Semantic Web & Social Web

Web pro lidi, web pro roboty

PV005 Služby počítačových sítí   Tomáš Obšívač | 2010

blakejnolan.com

Semantic Web & Social Web

- ☐ Net and Web
  - ◾ We are here. :-)

- ☐ Semantic Web
  - ◾ Web of data or Web with metadata

- ☐ Social Web
  - ◾ How people change the Web & how the Web change people
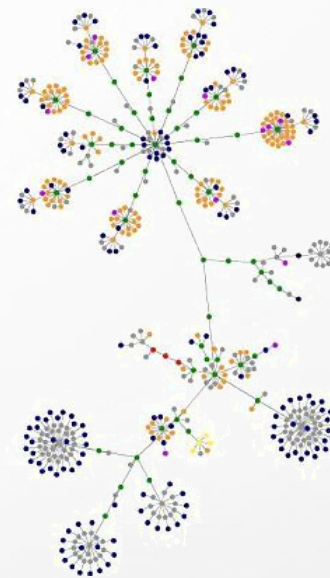
Net → Web → Graph

- **Net** ~ propojené počítače

  III: International Information Infrastructure

  ↓

- **Web** ~ prop. dokumenty = hypertext

  WWW: World Wide Web

- **Graph** ~ propojené „objekty"

  GGG: Giant Global Graph

  O čem jsou všechny ty dokumenty?!

  http://dig.csail.mit.edu/breadcrumbs/node/215

Roots of Net's and Web's Success

- Network effect ~ Metcalfe's law (1980)
  - The value of a network is proportional to the square of the number of connected nodes.

- Proč se nám zdá, že svět je malý?
  - Small worlds – nejsme sousedé, ale jsme si blízko
  - Six degrees of separation (1967)
  - Shrinking world, časoprostorové rozpojení (A. Giddens), …

Web in numbers

- ☐ Documents
  - ■ Over 100 million websites, 30 bilion documents
  - ■ 2/3 indexed by search engines, 500x deep web (?!)
  - ■ Is there any qualified judgement of amount of data?
  - ■ More storage or data?
  - ■ Average piece of information is never looked at by a human.

- ☐ People
  - ■ 30% of world population online so far
  - ■ CZ: 65%, US: 77%

Semantic Web

Put machines to work

- ☐ Methods and technologies to allow **machines** to understand the meaning of information on the Web.
  - ■ Questionable feasibility of W3C approach

- ☐ Common framework that allows **data** to be shared and reused across applications.
  - ■ Documents such as HTML page are readable by humans. Data are readable by machines.

- ☐ Autonomous **agents**
  - ■ smarter than common web browsers or thermostat ;-)

- ☐ Metadata, **relations**

Linked Data ~ Web of Data (2006)

- Best practices for publishing and **connecting** structured data on the Web:
  - URI, HTTP, RDF

- Building blocks of the Semantic Web

- 5-star deployment scheme
  - http://lab.linkeddata.deri.ie/2010/star-scheme-by-example/

Resource Description Framework

- ☐ General method for conceptual description or modeling of information that is implemented in web resources, using a variety of syntax formats.
  - ■ Similar to classic conceptual modeling approaches such as ERD or Class diagrams.
  - ■ Labeled, directed multi-graph

- ☐ Triple: subject-predicate-object expression
  - ■ Example: *Tomáš má e-mail obsivac@fi.muni.cz.*
  - ■ Subject: *https://is.muni.cz/osoba/obsivac*
  - ■ Predicate: *has the e-mail address*
  - ■ Object: *mailto:obsivac@fi.muni.cz*

- ☐ Notations for RDF (e.g. RDF/XML, Notation3, RDFa)

Ontology

- ☐ RDF vocabulary
  - ■ described by RDF Schema, OWL, …

- ☐ Formal knowledge representation

- ☐ Set of concepts (classes) within a domain and their properties (attributes) and relationships
  - ■ Individuals

- ☐ Allows reasoners to infer about domain's entities

- ☐ Semantic Web application can exists w/o ontology.

Examples

- ## Friend of a Friend
  - FooF describe persons, their activities and their relations to other people and objects.

- ## DBpedia
  - One of Linked Data's datasets
  - A community effort to extract structured information from Wikipedia.
  - *Which Skyscrapers in China have more than 50 floors and have been constructed before the year 2000?*
    - *http://dbpedia.neofonie.de/browse/*

How to query RDF data?

☐ SPARQL

☐ Example
  - spammer's dream :-)

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name ?email
WHERE {
  ?person a foaf:Person.
  ?person foaf:name ?name.
  ?person foaf:mbox ?email.
}
```

Microformats, RDFa, Microdata

☐ Microformats.org

☐ RDF in attributes

    ■ Příklad z Wikipedie:

```
<p xmlns:dc="http://purl.org/dc/elements/1.1/"
    about="http://www.example.com/books/wikinomics">
  In his latest book
  <cite property="dc:title">Wikinomics</cite>,
  <span property="dc:creator">Don Tapscott</span>
  explains deep changes in technology,
  demographics and business.
  The book is due to be published in
  <span property="dc:date" content="2006-10-01">October 2006</span>.
</p>
```

☐ Microdata (HTML5)

Any use today?

- ☐ Augmented reality
  - ▪ Data about local reality, layers over maps

- ☐ Google Rich Snippets (and local search)
  - ▪ Events, reviews, People, …
  - ▪ http://www.google.com/support/webmasters/bin/answer.py?answer=99170

- ☐ Social Graph API demo

Social Web

Web as a kind of Social Media

- ☐ Media
  - ■ Channel or tool to deliver data.
  - ■ One-to-one, one-to-many, **many-to-many**

- ☐ User-generated content
  - ■ e.g. player generated content (common in RPG)
  - ■ Prosumer (A. Toffler, 1980, M. McLuhan 1972)

How people change web?

- People socialize and interact on the Web. How?

- We form online communities. How?
  - Membership Lifecycle (Amy Jo Kim)
    - Lurker, Novice, Regular, Leader, Elder
  - 90-9-1
  - Motivations for contributing
    - „revenge", „ego boost", belongingness and influence

- Social networking service
  - Focused on people vs. hobby/interest
  - Reflects part of **social graph**

Social Software

- Which attributes make software "social"?
  - Identity – who are you?
  - Reputation – what others think?
  - Presence – where are you?
  - Relationships – who/what are you connected with?
  - Groups – organization of connections
  - Conversations – discussions, topics
  - Sharing – content contribution

- Yes and again, people make it.

Social Network Analysis

☐ Many possible measures and methods
  ▪ Node centrality, topology, bridge, path lengths, reach, clustering

☐ E.g. Collaboration graph
  ▪ CG are used to measure the closeness of a network participants.

☐ Social graph
  ▪ Facebook attempt to rule the web.

How web influence society?

- ☐ Knowledge sharing

- ☐ Crowdsourcing (J. Howe, Wired Mag, 2006)
  - ◼ Outsourcing tasks to community
  - ◼ The Wisdom of Crowds (J. Surowiecki, 2004)

- ☐ Network society (M. Castells, since 1996)
  - ◼ Step further from information (aka postindustrial) society

- ☐ Attention Economy, Economy of Free, Link Economy, Wikinomics
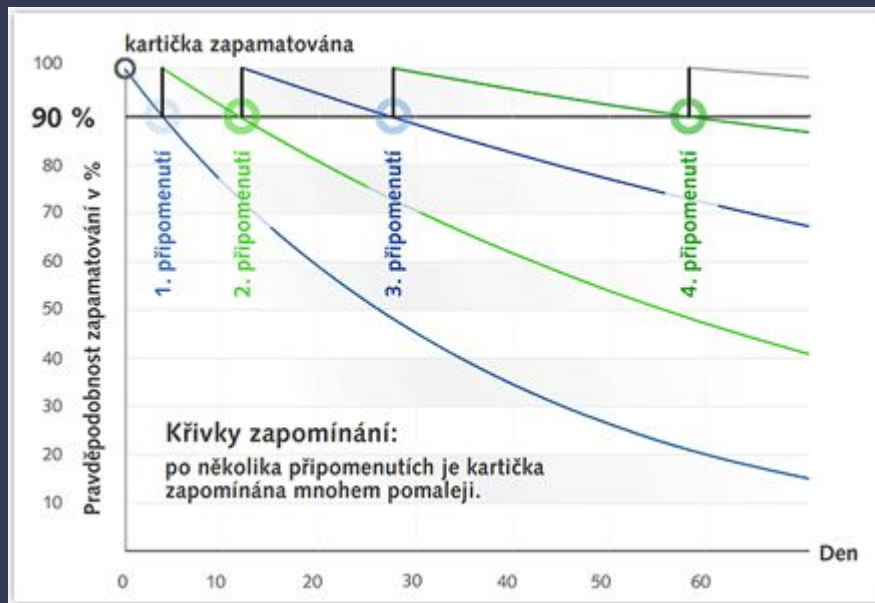 - ◼ Wikinomics Forum 2010, sobota 4. 12., FF UK

Missuse, Issues

☐ Vandalism, spam, flames, phising, leaking, plagiarism, addiction, Continuous Partial Attention, procrastination, …

☐ Privacy, stalking
  – *First time in history, publicity is cheap and privacy is expensive.*

☐ Social exclusion (digital divide)

PV219 Seminář webdesignu

- ☐ Orientovaný prakticky, rádoby pro pokročilé, max. 20 studentů ve skupině (x 3 skupiny)?

- ☐ Zvaní přednášející – experti
  - ■ Máme je natočené – video.muni.cz
    - ☐ Martin Hassman, Jan Sládek, Jirka Kosek, Martin Kopta, Jan Korbel, David Grudl, Veronika Rojkovičová, Radek Pavlíček, Emil Hampejz

- ☐ Ukončení
  - ■ Prezentace   na domluvené téma, ~15 min.
  - ■ Prezence   max. 2 neomluvené
  - ■ Projekt   konkrétní řešení (může být týmové)

- ☐ http://www.fi.muni.cz/~xobsivac/PV219/

PV219: example webdev topics

- ☐ Mobile web
  - ▪ More mobile browsers than desktop ones by 2013.
  - ▪ Responsive web design
    - CSS media queries:
      ```
      <link media="only screen and
                   (max-device-width: 480px)"
      ```

- ☐ Cloud
  - ▪ Resources for webapps as a **utility**.
  - ▪ Google AppEngine (Java, Python), Heroku (Ruby)

Dril

- *And now for something completely different.*

- Spaced repetition
- http://www.wired.com/medtech/health/magazine/16-05/ff_wozniak