

The Architecture of the Web

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Wikipedia: The Web is

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The Web is changing!

Modern Version: The Web is a system of **data, people and software** connected via the Internet and mobile networks.

Outline

1 Data Markup

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- 1 Data Markup
- 2 Linking the Web
 - Data Distribution
 - Identity Management
 - Widgets and APIs

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- 3 Market Graph
- 4 Thoughts on Future

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Data Markup

W3C Standards

- HTML, XHTML
- CSS
- XML, RDF

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:dc="http://purl.org/dc/elements/1.1/">
  <rdf:Description
    rdf:about="http://en.wikipedia.org/wiki/Tony_Benn">
    <dc:title>Tony Benn</dc:title>
    <dc:publisher>Wikipedia</dc:publisher>
  </rdf:Description>
</rdf:RDF>
```



FOAF



- **Mission:** creating machine-readable pages describing people, the links between them and the things they create and do
- Started in 2000 by Libby Miller and Dan Brickley
- Tim Berners-Lee: FOAF is a basis for Global Giant Graph

FOAF: Example

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:foaf="http://xmlns.com/foaf/0.1/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
  <foaf:Person rdf:about="#JW">
    <foaf:name>Jimmy Wales</foaf:name>
    <foaf:mbox rdf:resource="mailto:jwales@bomis.com" />
    <foaf:homepage rdf:resource="http://www.jimmywales.com/" />
    <foaf:nick>Jimbo</foaf:nick>
    <foaf:depiction
      rdf:resource="http://www.jimmywales.com/aus_img_small.jpg" />
    <foaf:interest>
      <rdf:Description rdf:about="http://www.wikimedia.org"
        rdfs:label="Wikipedia" />
    </foaf:interest>
    <foaf:knows>
      <foaf:Person>
        <foaf:name>Angela Beesley</foaf:name>
      </foaf:Person>
    </foaf:knows>
  </foaf:Person>
</rdf:RDF>
```

Microformats



- Grassroots approach to Semantic Web
- Notable microformats: hCalendar, hCard, hReview, hResume, XFN, XOXO

<http://tantek.com/presentations/2006/07/what-are-microformats/>

Microformat Example: hCard

```
<div class="vcard">  
  <div class="fn">Joe Doe</div>  
  <div class="org">The Example Company</div>  
  <div class="tel">604-555-1234</div>  
  <a class="url" href="http://example.com/"  
  >http://example.com/</a>  
</div>
```

Social Graph API

Brad Fitzpatrick presents Social Graph API:

<http://www.youtube.com/watch?v=LabCylbapuM>

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Linking the Web

Types of Connections

- Pointers (URL, XRI & XDI, Yahoo woelD)

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- Data distribution
- Identity management
- Widgets and APIs



- Full name



- Full name

Really Simple Syndication

RDF Site Summary



- Full name

 - Really Simple Syndication

 - RDF Site Summary

- Started in 1999 by Ramanathan V. Guha

- List of feeds: OPML

- Attention profile: APML

- Challenges: filtering, discovery, promotion

RSS Example

```
<?xml version="1.0"?> <rss version="2.0">
  <channel>
    <title>Lift Off News</title>
    <link>http://liftoff.msfc.nasa.gov/</link>
    <description>Liftoff to Space Exploration.</description>
    <language>en-us</language>
    <pubDate>Tue, 10 Jun 2003 04:00:00 GMT</pubDate>
    <lastBuildDate>Tue, 10 Jun 2003 09:41:01 GMT</lastBuildDate>
    <docs>http://blogs.law.harvard.edu/tech/rss</docs>
    <generator>Weblog Editor 2.0</generator>
    <managingEditor>editor@example.com</managingEditor>
    <webMaster>webmaster@example.com</webMaster>
    <ttl>5</ttl>

    <item>
      <title>Star City</title>
      <link>http://liftoff.msfc.nasa.gov/news/2003/news.asp</link>
      <description>How do Americans get ready to work with Russians
        aboard the International Space Station? They take a crash
        course in culture, language and protocol at Russia's
        Star City.</description>
      <pubDate>Tue, 03 Jun 2003 09:39:21 GMT</pubDate>
      <guid>http://liftoff.msfc.nasa.gov/2003/06/03.html#item573</guid>
    </item>
```

Viral Propagation

- Digg, Yahoo! Buzz
- Del.icio.us, Stumbleupon
- Social news feeds (Facebook news, FriendFeed)

OpenId



- **Glossary:** identity provider, relying party
- 2005: Started by Brad Fitzpatrick in LiveJournal project
- 2007: OpenID Foundation

OAuth



- Open standard for [access delegation](#)
- Started in November 2006, first draft in October 2007
- Glossary: User, Consumer, Service Provider, Protected Resources
- Challenges: phishing attack, DoS attack

Facebook Platform

- A framework for creating third-party applications that interact with core Facebook features. Launched in May 2007
- Interface (API), Query (FQL), Markup (FBML)
- **Anatomy:** about, left nav, Facebook canvas pages, profile box, profile action links, privacy settings, news feed, alerts, message attachments, requests

Other Application Platforms

- OpenSocial, FriendConnect, Y!OS
- Firefox extensions and userscripts (via GreaseMonkey)
- iPhone OS
- iGoogle, Netwibes, Yahoo Pipes
- Wordpress & Drupal, Salesforce.com,

APIs

- Google AJAX Search API, Yahoo Search API, Yahoo SearchMonkey
- MySpace Data Availability, FacebookConnect
- Yelp API

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Ongoing Project: Market Graph

Market Graph

Market Graph is a graph of relations between people, businesses and products.

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Market Graph is a graph of relations between people, businesses and products.

- Transactions (I bought, I order)
- Evaluation (I like, I hate, product rating)
- Demand (wishlists, problem list)
- Authorship and employment

Applications of Market Graph

- Recommendations
- Search
- Ad targeting
- Viral propagation
- Demand generation
- Platform for third-party applications
- Market computing

Market Graph: Questions

- Business model and incentives
- Centralized vs. decentralized?
- Data reliability
- Publishing Market Graph data

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Thoughts on Future

Emerging Technologies in the Web

Emerging Technologies in the Web

- Augmented reality, Geoweb
- Vector graphics, 3D
- Internet TV, video
- Ubiquitous computing
- Semantic web
- Artificial intelligence, question answering
- Machine translation
- Intelligent agents
- New interfaces (HCI)

Web OS

- Web office: Google Docs, Zoho
- Social platforms: Facebook, OpenSocial
- DesktopTwo, Netvibes, iGoogle, myYahoo
- Firefox Gran Paradiso
- CMS as Web OS?

DataPortability.org



- **Participants:** Google, Facebook, Plaxo, Drupal, Netvibes, Mystrands, LinkedIn, Flickr, Six Apart, Twitter, Digg, Microsoft
- **Started:** November 2007
- **Standards involved:** APML, FOAF, hCard, OAuth, OpenID, OPML, RDF, RSS, SIOC, XFN, XRI, and XDI.
- **Next goal:** DataPortability reference design

Links

Homepage <http://yury.name>

<http://businessconsumer.net/files/marketing-agenda.pdf>

Research Agenda in Online Marketing [Working paper]

<http://yury.name/newweb.html>

Tutorial “The New Web”

<http://yury.name/reputation.html>

Tutorial “Reputation Systems”

<http://businessconsumer.net>

Our research project in online marketing

References

Conferences: WWW, WSDM, EC, Web 2.0 Expo, Web 2.0 Summit, The Next Web, Techcrunch50, ETech, TED

Videos: TED Talks (Jeff Bezos, Larry Lessig, Mena Trott, Jimmy Wales), OpenSocial Launch Event, Mark Zuckerberg (F8 Keynote)

Blogs: Techcrunch, ReadWriteWeb, Mashable!, Valleywag, Techmeme, VentureBeat, Greg Linden

People: Kevin Marks, Brad Fitzpatrick, Tantek Celik, David Recordon, Joseph Smarr, Matt Mullenweg, Mark Zuckerberg, Kevin Rose, Dries Buytaert, Chris Messina, Nova Spivack, Dick Hardt, Chris Saad

Thanks for your attention!
Questions?