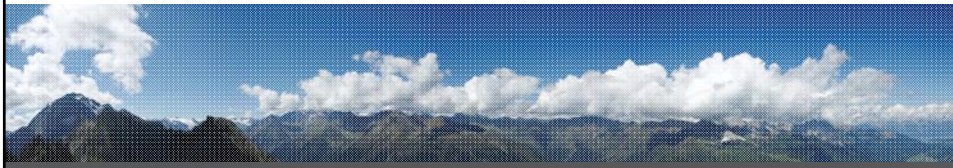




Modeling for the Web

Web 2.0 and Web 3.0
Why ontologies?



© Copyright 2008 STI INNSBRUCK www.sti-innsbruck.at

Motivation



A collage of various logos and icons representing social media and web 2.0 services. It includes: a globe with characters and symbols; the XING logo; the Facebook logo; the Flickr logo with a child's face; the Blogger logo; the Del.icio.us logo with the tagline "your bookmarks"; the LinkedIn logo; the studiVZ logo with "BETA 2.0 Das Studierverzeichnis"; the Skype logo; the Last.fm logo with "the social music revolution"; the MySpace logo with "a place for friends"; and the YouTube logo with "Broadcast Yourself".

www.sti-innsbruck.at

2

Motivation (cont'd)



- File Sharing:
 - Flickr (Images)
 - YouTube (Videos)
 - Wikipedia (Online Encyclopedia)
 - Blogs
 - Open Source Community (Linux)
- File Management
 - Tagging
- Social Websites and Communication:
 - Facebook
 - LastFM
 - Skype
 - StudiVZ
 - LinkedIn, Xing
- Open Systems: APIs, partly open source allow extensions by users





Motivation (cont'd)



Internet platform for creation of social networks

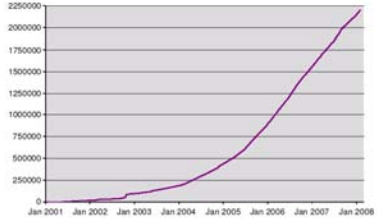
- Founded in 2004
- **64 Millionen** active users
- **250.000 new registrations** on average per day since Jan. 2007
- More than the half of users are not any more on college
- More than **65 Billion page views** per month
- More than the half of the users visit Facebook daily
- Average Visit: 20 minutes
- Estimated market value: **15 Billion Dollars**

Wikipedia

Motivation (cont'd)


Free Online Encyclopedia



- **2,214,717 Articles** (english Wikipedia)
- **6,383,758 registered users**
- Clever mechanisms combined with human intelligence
- High quality articles
- Uncontrolled and open

Number of Articles



Date	Number of Articles
Jan 2001	~10,000
Jan 2002	~20,000
Jan 2003	~40,000
Jan 2004	~80,000
Jan 2005	~150,000
Jan 2006	~400,000
Jan 2007	~1,000,000
Jan 2008	~2,214,717


www.sti-innsbruck.at
5



Motivation (cont'd)


Videportal: free Up- and Download of Videos

- Number of videos grew by 20 percent to 6.1 million in a single month
- 45 Terabyte of Videos
- **1.73 Billion Video Views**
- All users together spent 9.305 years with watching YouTube videos
- Google paid 1.6 Billion Dollars for YouTube last year


www.sti-innsbruck.at
6

Web 2.0




Web 2.0 is a notion for a row of interactive and collaborative systems of the internet

www.sti-innsbruck.at
7

What is the web 2.0? „Definition“ by O'Reilly


Web 1.0	Web 2.0	improvement
DoubleClick	Google AdSense	personalized
Ofoto	Flickr	tagging, community
Britannica Online content	Wikipedia	community, free
Webseiten publishing	blogging	dialogue
CMS	participation	
directories	wikis	flexibility, freedom
taxonomy	tagging	community
	folksonomy	

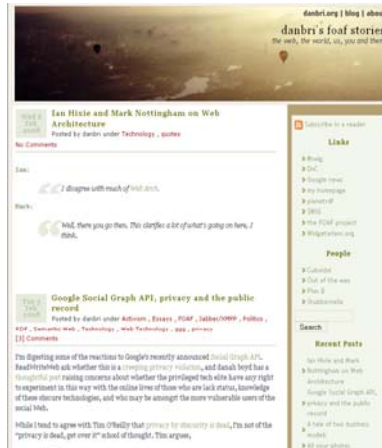
Consumers → Prosumers

www.sti-innsbruck.at
8

Blogs



- Easy usable user interfaces to update contents
- Easy organization of contents
- Easy usage of contents
- Easy publishing of comments
- **Social: collaborative (single users but strongly connected)**



Wikis



- Wiki → invented by Ward Cunningham
- Collection of HTML sites: read and edit
- Most famous and biggest Wiki: Wikipedia (MediaWiki)
 - But: Also often used in Intranets (i. e. our group)
- Problems solved socially instead of technically
- Flexible structure
- Background algorithms + human intelligence
- No new technologies
- **social: collaborative (nobody owns contents)**



Wikis: Design Principles



- **Open**
Should a page be found to be incomplete or poorly organized, any reader can edit it as they see fit.
- **Incremental**
Pages can cite other pages, including pages that have not been written yet.
- **Organic**
The structure and text content of the site are open to editing and evolution.
- **Mundane**
A small number of (irregular) text conventions will provide access to the most useful page markup.
- **Universal**
The mechanisms of editing and organizing are the same as those of writing so that any writer is automatically an editor and organizer.
- **Overt**
The formatted (and printed) output will suggest the input required to reproduce it.

Source: <http://c2.com/cgi/wiki?WikiDesignPrinciples>

Wikis: Design Principles



- **Unified**
Page names will be drawn from a flat space so that no additional context is required to interpret them.
- **Precise**
Pages will be titled with sufficient precision to avoid most name clashes, typically by forming noun phrases.
- **Tolerant**
Interpretable (even if undesirable) behavior is preferred to error messages.
- **Observable**
Activity within the site can be watched and reviewed by any other visitor to the site.
- **Convergent**
Duplication can be discouraged or removed by finding and citing similar or related content.

Source: <http://c2.com/cgi/wiki?WikiDesignPrinciples>

Social Tagging



- Idea: Enrich contents by user chosen keywords
- Replace folder based structure by a organisation using tags
- New: Simple user interfaces for tagging and tag based search
- First steps to Semantic Web?
- Technically: user interfaces
- **Social: collaborative** (own contents, shared tags)

Collaborative Tagging



The screenshot shows the del.icio.us website interface for the 'popular / linux' category. The browser address bar shows 'http://del.icio.us/popular/linux'. The page title is 'del.icio.us / popular / linux'. Below the title, there are navigation links: 'your bookmarks', 'inbox', 'links for you', and 'post'. The user is logged in as 'xamde'. A search bar is present with the text 'Popular items tagged linux -- view yours, all'. The main content area lists several items:


- Tons of Linux Links**: first posted by ravee_27 on 2005-10-20 ... saved by 167 other people (136 recently)
- Linux.com | My sysadmin toolbox**: first posted by screaming on 2006-03-25 ... saved by 126 other people (102 recently)
- Linux App Finder**: first posted by kylemaxwell on 2006-03-25 ... saved by 94 other people (79 recently)

On the right side, there is a 'related tags' section with a list of tags: software, howto, opensource, reference, ubuntu, tools, backup, tips, sysadmin.

related tags + semanticweb + wiki + wikipedia


denkwerkzeug cds denkwerkzeug personalwiki pkm Wiki

unbundled tags 3d acemedia ajax annotation ant api atom blog book coffee collaborative_tool compiler conference conferencesite cyc d233a database datasource deadline2005-06 desktop digester DILIGENT dtd eclipse editor facet farm foaf framework graphics gtd gui hebamme heiko html image it java javascript jcr junit karlsruhe kweb latex mailto markdown metamodel microformats miktex mp3 nepomuk newyork niceplace office ontology openid opensource owl p2p papers parser pim programming project python query rcp rdf rdf2go rdfeditor rdfreactor rdfs rdfschema realtime rest restspec richclient samba semantic semanticweb ! semanticwiki semfs server socialnetwork summerofcode tagfs tagging tagline topicmaps transformation unrestful uwe validator visio visualisation voip wal web2.0 webdav wikipedia wikisym wikisym2005 wikisyntax winedt xfn xhtml xml xpath xrest xsit xwiki

Tagging: Flickr.com 


Tags / beach / clusters

beach
 (Or, try an [advanced search](#).)




[ocean](#), [sand](#), [sea](#), [water](#), [sunset](#), [waves](#),
[sky](#), [sun](#), [blue](#), [clouds](#)

[See more in this cluster.](#)



[tree](#), [palm](#)


[See more in this cluster.](#)



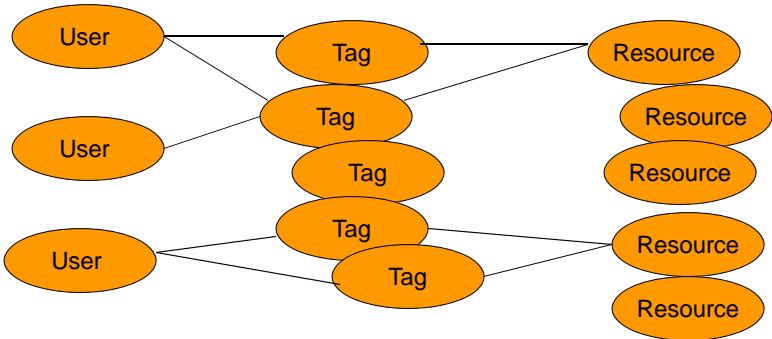
[beach](#), [beach](#)

[See more in this cluster.](#)

www.sti-innsbruck.at 15

Folksonomies 

Data created by tagging, knowledge structures



Mary tags www.wikipedia.org with wiki wikipedia encyclopedia
 Bob tags www.wikipedia.org with wiki web2.0 encyclopedia knowledge

www.sti-innsbruck.at 16

- Rights for Tagging
 - Self-tagging: Contents only tagged by owner (Technorati)
 - Free-for-all tagging: Tagging by all users (Yahoo!)
- Support of Tagging
 - Blind Tagging: Existing Tags are not displayed (Flickr)
 - Viewable Tagging: Existing Tags are displayed (Del.icio.us)
 - Suggestive Tagging: Suggestions for Tags (MyWeb 2.0)
- Aggregation of Tags
 - Bag-model: Multiple entries (Del.icio.us)
 - Set-model: Only single entries (YouTube)

- Types of Ressources
 - Text vs. Others (Images, URL, Places, ...)
- Source of Ressources
 - Participant (Upcoming)
 - System (Last.fm)
 - Arbitrary web ressource (Del.icio.us)
- Connection between ressources
 - linked, grouped, none
- Social Connections

Tag Clouds



All time most popular tags

Size of Tags: count of usage

Browsing replaces Searching


Different meaning for different users

Orientation in Information Set

amsterdam animal animals april architecture art australia baby barcelona
 beach berlin bird birthday black blackandwhite blue boston bridge building bw
 california cameraphone camping canada car cat cats chicago
 china christmas church city clouds color colorado concert day dc dog dogs england
 europe family festival fireworks florida flower flowers food france
 friends fun garden geotagged germany girl graduation graffiti green hawaii
 holiday home honeymoon house india ireland italy japan july june kids lake
 landscape light london losangeles macro march may me mexico moblog
 mountains museum music nature new newyork newyorkcity newzealand night
 ocean orange oregon paris park party people phone photo pink portrait
 reflection river roadtrip rock rome sanfrancisco school scotland sea seattle sign
 sky snow spain spring street summer sun sunset taiwan texas thailand
 tokyo toronto travel tree trees trip uk unfound urban usa vacation
 vancouver washington water wedding white winter yellow zoo

www.sti-innsbruck.at 19

What is the Web 2.0? Trends for Web Applications



- Technical Evolution
 - **Web User Interfaces become faster** (AJAX)
 - **Desktop shifts to Web** (GMail, Google Notebooks, AJAX)
- Social Evolution
 - **Collective creates additional value** (Wiki, Tagging)
 - **Free contents become popular** (Licenses)
 - **Attention is getting monetarized** (Text-Ads)
 - **Websites with additional value by recombination** (Mash-Ups, RSS)

www.sti-innsbruck.at 20

Semantic Web + Web 2.0 = Web 3.0?



	Web 2.0	Web 3.0
Tagging	<ul style="list-style-type: none"> • Annotation with Tags • Singular/Plural Problem • Synonyms • No Intelligence 	<ul style="list-style-type: none"> • Annotation with concepts • Inferenz (Tag „Hund“ --> Tag „Tier“)
Recombination of data from different sources	<ul style="list-style-type: none"> • Mash-Ups developed earlier by programmer 	<ul style="list-style-type: none"> • Spontaneous by End User
Search	<ul style="list-style-type: none"> • Keyword Search or Tag Search <i>finds</i> documents 	<ul style="list-style-type: none"> • Structured Search combines Data und <i>creates</i> documents
Period	<ul style="list-style-type: none"> • 2004 - 2007 	<ul style="list-style-type: none"> • 2007 – 2010

Based on Völkl, Vrandečić and colleagues.

www.sti-innsbruck.at

21

Web 2.0 and the Semantic Web




- Web 2.0 and Semantic Web are complementary approaches
- Semantic Blogging
- Semantic Wikis
 - Semantic MediaWiki
- Web 2.0 ontology building
 - myOntology
- Semantically interlinked communities
 - SIOC
- Games for semantic content creation
 - OntoGame

www.sti-innsbruck.at

22

Semantic Blogging



- Creating blog entries in a structured fashion
- Based on ontologies
- This allows:
 - Acquiring complementary information from the Web
 - Finding blog entries better

Archive

June 2007
May 2007
April 2007
March 2007

About me

RSS-Feed

Blogroll

nutkiddz
nakit-arts
Blog of the rings
Matrix Reblogged

Links

Gloria Cinema
Ecoshop
Legolas fanzine

Pirates of the Caribbean 3
June 21st, 2007

I just went with **Till** into the last part of the Pirates of the Caribbean, where our heroes (the adoringly cute **Orlando Bloom** and Keira Knightly reprise their roles) go to the end of the world to save the one and only Captain Jack Sparrow (**Johnny Depp!** xOxOx!) from the claws of the Kraken. And guess what - Jack Sparrows daddy has a special appearance, played by old Rolling Stone Keith Richards! Weeeeha!

Best movie of the year, until know, without a question! Tons of fun, and colorful action.

no comments yet – post your comment - backtrack

Pirates of the Caribbean 3
June 21st, 2007


I just went with **Till** into the last part of the Pirates of the Caribbean, where our heroes (the adoringly cute **Orlando Bloom**

See Pirates of the Caribbean 3 in the Gloria:
Today 16.00, 18.30, 21.00
Tomorrow 16.00, 18.30, 21.00
[Reserve tickets now](#)

Director George Verbinski
Running time: 126 minutes
Starring Johnny Depp, Keira Knightley, Orlando Bloom, Geoffrey Rush
[Info from Wikipedia](#)


See Pirates of the Caribbean 3 in the Gloria:
Today 16.00, 18.30, 21.00
Tomorrow 16.00, 18.30, 21.00
[Reserve tickets now](#)

no comments yet – post your comment - backtrack



www.sti-innsbruck.at
23

Semantic Wikis

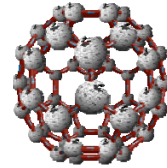


- A semantic wiki is a wiki that has an underlying model of the knowledge described in its pages.
- Regular, or syntactic, wikis have structured text and untyped hyperlinks.
- Semantic wikis, on the other hand, allow the ability to capture or identify information about the data within pages, and the relationships between pages, in ways that can be queried or exported like database data.
- Wikis:
 - Platypus wiki
 - IkeWiki
 - Kiwi
 - WikiFactory
 - Semantic MediaWiki

www.sti-innsbruck.at
24

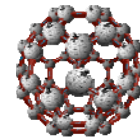
Structured Knowledge can be exported (in RDF standard)

- New Web 2.0 Applications are possible
- Reusing of knowledge beyond language borders
- Aggregated Search over more than one site
- **Quality: Finding of mistakes and conflicts**
 - Has every country a capital city?
 - Is every person born before dying?
 - Does the population density match to population and area?





Based on Völkl, Vrandečić and colleagues.

- Semantic MediaWiki: Extension of the MediaWiki Software
- Syntax extension allows **typed links**
- Page **Karlsruhe**
 - Up to now: ... in the south of [[Germany]] ...
 - Now: ... in the south of [[is in::Germany]] ...
- Syntax extension allows **annotation of values**
- Page **Karlsruhe**
 - Up to now: ... has a population of 280,000 people. ...
 - Now: ... has a population of [[population:=280000]] people.



Based on Völkl, Vrandečić and colleagues.

Semantic MediaWiki 



navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help
- Donations

search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version

San Diego

San Diego is a city located in the southwestern corner of California, the extreme south seat of San Diego County. As of the 2000 census, the city had a total population of 1,305,736 residents. The city is the second-largest in California and has many beaches, and sunny weather. The city is named after San Diego de Alcalá. Its coordinates are 32°42′54″N, 117°09′45″W﻿, ﻿its elevation is 12.8 m. According to the United States Census Bureau, the city has a total area of 963.6 km² (840.0 km² of it is land and 123.5 km² (47.7 mi²) of it is water. The total area of the city is 1,305,736 people. Most notably, in San Diego was the located the International Symposium on Wikis 2005, the location of the San Diego Zoo and the San Diego Chargers.

Relations to other articles — Click + to find similar articles.

San Diego is a city + [↗](#)

San Diego is located in California + [↗](#), and United States + [↗](#)

San Diego is county seat of San Diego County + [↗](#)

San Diego is named after San Diego de Alcalá + [↗](#)

San Diego is location of WikiSym 2005 + [↗](#), San Diego Zoo + [↗](#), and San Diego Chargers + [↗](#)

Attributes of San Diego — click + to find similar articles.

population: 1,305,736 + [↗](#)

climate: temperate + [↗](#)

features: many beaches + [↗](#), and sunny weather + [↗](#)

coordinates: 32°42′54″N, 117°09′45″W﻿, ﻿(32.715°N, 117.163°W) + [↗](#) [find maps](#)

elevation above sea level: 12.8 m (0.013 km, 0.008 miles) + [↗](#)

area: 963.6 km² (372.048 miles²) + [↗](#)

[Editing help on relations and attributes](#)

Categories: Cities

Editing San Diego

'''San Diego''' is a [[in a city]] located in the southwestern corner of the contiguous 48 states of the United States of America. As of the 2000 census, the California Department of Finance estimated the city's population to be 1,305,736. The city is the second-largest in California and the seventh-largest in the United States. It has many beaches and a sunny climate. Its coordinates are [[coordinates:32°42′54″N, 117°09′45″W]]. According to the United States Census Bureau, the city has a total area of 963.6 km² (840.0 km² of it is land and 123.5 km² (47.7 mi²) of it is water. The total area of the city is 1,305,736 people. Most notably, in San Diego was the located the International Symposium on Wikis 2005, the location of the San Diego Zoo and the San Diego Chargers. It was first shown in public in 2005. [[the Semantic MediaWiki]] was first shown in public in 2005. [[the location of:San Diego]] and [[the location of:San Diego Zoo]] and [[the location of:San Diego Chargers]].


[[Category:Cities]]

Summary:

Editing h

Based on Völk, Vrandečić and colleagues.

www.sti-innsbruck.at 27

What is located in California? 

special page

Simple semantic search

Fill in either the upper or lower row of the input form to search for relations or attributes. However, if an attribute value is given, the attribute name must be specified as well. Be aware that you must press the right button to obtain results. Just pressing *Return* will not work.

Subject article: Relation name: Object article:

Is located in California

Attribute name: Attribute value:

Search results (relations)

Sacramento County	is located in	California
San Diego	is located in	California
Sacramento	is located in	California
Talk:San Diego	is located in	California
San Diego Simple	is located in	California

According to the United States Census Bureau, the city has a total area of 963.6 km² (840.0 km² of it is land and 123.5 km² (47.7 mi²) of it is water. The total area of the city is 1,305,736 people. Most notably, in San Diego was the located the International Symposium on Wikis 2005, the location of the San Diego Zoo and the San Diego Chargers.

963.6 km² (840.0 km² of it is land and 123.5 km² (47.7 mi²) of it is water. The total area of the city is 1,305,736 people. Most notably, in San Diego was the located the International Symposium on Wikis 2005, the location of the San Diego Zoo and the San Diego Chargers.

Relations to other articles — Click + to find similar articles.

Relation:is located in [↗](#)

Something is located in something if it geographically ... This is a transitive relation, i.e. if A is located in B and B is located in C, then the system should also return A if users search for everything located in C. Such reasoning can greatly reduce the amount of typed links that one needs to specify (consider, e.g., in how many things Berlin is located in). However, at the moment, this feature is not supported or treated in any special way, but this page gives an example of how one could define such information.

Relations to other articles — Click + to find similar articles.

Relation:is located in [has relation property transitive](#) + [↗](#)

[Editing help on relations and attributes](#) [View as RDF](#)

Based on Völk, Vrandečić and colleagues.

www.sti-innsbruck.at 28

Summary



- The Web has undergone change from „Web 1.0“ to „Web 2.0“.
- Web 2.0 stands for more user interaction, the change from consumers to prosumers, the programmable Web, collaboration, easy interfaces, etc.
- This movement has triggered enormous user participation. Many tools provide strong incentives to their users.
- Social Semantic Web approaches aim at combining parts of Web 2.0 with semantics.
- Examples including Semantic Wikis, Semantic blogs, games for Semantic content creation, etc.

References



- <http://oreilly.com/web2/archive/what-is-web-20.html>
- <http://semanticweb.org>
- S. Braun, A. Schmidt, A. Walter, G. Nagypal, and V. Zacharias. Ontology maturing: A collaborative web 2.0 approach to ontology engineering, May 8 2007.
- S. E. Campanini, P. Castagna, and R. Tazzoli. Platypus wiki: a semantic wiki wiki web. pages 16, December 10 2004.
- Peter Mika. Ontologies are us: A unied model of social networks and semantics. volume LNCS 3729. Springer, 2005.
- S. Schaffert. Ikwiki: A semantic wiki for collaborative knowledge management. June 2006.
- K. Siorpaes, M. Hepp, A. Klotz, and M. Hackl. myontology: Tapping the wisdom of crowds for building ontologies. Technical report, STI Innsbruck Technical Report, 2008.
- K. Siorpaes and M. Hepp. Games with a purpose for the semantic web. IEEE Intelligent Systems, 23(3):5060, 2008.
- M. Völkel, M. Krötzsch, Denny Vrandecic, and H. Haller. Semantic wikipedia. May 23-26, 2006.