturing
- Cognos
- Cross Worlds
- SANSF, ViaVoice
- Lotus Notes
What Would Google Do?

Jeff Jarvis
Earlier this year, the AP slashed prices to try to hold on to subscribers.

That's not the answer, says Jeff Jarvis, journalism professor at City University of New York.

JEFF JARVIS: The fundamentals of the media economy are changing, from a content economy to a link-based economy.

Jarvis says the AP needs to become the broker for those links, like helping the Baltimore Sun link to a story about GM from the Detroit Free Press.
Jarvis resorts to the concept of a "gift economy" to explain the link economy.
I am a behavioral economist. Gift economics are frequently used as explanations for what we don't understand.
Worse I am a Behaviorist
Only talk about what you can observe
Semantics

Process of communicating enough meaning to result in an action
Link Economy

- Enriching links focuses meaning
  - Improves "findability" (SEO)
  - Increased usability
  - Better ad selection
Link Economy

• Semantics Benefit
  • Site owners
  • Site users
  • Developers
  • You

At the end of this talk - you should be able to say how semantics benefits each of these groups.
Programming the Semantic Web

Toby Segaran, Colin Evans & Jamie Taylor
Wish it were real
Might be real

Programming the Semantic Web

Build Flexible Applications with Graph Data

Toby Segaran, Colin Evans & Jamie Taylor

O'Reilly®
Is real, but don't believe it
Is very useful

Build Flexible Applications with Graph Data
Not Your Typical Semantic Web Talk
The W3C Layer Cake

- SPARQL
- RDF
- XML
- URI/IRI
- RDF-S
- Rule: RIF
- OWL
- Ontology:
- Unifying Logic
- Prolog
- Trust
- User Interface & Applications

AI Agents
Ontologies
Instead....

• Part I
  • Why
    • Uses, Benefits

• Part II
  • How
    • Representation, Concepts
Part I

Why
Is very useful

Programming the Semantic Web

Build Flexible Applications with Graph Data
Graph Data Model

The Office (US)
TV Program

Leatherheads
Film

stars in

John Krasinski
Person, Actor

starred in

attended

Brown University
College/university
Freebase™
A socially managed semantic database
Freebase has Many Types of Things
9,547,107 Topics
Contributions over $50,000 made to members of the US congress in the 2008 election cycle by companies headquartered outside of the United States
Industry Browser Identity Model

Industry (USCB) NAICS

Industry (SEC) SIC

Company Ticker

Company CIK

Company CRP ID

People CIK

Person Wikipedia

Donations CRP ID

Location ZIP Code

Freebase

Freebase

SEC

SEC

CRP

CRP

Wikipedia

Article
Industry Browser

http://kiwitobes.com/industry_mashup/
Barriers between science and the humanities impede solving humanities important problems.
Pirates of the Caribbean 3
June 21st, 2007

I just went with Till into the last part of the Pirates of the Caribbean, where our heroes (the adoringly cute Orlando Bloom and Keira Knightly reprise their roles) go to the end of the world to save the one and only Captain Jack Sparrow (Johnny Depp! xOxOx!) from the claws of the Kraken. And guess what - Jack Sparrows daddy has a special appearance, played by old Rolling Stone Keith Richards! Weeeeha!

Best movie of the year, until know, without a question! Tons of fun, and colorful action.

"Smoov"
Ankolekar et al. 2007
Add TopicBlocks to Your Blog or Website

TopicBlocks improve your site with facts, images, and other relevant content from across the Web.

1 Choose a topic: Pirates of the Caribbean: At World’s End

2 Preview and configure:

Pirates of the Caribbean: At World’s End

Related Topics
- National Treasure
- The Rock
- Charlie’s Angels

Initial release date: May 24, 2007
Directed by: Gore Verbinski
Produced by: Jerry Bruckheimer

Elsewhere on the Web
- Amazon.com
- Pictures of the caribbean: at world’s end vds

3 Cut and paste this code into your website:

```
```


Photos from District 9

Related Videos
District 9 (2009) (47)
District 9: TV Spot
District 9 (2009)
District 9 (2009)

Kodak EasyShare M340 Digital Camera
Point. Shoot. Share.
It's never been easier.
Learn More

Titles: District 9
Names: Sharlto Copley
Characters: Wikus Van De Merwe
Photo 8 of 26: Photo date: 29 July 2009
Sharito Copley in "District 9."
Patrick Sinclair (BBC)
About the Content (and visitor?)
Simile

Timeline

(see the same data in Timeplot)

http://dev.mqlx.com/~jamie/simile/timeline.html

Credits: This software is maintained by SIMILE and David François Huynh
Data Portability

Semantics allows data to be utilized by unanticipated new applications.
Simile

Timeplot

(see the same data in Timeline)

New Legal Permanent Residents in the U.S. (per year) vs. U.S. Population vs. U.S. History

Credits - This software was created and its maintained by

World War I
Mon, 27 Jul 1914 17:00:00 GMT
Sun, 10 Nov 1918 17:00:00 GMT
MIT Simile: Exhibit
User Experience
Topic Hubs
Business intelligence and analytics can be used to save lives, as IBM demonstrates at its Information on Demand conference in Las Vegas.

By Asavin Wattanajantra, 27 Oct 2009 at 23:26

IBM has showcased research carried out in the world of healthcare, where information is used to both predict as well as diagnose problems in patients.

William Pulleybank, vice president for business optimisation at IBM global services, said that healthcare was a sector that had the greatest challenges and opportunities when it came to the company’s vision of making the world use information in more intelligent ways.

Pulleybank, who previously lead the Blue Gene project for IBM research, presented a project that the company worked on with the University of Ontario, which looked at how real-time data taken from patients could be used to potentially predict the onset of conditions.
IBM has showcased research carried out in the world of healthcare, where information is used to both predict as well as diagnose problems in patients. William Pulleybank, vice president for health and scientific computing at IBM, said there was a sector that had the potential to change the way the world used diagnostics and opportunities when it came to the company's vision of making the world use IT in more intelligent ways. Pulleybank, who previously led the Blue Gene project for IBM, said he had the University of Ontario, which had a monitoring system in place to track data collected from patients who could be used to potentially predict the onset of a disease. He said that this information could be supported by published data from medical journals, pulled in to a system called 'Watson' that collected, assimilated, and could understand the content.

"When we give these recommendations to the physician as to what could be the cause of a disease, it incorporates recent learning into it. How valuable is that?" Pulleybank said.

"Think of that physician who hasn't got time to read all those articles. What if the ones that matter are being brought to your attention? It's an extraordinary opportunity to speed and improve the diagnosis, and also save costs," he added.

Cost saving is a major factor, especially in the US, because if a doctor knows what the problem isn't, it negates the need for unnecessary expensive tests and procedures.
International Business Machines Corporation

Type:
- Company (disambiguated)

Company Profile:
International Business Machines Corporation (IBM) is an information technology (IT) company. The Company’s major operations include Global Technology Services segment (GTS), Global Business Services segment (GBS), Software segment, Systems and Technology segment, and Global Financing segment. On January 31, 2008, the Company acquired 100% of Cognos, Inc. On April 3, 2008, IBM acquired 100% of Telelogic, AB. In July 2008, the Company acquired Platform Solutions, Inc. (PSI). In December 2008, its internal global logistics operations were acquired by SNCF Transport and logistics division of Geodis., [2009-02-25T03:26:01]

Ticker:
- IBM

CIK:
- 0000051143

SIC:
- Computer Periph'L Equipment, Nec (3577)
- Computer Rental & Leasing (7377)
- Electronic Computers (3571)
- Prepackaged Software (7372)
- Computer Integrated System Design (7373)
- Computer Programming Services (7371)
- Misc Business Credit Institutions (6159)
- Semiconductors/related Devices (3674)

http://p.opencalais.com/er/company/ralg-tr1r/9e3f6c34-aa6b-3a3b-b221-a07aa7933633

Open Calais
IBM Corporation And Siemens Announce Integrated Solutions To Help Companies
<owl:sameAs rdf:resource="http://dbpedia.org/resource/IBM"/>
<owl:sameAs rdf:resource="http://cb.semsol.org/company/ibm#self"/>
<owl:sameAs rdf:resource="http://p.opencalais.com/er/company/ralg-tr1r/9e3f6c34-aa6b-3a3b-b221-a07aa7933633"/>
Epispider
ETech 2009: ‘You don't know the future, but you can rise to meet it,’ says Tim O'Reilly

The technology trendwatcher and publisher officially kicked off this year's Emerging Technology conference in San Jose with a call to arms.

Day zero of the O'Reilly Emerging Technology conference? ETech? has just ended, and so far, so good, so quiet. The preamble to the main event consisted of a full slate of workshops and DIY hackathons, which proved fun for attendees. Among the workshops that went down particularly well: a build-your-own online maps tutorial from Stamen: MIT's stitch-and-bitch on wearable computing, and Rob Faludi's session on building wireless, social objects. But there's no denying that the atmosphere so far has been quite low-key - one regular attendee told me that he'd 'never seen it this quiet before. Perhaps it's the result of the recession, the decision to move things from San Diego to San Jose, or simply because the programme isn't in full swing yet. In any case, it can't particularly please Tim O'Reilly, the tech-pushing maven whose company puts on the event (and calls it their most important conference) but tomorrow is another day. Still, to welcome everyone into the fold, O'Reilly (who, for the uninstructed, unannounced the phrase "web 2.0" on the wall) took the stage for a talk on why he thought ETech matters now. He began by reiterating his argument that technologies need to start doing things that have genuine benefits, not just creating mindless Facebook apps or "throwing sheep" as he puts it. "There's a certain way that the technology industry, particularly its focus on consumer electronics, was missing something," he said. "It was focusing on consumption, on advertising, on selling people things that they don't really need. "When I used people in the technology world to think deeply about what matters. A lot of people thought I was saying to work on non-profits, or maybe social ventures. But I don't think we should relegated what's important to the world of non-profits. We need to reinvent our world so that we see working on stuff that matters as the heart of opportunity. The world's great challenges are also the world's great opportunities." He goes on to list a few examples of what he means by that: Shai Agassi's Better Place, which doesn't just want people to build electric cars; he wants them to be able to use them wherever they go. "He may not succeed, but that's OK. And next year somewhere that's really..."
Vocabulary

Do you understand the words that are coming out of my mouth?

-Chris Tucker, Rush Hour
vocabularies...are everywhere
The Twitter Vocabulary

@ Short URLs

#
Heads up at #nar09 that @realestatecafe and I are thinking of putting together a meetup on VRM and Real Estate tonight.

about 1 hour ago from Tweetie

@acroll Those cowpaths will lead to the demise of Twitter IMO.

about 3 hours ago from TweetDeck in reply to acroll

RT @EdenSpodek: Congrats Mondoville for your mention in today's @globeandmail! http://j.mp/2fG7vH'

about 5 hours ago from TweetDeck

Once again, it appears that Twitter may be paving the wrong cowpaths: http://ow.ly/CeWg (via @bretones)

about 5 hours ago from TweetDeck

Although it was the best possible way for Gegenschatz to go (doing what he loved), he was way too young. #TED

about 5 hours ago from TweetDeck

Pivot on an @ tag
lizasperling @missrogue Knock 'em dead at NAR09! Excited to see you speak (and be roomies) at W2E.
5 minutes ago from CoTweet

scoutlabs RT @drnatalie @lizasperling: 3 fab females representing Scout Labs at W2E. Join us Mon at 9am, and be sure to say hi! | Go Gals!
11 minutes ago from CoTweet

mirmat @dilluns @marccortes que tingueu un bon viatge,disfruteu dl' congres i dl la "gran manzana"!saludeu a l'O'reille tb :) w2e nyc
25 minutes ago from Snaptu

mbuckbee @sourcepov Chris, what would you consider to be an example of 'direct public engagement – W2E
http://bit.ly/3zyJ8g
28 minutes ago from CrowdCampaign

innonate @andrewhyde will you be at Web 2.0 Expo? W2E
about 1 hour ago from TweetDeck
http://bit.ly/info/3zyJ8g

### Traffic

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<tr>
<th>Traffic</th>
<th>Clicks</th>
<th>Referrers</th>
<th>Locations</th>
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<tr>
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#### Top Referrers

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<th>Referring Site</th>
<th>Click(s)</th>
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<tr>
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<td>Registered Applications +</td>
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<tr>
<td>twitter.com +</td>
<td>2</td>
</tr>
</tbody>
</table>

Click + to see aggregate bit.ly referrer data for this long link.

---

### Conversations

**Twitter (2)**

mbuckbee @sourcepov Chris, what would you consider to be an example of 'direct public engagement' - #w2e http://bit.ly/3zyJ8g

sourcePOV Asking Beth Noveck: How can #opengov drive meaningful industry engagement on policy? #w2e http://bit.ly/3zyJ8g #govloop

**FriendFeed (0)**

No FriendFeed conversations about this page have been found

**Comments on Page (0)**

No comments found on this page.

---

Pivot on a Short URL
Vocabularies make links more understandable

...and thus content more findable
microformats

Annotate existing HTML so the content can be "extracted by software and indexed, searched for, saved, cross-referenced or combined."
microformats

Jared Hanson
www.jaredhanson.net

Home Work

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<th>Berkeley, CA United States</th>
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<td>aim</td>
<td><a href="mailto:jaredhanson@mac.com">jaredhanson@mac.com</a></td>
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Home Work

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<td>Madison, SD 57042</td>
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<td></td>
<td>United States</td>
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<td><a href="http://www.helixent.com">www.helixent.com</a></td>
</tr>
<tr>
<td>email</td>
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              <span class="region">CA</span>
              <div class="country-name">United States</div>
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        </tr>
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Specifications

The list of current, stable Microformats open standard specifications.

- hCalendar - hCalendar creator
- hCard - hCard creator
- rel-license
- rel-nofollow
- rel-tag
- VoteLinks
- XFN - XFN creator
- XMDP
- XOXO

If you’re tempted to try your hand at writing a microformat please read the process page first!

Drafts

Drafts are newer microformats, for which the specifications haven’t been completed yet. Drafts are somewhat mature in the development process (see exploratory-discussions for additional efforts that are not as far along in the process). The stability of these documents cannot be guaranteed, and implementers should be prepared to keep abreast of future developments and changes. Please watch the wiki pages for updates.

- adr - for marking up address information
- geo - for marking up WGS84 geographic coordinates (latitude; longitude)
- hAtom - syndicating episodic content (e.g. weblog postings)
- hAudio
- hListing - open, distributed listings
- hMedia - A single media publishing format that relates to Images, Video and Audio.
- hNews
- hProduct
- hRecipe - for cooking+baking recipes
- hResume - for publishing resumes and CVs
microformats

- (Relatively) easy to use
- Small, fixed vocabulary
- No standard parsing pattern
- No strong identifiers
  - Limits utility
RDFa

Annotate HTML with machine readable RDF
RDFa

<div xmlns:fb="http://rdf.freebase.com/ns/"
about="http://rdf.freebase.com/ns/en.jamie_taylor"
rel=fb:people.person.place_of_birth>


</div>
RDFa

- Unambiguous identifiers
- Extensible vocabulary
- Standard parsing pattern
  - Produces RDF
- Hard to use
  - Rules about formatting based on RDF
What “concepts” are covered in content

Like existing tagging,
but with strong identifiers!

"text"
<resource>

Tag
"2001-01-01"
taggingDate
means
label
<tagged>
<resource>
NASA's Phoenix Mars Lander has deployed its robotic arm.
Shabu-shabu (しゃぶしゃぶ, also spelled syabu-syabu) is a Japanese variant of hot pot. The dish is related to sukiyaki in style, where both use thinly sliced meat and vegetables, and usually served with dipping sauces. However, it is starkly different in taste; shabu-shabu is more savory and less...

This content is freely licensed. See Freebase for details.

By Zemanta

Read about the Shabu-Shabu
And the winner is....
HTML5 MicroData

• Annotate HTML with machine readable data
• Simple Name-Value Pair design
Sometimes, it is desirable to annotate content with specific machine-readable labels, e.g. to allow generic scripts to provide services that are customised to the page, or to enable content from a variety of cooperating authors to be processed by a single script in a consistent manner.
HTML5

Draft Standard — 13 November 2009

You can take part in this work. Join the working group’s discussion list. Web designers! We have a FAQ, a forum, and a help mailing list for you!

Multiple-page version:

http://whatwg.org/html5

One-page version:

http://www.whatwg.org/specs/web-apps/current-work/

PDF print versions:


Version history:

Twitter messages (non-editorial changes only): http://twitter.com/WHATWG
Commit-Watchers mailing list: http://lists.whatwg.org/listinfo.cgi/commit-watchers-whatwg.org
Subversion interface: http://svn.whatwg.org/
HTML diff with the last version in Subversion: http://whatwg.org/specs/web-apps/current-work/index-diff

Issues:
HTML5 MicroData

<section itemscope itemtype="http://example.org/animals#cat" itemid="http://semprog.com/jamiestuff/hedral">
  <h1 itemprop="name">Hedral</h1>
  <p itemprop="desc">Hedral is a male american domestic shorthair, that is <span itemprop="http://example.com/color">black</span> and <span itemprop="http://example.com/color">white</span>.</p>
  <img itemprop="img" src="hedral.jpeg" alt="" title="Hedral, age 18 months"/>
</section>
MicroData Widgets

Season 6, Episode 20
Dead Reckoning

Gibbs and the team must work with the shady Trent Kort to put away one of NCIS's most wanted.

NCIS on CBS
by Donald Bellisario

Related Shows
Chicago Hope, Magnum, P.I., JAG, Bones, Hill Street Blues

Episode 19
« Hide and Seek
Aired Mar 24, 2009

Episode 21
Toxic »
Aired Apr 07, 2009

Free episode viewer by Freebase.
HTML5 MicroData

• Easy to use
• Strong identifiers
• Extensible vocabulary
• Easy to parse

• In last call for comments stage!
  • Usable! Now!
Vocabulary Powered Search

Search Applications:
- Enhanced results
- Info Bar

**Taylor's Automatic Refresher** - Embarcadero - San Francisco, CA

User Reviews  |  Photos  |  Write Review

- Yelp Rating: ★★★★★ (Based on 713 reviews)
- Address: 1 Ferry Bldg, Marketplace Shop #6, San Francisco, CA...
- Phone: +1-866-328-3663

www.yelp.com/biz/taylors-automatic-refresher-san-francisco - 182k - Cached

**Dr. Seuss' Horton Hears a Who - Acme Movies**

Collection of critics' reviews for the 2008 movie Horton Hears a Who! that have been compiled to formulate a "fresh" or "acme" rating.

moviest.acme.com/movies/horton_hears_a_who - 86k - Cached

- Reviews  |  Info  |  Cast & Crew  |  Info  |  Recommendations
Taylor's Automatic Refresher

3.5 star rating based on 888 reviews

Category: Burgers

Neighborhood: Embarcadero
1 Ferry Bldg, Marketplace Shop #6
San Francisco, CA
94111

(866) 328-3663
Taylor's Automatic Refresher - Embarcadero - San Francisco, CA

721 Reviews of Taylor's Automatic Refresher "My brother's fiance found this place watching a show from the Food Network. Burgers were good, nothing fancy.

721 reviews - Price range: $$$

Based on 888 reviews

Category: Burgers

Neighborhood: Embarcadero
1 Ferry Bldg
San Francisco, CA 94111

(866) 328-3663
# Search Monkey Vocabulary

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<td>Events and other calendar items</td>
<td>See <a href="#">included documentation</a></td>
</tr>
<tr>
<td>review</td>
<td>hReview</td>
<td>Reviews</td>
<td>See <a href="#">included documentation</a></td>
</tr>
<tr>
<td>sioc</td>
<td>SIOC</td>
<td>Blogs, discussion forums, Q&amp;A sites</td>
<td>See <a href="#">included documentation</a></td>
</tr>
<tr>
<td>gr</td>
<td>GoodRelations</td>
<td>Product price specification, delivery and payment etc.</td>
<td>See <a href="#">included documentation</a></td>
</tr>
<tr>
<td>dbpedia</td>
<td>DBPedia</td>
<td>Generic vocabulary</td>
<td>See <a href="#">documentation on the web</a></td>
</tr>
<tr>
<td>fb</td>
<td>Freebase</td>
<td>Generic vocabulary</td>
<td>See <a href="#">documentation on the web</a></td>
</tr>
<tr>
<td>Prefix</td>
<td>Name</td>
<td>Namespace</td>
<td></td>
</tr>
<tr>
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<td>-------------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
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<td>action</td>
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</tr>
<tr>
<td>assert</td>
<td>SearchMonkey Assertions (deprecated)</td>
<td><a href="http://search.yahoo.com/searchmonkey/assert/">http://search.yahoo.com/searchmonkey/assert/</a></td>
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<td>cc</td>
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<td><a href="http://search.yahoo.com/searchmonkey/commerce/">http://search.yahoo.com/searchmonkey/commerce/</a></td>
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</tr>
<tr>
<td>context</td>
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<td><a href="http://search.yahoo.com/searchmonkey/context/">http://search.yahoo.com/searchmonkey/context/</a></td>
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<td><a href="http://search.yahoo.com/searchmonkey-datatype/country/">http://search.yahoo.com/searchmonkey-datatype/country/</a></td>
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<td></td>
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<td>feed</td>
<td>SearchMonkey Feed</td>
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<td><a href="http://xmlns.com/foaf/0.1/">http://xmlns.com/foaf/0.1/</a></td>
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<tr>
<td>geo</td>
<td>GeoRSS</td>
<td><a href="http://www.georss.org/georss#">http://www.georss.org/georss#</a></td>
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<tr>
<td>job</td>
<td>SearchMonkey Jobs</td>
<td><a href="http://search.yahoo.com/searchmonkey/job/">http://search.yahoo.com/searchmonkey/job/</a></td>
<td></td>
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<tr>
<td>media</td>
<td>SearchMonkey Media</td>
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<td><a href="http://www.w3.org/2002/07/owl#">http://www.w3.org/2002/07/owl#</a></td>
<td></td>
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<tr>
<td>page</td>
<td>SearchMonkey Page (deprecated)</td>
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<td></td>
</tr>
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<td>rel</td>
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<td><a href="http://search.yahoo.com/searchmonkey-relation/">http://search.yahoo.com/searchmonkey-relation/</a></td>
<td></td>
</tr>
<tr>
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<td><a href="http://search.yahoo.com/searchmonkey/resume/">http://search.yahoo.com/searchmonkey/resume/</a></td>
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</tr>
<tr>
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<td>Review</td>
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<td></td>
</tr>
</tbody>
</table>
Rich Snippet Vocabulary

- name
- affiliation
- nickname
- price
- postal-code
- dtReviewed
- photo
- country-name
- locality
- reviewer
- region
- count
- address
- itemReviewed
- title
- brand
- category
- role

http://data-vocabulary.org
Rich Snippet Vocabulary

<rdf:Property rdf:ID="affiliation">
  <rdfs:comment>An affiliation can be specified by a string literal or an Organization instance.</rdfs:comment>
  <rdfs:domain rdf:resource="#Person"/>
  <rdfs:range>
    <owl:Class>
      <owl:unionOf rdf:parseType="Collection">
        <owl:Class rdf:about="#Organization"/>
        <owl:Class rdf:about="xsd:string"/>
      </owl:unionOf>
    </owl:Class>
  </rdfs:range>
</rdf:Property>

<rdf:Property rdf:ID="brand">
  <rdfs:domain rdf:resource="#Product"/>
</rdf:Property>

<rdf:Property rdf:ID="category">
  <rdfs:domain>
    <owl:Class>
      <owl:unionOf rdf:parseType="Collection">
        <owl:Class rdf:about="#Organization"/>
        <owl:Class rdf:about="#Product"/>
      </owl:unionOf>
    </owl:Class>
  </rdfs:domain>
</rdf:Property>
HTML5 Vocabularies

Microdata Vocabularies: vCard, vEvent, and works
Draft Standard — 27 October 2009

You can take part in this work. Join the working group's discussion list.

This specification:
http://www.whatwg.org/specs/web-apps/current-work/

Version history:
Twitter messages (non-editorial changes only): http://twitter.com/WHATWG
Commit-Watchers mailing list: http://lists.whatwg.org/listinfo.cgi/commit-watchers-whatwg.org
Subversion interface: http://svn.whatwg.org/

Issues:
To send feedback: whatwg@whatwg.org
To view and vote on feedback: http://www.whatwg.org/issues/

Editor:
Ian Hickson, Google, ian@hixie.ch

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Microdata Vocabularies

Person
  googlePerson
  Represents a Person, living/dead/fictional.
  vCard
  Represents a person's or organization's contact information.
  googleOrganization
  An Organization is a business, agency, school, etc.

Review
  googleReview
  A single instance of a Review.
  hReview

Content
  hNews
  News is a microformat for news content. hNews extends hAtom, introducing a number of fields that more completely describe a journalistic work.

DC Resource
  A resource with Dublin Core Metadata

hAtom
  hAtom is a microformat for content that can be syndicated, primarily but not exclusively weblog postings. hAtom is based on a subset of the Atom syndication format.
Part II
How
(or why we wrote the book)
John Burke Krasinski (born October 20, 1979) is an American actor, film director and writer. He has acted in several films, including Shrek, The Third, Leatherheads and Away We Go, but is most widely known for playing Jim Halpert on the NBC sitcom The Office. Krasinski was born in the Brighton area of Boston, Massachusetts, the son of a Polish-American father, internist Dr. Ronald Krasinski, and an Irish American mother, Mary Clare (née Doyle).

Read article at Wikipedia

Date of birth: Oct 20, 1979
Country of nationality: United States
Also known as: John Burke Krasinski
Rich Graph Data
Connected to other rich sources
Where does your data live?
Traditional data-modeling
<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Address</th>
<th>Cuisine</th>
<th>Price</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
<td>Deli</td>
<td>$</td>
<td>Mon, Tue, Wed, Thu, Fri</td>
</tr>
<tr>
<td>Peking Inn</td>
<td>Lake St</td>
<td>Chinese</td>
<td>$$$</td>
<td>Thur, Fri, Sat</td>
</tr>
<tr>
<td>Thai Tanic</td>
<td>Branch Dr</td>
<td>Thai</td>
<td>$$</td>
<td>Tue, Wed, Thu, Fri, Sat, Sun</td>
</tr>
<tr>
<td>Lord of the Fries</td>
<td>Flower Ave</td>
<td>Fast food</td>
<td>$$</td>
<td>Tue, Wed, Thu, Fri, Sat, Sun</td>
</tr>
<tr>
<td>Marquis de Salade</td>
<td>Main St</td>
<td>French</td>
<td>$$$</td>
<td>Thur, Fri, Sat</td>
</tr>
<tr>
<td>Wok this way</td>
<td>Second St</td>
<td>Chinese</td>
<td>$</td>
<td>Mon, Tue, Wed, Thu, Fri, Sat, Sun</td>
</tr>
<tr>
<td>Luna Sea</td>
<td>Autumn Dr</td>
<td>Seafood</td>
<td>$$$</td>
<td>Tue, Thu, Fri, Sat</td>
</tr>
<tr>
<td>Pita Pan</td>
<td>Thunder Rd</td>
<td>Middle Eastern</td>
<td>$$</td>
<td>Mon, Tue, Wed, Thu, Fri, Sat, Sun</td>
</tr>
<tr>
<td>Award Weiners</td>
<td>Dorfold Mews</td>
<td>Fast food</td>
<td>$</td>
<td>Mon, Tue, Wed, Thu, Fri, Sat</td>
</tr>
<tr>
<td>Lettuce Eat</td>
<td>Rustic Parkway</td>
<td>Deli</td>
<td>$$</td>
<td>Mon, Tue, Wed, Thu, Fri</td>
</tr>
</tbody>
</table>
### Tabular Data

<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Address</th>
<th>Cuisine</th>
<th>Price</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
<td>Deli</td>
<td>$</td>
<td>Mon (11a-4p), Tue (11-4), Wed (11-4), Thu (11-7), Fri (11-8)</td>
</tr>
<tr>
<td>Peking Inn</td>
<td>Lake St</td>
<td>Chinese</td>
<td>$$$</td>
<td>Thur (5p-10p), Fri (5p-1a), Sat (5p-1a)</td>
</tr>
<tr>
<td>etc...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A simple schema

Restaurant
  id
  name
  address
  cuisine_id

Cuisine
  id
  name

Hours
  restaurant_id
  day
  open
  close

Allows for simple queries
A simple schema

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>address</th>
<th>price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>Peking Inn</td>
<td>Lake St</td>
<td>$$$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>restaurant_id</th>
<th>day</th>
<th>open</th>
<th>close</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mon</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>Tue</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>Thu</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Fri</td>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

Filled with data
Some new data

<table>
<thead>
<tr>
<th>Bar</th>
<th>Address</th>
<th>DJ</th>
<th>Best Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Bitter End</td>
<td>14th Ave</td>
<td>No</td>
<td>Beer</td>
</tr>
<tr>
<td>Peking Inn</td>
<td>Lake St</td>
<td>No</td>
<td>Scorpion Bowl</td>
</tr>
<tr>
<td>Hammer Time</td>
<td>Wildcat Dr</td>
<td>Yes</td>
<td>Hennessey</td>
</tr>
<tr>
<td>Marquis de Salade</td>
<td>Main St</td>
<td>Yes</td>
<td>Martini</td>
</tr>
</tbody>
</table>

This doesn’t fit into our schema...
<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Address</th>
<th>Price</th>
<th>DJ</th>
<th>Best Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peking Inn</td>
<td>Lake St</td>
<td>$$$</td>
<td>No</td>
<td>Scorpion Bowl</td>
</tr>
<tr>
<td>Thai Tanic</td>
<td>Branch Dr</td>
<td>$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lord of the Fries</td>
<td>Flower Ave</td>
<td>$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marquis de Salade</td>
<td>Main St</td>
<td>$$$</td>
<td>Yes</td>
<td>Martini</td>
</tr>
<tr>
<td>Wok this way</td>
<td>Second St</td>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luna Sea</td>
<td>Autumn Dr</td>
<td>$$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pita Pan</td>
<td>Thunder Rd</td>
<td>$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Award Weiners</td>
<td>Dorfold Mews</td>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lettuce Eat</td>
<td>Rustic Parkway</td>
<td>$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hammer Time</td>
<td>Wildcat Dr</td>
<td></td>
<td>Yes</td>
<td>Hennessey</td>
</tr>
<tr>
<td>The Bitter End</td>
<td>14th St</td>
<td></td>
<td>No</td>
<td>Beer</td>
</tr>
</tbody>
</table>

Maybe ok now, but can’t this keep happening?
Link the tables

Restaurant
- id
- name
- address
- cuisine_id

RB_Link
- restaurant_id
- bar_id

Bar
- id
- name
- dj
- best_drink

But now the information is duplicated :(
Better, but now we have to “migrate”
Large schemas

A small section of a limited product
A flexible schema

Venue
id
name
address

Properties
venue_id
field_id
value

field
id
name

Does this look familiar?
Add some data

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
</tr>
<tr>
<td>2</td>
<td>Peking Inn</td>
<td>Lake St</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>venue_id</th>
<th>field_id</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Deli</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Chinese</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>$$$</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Scorpion Bowl</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cuisine</td>
</tr>
<tr>
<td>2</td>
<td>Price</td>
</tr>
<tr>
<td>3</td>
<td>Specialty Cocktail</td>
</tr>
<tr>
<td>4</td>
<td>DJ?</td>
</tr>
</tbody>
</table>
## Add live music info

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deli Llama</td>
<td>Peachtree Rd</td>
</tr>
<tr>
<td>2</td>
<td>Peking Inn</td>
<td>Lake St</td>
</tr>
<tr>
<td>3</td>
<td>Thai Tanic</td>
<td>Branch Dr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>venue_id</th>
<th>field_id</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Deli</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>$</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Chinese</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>$$$</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Scorpion Bowl</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Jazz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cuisine</td>
</tr>
<tr>
<td>2</td>
<td>Price</td>
</tr>
<tr>
<td>3</td>
<td>Specialty Cocktail</td>
</tr>
<tr>
<td>4</td>
<td>DJ?</td>
</tr>
<tr>
<td>5</td>
<td>Live Music</td>
</tr>
<tr>
<td>6</td>
<td>Music Genre</td>
</tr>
</tbody>
</table>

No schema change required
Explicit semantics
The basic data unit

subject → predicate → object

Remember this from grammar class?
### Restaurants as Triples

<table>
<thead>
<tr>
<th>subject</th>
<th>predicate</th>
<th>object</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>cuisine</td>
<td>“Deli”</td>
</tr>
<tr>
<td>S1</td>
<td>price</td>
<td>“$”</td>
</tr>
<tr>
<td>S1</td>
<td>name</td>
<td>“Deli Llama”</td>
</tr>
<tr>
<td>S2</td>
<td>cuisine</td>
<td>“Chinese”</td>
</tr>
<tr>
<td>S2</td>
<td>price</td>
<td>“$”</td>
</tr>
<tr>
<td>S2</td>
<td>name</td>
<td>“Peking Inn”</td>
</tr>
<tr>
<td>S2</td>
<td>best drink</td>
<td>“Scorpion Bowl”</td>
</tr>
<tr>
<td>S2</td>
<td>address</td>
<td>“Lake St”</td>
</tr>
<tr>
<td>S2</td>
<td>DJ?</td>
<td>“No”</td>
</tr>
<tr>
<td>S4</td>
<td>name</td>
<td>“Fendalton”</td>
</tr>
<tr>
<td>S4</td>
<td>contained-by</td>
<td>S5</td>
</tr>
<tr>
<td>S5</td>
<td>name</td>
<td>“Christchurch”</td>
</tr>
<tr>
<td>S1</td>
<td>location</td>
<td>S4</td>
</tr>
<tr>
<td>S6</td>
<td>name</td>
<td>“Downtown”</td>
</tr>
<tr>
<td>S6</td>
<td>contained-by</td>
<td>S7</td>
</tr>
<tr>
<td>S7</td>
<td>name</td>
<td>“Wellington, NZ”</td>
</tr>
<tr>
<td>S2</td>
<td>location</td>
<td>S6</td>
</tr>
</tbody>
</table>

Machine readable and almost human readable
...or as a graph

```
S1
  ──── Name ────
     |           |
     V           V
  Cuisine  Price
  ────          ────
     |          |
     V          V
Deli Liiama Deli
          $      
```
Restaurant Graph

- Peking Inn
- Deli Liiama
- Deli
- Chinese Cuisine
- Fendalton
- $
Extending The Restaurant Model

Urban Chic
- Decor
- Music
- Live DJ

Deli Liiama
- Name
- Cuisine
- Price
- Location
- Contained-by
- Christchurch
- Fendalton

Deli
- $
Integrating Graph Data Models

Deli Liiama

A2
OnTap

S1
Cuisine

Deli Liiama

Z6
Brand

Brand

Leinenkugel

Pabst BR

Name

Price

Brand

Name

$
What Went Wrong?

Things change
Requirements change
User expectations change
Data structures change
Our data models aren’t keeping up
Semantic Representation

Relationships are represented explicitly.

Schema can be represented as a graph.

Data integration is the union of two graphs.

This makes creating, extending, and combining data much easier than before.
Just enough RDF
Just Enough RDF

RDF is a Data Model
A very simple model!
Cosmos was written by Carl Sagan
(Cosmos) (was written by) (Carl Sagan)
Subject

(Cosmos)

Which Cosmos?

Results 1 - 100 of about 293,000 for cosmos book.

C O S M O S:
A SKETCH
OF A
PHYSICAL DESCRIPTION OF THE UNIVERSE.

BY
ALEXANDER VON HUMBOLDT.

TRANSLATED FROM THE GERMAN,
BY
E. C. OTTÉ AND W. S. DALLAS, F.L.S.

VOL. V.

LONDON:
HENRY G. BOHN, YORK STREET, COVENT GARDEN.
1858.
Subject

Which Cosmos?

(Cosmos)
Identifiers are Everywhere

#w2e

ISBN-10: 1594489505
The humble URI

• URI’s provide strong references
  • Much like pointing in the physical world
    “this is red”
    “this is a pen”
  • a URIref is an unambiguous pointer to something of meaning
Subject

(Cosmos)

Which Cosmos?

What do you mean, author?

http://rdf.freebase.com/ns/book.written_work.author

Cosmos → author → Carl Sagan

vocabulary
There are billions of Carl Sagans...

http://rdf.freebase.com/ns/en.carl_sagan
Cosmos authored by Carl Sagan and published in 1980.
RDF Data Model

Nodes ("Subjects")
connect via Links ("Predicates")
to Objects
  • either Nodes or Literals
Expressions of RDF

RDF has many (inconvenient) serializations

- RDF-XML
- N3
- Turtle
- NTriples
- RDFa
URIs provide identity

http://rdf.freebase.com/ns/en.robert_cook

Stability
Simplicity
Manageability
Not all URL’s are good identifiers

Plugable Data

Semantics allows an application to utilize unanticipated new data sources
Plugable Data

FilmSpin
- Steve Guttenberg
- Richard D. Zanuck
- Tahree Welch
- Linda Harrison
- David Brown
- Ron Howard
- Don Amache
- Gwen Verdon
- Willford Brimley
- Jessica Tandy

Venture Spin
- William Randolph Hearst
- Ron Howard
- William F. Baker
- Paul Allen
- William Clay Ford
- Ted Turner
- Daniel Abraham
- Pamela Aya
- Lewis L. Hart
- Steve Sak

Applied Minds
- Kleine &战
- Benioff & Partners
- Applied Minds
Data Portability

Semantics allows data to be utilized by unanticipated new applications
Data Portability

Timeline

(see the same data in Timeplot)

http://dev.mqlx.com/~jamie/simile/timeline.html

Credits: This software is maintained by SIMILE and David François Huynh
Data Portability

Timeplot

New Legal Permanent Residents in the U.S. (per year) vs. U.S. Population vs. U.S. History

Credits - This software was created and its maintained by World War I
Mon, 27 Jul 1914 17:00:00 GMT
Why Does This Work?

Semantics facilitate shared meaning through:

- Subject Identity
- Strong and Consistent Semantics
- Open APIs + Open Data

These principles make it much easier to extend, combine, and integrate data.
RDF Graphs

- Carrie Fisher Starred In Star Wars
- Harrison Ford Starred In Blade Runner
- Daryl Hannah Starred In Star Wars
Triple Stores
(aka Graph Stores)
Allegro Graph

Franz Inc.

openRDF.org
...home of Sesame

mulgara™
SEMANTIC STORE

openlink
Virtuoso

semantic web framework

Jena

ORACLE®

4store

Redland
Keep your data as flexible as the source
Strong Identifiers

Strong Semantics
(strong vocabularies)

Open Data
Can describe?!

• Semantics Benefit
  • Site owners
  • Site users
  • Developers
  • You

At the end of this talk - you should be able to say how semantics benefits each of these groups.