RDF Beyond
Outline

• RDFa
• Microformat
• Schema.org
RDFa
RDFa

• RDFa: A collection of attributes and processing rules for extending XHTML to support RDF.
• HTML contains structured data, but not accessible to tools and applications
• RDFa is a specification for attributes to express structured data
• RDFa allows terms from multiple independently-developed vocabularies to be freely intermixed
• RDFa brings some part of XHTML machine processable
RDFa examples

```html
<html xmlns="http://www.w3.org/1999/xhtml"
     xmlns:foaf="http://xmlns.com/foaf/0.1/"
     xmlns:dc="http://purl.org/dc/elements/1.1/">
  <head>
    <title>My home-page</title>
    <meta property="dc:creator" content="Mark Birbeck" />
    <link rel="foaf:topic" href="http://www.formsPlayer.com/#us" />
  </head>
  <body>...
</html>
```
RDFa examples

I'm holding one last summer Barbecue, on September 16th at 4pm.

Adding `datatype`
RDFa examples

<html xmlns="http://www.w3.org/1999/xhtml"
     xmlns:cal="http://www.w3.org/2002/12/cal/ical#"
     xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <head><title>Jo's Friends and Family Blog</title></head>
  <body>
    <p typeof="cal:Vevent">
      I'm holding
      <span property="cal:summary">
        one last summer Barbecue
      </span>,
      on
      <span property="cal:dtstart" content="2007-09-16T16:00:00-05:00" datatype="xsd:dateTime">
        September 16th at 4pm
      </span>.
    </p>
  </body>
</html>

Adding typeof
I think White's book 'Canteen Cuisine'

is well worth getting since although it's quite advanced stuff, he makes it pretty easy to follow. You might also like

White's autobiography.
RDFa

- RDFa allows authors to mark up human-readable data with machine-readable information for browsers and other applications to interpret by using a few simple XHTML attributes.
Use case

- Alice: a blogger who publishes a mix of professional and personal articles at http://example.com/alice

All content on this site is licensed under
<a href="http://creativecommons.org/licenses/by/3.0/">a Creative Commons License</a>.
Use Case

```
<div xmlns:dc="http://purl.org/dc/elements/1.1/">
  <h2 property="dc:title">The trouble with Bob</h2>
  <h3 property="dc:creator">Alice</h3>
  ...
</div>
```
Use Case

<div xmlns:dc="http://purl.org/dc/elements/1.1/">

<div about="/alice/posts/trouble_with_bob">
  <h2 property="dc:title">The trouble with Bob</h2>
  <h3 property="dc:creator">Alice</h3>
...
</div>

<div about="/alice/posts/jos_barbecue">
  <h2 property="dc:title">Jo's Barbecue</h2>
  <h3 property="dc:creator">Eve</h3>
...
</div>

...</div>
Use Case

Alice Birpemswick

Email: alice@example.com

Phone: +1 617.555.7332
Use Case

[Diagram of a social network graph with nodes labeled as Bob, Eve, and Manu, connected by 'knows' relationships]

```xml
<div xmlns:foaf="http://xmlns.com/foaf/0.1/" about="#me" rel="foaf:knows">
  <ul>
    <li typeof="foaf:Person">
      <a property="foaf:name" rel="foaf:homepage" href="http://example.com/bob/">Bob</a>
    </li>
    <li typeof="foaf:Person">
      <a property="foaf:name" rel="foaf:homepage" href="http://example.com/eve/">Eve</a>
    </li>
    <li typeof="foaf:Person">
      <a property="foaf:name" rel="foaf:homepage" href="http://example.com/manu/">Manu</a>
    </li>
  </ul>
</div>
```
MICROFORMAT
Microformats

• A way of thinking about data
• Design principles for formats
• Adapted to current behaviors and usage patterns
• Highly correlated with semantic XHTML
• A set of simple open data format standards that are actively developing and implementing for more/better structured blogging and web microcontent publishing in general
Microformats are NOT

• A new language
• Infinitely extensible and open-ended
• An attempt to get everyone to change their behavior and rewrite their tools
• A whole new approach that throws away what already works today
• A panacea for all taxonomies, ontologies, and other such abstractions
• Defining the whole world, or even boiling the ocean
Microformat principles

• Solve a specific problem
• Start as simple as possible
• Design for humans first, machines second
• Reuse building blocks from widely adopted standards
• Modularity/embeddability
• Enable and encourage decentralized development, content, services
Microformat

• They use ‘span’ element because this is a basic, versatile, element that works almost everywhere on the web

• Provide their own vocabularies
  – hCard (your information)
  – XFN (your networks about friends and contacts)
  – hCalendar (events)
  – hReview (review movies, books, and more)
Examples

Schema.org

• This is a joint effort from Microsoft, Google and Yahoo! to provide a collection of schemas (i.e. HTML tags) to better represent the structured data on the Web.
• It started May 2011.
• Website: http://schema.org/
• Blog: http://blog.schema.org/
## Schema for person

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>additionalName</td>
<td>Text</td>
<td>An additional name for a Person, can be used for a middle name.</td>
</tr>
<tr>
<td>address</td>
<td>PostalAddress</td>
<td>Physical address of the item.</td>
</tr>
<tr>
<td>affiliation</td>
<td>Organization</td>
<td>An organization that this person is affiliated with. For example, a school/university, a club, or a team.</td>
</tr>
<tr>
<td>alumniOf</td>
<td>EducationalOrganization</td>
<td>An educational organizations that the person is an alumni of.</td>
</tr>
<tr>
<td>awards</td>
<td>Text</td>
<td>Awards won by this person or for this creative work.</td>
</tr>
<tr>
<td>birthDate</td>
<td>Date</td>
<td>Date of birth.</td>
</tr>
<tr>
<td>children</td>
<td>Person</td>
<td>A child of the person.</td>
</tr>
<tr>
<td>colleagues</td>
<td>Person</td>
<td>A colleague of the person.</td>
</tr>
<tr>
<td>contactPoints</td>
<td>ContactPoint</td>
<td>A contact point for a person or organization.</td>
</tr>
<tr>
<td>deathDate</td>
<td>Date</td>
<td>Date of death.</td>
</tr>
<tr>
<td>email</td>
<td>Text</td>
<td>Email address.</td>
</tr>
<tr>
<td>familyName</td>
<td>Text</td>
<td>Family name. In the U.S., the last name of an Person. This can be used along with givenName instead of Name property.</td>
</tr>
<tr>
<td>faxNumber</td>
<td>Text</td>
<td>The fax number.</td>
</tr>
<tr>
<td>follows</td>
<td>Person</td>
<td>The most generic uni-directional social relation.</td>
</tr>
<tr>
<td>gender</td>
<td>Text</td>
<td>Gender of the person.</td>
</tr>
<tr>
<td>givenName</td>
<td>Text</td>
<td>Given name. In the U.S., the first name of a Person. This can be used along with familyName instead of Name property.</td>
</tr>
<tr>
<td>homeLocation</td>
<td>Place or ContactPoint</td>
<td>A contact location for a person’s residence.</td>
</tr>
<tr>
<td>honorificPrefix</td>
<td>Text</td>
<td>An honorific prefix preceding a Person’s name such as Dr/Mrs/Mr.</td>
</tr>
<tr>
<td>honorificSuffix</td>
<td>Text</td>
<td>An honorific suffix preceding a Person’s name such as M.D. /PhD/MSCSW.</td>
</tr>
</tbody>
</table>

http://schema.org/Person
Overview of whole Schema

**Thing:** name, url, image, description

  - **CreativeWork:** encodings, associatedMedia, headline, alternativeHeadline, dateCreated
  - dateModified, thumbnailUrl, discussionUrl, version, publishingPrinciples
  - copyrightYear, comment, mentions, provider, contributor
  - copyrightHolder, sourceOrganization, accountablePerson, editor, keywords
  - about, datePublished, author, creator, contentRating
  - inLanguage, audio, video, genre, editor
  - awards, publisher, isFamilyFriendly, contentLocation, interactionCount
  - aggregateRating, offers, reviews

  - **Article:** articleSection, articleBody, wordCount
  - **BlogPosting**
    - **NewsArticle:** dateline, printColumn, printEdition, printPage, printSection
    - **ScholarlyArticle**
  - **Blog:** blogPosts
  - **ItemList:** itemListElement, itemListOrder
  - **Map**
    - **MediaObject:** encodesCreativeWork, width, height, regionsAllowed, embedURL
    - bitrate, encodingFormat, playerType, duration, expires
    - contentURL, requiresSubscription, uploadDate, associatedArticle, contentSize
    - interactionCount, offers
  - **AudioObject:** transcript
  - **ImageObject:** thumbnail, representativeOfPage, caption, exifData
  - **MusicVideoObject**
  - **VideoObject:** thumbnail, transcript, productionCompany, caption, videoQuality
  - **Movie:** duration, director, actors, producer, trailer
  - productionCompany, musicBy
  - **MusicPlaylist:** tracks, numTracks

http://schema.org/docs/full.html
Datatype

• Have their own datatypes

**DataType**
The basic data types such as Integers, Strings, etc.

**More specific types**

• Boolean
• Date
• Number
• Text
Data Model of Schema.org

• It is similar a data model of RDF triple
  – A set of types in a hierarchy with multiple inheritance
  – A set of properties with multiple domains and ranges.
Buyers:

<div vocab="http://schema.org/" typeof="Product">
  <img rel="image" src="dell-30in-lcd.jpg" />
  <span property="name">Dell UltraSharp 30" LCD Monitor</span>
  <div rel="hasAggregateRating">
    <div typeof="http://schema.org/AggregateRating">
      <span property="ratingValue">87</span>
      out of <span property="bestRating">100</span>
      based on <span property="ratingCount">24</span> user ratings
    </div>
  </div>
  <div rel="offers">
    <div typeof="http://schema.org/AggregateOffer">
      <span property="lowPrice">$1250</span>
      to <span property="highPrice">$1495</span>
      from <span property="offerCount">8</span> sellers
    </div>
  </div>
</div>
Mapping to RDFa1.1

Sellers:
<div rel="offers">
  <div typeof="http://schema.org/Offer">
    <a property="url" href="save-a-lot-monitors.com/dell-30.html">
      Save A Lot Monitors - $1250
    </a>
  </div>
</div>

<div rel="offer">
  <div typeof="http://schema.org/Offer">
    <a property="url" href="jondoe-gadgets.com/dell-30.html">
      Jon Doe's Gadgets - $1350
    </a>
  </div>
</div>
Schema.org using Microdata

• Basic Vocabulary of Microdata
  (http://dev.w3.org/html5/md-LC/)
**Microdata model**

- **Item**: a group of name-value pairs
  - Each item can have item type, a global identifier, and a list of properties
- **Property**: name in the name-value pair
  - Each property has one or more values
  - Each value is a string or an item
My name is <span itemprop="name">Neil</span>.

My band is called <span itemprop="band">Four Parts Water</span>.

I am <span itemprop="nationality">British</span>.

### Typed items

A male American domestic shorthair, with a fluffy black fur with white paws and belly.
Item

- Global identifier for items

```html
<dl itemscope
    itemtype="http://vocab.example.net/book"
    itemid="urn:isbn:0-330-34032-8">
    <dt>Title
    <dd itemprop="title">The Reality Dysfunction
    <dt>Author
    <dd itemprop="author">Peter F. Hamilton
    <dt>Publication date
    <dd><time itemprop="pubdate" datetime="1996-01-26">26 January 1996</time>
</dl>
```
Property

• Using itemprop
  – The value of the itemprop is the unordered set of unique space-separated tokens, and case-sensitive
Value

• The property value: the value of itemprop.

```html
<html>
<head>
  <title>Photo gallery</title>
</head>
<body>
  <h1>My photos</h1>
  <figure itemscope itemtype="http://n.whatwg.org/work" itemref="licenses">
    <img itemprop="work" src="images/house.jpeg" alt="A white house, boarded up, sits in a forest.">
    <figcaption itemprop="title">The house I found.</figcaption>
  </figure>
  <figure itemscope itemtype="http://n.whatwg.org/work" itemref="licenses">
    <img itemprop="work" src="images/mailbox.jpeg" alt="Outside the house is a mailbox. It has a leaflet inside.">
    <figcaption itemprop="title">The mailbox.</figcaption>
  </figure>
  <footer>
    <p id="licenses">All images licensed under the <a itemprop="license" href="http://www.opensource.org/licenses/mit-license.php">MIT license</a>.</p>
  </footer>
</body>
</html>`
Converting Microdata to RDF

<dl itemscope
    itemtype="http://purl.org/vocab/frbr/core#Work"
    itemid="http://books.example.com/works/45U8QJGZSQKDH8N">
    <dt>Title</dt><dd><cite itemprop="http://purl.org/dc/terms/title">Just a Geek</cite></dd>
    <dt>By</dt><dd><span itemprop="http://purl.org/dc/elements/1.1/creator">Wil Wheaton</span></dd>
    <dt>Format</dt>
    <dd itemprop="http://purl.org/vocab/frbr/core#realization"
        itemscope
        itemtype="http://purl.org/vocab/frbr/core#Expression"
        itemid="http://books.example.com/products/9780596007683.BOOK">
        <link itemprop="http://purl.org/dc/terms/type"
            href="http://books.example.com/product-types/BOOK">
            Print
        </link>
    </dd>
    <dd itemprop="http://purl.org/vocab/frbr/core#realization"
        itemscope
        itemtype="http://purl.org/vocab/frbr/core#Expression"
        itemid="http://books.example.com/products/9780596802189.EBOOK">
        <link itemprop="http://purl.org/dc/terms/type"
            href="http://books.example.com/product-types/EBOOK">
            Ebook
        </link>
    </dd>
</dl>
@prefix dct: <http://purl.org/dc/terms/> .
@prefix dce: <http://purl.org/dc/elements/1.1/> .
@prefix frbr: <http://purl.org/vocab/frbr/core#> .

<http://books.example.com/works/45U8QJGZSQKDH8N> a frbr:Work ;
   dce:creator "Wil Wheaton"@en ;
   dct:title "Just a Geek"@en ;
   frbr:realization <http://books.example.com/products/9780596007683.BOOK>,

<http://books.example.com/products/9780596007683.BOOK> a frbr:Expression ;

<http://books.example.com/products/9780596802189.EBOOK> a frbr:Expression ;

Converting Microdata to RDF
References

• RDFa
  – RDFa at W3C: http://www.w3.org/TR/rdfa-syntax/
  – RDFa Primer: http://www.w3.org/TR/xhtml-rdfa-primer/
  – RDFa Wiki: http://rdfa.info/wiki/Tutorials

• Schema.org
  – www.schema.org
  – Microdata: http://dev.w3.org/html5/md-LC/

• Microformat:
  – http://microformats.org/