

# RDFa:

## Embedding RDF Knowledge in HTML

Some content from a presentation by Ivan Herman of the W3c, [Introduction to RDFa](#), given at the 2011 Semantic Technologies Conference.

# What is RDFa?

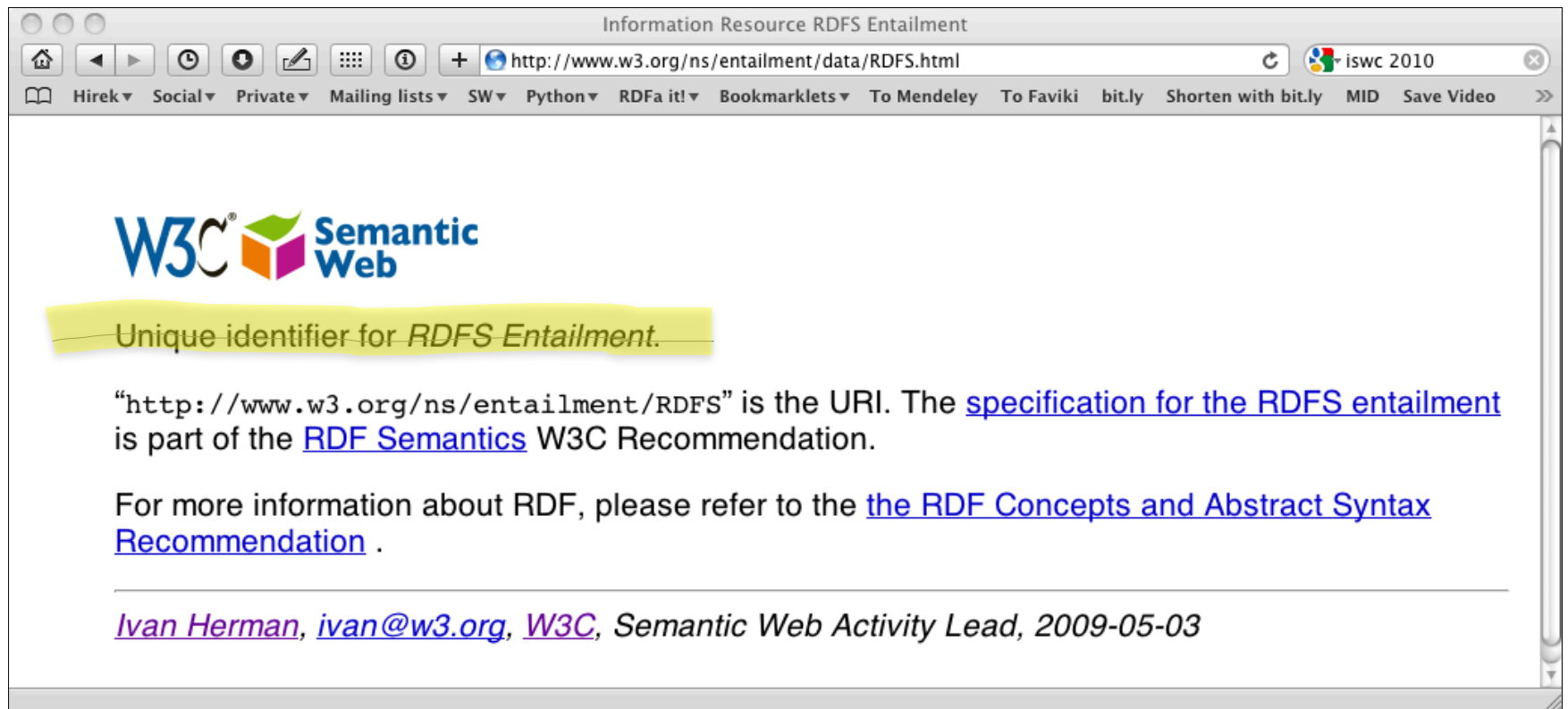


- Serialization of RDF embedded in HTML, HTML or XML
  - Provides set of attributes (the *a* in RDFa) to use with existing tags to carry RDF metadata
- 2004: work on developing standards began
- 2008: RDFa 1.0 a recommendation (but only in XHTML, which failed to launch)
- 2012-15: RDFa 1.1 recommendation (works in HTML4, HTML5)
- See <http://rdfa.info/>

# Principles of RDFa

- RDF content specified in XML *attributes* of tags rather than *elements*
  - The XML/HTML *tree structure* is used as context, when appropriate
  - Some new attributes are *introduced* and some existing ones (@href, @rel) *reused*
  - When possible, HTML text content used for *literal values*
- ➔ Same file used by browser & RDF extractor

# Web page viewed by a person



<http://www.w3.org/ns/entailment/data/RDFS.html>

# The source

```
<p about="http://www.w3.org/ns/entailment/RDFS"  
  property="http://purl.org/dc/terms/description">  
  Unique identifier for RDFS Entailment.</p>
```

# Source and generated RDF...

```
<p about="http://www.w3.org/ns/entailment/RDFS"  
  property="http://purl.org/dc/terms/description">  
  Unique identifier for <em>RDFS Entailment</em>.</p>
```

```
<http://www.w3.org/ns/entailment/RDFS>
```

```
... .
```

# Source and generated RDF...

```
<p about="http://www.w3.org/ns/entailment/RDFS"  
  property="http://purl.org/dc/terms/description">  
  Unique identifier for <em>RDFS Entailment</em>.</p>
```

```
<http://www.w3.org/ns/entailment/RDFS>  
  <http://purl.org/dc/terms/description>  
  ... .
```

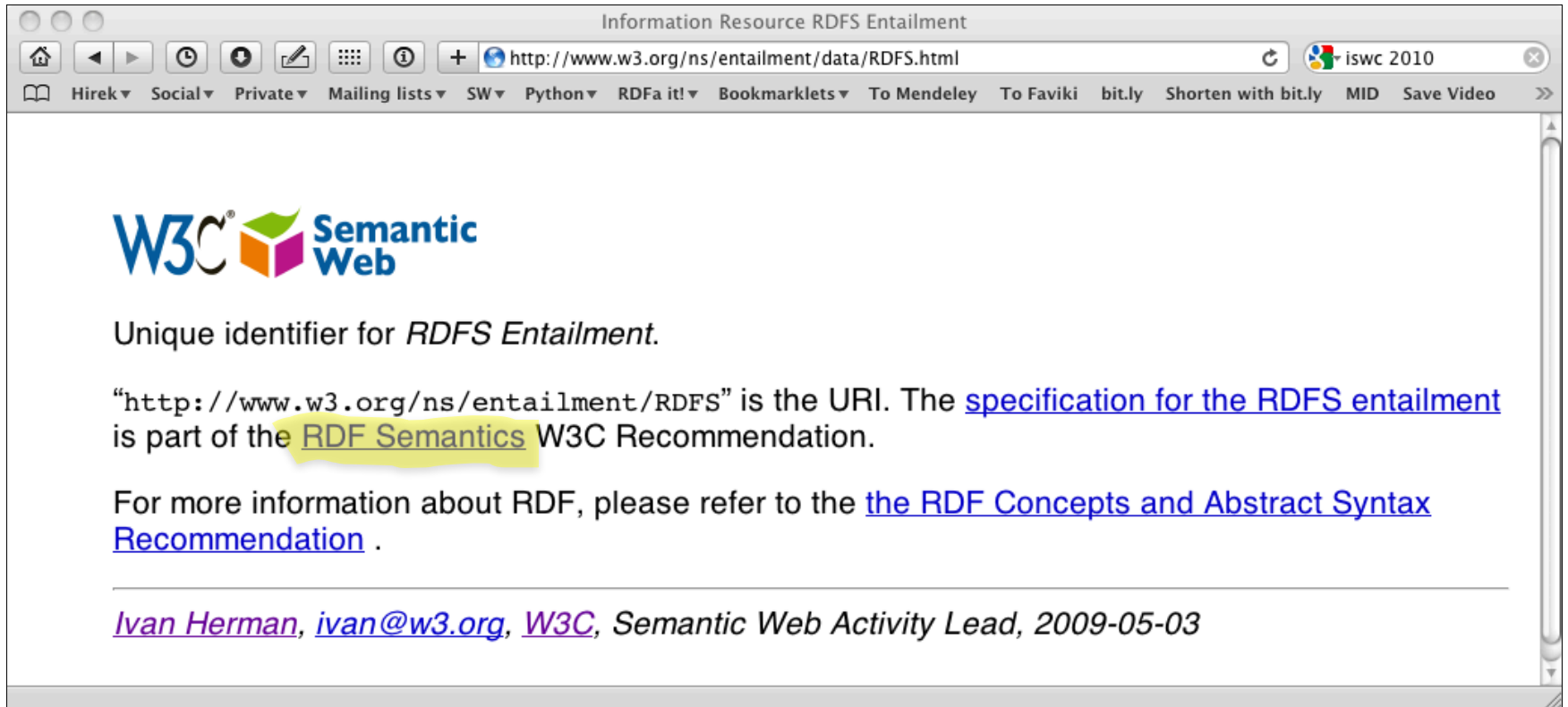
# Source and generated RDF...

```
<p about="http://www.w3.org/ns/entailment/RDFS"  
  property="http://purl.org/dc/terms/description">  
  Unique identifier for <em>RDFS Entailment</em>.</p>
```

```
<http://www.w3.org/ns/entailment/RDFS>  
  <http://purl.org/dc/terms/description>  
    "Unique identifier for RDFS Entailment." .
```




# The Web page viewed by a person



Information Resource RDFS Entailment

http://www.w3.org/ns/entailment/data/RDFS.html

Hirek Social Private Mailing lists SW Python RDFa it! Bookmarklets To Mendeley To Faviki bit.ly Shorten with bit.ly MID Save Video

 W3C<sup>®</sup> Semantic Web

Unique identifier for *RDFS Entailment*.

“<http://www.w3.org/ns/entailment/RDFS>” is the URI. The [specification for the RDFS entailment](#) is part of the **RDF Semantics** W3C Recommendation.

For more information about RDF, please refer to the [the RDF Concepts and Abstract Syntax Recommendation](#) .

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*[Ivan Herman](#), [ivan@w3.org](mailto:ivan@w3.org), [W3C](#), Semantic Web Activity Lead, 2009-05-03*

# The source

```
<a about="http://www.w3.org/ns/entailment/RDFS"  
  rel="http://www.w3.org/2000/01/rdf-schema#seeAlso"  
  href="http://www.w3.org/TR/2004/REC-rdf-mt-20040210/">  
  RDF Semantics.  
</a>
```

# Source and generated RDF...

```
<a about="http://www.w3.org/ns/entailment/RDFS"  
  rel="http://www.w3.org/2000/01/rdf-schema#seeAlso"  
  href="http://www.w3.org/TR/2004/REC-rdf-mt-20040210/">  
  RDF Semantics.  
</a>
```

```
<http://www.w3.org/ns/entailment/RDFS>
```

```
...
```

# Source and generated RDF...

```
<a about="http://www.w3.org/ns/entailment/RDFS"  
  rel="http://www.w3.org/2000/01/rdf-schema#seeAlso"  
  href="http://www.w3.org/TR/2004/REC-rdf-mt-20040210/">  
  RDF Semantics.  
</a>
```

```
<http://www.w3.org/ns/entailment/RDFS>  
  <http://www.w3.org/2000/01/rdf-schema#seeAlso>  
  ... .
```

# Source and generated RDF...

```
<a about="http://www.w3.org/ns/entailment/RDFS"  
  rel="http://www.w3.org/2000/01/rdf-schema#seeAlso"  
  href="http://www.w3.org/TR/2004/REC-rdf-mt-20040210/">  
  RDF Semantics.  
</a>
```

```
<http://www.w3.org/ns/entailment/RDFS>  
  <http://www.w3.org/2000/01/rdf-schema#seeAlso>  
    <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/> .
```

# Ntriples in HTML ☹️

- Maybe we can do better, instead of this

```
<http://www.w3.org/ns/entailment/RDFS>  
  <http://purl.org/dc/terms/description>  
    "Unique identifier for RDFS Entailment." .  
<http://www.w3.org/ns/entailment/RDFS>  
  <http://www.w3.org/2000/01/rdf-schema#seeAlso>  
    <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/> .
```

- Allow URI prefixes and shared subject, like this

```
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .  
@prefix dcterms: <http://purl.org/dc/terms/> .  
  
<http://www.w3.org/ns/entailment/RDFS>  
  rdfs:seeAlso <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/> ;  
  dcterms:description "Unique identifier for RDFS Entailment." .
```

# Turtlizing RDFa

- Turtle supports several simplifying ideas
- Use **compact URIs** ([CURIE](#)) when possible
  - URI with a prefix defined elsewhere, e.g.,  
*foaf:mbox*
- Making use of the natural structure for
  - shared subjects
  - shared predicates
  - creating blank nodes
  - etc.

# CURIE definition and usage

```
<html>
...
<p about="http://www.w3.org/ns/entailment/RDFS"
  property="http://purl.org/dc/terms/description">
  Unique identifier for <em>RDFS Entailment</em>.</p>
...
</html>
```

- can be replaced by:

```
<html prefix="dcterms: http://purl.org/dc/terms/">
...
<p about="http://www.w3.org/ns/entailment/RDFS"
  property="dcterms:description">
  Unique identifier for <em>RDFS Entailment</em>.</p>
...
</html>
```



# Details on @prefix in RDFa

- Can be anywhere in the HTML tree and is valid for entire sub-tree
  - i.e., html element not the only place to have it
- The same @prefix attribute can hold several definitions:
  - prefix="dcterm: http://purl.org... foaf: http://..."
- CURIEs and “real” URIs can usually be mixed
- CURIEs *cannot* be used on @href

# Sharing subjects

Basic principle: @about is inherited by children nodes, so no reason to repeat it

```
<html prefix="dcterms: http://purl.org/dc/terms/  
        rdfs: http://www.w3.org/2000/01/rdf-schema#">  
...  
<body about="http://www.w3.org/ns/entailment/RDFS">  
...  
<p property="dcterms:description">  
  Unique identifier for <em>RDFS Entailment</em>.</p>  
<p>...<a rel="rdfs:seeAlso"  
  href="http://www.w3.org/TR/2004/REC-rdf-mt-20040210">  
  RDFS Semantics</a>...</p>
```

# ... yielding

```
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
```

```
@prefix dcterms: <http://purl.org/dc/terms/> .
```

```
<http://www.w3.org/ns/entailment/RDFS>
```

```
  rdfs:seeAlso <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/> ;
```

```
  dcterms:description "Unique identifier for RDFS Entailment." .
```

# On reusing literals

- Reusing literals is a plus, but you don't always want to do it
- The basic rule says: the (RDF) Literal is the enclosed text from the HTML content
- This is fine in 80% of the cases, but...
- ...it may not be natural in many cases!

# Example: dates

```
<body about=".." prefix="dcterms: http://... xsd: http://..."  
  <address>  
    <p property="dcterms:date" datatype="xsd:date">2010-07-05</p>  
  </address>  
</body>
```

- This leads to:

```
@prefix dcterms: <http://...> .  
@prefix xsd: <http://...> .  
<..> dcterms:date "2010-07-05"^^xsd:date .
```

- 2010-07-05 is official ISO format (for xsd:date)  
but “July 5, 2010” is preferred by people

# Usage of @content

```
<body about=".." prefix="dcterms: http://... xsd: http://..."  
  <address>  
    <p property="dcterms:date" datatype="xsd:date"  
      content="2010-07-05">July 5, 2010</p>  
  </address>  
</body>
```

- Also leads to:

```
@prefix dcterms: <http://...> .  
@prefix xsd: <http://...> .  
<..> dcterms:date "2010-07-05"^^xsd:date .
```

# On subjects and objects

- Here is our rule so far
  - **@about** sets the subject
  - **@href** sets the object
- But that is not always good enough
  - We may not want to introduce an active link (i.e., "a" element) on the web page
  - what about other links in HTML?

# We may not always want links...

- The RDFa @resource attribute is equivalent to @href
- Sets the object, just like @href but is ignored by browsers, e.g.,:

```
<span about="http://www.ivan-herman.net/foaf#me">  
  <span rel="rdfs:seeAlso"  
    resource="http://www.w3.org/People/Ivan/">Activity Lead</span>  
</span>
```



# More features

- RDFa 1.1 has more features that make it easier to represent knowledge compactly in HTML
- These take advantage of the HTML tree context
- We'll skip the details, which you can find in
  - [RDFa 1.1 Primer](#)
  - [RDFa 1.1 Core](#)

# Authoring RDFa

- Some tools already have RDFa facilities:
  - e.g., it is possible to add the right DTD to Dreamweaver, Amaya has it at its core, etc.
- There are plugins to, e.g., WordPress, to generate RDFa markup
- CMS systems (like Drupal 7) may have RDFa built in their publication system
  - users generate RDFa whether they know about it or not...

# Consuming RDFa

- Major search engines (Google, Yahoo) process RDFa for vocabularies they understand can use
- There are libraries, distillers, etc., to extract RDFa information
  - may be part of RDF development environments like Redland, RDFLib
  - see, for further references, <http://rdfa.info/wiki/Consume>
- Facebook’s “social graph” is based on RDFa

# A page from Best Buy

RDFa for Facebook markup, JSON-LD for search engines

The screenshot shows a web browser window displaying the Best Buy product page for a Google Pixel 2 4G LTE with 64GB memory cell phone. The browser's address bar shows the URL: [www.bestbuy.com/site/google-pixel-2-4g-lte-with-64gb-memory-cell-](http://www.bestbuy.com/site/google-pixel-2-4g-lte-with-64gb-memory-cell-). The page features a dark blue navigation bar with a search bar and a cart icon. Below the navigation bar, there are promotional banners and a main product section. The product section includes a large image of the phone, a 'SAVE \$300' badge, and pricing options. The pricing options are: \$27.00/mo. for 24 months, \$14.58/mo. for 24 months, and a 'SAVE \$300 (\$12.50/mo.)' offer. The 'Add to Package' button is highlighted in yellow. The 'Pricing Options' section shows a comparison between the monthly price and the retail price of \$649.99. The page also includes a 'PROTECT YOUR PRODUCT' section with a link to learn about accidental damage plans.

**SAVE \$200** ON THE NEW ZTE AXON M PHONE WITH GLASS-NO ACTIVATION

Free Shipping on Everything

Weekly Ad Deal of the Day Credit Cards

Gift Cards Gift Ideas & Registry

Search Best Buy

Glen Burnie MD Open till 9 pm

PRODUCTS BRANDS DEALS SERVICES

**SAVE \$300**

Best Buy Cell Phones All Cell Phones with Plans

Google - Pixel 2 4G LTE with 64GB Memory Cell Phone - Just Black (Verizon)

Model: GA00139-US SKU: 6099993

4.7 (47) 51 Questions, 45 Answers

verizon

Share Print

\$27.00/mo. for 24 months

\$14.58/mo. for 24 months

**SAVE \$300 (\$12.50/mo.)**

Total savings of \$300.00 includes \$12.50/mo. carrier bill for 24 months. Bill credits end when phone balance is paid off.

**PROTECT YOUR PRODUCT**  
Learn about Accidental Damage Plans

Add to Package

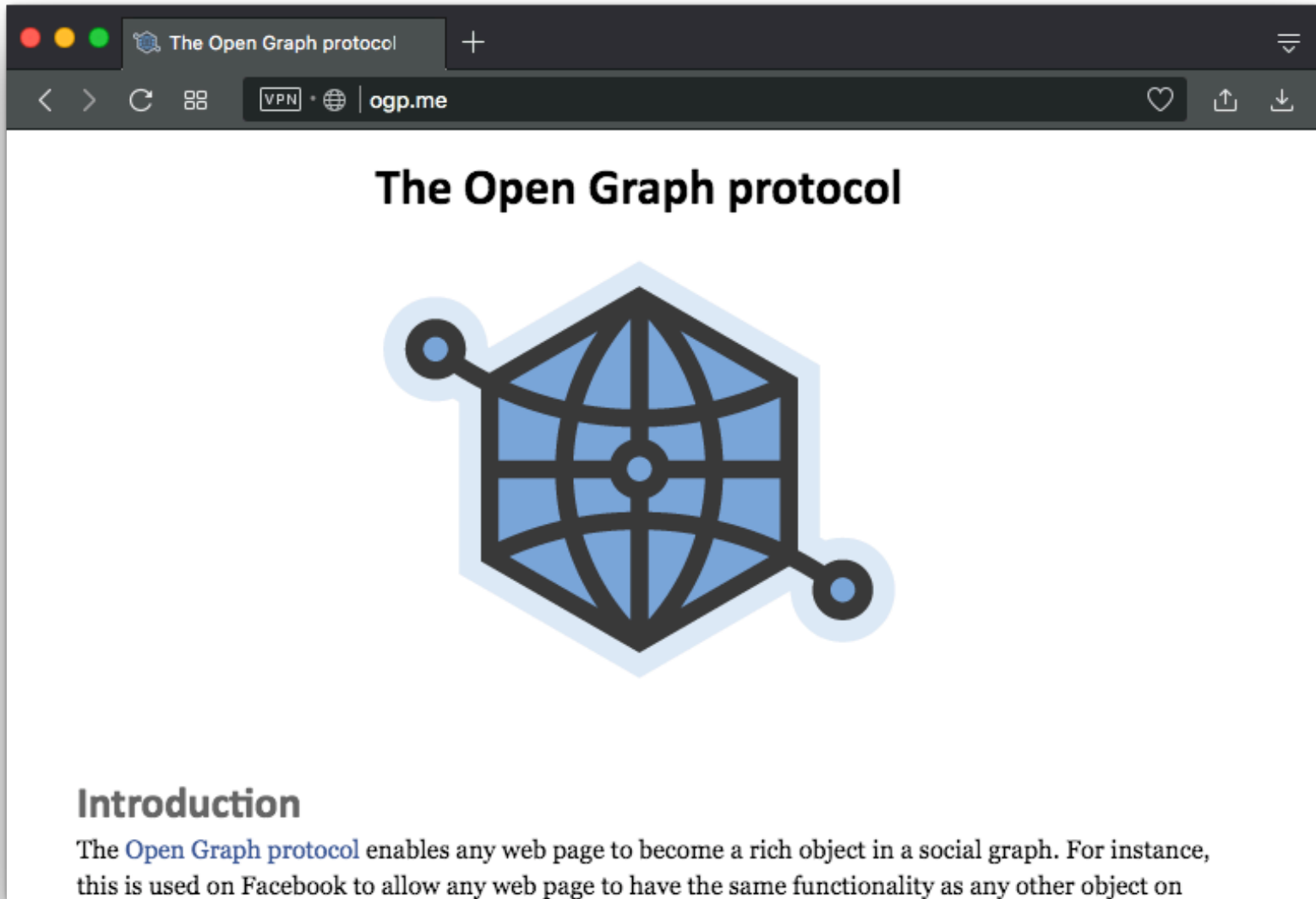
Pricing Options:

\$14.58/mo. for 24 months	\$649.99 Retail price
---------------------------	-----------------------

with device

\$649.92

# FB's Open Graph Protocol



The screenshot shows a web browser window with the title "The Open Graph protocol" and the URL "ogp.me". The page content includes the title "The Open Graph protocol" and a large blue icon of a globe with nodes. Below the icon is the section "Introduction" with the text: "The [Open Graph protocol](#) enables any web page to become a rich object in a social graph. For instance, this is used on Facebook to allow any web page to have the same functionality as any other object on

# Publishing RDFa

- RDFa+HTML file can just be on a server
  - the client extracts the RDF content
- Content negotiations can be set up on the server side
  - the client gets the format he/she asks for
  - the RDF content can either be generated on the fly or stored on the server statically

# Google's rich snippets

Embedded metadata (microdata or RDFa) is used to improve search result page

- at the moment only a few vocabularies are recognized, but that is evolving continually



The image shows a screenshot of a Google search result for "chicken noodle soup recipes". The search bar contains the text "chicken noodle soup recipes" and the results show "About 1,150,000 results (0.26 seconds)". The first result is from "Cooks.com - Recipes - Homemade Chicken Noodle Soup" with a snippet: "Enter your email to signup for the Cooks.com Recipe Newsletter. ... H NOODLE SOUP: Put chicken and all seasonings in a ... are soft. ... www.cooks.com > Recipes - Cached - Similar". The second result is from "Grandma's Chicken Noodle Soup Recipe - Allrecipes.com" with a snippet: "★★★★★ 561 reviews - Prep time: 20 mins - Cook time: 25 mins This is a recipe that was given to me by my grandmother. It is a very and I believe that all will like it." The word "recipe" in the second snippet is circled in red.

# Effects of, e.g., Google or Facebook

A number of popular sites publish RDFa as part of their normal pages:

- Tesco, BestBuy, Slideshare, The London Gazette, Newsweek, MSNBC, O'Reilly Catalog, the White House...
- Creative Commons snippets are in RDFa (e.g., on Flickr)



# BestBuy example of RDFa use

My Account | Order Status | Customer Service | Español


**BEST BUY** Weekly Ad Store Locator Outlet Center Services Gifts cart Items

TV & VIDEO AUDIO CAR & GPS CAMERAS & CAMCORDERS COMPUTERS MOBILE PHONES & OFFICE MUSIC, MOVIES & BOOKS VIDEO GAMES & GADGETS HOME & APPLIANCES

Search All Categories Keyword or Item # GO Credit Cards Reward Zone®

## Best Buy - Carbondale

Print



1270 E Main St  
Carbondale, IL 62901  
Phone: 618-351-1700  
GEO: 37.732719, -89.192314


Customer Reviews:  
☆☆☆☆☆  
Be the first to write a store review.

[Maps & Directions](#) | [Weekly Ad](#)

**Store Hours**  
Mon: 10-9; Tue: 10-9; Wed: 10-9; Thurs: 10-9; Fri: 10-9; Sat: 10-9; Sun: 11-7;  
4/4 - 4/10, 2010  
Mon: 10-9; Tues: 10-9; Wed: 10-9; Thurs: 10-9; Fri: 10-9; Sat: 10-9; Sun: Closed

### Events

#### Avatar Midnight Release!



The biggest movie of 2009 is coming to Best Buy on April 22nd! Carbondale Best Buy is hosting a special midnight release! We will open the doors at 12:00am on 4/22! We'll have door prizes including movie posters available only to those in attendance at the midnight release! Local band "Ravenhill" will be playing, as well! You don't want to miss this special event! Check back for more information as we get closer to the release date!

### Local Selections

Check out these special product selections at our store.

**Open Box Items (25)**

### At This Location

- Geek Squad**  
Computer setup & services, plus home theater, appliance and car installation.
- Best Buy Mobile**  
Get informed advice from noncommissioned mobile phone specialists.
- Small Business Solutions**  
Featuring Professional Series products and trained staff to help with small business needs.
- Apple Shop**  
Mac, iPod and more at this Apple store-within-a-store.
- Electronics Recycling**  
We offer electronics recycling at this and all other U.S. stores.

# BestBuy example of RDFa Use

My Account | Order Status | Customer Service | Español


**BEST BUY** Weekly Ad Store Locator Outlet Center Services Gifts cart Items

TV & VIDEO AUDIO CAR & GPS CAMERAS & CAMCORDERS COMPUTERS MOBILE PHONES & OFFICE MUSIC, MOVIES & BOOKS VIDEO GAMES & GADGETS HOME & APPLIANCES

Search [All Categories] >

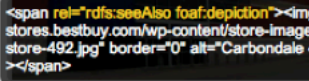
```
<div class="fn n" property="foaf:name rdfs:label vcard:fn gr:legalName"> Reward Zone*
<h1 class="org" property="geo:lat_long" content="37.732719,-89.192314">Best
Buy - Carbondale</h1>
</div>
```

Best Buy - Carbondale Print



1270 E Main St  
Carbondale, IL 62901  
Phone: 618-351-1700  
GEO: 37.732719, -89.192314

Customer Reviews:  
☆☆☆☆☆  
Be the first to write a store review.

See also foaf:deprecation  Carbondale 492 class="photo" /

Store Hours  
Mon: 10-9; Tue: 10-9; Wed: 10-9; Thurs: 10-9; Fri: 10-9; Sat: 10-9; Sun: 11-7;

```
<div class="hours" rel="gr:hasOpeningHoursSpecification">
<div typeof="gr:OpeningHoursSpecification" about="#regularhours">
<span typeof="gr:OpeningHoursSpecification">
<span rel="gr:hasOpeningHoursDayOfWeek" resource="http://
purl.org/goodrelations/v1#Monday" class="dow">Mon:</
span>&nbsp;&nbsp;&nbsp;<span property="gr:opens" datatype="xsd:time">10</
span><span property="gr:closes" datatype="xsd:time">9</span>;
</span>
...
</span>
</div>
</div>
```

The biggest movie of 2009 is coming to Best Buy on April 22nd! Carbondale Best Buy is hosting a special midnight release! We will open the doors at 12:00am on 4/22! We'll have door prizes including movie posters available only to those in attendance at the midnight release! Local band "Ravenhill" will be playing, as well! You don't want to miss this special event! Check back for more information as we get closer to the release date!

```
<div class="adr" rel="vcard:adr">
<div typeof="vcard:Address">
<div class="street-address"
property="vcard:street-address">1270 E Main
St</div>
<span class="locality">
property="vcard:locality">Carbondale</span>,
<span class="region">
property="vcard:region">IL</span> <span
class="postal-code" property="vcard:postal-
code">62901</span> <span
class="country">USA</span>
</div>
<div class="tel">
<span>Phone</span>: <span
property="vcard:tel" class="phone-
number">618-351-1700</span>
</div>
<div class="geo" rel="vcard:geo">GEO:
<span class="latitude">
property="vcard:latitude">37.732719</span>,
<span class="longitude">
property="vcard:longitude">-89.192314</span>
</div>
```

**Apple Shop**  
Mac, iPod and more at this Apple store-within-a-store.

**Electronics Recycling**  
We offer electronics recycling at this and all other U.S. stores.

# Effects on BestBuy

- Reported in a BestBuy blog:
  - [GoodRelations](#)+RDFa improved Google rank tremendously
  - 30% increase in traffic on BestBuy store pages
  - Yahoo observers a 15% increase in click-through rate
- Today, BestBuy uses RDFa for much more than just snippets
  - E.g., to locate shops that have certain products on stock...

# Library of Congress RDFa use

## Semantic Web

### From Library of Congress Subject Headings

#### Details

Visualization

Suggest Terminology

#### Semantic Web

##### URI

<<http://id.loc.gov/authorities/sh2002000569#concept>>

##### Type

Topical Term

##### Broader Terms

- > [Semantic integration \(Computer systems\)](#)
- > [Semantic networks \(Information theory\)](#)
- > [World Wide Web](#)

##### Related Terms

- > [Microformats](#)

##### Sources

- > Engr. index online, May 6, 2002 (identifier: Semantic Web)
- > ASTI on FirstSearch, May 6, 2002: in titles (semantic Web)
- > Work cat.: 2002070545: The Semantic Web--ISWC 20002, 2002.

##### LC Classification

TK5105.88815

# Library of Congress RDFa use

```
Source of http://id.loc.gov/authorities/sh2002000569
<p rel="skos:inScheme" resource="http://id.loc.gov/authorities#topicalTerms">topical
Term</p>
  </li>
  <li>
    <h3>Broader Terms</h3>
    <ul class="std">
      <li>
        <a href="http://id.loc.gov/authorities/sh2004000479#concept" rel="skos:broader">
          <span property="skos:prefLabel" xml:lang="en">Semantic integration (Computer
systems)</span>
        </a>
      </li>
      <li>
        <a href="http://id.loc.gov/authorities/sh92004914#concept" rel="skos:broader">
          <span property="skos:prefLabel" xml:lang="en">Semantic networks (Information
theory)</span>
        </a>
      </li>
      <li>
        <a href="http://id.loc.gov/authorities/sh95000541#concept" rel="skos:broader">
          <span property="skos:prefLabel" xml:lang="en">World Wide Web</span>
        </a>
      </li>
    </ul>
  </li>
```

# Overstock.com example

Shopping Community Cars Real Estate Auctions We Recommend My Account


Welcome To **overstocktober™**  
11 Years

Free Shipping on your orders

Shop All Departments

Online Shopping Electronics Cameras & Photo Camcorders Digital Camcorders

Photos



**Bell and Howell DV550UW 12MP Digital Video Camera with Underwater Housing**

Rating 3.8 ★★★★★ 10 reviews  
Read Reviews / Write a review

**Today: \$68.99**

Get 5% Back with Club O  
View Details

**Brief Description** Item#: 12403958


- Take great videos with the Bell + Howell digital video camera
- Digital video camera has ultra compact body and features a flip-up USB
- Camcorder includes waterproof underwater housing to take video underwater (up to 33 ft)

**Sold out!**  
This product is not in stock.  
We will notify you when this product is in stock.  
Please enter your email address below, then

Compare to these items?






ADORAMA  
TigerDirect

People Who Viewed



SVP Underwater 5MP Digital Video Camera  
**Today: \$75.99**  
Review

# Overstock.com example

 Shopping  Community  Cars  Real Estate  Auctions We Recommend My Account



Free Shipping on yo

Shop All Departments

```
http://www.w3.org/2007/08/pyRdfa/extract?format=turtle&uri=http%3A//www.overstock.co...d-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#myoffer> .
```

```
<http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#myoffer> v:count "10" .
```

```
<http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#myoffer> xhv:icon <http://ak1.ostkcdn.com/favicon.ico> ;
xhv:stylesheet <http://ak1.ostkcdn.com/css/ProductPageC.css>, <http://ak1.ostkcdn.com/css/os_master.less>, <http://ak1.ostkcdn.com/css/productPageImgGallery.css> .
```

```
<http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#TypeAndQuantityNode> a gr:TypeAndQuantityNode ;
gr:hasUnitOfMeasurement "C62"^^xsd:string ;
gr:typeOfGood <http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#product> .
```

```
<http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#UnitPriceSpecification> a gr:UnitPriceSpecification .
```

```
<http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#myoffer> a gr:Offering ;
gr:hasBusinessFunction gr:Sell ;
gr:hasPriceSpecification
[ gr:hasCurrency "USD"^^xsd:string ;
  gr:hasCurrencyValue "68.99"^^xsd:float
] <http://www.overstock.com/Electronics/Bell-and-Howell-DV550UW-12MP-Digital-Video-Camera-with-Underwater-Housing/4450313/product.html#UnitPriceSpecification> .
```

# Drupal content management system

The screenshot shows the Drupal 7 homepage with a blue header. The main navigation bar includes links for Get Started, Community & Support, Documentation, Download & Extend, Marketplace, and About. The Drupal logo is prominently displayed on the left, with the text 'We're celebrating the launch of Drupal 7' and a brief description of the platform. A search bar is located in the top right. Below the header, there are several content sections: 'Why Choose Drupal?' with a 'Get Started with Drupal' button, 'Sites Made with Drupal' featuring a thumbnail of a website, 'Develop with Drupal' with statistics on modules, themes, and active developers, and a 'News' section with a featured article about the Drupal 7 release party. A world map is also visible, showing the global reach of the system.

Drupal News  
Planet Drupal  
Association News  
Security Announcements  
Jobs

Community & Support  
Getting Involved  
Marketplace  
Groups & Meetups  
DrupalCon Chicago 2011  
DrupalCon London 2011

Get Started  
Documentation Home  
Installation Guide  
Site Building Guide  
api.drupal.org

Download & Extend  
Drupal Core  
Modules  
Themes  
Installation Profiles

About  
Druplicon  
The Drupal Association  
Advertise  
Drupal.org

Drupal is a registered trademark of Dries Buytaert.

- RDF support in Drupal v. 7
- Major CMS system
- Has RDF at his core, pages contain RDFa
- In one step millions of pages of additional RDF data!



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## Sheriff Dupnik names Angle and Palin as two responsible for 'vitriol' (Video)



Yesterday Pima County Sheriff Charles Dupnik took the bold step of naming Sharon Angle and Sarah Palin as two individuals responsible for the kind of toxic 'political vitriol' which he believes must end in light of the recent shooting in Tucson, Arizona. Dupnik's comments came in an interview with Geraldo Rivera of Fox News. Earlier in the day Dupnik had been interviewed by Megyn Kelly of Fox News, who accused the Sheriff of inserting politics where it did not belong. In the Rivera interview, Dupnik stands by his earlier comments, and goes further in identifying two Republicans as the source...

**Ryan Witt**  
Political Buzz Examiner  
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Missed field goals by Eagles kicker David Akers makes him...

FDA outlawing natural cancer cure to further destroy...

Eco-Travel Tip: Use an e-book reader to lighten your...

Lyndon Johnson and the Great Society...

# The Examiner.com

## Sheriff Dupnik for 'vitriol' (Video)



Sheriff Dupnik names  
Angle and Palin as two  
responsible...

Missed  
Eagles  
Akers

```
http://www.w3.org/2007/08/pyRdfa/extract?format=turtle&uri=http%3A//www.examiner.com/national
http://www.w3.org/2007/08/pyRdfa/extract?format=tl the examiner
Feeds Reader Social Private Mailing lists SW Python RDFa it! Bookmarks bit.ly To Faviki Add Zemanta tags To Mendeley
<http://www.examiner.com/sports-twitter-in-national/missed-field-goals-by-eagles-kicker-david-akers-makes-him-popular-
twitter-trend>;
xhv:icon <http://cdn2-b.examiner.com/sites/all/themes/base/favicon.ico>;
xhv:stylesheet
<http://cdn2-b.examiner.com/sites/default/files/css/css_0J_8rZyYen4LW_6vfrH9Lk3SF1pAp1tBETwGkDYgUCs_18.css>;
<http://cdn2-b.examiner.com/sites/default/files/css/css_2xhXDFX6AKESGrCwSeGy_SWFPESHAcKyJn35Kk9ecM_18.css>;
<http://cdn2-b.examiner.com/sites/default/files/css/css_L1V30UAWv2kWDs1F7U18UMZxdAvytakCHPN2gR11JEM_18.css>;
<http://cdn2-b.examiner.com/sites/default/files/css/css_T617aJmFY3qgtXCh-hLpMKKIg9aLzWqMh5exPR06t8_18.css>;
<http://cdn2-b.examiner.com/sites/default/files/css/css_z8NQukDms5n0K5_mf-MYwExoy4rLZ16V280vQwx34oQ_18.css>.
<http://www.examiner.com/national/discuss/an-offer-to-the-republican-party> a sioc:Item, foaf:Document ;
dc:title "An Offer to the Republican Party"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/an-offer-to-the-republican-party> .
<http://www.examiner.com/national/discuss/chicago-s-bill-daley-becomes-obama-s-newest-chief-of-staff> a sioc:Item, foaf:Document ;
dc:title "Chicago's Bill Daley becomes Obama's newest Chief of Staff"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/chicago-s-bill-daley-becomes-obama-s-newest-chief-of-staff> .
<http://www.examiner.com/national/discuss/could-the-mass-dead-fish-dead-bird-cases-be-a-case-of-over-reporting> a sioc:Item,
foaf:Document ;
dc:title "Could the mass dead fish, dead bird cases be a case of over-reporting?"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/could-the-mass-dead-fish-dead-bird-cases-be-a-case-of-over-reporting> .
<http://www.examiner.com/national/discuss/death-and-dignity-hospice-caregiver-advice-for-end-of-life-process> a sioc:Item,
foaf:Document ;
dc:title "Death and dignity: Hospice caregiver advice for end of life process"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/death-and-dignity-hospice-caregiver-advice-for-end-of-life-process> .
<http://www.examiner.com/national/discuss/exclusive-interview-with-naomi-judd-on-alternative-pain-management> a sioc:Item,
foaf:Document ;
dc:title "Exclusive interview with Naomi Judd on Alternative Pain Management"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/exclusive-interview-with-naomi-judd-on-alternative-pain-management> .
<http://www.examiner.com/national/discuss/if-given-a-choice-at-the-rental-counter-would-you-rent-the-chevy-volt> a sioc:Item,
foaf:Document ;
dc:title "If given a choice at the rental counter, would you rent the Chevy Volt?"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/if-given-a-choice-at-the-rental-counter-would-you-rent-the-chevy-volt> .
<http://www.examiner.com/national/discuss/introducing-the-next-tim-mcveigh> a sioc:Item, foaf:Document ;
dc:title "Introducing - the Next Tim McVeigh"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/introducing-the-next-tim-mcveigh> .
<http://www.examiner.com/national/discuss/is-the-reality-of-climate-change-still-question> a sioc:Item, foaf:Document ;
dc:title "Is the reality of climate change still in question?"@en ;
xhv:bookmark <http://www.examiner.com/national/discuss/is-the-reality-of-climate-change-still-question> .
<http://www.examiner.com/national/discuss/was-the-reading-of-the-u-s-constitution-congress-beneficial> a sioc:Item, foaf:Document ;
```

# Extracting the data

```
rdfa> python getdata.py "http://www.w3.org/ns/entailment/data/RDFS.html"
@prefix dc: <http://purl.org/dc/terms/> .
@prefix ent: <http://www.w3.org/ns/entailment/> .
...
ent:RDFS a ent:Entailment ;
  dc:creator <http://www.ivan-herman.net/foaf#me> ;
  dc:date "2010-05-03"^^xsd:date ;
  dc:description "Unique identifier for RDFS Entailment" ;
  rdfs:comment "The specification for the RDFS entailment is ... Semantics W3C Recommendation." ;
  rdfs:isDefinedBy <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/#rdfs_entailment> ;
  rdfs:seeAlso <http://www.w3.org/TR/2004/REC-rdf-mt-20040210/> .
<http://www.w3.org/ns/entailment/data/RDFS.html> dc:title "Information Resource RDFS Entailment" ;
  xhv:stylesheet <http://www.w3.org/StyleSheets/TR/base> .
<http://www.ivan-herman.net/foaf#me> a foaf:Person ;
  rdfs:seeAlso <http://www.ivan-herman.net/foaf> ;
  foaf:mbox <mailto:ivan@w3.org> ;
  foaf:name "Ivan Herman" ;
  foaf:title "Semantic Web Activity Lead" ;
  foaf:workplaceHomepage <http://www.w3.org> .
```

# getdata.py is very simple

```
import rdflib, sys
```

```
if not (1 < len(sys.argv) < 4):
```

```
    print 'usage: python getdata.py url [\'json-ld\' | rdfa | rdfa1.1 | microdata | html ]'
```

```
    print ' eg: python getdata.py "http://www.w3.org/ns/entailment/data/RDFS.html"'
```

```
    sys.exit(0)
```

```
url = sys.argv[1]
```

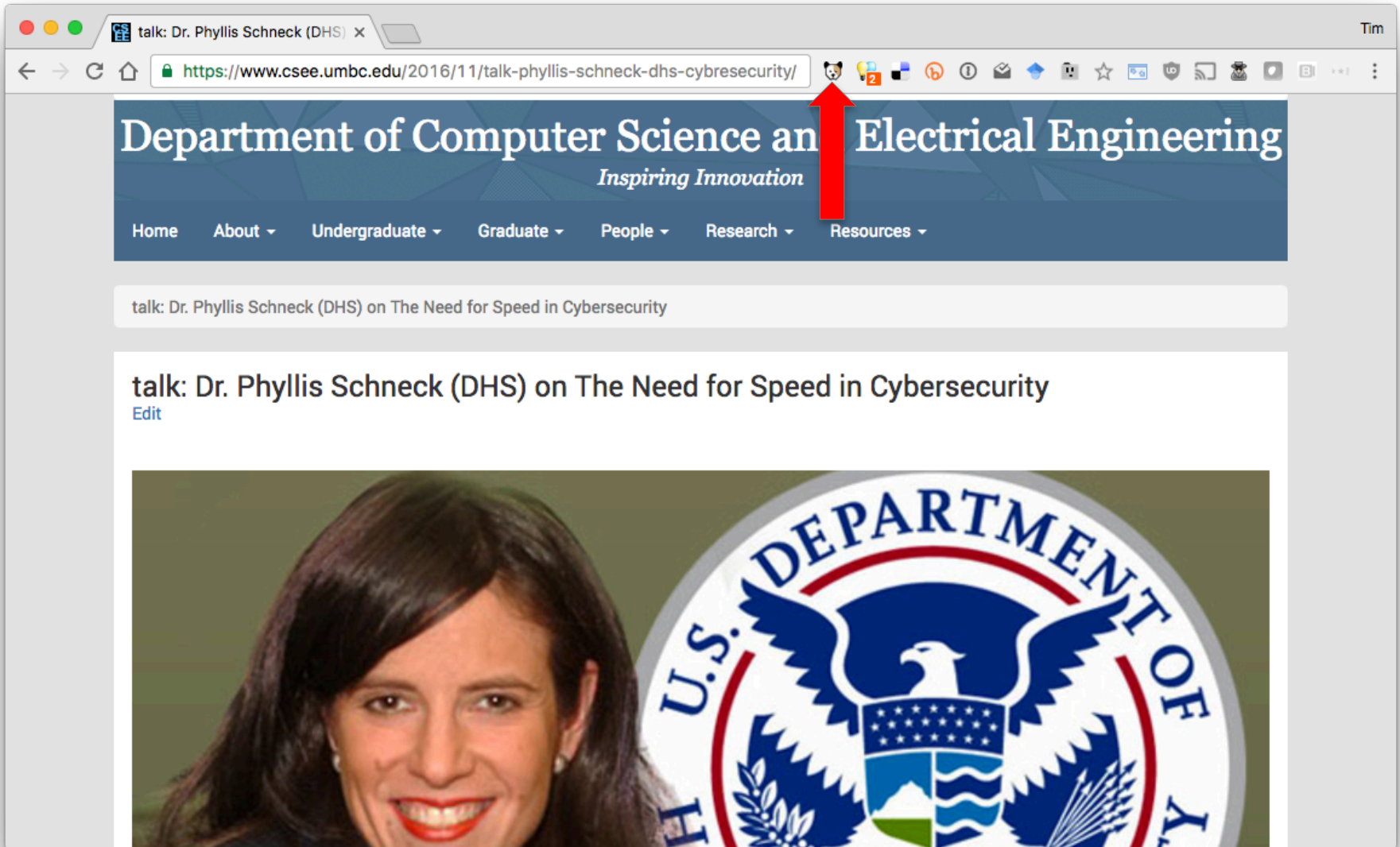
```
format = sys.argv[2] if len(sys.argv) == 3 else 'rdfa1.1'
```

```
g = rdflib.Graph()
```

```
g.parse(url, format=format)
```

```
print g.serialize(format='n3')
```

# OpenLink Structured Data Sniffer\*



The screenshot shows a web browser window with the following elements:

- Address bar: <https://www.csee.umbc.edu/2016/11/talk-phyllis-schneck-dhs-cybresecurity/>
- Page Header: Department of Computer Science and Electrical Engineering, Inspiring Innovation
- Navigation Menu: Home, About, Undergraduate, Graduate, People, Research, Resources
- Page Title: talk: Dr. Phyllis Schneck (DHS) on The Need for Speed in Cybersecurity
- Content: talk: Dr. Phyllis Schneck (DHS) on The Need for Speed in Cybersecurity (with an Edit link)
- Image: A portrait of Dr. Phyllis Schneck next to the U.S. Department of Homeland Security seal.

A red arrow points to the OpenLink Structured Data Sniffer icon in the browser's toolbar.

\* <http://osds.openlinksw.com/>

# OpenLink Structured Data Sniffer\*

talk: Dr. Phyllis Schneck (DHS) x


https://www.csee.umbc.edu/2016/11/talk-phyllis-schneck-dhs-cybresecurity/

JSON-LD **RDFa** POSH

Statement Collection #1

Entity <https://www.csee.umbc.edu/2016/11/talk-phyllis-schneck-dhs-cybresecurity/>

Attributes

- [ogp:locale](#) "en\_US"@en-US
- [ogp:type](#) "article"@en-US
- [ogp:title](#) "talk: Dr. Phyllis Schneck (DHS) on The Need for Speed in Cybersecurity"@en-US
- [ogp:description](#) "Dr. Phyllis Schneck, DHS Deputy Under Secretary for Cybersecurity & Communications, talks on the Need for Speed in cybersecurity, 3:00pm Thur Dec 1, UMBC"@en-US
- [ogp:url](#) "<https://www.csee.umbc.edu/2016/11/talk-phyllis-schneck-dhs-cybresecurity/>"@en-US
- [ogp:site\\_name](#) "Department of Computer Science and Electrical Engineering"@en-US
- article:publisher "<https://www.facebook.com/pages/UMBC-CSEE-Department/104803409392>"@en-US
- article:section "Computer Science"@en-US
- article:published\_time "2016-11-29T10:23:42-05:00"@en-US
- article:modified\_time "2016-11-30T09:50:02-05:00"@en-US
- [ogp:updated\\_time](#) "2016-11-30T09:50:02-05:00"@en-US
- [ogp:image](#) @en-US

<https://api.w.org/> <https://www.csee.umbc.edu/wp-json/>

ver: 2.13.9 OpenLink Structured Data Sniffer Copyright © 2015-2016 OpenLink Software

Electrical Engineering

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Cybersecurity

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\* <http://osds.openlinksw.com/>

# Conclusions

- Web developers want content providers to add structured data to HTML pages
- Content providers are incentivized to do so because their content will be better understood, ranked higher, more useful, etc.
- RDFa is most powerful & flexible knowledge markup standard understood by search engines
- RDFa is also an alternative serialization of full RDF