

Light at the end of the tunnel

R.V.Guha

Google

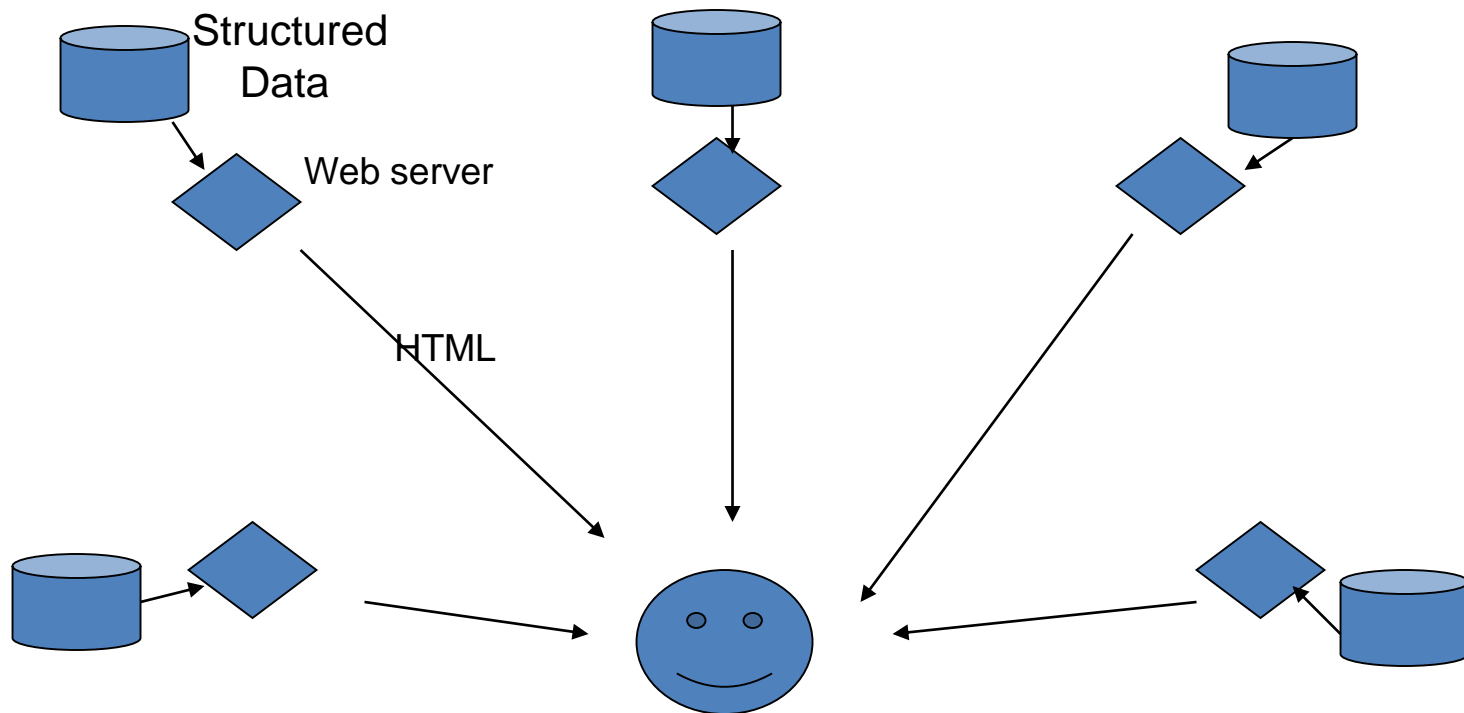
Outline of talk

- How did we end up here ... a personal perspective
 - The tortuous path through standards and products
- Schema.org
 - Why schema.org, principles, how does it work
 - Status : schemas, adoption, partners, applications
- Reports from Google, Bing, Yahoo! & Yandex
- Looking forward: Schemas in the pipeline, Research problems

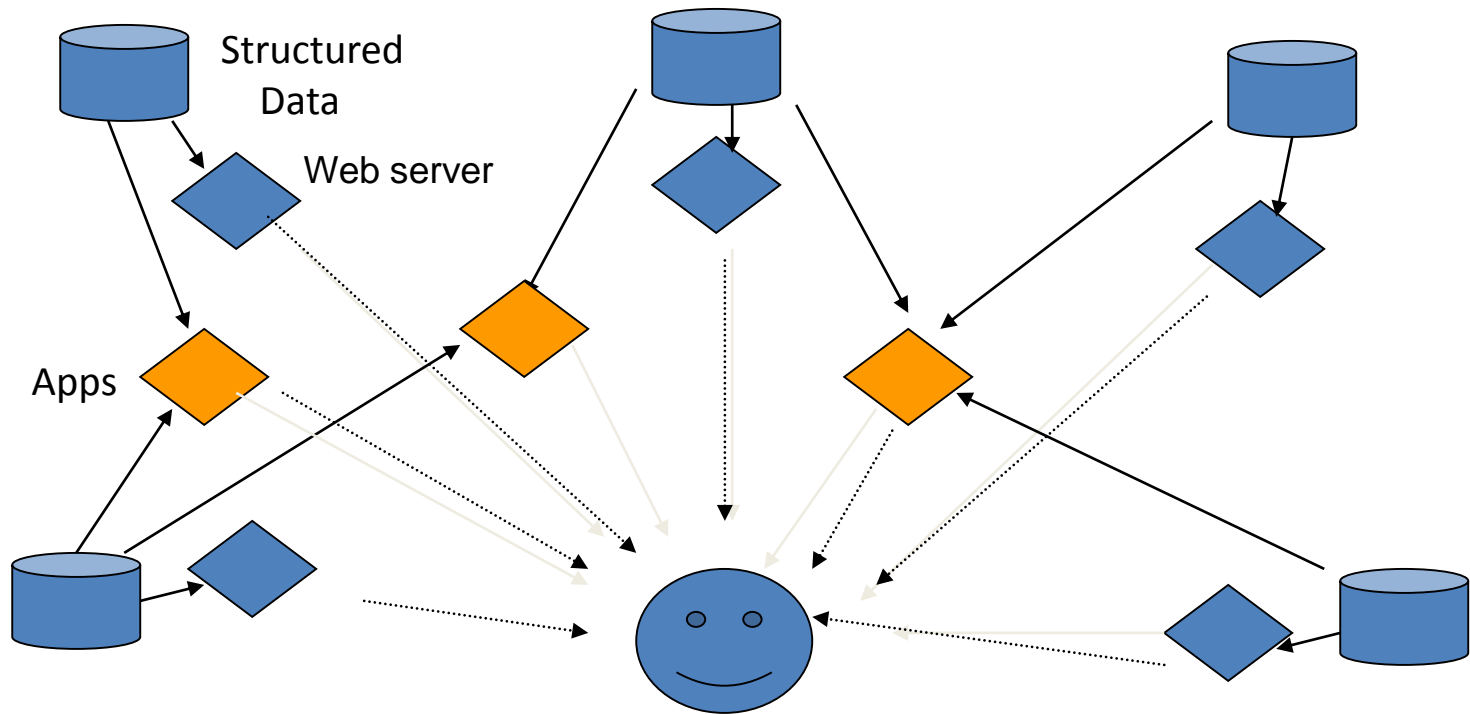
One day, 16 years ago, ...

- Ralph Swick, Ora Lasilla, Tim Bray, Eric Miller and myself
- Trying to make sense of a flurry of activity
 - XML, MCF, CDF, Sitemaps, ...
- There were a number of problems
 - PICS, Meta data, sitemaps, ...
- But one unifying idea

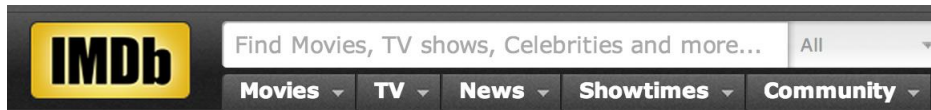
Context: The Web for humans



Goal: Web for Machines & Humans



What does that mean?



Chuck Norris

[Actor](#) | [Music Department](#) | [Producer](#)

Chuck Norris attended North Torrance High School in September, 1955 until his graduation in 1958. He is one of several storied alumni from the school. Other NHS alumni include Bob Hite (1943-1981), the lead singer of "Canned Heat," Chris Demaria, a professional baseball player in the Kansas City and Milwaukee Brewers organizations... [See full bio](#)

Born: [Carlos Ray Norris](#)
[March 10, 1940](#) in [Ryan, Oklahoma, USA](#)

[Celebrities](#) » [Chuck Norris](#)



Chuck Norris

Highest Rated: 🍅 100% [Return of the Dragon \(The Way of the Dragon\) \(1973\)](#)

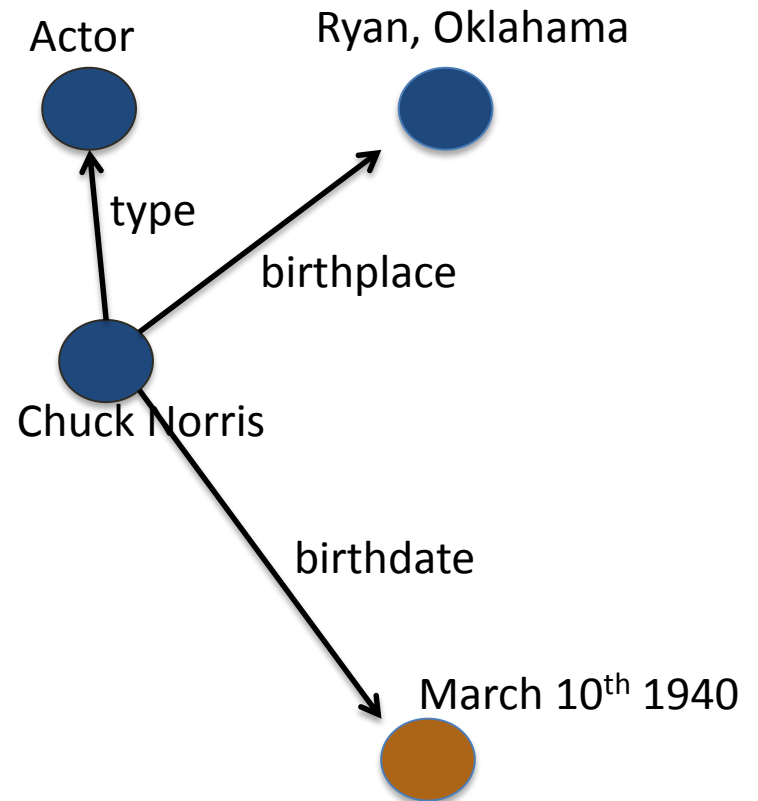
Lowest Rated: 🍷 0% [Firewalker \(1986\)](#)

Birthday: Mar 10, 1940

Birthplace: Ryan, Oklahoma, USA

Bio: American action star Chuck Norris first learned martial arts while serving in the U.S. Marine Corps. From 1968 through 1974, he held the world's middleweight karate championship. During this period, he made his film debut in *The Wrecking Crew* (1968) and his TV bow on *Kung Fu* in the episode "The Room 222". Thanks...

[Full Chuck Norris Bio](#)



How do we get there?

- How does the author give us the graph
 - Data Model
 - Syntax
 - Vocabulary
 - Identifiers for objects
- Why should the author give us the graph?

Going depth first

- Many heated battles
 - Lot of proposals, standards, companies, ...
- Data model
 - Trees vs DLGs vs Vertical specific vs who needs one?
- Syntax
 - XML vs RDF vs json vs ...
- Model theory anyone
 - We need one vs who cares vs what's that?

Timeline of 'standards'

- '96: Meta Content Framework (MCF) (Apple)
- '97: MCF using XML (Netscape) → RDF, CDF
- '99 -- : RDF, RDFS
- '01 -- : DAML, OWL, OWL EL, OWL QL, OWL RL
- '03: Microformats
- And many many many more ... SPARQL, Turtle, N3, GRDDL, R2RML, FOAF, SIOC, SKOS, ...
- Lots of bells & whistles: model theory, inferencing, type systems, ...

But something was missing ...

- Fewer than 10k sites were using these standards
- Something was clearly missing and it wasn't more language features
- We had forgotten the 'Why' part of the problem
- The RSS story

'07 - :Rise of the consumers

- Yahoo! Search Monkey, Google Rich Snippets, Facebook Open Graph
- Offer webmasters a simple value proposition
- Search engines to webmasters:
 - You give us data ... we make your results nicer
- Usage begins to take off
 - 1000x increase in markup'ed up pages in 3 years

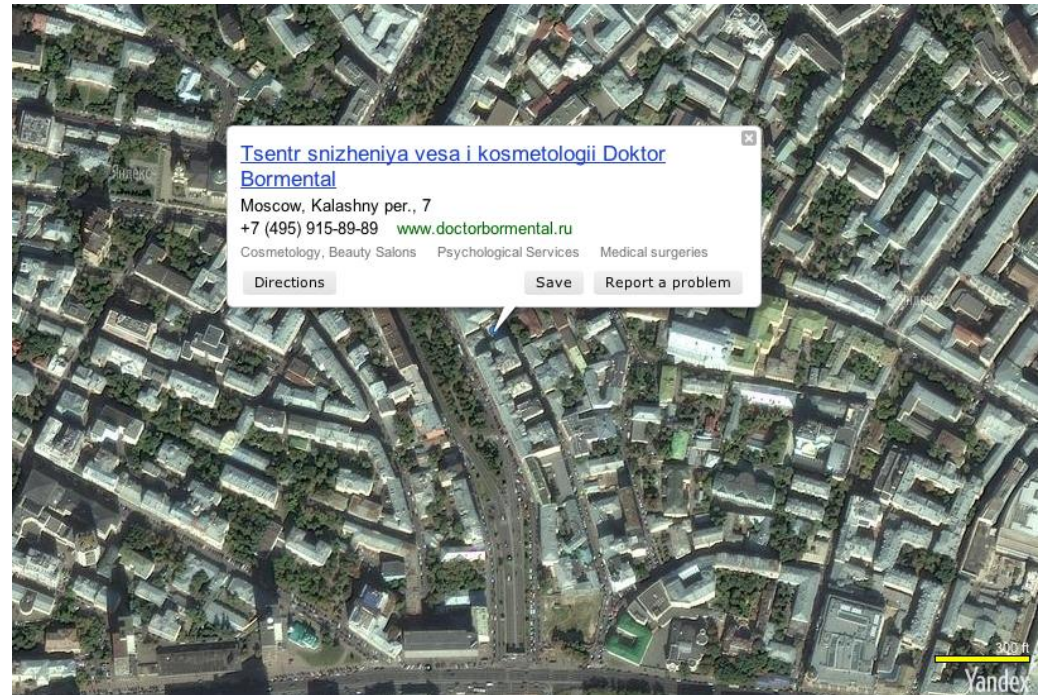
Yahoo Search Monkey

- Give websites control over snippet presentation
- Moderate adoption
 - Targeted at high end developers
 - Too many choices



Yandex Enhanced Snippets & Services

- Snippets for Web Search
- Data for Vertical Search Services
- Various syntax and vocabularies
- Yandex specific vocabs for unexamined use cases



Google Rich Snippets: Reviews

Google

xanh mountain view

About 8,810,000 results (0.26 seconds)


Advanced search

Everything
Images
Videos
News
Shopping
More

Mountain View, CA
Change location

Show search tools

XANH RESTAURANT
xanhrestaurant.com/ - Cached - Similar



Xanh Restaurant
Place page

110 Castro Street
Mountain View, CA 94041
(650) 964-1888
Tram: Mountain View Station (1)
Get directions - Is this accurate?

Open Mon-Thu 11:30am-2:30pm, 5pm-10pm;
Fri-Sat 11:30am-2:30pm, 5pm-11pm; Sun
5pm-10pm

★★★★★ 1587 reviews - Write a review
"Pros: Good decor Cheap food (\$12 lunch)
Fast service ... Cons: 1. Parking is a ..."
- yelp.com


→ **Xanh Restaurant - Mountain View, CA**
★★★★★ 913 reviews - Price range: \$\$
913 Reviews of Xanh Restaurant "I've been here for dinner and lunch a few times. The dinner is good but I heart their lunch buffets.
www.yelp.com > Restaurants > Vietnamese - Cached - Similar

→ **XANH Restaurant - Mountain View, CA | OpenTable**
★★★★★ 228 reviews - Price range: \$30 and under
228 Reviews for XANH in Mountain View. "Nice/fancy presentation but food is so so. The fish is overdone. In general, it is lacking the freshness..."
www.opentable.com/xanh - Cached - Similar







→ **Xanh - Mountain View | Urbanspoon**
★★★★★ 12 reviews - Price range: \$25 on up per entree
Xanh, Vietnamese Restaurant in Mountain View. See the menu, 3 photos, 7 critic reviews, 1 blog post and 4 user reviews. Reviews from critics, food blogs and ...
www.urbanspoon.com > ... > Peninsula > Mountain View - Cached - Similar

Google Rich Snippets: People

Web Images Videos Maps News Mail more -


 pravir gupta


About 102,000 results (0.26 seconds) [Advanced search](#)


 Everything
 Images
 Videos
 News
 Shopping
 More

Mountain View, CA
[Change location](#)

[Show search tools](#)

[Pravir Gupta](#) | LinkedIn 
San Francisco Bay Area - Software Engineer
View [Pravir Gupta's](#) professional profile on LinkedIn. LinkedIn is the world's largest business network, helping professionals like **Pravir Gupta** discover ...
[us.linkedin.com/pub/dir/Pravir/Gupta](#) - Cached

[Pravir Gupta](#) - Knol: a unit of knowledge 
May 10, 2011 ... by **Pravir Gupta**. We are continuously looking at enabling sites. ... by **Pravir Gupta**. Which site is it? Published version: 1 ...
[knol.google.com/k/pravir-gupta/-/3phlmrwubhji/0](#) - Cached - Similar

[pravir](#) 
Pravir Gupta. ... attachment from **Pravir Gupta**. Home. attachment removed by **Pravir Gupta**.
edited by **Pravir Gupta**. attachment from **Pravir Gupta** ...
[pravirgupta.com/](#) - Similar

Google Rich Snippets: Events

Web Images Videos Maps News Mail more -

Google


britney spears concert Search


About 42,800,000 results (0.26 seconds) Advanced search


Everything
Images
Videos
News
Shopping
Realtime
More


Mountain View, CA
Change location


Any time
Latest
Past 24 hours
Past 2 days
Past week
Past month
Past year
Custom range...

Britney Spears Concert - Cheap Britney San Jose Tickets.  Ads
Check Our Prices. Save 15% or More.
ticketliquidator.com is rated ★★★★★ 80 reviews
www.ticketliquidator.com

Britney Spears Tickets - Britney Spears 2011 concert tour. 
Tickets to **Britney Spears** concerts.
britney.concertticketcenter.com

Britney Spears tickets, concerts and tour dates. Official ... 
Results 1 - 10 of 34 ... Find and buy **Britney Spears** tickets at Ticketmaster.com. ... **Britney Spears** Tickets and **Concert** Dates ...
www.ticketmaster.com/**Britney-Spears**-tickets/artist/723427 - Cached - Similar

Britney Spears Tickets, Britney Spears Concert - Britney Tickets ... 
The widest selection of **Britney Spears** Tickets - GOTickets is your source for premium **Concert** Tickets, so BUY with confidence and KNOW your order is secure ...
Thu, Jun 16 Power Balance Pavilion, Sacramento, CA
Sat, Jun 18 HP Pavilion at San Jose, San Jose, CA
Mon, Jun 20 Staples Center, Los Angeles, CA
www.gotickets.com/**concert/britney_spears**.php - Cached - Similar

Wet Weather Sends Britney Spears Concert Indoors - News Story ... 
Mar 23, 2011 ... SAN FRANCISCO -- A nationally televised **concert** featuring singer **Britney**

Google Rich Snippets: Recipes



tiramisu recipe



Search

About 493,000 results (0.25 seconds)

[Advanced search](#)

Everything

Images

Videos

News

Shopping

Recipes

More

San Francisco, CA

[Change location](#)

All results

[Sites with images](#)

[More search tools](#)

[Tiramisu Recipes - Allrecipes.com](#)

Looking for **tiramisu recipes**? Allrecipes has more than 20 trusted **tiramisu recipes** complete with ratings, reviews and baking tips.

[Easy Tiramisu](#) - [Tiramisu II](#) - [Photo of - Emily's Famous Tiramisu](#)
[allrecipes.com/recipes/desserts/tiramisu/](#) - [Cached](#) - [Similar](#)

▶ [Classic Tiramisu Recipe - Allrecipes.com](#)

★★★★★ 531 reviews - 2 hrs - 568 cal

Classic Italian dessert made with ladyfingers and mascarpone cheese. It can ...

[allrecipes.com/recipe/classic-tiramisu/](#) - [Cached](#) - [Similar](#)

[Tiramisu II Recipe - Allrecipes.com](#)



★★★★★ 478 reviews - 5 hrs - 387 cal

Mascarpone custard layered with whipped cream and rum and coffee soaked ...

[allrecipes.com/recipe/tiramisu-ii/](#) - [Cached](#) - [Similar](#)

[Show more results from allrecipes.com](#)

[Tiramisu Recipe : Food Network](#)



★★★★★ 59 reviews - 2 hr 25 min

Jun 1, 2011 ... Food Network invites you to try this **Tiramisu recipe**.

[www.foodnetwork.com](#) > [Recipes](#) > [Italian](#) - [Cached](#) - [Similar](#)

[Tiramisu Recipes - Tiramisu: Heaven In Your Mouth](#)

But essentially, the recipes present Tiramisu in its purest form. ... **Tiramisu recipes** tend to fall into three categories: (1) Basic recipes that are more ...

[Basic Tiramisu Recipes](#) - [Variety Recipes \(19\)](#) - [Healthy Recipes \(22\)](#)
[www.heavenlytiramisu.com/recipes.htm](#) - [Cached](#) - [Similar](#)

Google Rich Snippets: Recipe View



ina garten cakes



Search

About 69,700 results (0.22 seconds)

[Advanced search](#)

Everything

Images

Videos

News

Shopping

Recipes

More

Ingredients	Yes	No
coffee	<input type="checkbox"/>	<input type="checkbox"/>
coconut	<input type="checkbox"/>	<input type="checkbox"/>
sour cream	<input type="checkbox"/>	<input type="checkbox"/>
lemon	<input type="checkbox"/>	<input type="checkbox"/>
chocolate	<input type="checkbox"/>	<input type="checkbox"/>
vanilla extract	<input type="checkbox"/>	<input type="checkbox"/>
baking soda	<input type="checkbox"/>	<input type="checkbox"/>
maple syrup	<input type="checkbox"/>	<input type="checkbox"/>

Any cook time

[Less than 15 min](#)

[Less than 30 min](#)

[Less than 60 min](#)

Any calories

[Less than 100 cal](#)

[Less than 300 cal](#)

[Less than 500 cal](#)

► [Coconut Cake](#)



★★★★★ 324 reviews - 1 hr 55 min

Food Network invites you to try this Coconut **Cake** recipe from **Ina Garten**.

Ingredients: butter, sugar, eggs, vanilla extract, almonds, flour, baking ...

[www.foodnetwork.com](#) > [Recipes](#) > [Baking](#) - [Cached](#) - [Similar](#)

Sour Cream Coffee Cake



★★★★★ 246 reviews - 1 hr 40 min

Food Network invites you to try this Sour Cream Coffee **Cake** recipe from **Ina Garten**.

Ingredients: butter, sugar, eggs, vanilla extract, sour cream, flour, baking ...

[www.foodnetwork.com](#) > [Recipes](#) > [Baking](#) - [Cached](#) - [Similar](#)

Lemon Yogurt Cake



★★★★★ 433 reviews - 1 hr 20 min

Food Network invites you to try this Lemon Yogurt **Cake** recipe from **Ina Garten**.

Ingredients: flour, baking powder, yoghurt, sugar, eggs, lemon, vanilla extract ...

[www.foodnetwork.com](#) > [Recipes](#) > [Baking](#) - [Cached](#) - [Similar](#)

Beatty's Chocolate Cake



★★★★★ 1103 reviews - 1 hr 35 min

Food Network invites you to try this Beatty's Chocolate **Cake** recipe from **Ina Garten**.

Ingredients: butter, flour, sugar, cocoa, baking soda, baking powder, milk ...

[www.foodnetwork.com](#) > [Recipes](#) > [Baking](#) - [Cached](#) - [Similar](#)

Lemon Cake



★★★★★ 223 reviews - 1 hr 30 min

Food Network invites you to try this Lemon **Cake** recipe from **Ina Garten**.

Ingredients: butter, sugar, eggs, lemon, flour, baking powder, baking soda ...

[www.foodnetwork.com](#) > [Recipes](#) > [Baking](#) - [Cached](#) - [Similar](#)

Flag Cake



★★★★★ 132 reviews - 1 hr 15 min

Food Network invites you to try this Flag **Cake** recipe from **Ina Garten**.

Google Rich Snippets

- Multi-syntax
- Adhoc vocabulary for each vertical
- Very clear carrot
- Lots of experimentation on UI
- Moderately successful
- Scaling issues with vocabulary

Situation in 2010

- Too many choices/decisions for webmasters
 - Divergence in vocabularies
 - Too much fragmentation
 - N versions of person, address, ...
- A lot of bad/wrong markup
 - ~25% for microformats, ~40% with RDFA
 - Some spam, mostly unintended mistakes
- Absolute adoption numbers still rather low
 - Less than 100k sites

In the meantime ...

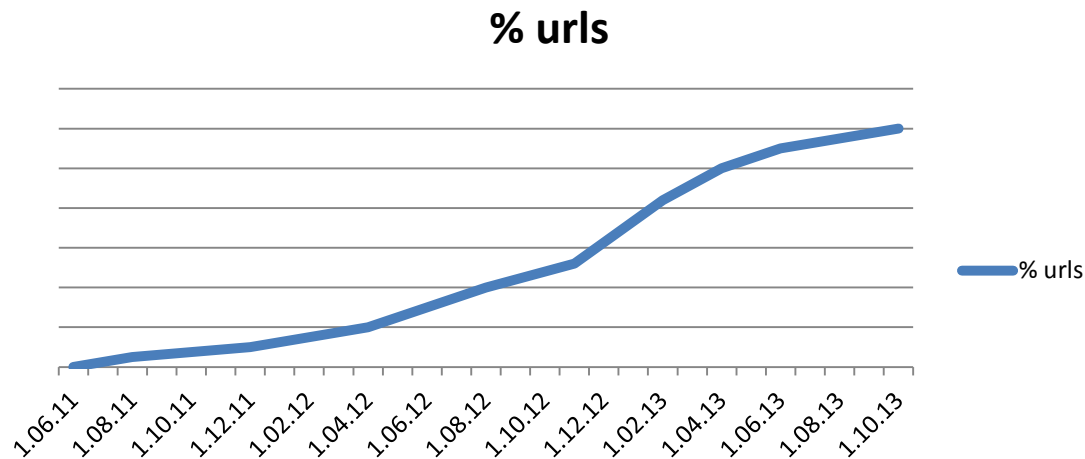
- The Web has grown
 - >25 million independent active sites
 - Trillions of web pages
 - ~5 billion pages change every day
 - Spam, malware, ...
- In other words: scaling problems along every dimension

Schema.org

- Work started in August 2010
 - Google, Yahoo!, Microsoft & then Yandex
- Goals:
 - One vocabulary understood by all the search engines
 - Make it very easy for the webmaster
- It is A vocabulary. Not The vocabulary.
 - Webmasters can use it together other vocabs
 - We might not understand the other vocabs. Others might

Schema.org: report card

- Over 15% of all sites/pages now have schema.org
- Over 5 million sites, over 25 billion entity references
- In other words
 - Same order of magnitude as the web
 - Not just ‘promising new stuff’ anymore



Schema.org: Major sites

- News: Nytimes, guardian.com, bbc.co.uk,
- Movies: imdb, rottentomatoes, movies.com
- Jobs / careers: careerjet.com, monster.com, indeed.com
- People: linkedin.com,
- Products: ebay.com, alibaba.com, sears.com, cafepress.com, sulit.com, fotolia.com
- Videos: youtube, dailymotion, frequency.com, vinebox.com
- Medical: cvs.com, drugs.com
- Local: yelp.com, allmenus.com, urbanspoon.com
- Events: wherevent.com, meetup.com, zillow.com, eventful
- Music: last.fm, myspace.com, soundcloud.com

Schema.org: categories

- Most used categories by occurrence
 - Person, Offer, Product, PostalAddress, VideoObject, ImageObject, BlogPosting, WebPage, Article, AggregateRating, LocalBusiness, Place, Organization, MusicRecording, JobPosting, Recipe, Book, Movie, Blog, Photograph, ImageGallery
- Most used categories by domains
 - ImageObject, WebPage, PostalAddress, BlogPosting, Product, Person, Offer, Article, LocalBusiness, Organization, Blog, AggregateRating, Review, VideoObject, Place, Event, Rating, AudioObject, MusicRecording, Store

Schema.org: properties

- Top properties by occurrence
 - name, url, image, description, offers, author, price, thumbnailUrl, datePublished, addressLocality, address, itemOffered, duration, streetAddress, isFamilyFriendly, priceCurrency, playerType, paid, regionsAllowed, postalCode, hiringOrganization, jobLocation,
- Top properties by domain
 - Name, description, url, image, contentURL, address, author, telephone, price, postalCode, offers, ratingValue, priceCurrency, datePublished, addressRegion, availability, email, bestRating, creator, review, location, startDate

Schema.org principles: Simplicity

- Simple things should be simple
 - For webmasters, not necessarily for consumers of markup
 - Webmasters shouldn't have to deal with N namespaces
- Complex things should be possible
 - Advanced webmasters should be able to mix and match vocabularies
- Syntax
 - Microdata, usability studies
 - RDFa, json-ld, ...

Schema.org principles: Simplicity

- Can't expect webmasters to understand Knowledge Representation, Semantic Web Query Languages, etc.
- It has to fit in with existing workflows
- Avoid KR system driven artifacts
 - domainIncludes/rangeIncludes
 - No classes like 'Agent'
 - Categories and attributes should be concrete

Schema.org principles: Simplicity

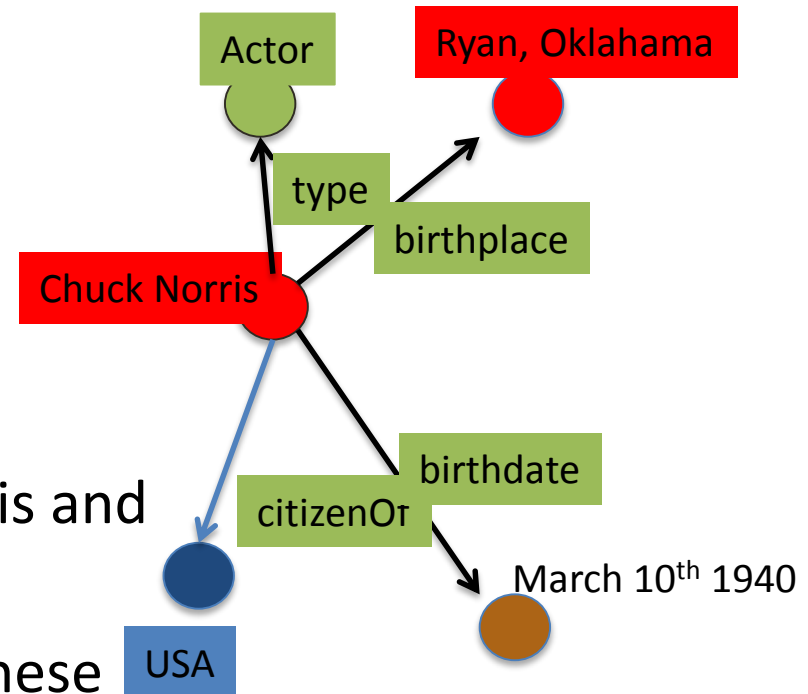
- Copy and edit as the default mode for authors
 - It is not a linear spec, but a tree of examples
- Vocabularies
 - Authors only need to have local view
 - But schema.org tries to have a single global coherent vocabulary

Schema.org principles: Incremental

- Started simple
 - ~ 100 categories at launch
- Applies to every area
 - Add complexity after adoption
 - now ~1200 vocab items
 - Go back and fill in the blanks
- Move fast, accept mistakes, iterate fast

Schema.org Principles: URIs

- ~1000s of terms like Actor, birthdate
 - ~10s for most sites
 - Common across sites
- ~10ks of terms like USA
 - External enumerations
- ~10m-100m terms like Chuck Norris and Ryan, Oklahoma
 - Cannot expect agreement on these
 - Consumers can reconcile entity references



Schema.org Principles: Collaborations

- Most discussions on public W3C lists
- Work closely with interest communities
- Work with others to incorporate their vocabularies
 - We give them attribution on schema.org
 - Webmasters should not have to worry about where each piece of the vocabulary came from
 - Webmasters can mix and match vocabs

Schema.org Principles: Collaborations

- IPTC /NYTimes / Getty with rNews
- Martin Hepp with Good Relations
- US Veterans, Whitehouse, Indeed.com with Job Posting
- Creative Commons with LRMI
- NIH National Library of Medicine for Medical vocab.
- Bibextend, Highwire Press for Bibliographic vocabulary
- Benetech for Accessibility
- BBC, European Broadcasting Union for TV & Radio schema
- Stackexchange, SKOS group for message board
- Lots and lots and lots of individuals

Schema.org Principles: Partners

- Partner with Authoring platforms
 - Drupal, Wordpress, Blogger, YouTube
- Drupal 8
 - Schema.org markup for many types
 - News articles, comments, users, events, ...
 - More schema.org types can be created by site author
 - Markup in HTML5 & RDFa Lite
 - Coming out early 2014



Schema.org & W3C

- Web Schemas – vocabulary discussion
 - Part of W3C Semantic Web Interest Group
- W3C Community Group(s)
 - e.g. <http://w3.org/community/schemabibex/>
- Wiki, Mercurial, email lists, ...
 - Informal collaboration rather than classic standardization
 - Ideas for extending schema.org welcomed
 - Also room this week Thu/Fri, see blog.schema.org

W3C Data Activity

- Subsumes & expands on Sem Web & eGov
- Success for Sem Web in several communities who publish self-describing, re-usable structured data
- schema.org makes it easier for developers to use common vocabulary
- W3C pleased with the success of schema.org and continues to encourage data formats that support mixing of vocabs

Schema.Org Usage @ MS

Today

- Used primarily to support Bing's Rich Captions
- Also recommended for Windows 8 App Contracts

Tomorrow

- Extended usage in Rich Captions and Bing Search
- Development support via new Bing Platform Dev Center
- Innovative experiences in other Microsoft products

Bing Rich Captions

[Apple Pie by Grandma Ople Recipe - Allrecipes.com](#)

[allrecipes.com/Recipe/Apple-Pie-by-Grandma-Ople](#) ▼



★★★★★ Rating: 4.8/5 · 5,404 reviews · 878 photos

"This was my grandmother's apple pie recipe. I have never seen another one quite like it. It will always be my favorite and has won me several first ...

[Qi Lu - Wikipedia, the free encyclopedia](#)



[en.wikipedia.org/wiki/Qi_Lu](#) ▼

Lu Qi PhD, more commonly known as Qi Lu in English, is currently Executive Vice President at Microsoft, leading the company's work on the Bing ...

[Skyfall \(2012\) - IMDb](#)

[www.imdb.com/title/tt1074638](#) ▼

★★★★★ Rating: 7.8/10 · 338,805 ratings · Action/Adventure/Thriller · PG-13

Title: *Skyfall* (2012) 7.8 /10. Want to share IMDb's rating on your own site? Use the HTML below. Show HTML View more styles ...

- Ensure your Schema.Org annotations represent the primary content on the page -> **ensures correct caption data is shown**
- Ensure your Schema.Org annotations are appropriate and relevant to the content of the page -> **improves your chances of being shown**
- Rich Captions do not support RDFa 1.1 or JSON-LD -> **stick with RDFa 1.0 or Microdata for now**

Relevant Links

Bing Platform Dev Center

<http://www.bing.com/dev/en-us/dev-center>

Bing Webmaster Tools (including Markup Validator)

<http://www.bing.com/toolbox/webmaster/>

Site Markup Guidance

<http://www.bing.com/webmaster/help/markin-up-your-site-with-structured-data-3a93e731>

Yahoo! Search

- Rich results

- Blanco et al. **Enhanced Results for Web Search**, SIGIR 2011
- Mika & Potter. **Metadata Statistics for a Large Web Corpus**, LDOW 2012

[Parcel 104 - Santa Clara, CA - Yelp, Inc.](http://www.yelp.com/biz/parcel-104-santa-clara?start=120)

www.yelp.com/biz/parcel-104-santa-clara?start=120 Cached

★★★★★ - (408) 970-6104 - Categories: American (New), Bars.
2700 Mission College Blvd Santa Clara, CA 95054 (408) 970-6104



- Related entities

- *Blanco et al.*
Entity recommendations in Web Search
- Wed 15:15 Search track

barcelona

Related Points Of Interest



[Sagrada Familia](#)



[Las Ramblas](#)



[Casa Milà](#)

Yahoo! Media

- Schema.org across the Yahoo! Network
 - Article, Photo and Video markup
 - Q&A and Sports under development
- Personalization
 - Based on past reading behavior, Facebook profile, implicit feedback
 - Concepts from a news taxonomy and entity-graph
 - *Nicolas Torzec. The Y! Knowledge Base: Making Knowledge Reusable at Yahoo! SemTech 2013*

Yahoo! and Marissa Mayer Doubters Simply Cannot Do Math Nor Know

History

Sometimes people just do not know how to concede that a win is a win. The truth is that winners
24/7 Wall St. Finance Investment & Company Information Marissa Mayer

Got it. We'll show you more stories like this.

[Content preferences](#)

Tell us more about what you like:

Stories about:



Finance



Investment & Company Information



Marissa Mayer



Yahoo!

Yahoo!7

- Linking structured and unstructured content
 - Character bio, appearances, related characters...
 - Articles, tweets, quotes, images, video...

The screenshot displays the Yahoo!7 homepage with a search bar and navigation links. Below the search bar, there are banners for 'Home and Away' and 'Health & Human Sciences'. The main content area features a profile for Darryl 'Brax' Braxton, played by Steve Peacocke. The profile includes a photo of Braxton, a quote, and a description of his character. To the right of the profile is a large advertisement for 'AT OUR GOLD COAST CAMPUS'. The bottom of the page has social media sharing links for Facebook, Twitter, and Email.

Y! tv Search Web SIGN IN New here? Sign up

Home and Away Health & Human Sciences Southern Cross University

Home Video Photos News Cast Features Synopses Forums Music Fango

Darryl 'Brax' Braxton
played by [Steve Peacocke](#)

“ We both do anything to protect the people we care about. ”

For all his swagger and easygoing charm, Brax is a reluctant hero.

When Darryl Braxton first appeared in Summer Bay he was just another River Boy – a

[View more](#)

share f t e

AT OUR GOLD COAST CAMPUS

Yandex Islands

Yandex

Aeroflot check in Moscow

Check in for your flight online. Aeroflot



aeroflot.ru/cms/online_registration

Online registration opens 24 hours and closes 45 minutes before departure. You can **check in** for your flight if your travel with **Aeroflot...**

Passenger Information

Name

Departure

City

Surname

Flight

SU

Check in

Yandex Islands

Yandex

Aeroflot check in Moscow

Check in for your flight online.

aeroflot.ru/cms/online_registration

Online registration opens 24 hours and 45 minutes before departure. You can **check in** for your flight if your travel with Aeroflot...

Passenger Information

Name

Departure

City

Flight

SU

Check in

Based on Schema.org Actions

Other Products

- Enhanced Snippets for Web Search
- Data for Vertical Search Services (Image Search, Video Search, Ya.Directory, ...)
- Data for algorithms
(schema.org/PeopleAudience, ...)

Links

- Docs: <http://clck.ru/8sA44>
- Validator: <http://clck.ru/8ridt>
- Yandex Islands: <http://beta.yandex.com>

tilid@yandex-team.ru

ajax@yandex-team.ru

Applications

- Applications drive adoption
- First generation of applications
 - Rich presentation of search results
- Many new applications are coming up
 - On search page and beyond

Newer Applications: Knowledge Graph

proxy

Maps Shopping Videos More ▾ Search tools

Results (0.28 seconds)

[The Proxy \(1994\) - IMDb](#)
[le/tt0110074/](#) ▾
7.3/10 - 48442 votes
en. With Tim Robbins, Jennifer Jason Leigh, Paul Newman, Charles
business graduate is installed as president of a ...
- The Hudsucker Proxy Trailer - Trivia - Quotes

[The Proxy - Wikipedia, the free encyclopedia](#)
[wiki/The_Hudsucker_Proxy](#) ▾
The Proxy is a 1994 screwball comedy film co-written, produced, and
directed by Joel and Ethan Coen. Sam Raimi co-wrote the script and served as ...
Soundtrack

[The Proxy - Rotten Tomatoes](#)
[es.com/m/hudsucker_proxy/](#) ▾
56% - 39 reviews
and Ethan Coen concocted this stylish screwball comedic amalgam
Howard Hawks. Tim Robbins stars as Norville ...

[The Proxy Official Trailer #1 - Charles Durning Movie ...](#)
[www.youtube.com/watch?v=dBa8p0NFwM8](#) ▾
Jan 10, 2012 - Uploaded by oldhollywoodtrailers
The Hudsucker Proxy Trailer - Directed by Joel Coen and starring

The Hudsucker Proxy







1994 Film

★★★★☆ 7.3/10 - IMDb
★★★★☆ 56% - Rotten Tomatoes
★★★★☆ 53% - Metacritic

The Hudsucker Proxy is a 1994 screwball comedy film co-written, produced, and directed by Joel and Ethan Coen. Sam Raimi co-wrote the script and served as second unit director. Wikipedia

Release date: March 11, 1994 (USA)
Directors: Joel Coen, Ethan Coen
Initial DVD release: May 18, 1999
MPAA rating: PG
Screenplay: Joel Coen, Ethan Coen, Sam Raimi

Cast



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Of monsters and men

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Ad related to of monsters and men

Of Monsters and Men - My Head Is an Animal

itunes.apple.com/OfMonstersAndMen

Featured video: [King and Lionheart](#)

In stores now

Feat. Little Talks, Mountain Sound, & King and Lionheart

iTunes \$7.99

Of Monsters and Men | The Official website for Of Monsters and Men

www.ofmonstersandmen.com/

The Official website for Of Monsters and Men.

Of Monsters and Men - Wikipedia, the free encyclopedia

en.wikipedia.org/wiki/Of_Monsters_and_Men

Of Monsters and Men is a six-piece, English-language, indie folk/pop band from Iceland, formed in 2010. The members are lead singer/guitarist Nanna Bryndís ...

My Head Is an Animal - Little Talks - Nanna Bryndís Hilmarsdóttir - Mountain Sound

Of Monsters and Men - YouTube

www.youtube.com/artist/of-monsters-and-men

After winning the nationwide 2010 battle-of-the-bands competition Musiktíðraunir in their native Iceland, six-piece chamber pop group Of Monsters and Men wer...

Of Monsters and Men | Facebook

www.facebook.com/ofmonstersandmen

Of Monsters and Men. 784817 likes · 52452 talking about this.

Of Monsters and Men – Free listening, concerts, stats, & pictures at ...

www.last.fm/music/Of+Monsters+and+Men

Top tracks from Of Monsters and Men: Little Talks, Dirty Paws & more. Of Monsters and Men are an indie folk band which formed in 2010 in Reykjavík, Iceland.

Of Monsters and Men | Free Music, Tour Dates, Photos, Videos

www.myspace.com/ofmonstersandmenmusic

Of Monsters and Men's official profile including the latest music, albums, songs, music videos and more updates.

Of Monsters and Men Play 'Little Talks' on 'SNL' - Video | Rolling St...

www.rollingstone.com/...

Of Monsters and Men

Band

Of Monsters and Men is a six-piece, English-language, indie folk/pop band from Iceland, formed in 2010. [Wikipedia](#)

Origin: Iceland

Albums: [My Head Is an Animal](#), [Little Talks](#)

Members: [Nanna Bryndís Hilmarsdóttir](#), [Brynjar Leifsson](#), [More](#)

Lead singers: [Nanna Bryndís Hilmarsdóttir](#), [Ragnar Þórhallsson](#)

Record labels: [Universal Music Group](#), [Republic Records](#), [Universal Republic Records](#)

Upcoming events


May 16 Thu	Of Monsters and Men Oakland, CA (near you)
May 19 Sun	Live 105's BFD 2013 Mountain View, CA (near you)
May 13 Mon	Of Monsters and Men Portland, OR

Songs

Little Talks	2011	Into the Woods
Mountain Sound	2012	My Head Is an Animal




Non web search Applications

- Searching for Veteran friendly jobs



National Resource Directory

Connecting Wounded Warriors, Service Members, Veterans,
Their Families and Caregivers with Those Who Support Them



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Veterans Job Bank

Beta

Keyword(s) [Help](#)

MOS/MOC(s)

 [Add](#)

Location

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- ☒ Campbell, CA
- ☒ Mount Hamilton, CA
- ☒ Sunnyvale, CA
- ☒ Newark, CA

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[Engineering Equipment Operator](#) [☆](#) [➔](#)

JOB SUMMARY:A career with the Forest Service will challenge you to manage and care for more than 193 million acres of our nation's most magnificent lands, conduct research through a network...

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Department Of Agriculture, Forest Service • Multiple Locations • 43680.00
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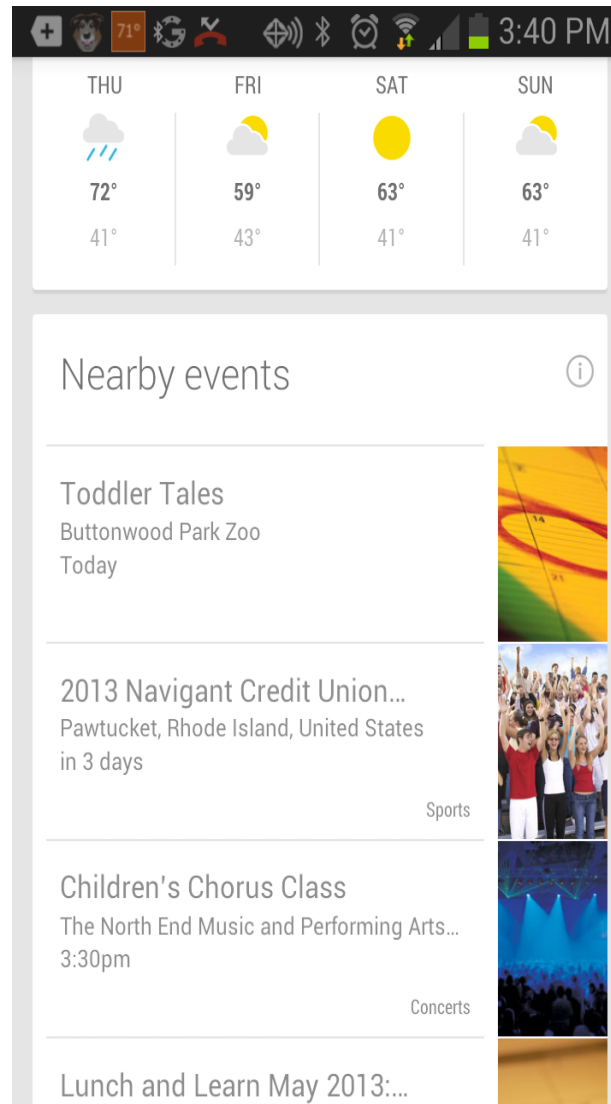
[Network Software Engineer \(Libraries and System Software\)](#) [☆](#) [➔](#)

Job Description The Intel Fabric Software development team is looking for a software development engineer to work in our Santa Clara design center to facilitate the delivery of the next generation...

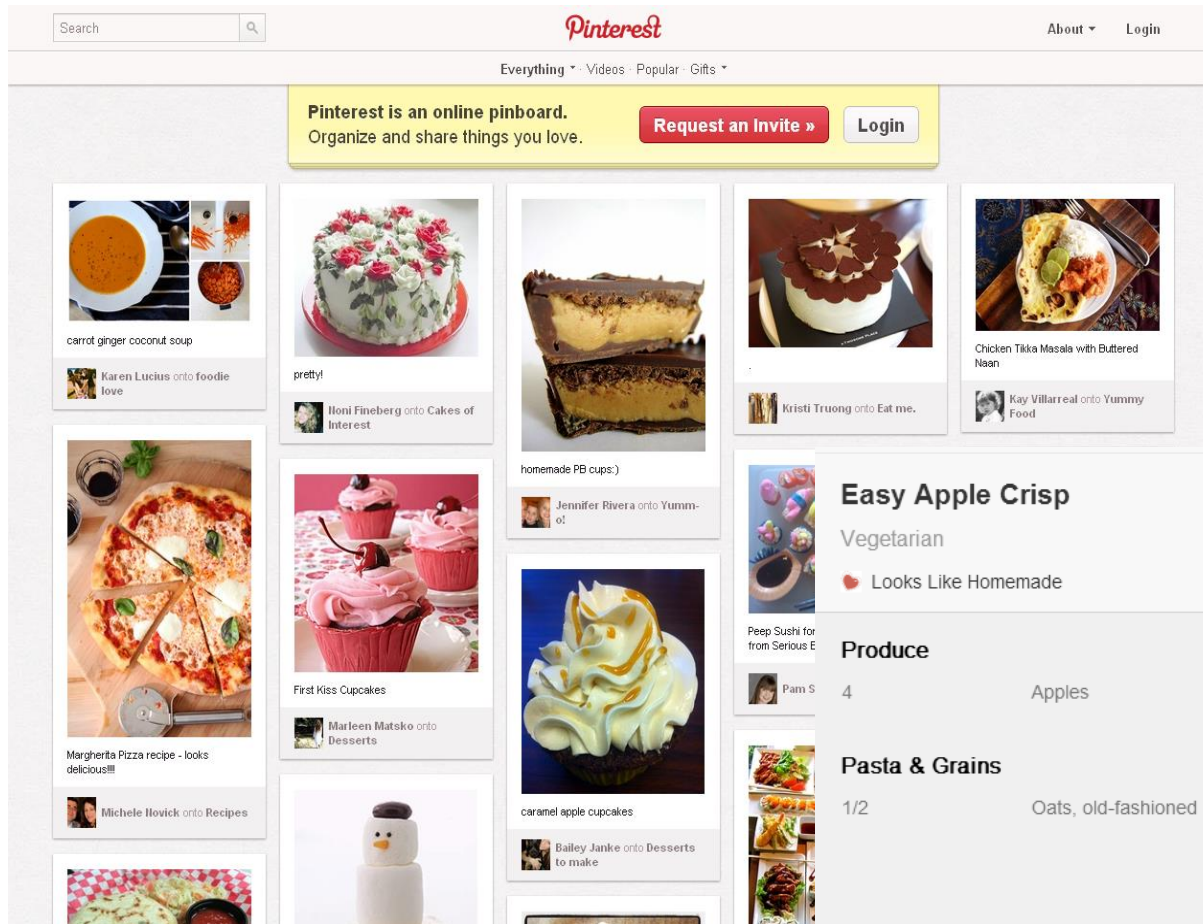
[View More Details](#) [Feedback](#)

Intel Corporation • Santa Clara, California
Posted 474 days ago

Non search applications: Google Now



Pinterest: Schema.org for Rich Pins



Easy Apple Crisp

Vegetarian

♥ Looks Like Homemade

Produce

4

Apples

Pasta & Grains

1/2

Oats, old-fashioned

Cooking & Baking

1/2 cup

All-purpose flour

3/4 cup

Brown sugar, packed

3/4 tsp

Cinnamon, ground

1/4 tsp

Cloves, ground

1/2 tsp

Nutmeg, ground

Dairy

1/3 cup


Butter

Make this on Looks Like Homemade



Non search Applications

- Open Table website → confirmation email → Android Reminder

 **Cascal Reservations** <member_services@opentable.com> Jul 22 5
to RV ▾

Dear RV,

Thank you for making your reservation through Yelp. You're dining at **Cascal**!
[Invite your party >](#)

--- Your Reservation Details ---

Diner's name: **RV Guha**
Date: **Monday, July 22, 2013**
Time: **8:30 PM**
Party Size: **2**

[Click here](#) to make changes to your reservation.

Cascal
400 Castro St. Mountain View, CA 94041
Cross Street: California St.
[\(650\) 940-9500](#)

[See menus, map & more >](#)

```
<span itemscope
    itemtype="http://schema.org/Restaurant"
    itemid="/restaurant">
    Cascal
</span>

....
<span itemprop="address"
    itemscope
    itemtype="http://schema.org/PostalAddress">
    <span itemprop="streetAddress">
        400 Castro St. Mountain View, CA 94041
    </span>
</span>

...
```

Future application

- Clinical trials
 - 4000+ clinical trials at any time in the US alone
 - Almost all the data ‘thrown away’
 - All that gets published is a textual ‘abstract’
- Over half the trials are redundant
 - Earlier trials have the data
 - Assumptions, etc. cannot be re-examined
 - Longitudinal studies extremely hard, but super

Vocabularies in the pipeline

- Actions (Potential Actions), Events
- Accessibility
- Commerce: Orders, Reservations, ...
- Communication: Fleshing out TV, Radio, Email, Q&A, ...
- Media: Scholarly works, Comics, Serials
- Sports
- and many many more ...

Big initiatives underway

- Representing time
 - Lot of triples with associated time interval
 - Hard to force into the triple model
 - Looking at named graphs
- Tabular / CSV data
 - Census data, Scientific data, etc.
 - Need mechanisms for external specification of the meaning of these tables

Research Problems

- Propositional Attitudes
 - Fictional characters
 - Possible actions
- Mapping Entities across sites
 - Billions of entities
 - But hundreds of billions of entity references
 - Very large scale cross site entity mapping

Schema.org: concluding

- Provide webmasters
 - A good reason for adding structured data markup
 - Allow more advanced authors to add much richer markup from many different vocabularies
 - An easy way to do it
- Many different applications emerging
- Many interesting research problems left
- Light at the end of the tunnel

Questions?

MCF

- Introduced the Directed Labeled Graph (DLG) model
- Used to describe site structure
- Provided simple visualization plugin
- ~3m downloads, few thousand sites
(not too bad for '96)
- Documentation was about a page
- Lead to MCF using XML
(4 pages including diagrams)



97-99: RDF / RDFS

- MCF (4 pages) got renamed to RDF
- Data model becomes a religion
- Lot of new things ... reification, sequences, chains, model theory, ...
- Final version done only by 2002
- RDF Primer is 100 pages long!
- But ... used by very few websites

'99: RSS 0.91

- Netscape needs customizable home page ala my.yahoo
- No \$s to do deals
- Create format and open it up to everyone
 - 2 year target was 5k feeds
 - 14 years later → 100m+ feeds

2002: OWL

- Tim BL, et. al. 'Semantic Web' paper
- Answer to lack of adoption: we need more features
- Lots of Darpa and EU funding
- Very powerful solutions ... looking for problems
- ~10 years later ... < 100 sites use it

'04-07: Microformats

- Reaction to the complexity of RDF & OWL
- Retrofitted vCard, etc. into HTML → hCard
- Adoption by Google & Yahoo! made it wildly successful
- Evolutionary dead-end: no new vocabulary in over 5 yrs.

Lessons

- The RSS story
- Make sure you have your carrot!
 - Carrots work much better than sticks!
- Find the right initial level of generality
- Start simple and iterate fast
- Optimize for flexibility