PA159: Introduction to Social Media and Social Networks

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December 13, 2012

What is Social Media?

What is Social Media

"Social media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content." p. 61

Source: Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59–68. doi:10.1016/j.bushor.2009.09.003

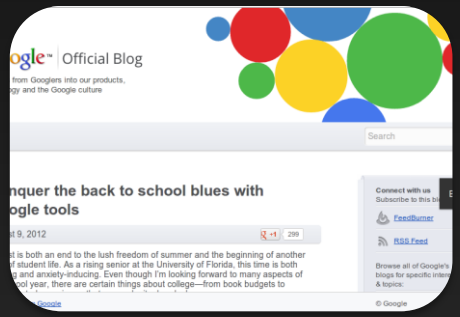
Source: http://blogs.earthlink.net/the-4-ps-of-social-media-etiquette/

Social Media Classifications

		Social Presence / Media Richness			
		Low	**Low-Medium**	**Medium**	**High**
Self Representation / Self-Disclosure	**High**	Blogs	Micro-blogging	Social Networking Sites	Virtual Social Worlds
	Low	Collaborative Projects		Content Communities	Virtual Game Worlds

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59–68. doi:10.1016/j.bushor.2009.09.003
Kaplan, A. M., & Haenlein, M. (2011). The early bird catches the news: Nine things you should know about micro-blogging. Business Horizons, 54(2), 105–113. doi:10.1016/j.bushor.2010.09.004

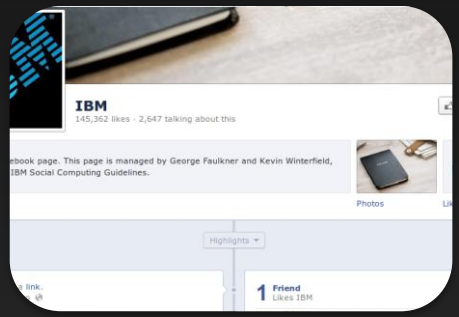
Social Media Classifications



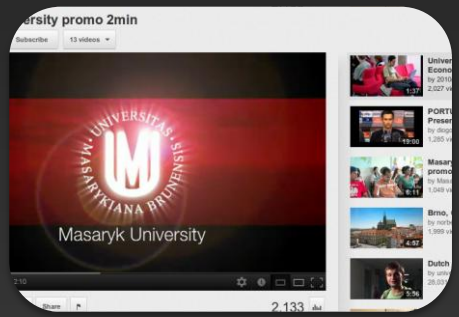
Blogs

Collaborative Projects

Microblogging



Social Networking Sites



Content Communities

Virtual Social Worlds

Virtual Game Worlds

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59–68. doi:10.1016/j.bushor.2009.09.003
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Characteristics of Social Media

- Participation: it blurs the line between media and audience.
- Openness: Everyone has a voice. Content seen as authentic and trustworthy?
- Conversation: Two (or more) way conversation between people rather than one-way broadcasting.
- Community: Support formation, growth and strength of communities around a particular shared interest.
- Connectedness: Thrives on being connected, making use of links to other sites, resources, people.

Source: Mayfield, Anthony. 2007. What is Social Media? (Online resource: http://www.icrossing.co.uk/fileadmin/uploads/eBooks/What_is_Social_Media_iCrossing_ebook.pdf). ICrossing.

Applications of Social media

Entertainment

Source: http://thechinabeat.blogspot.cz/2008/10/wow-in-china-and-us.html . Accessed September 8, 2012

Workplace

Source: Sarah Houghton, Source: Flickr.com

How Popular are Social Media Services?

- **112.8 million blogs** and over **250 million pieces of tagged** social media in June 2008, a specialist blog search engine
- More than **13 million hours** of video were uploaded during 2010 and **48 hours of video per minute**, resulting in nearly **8 years of content uploaded every day**
- More than **800 million active users**

Technorati™

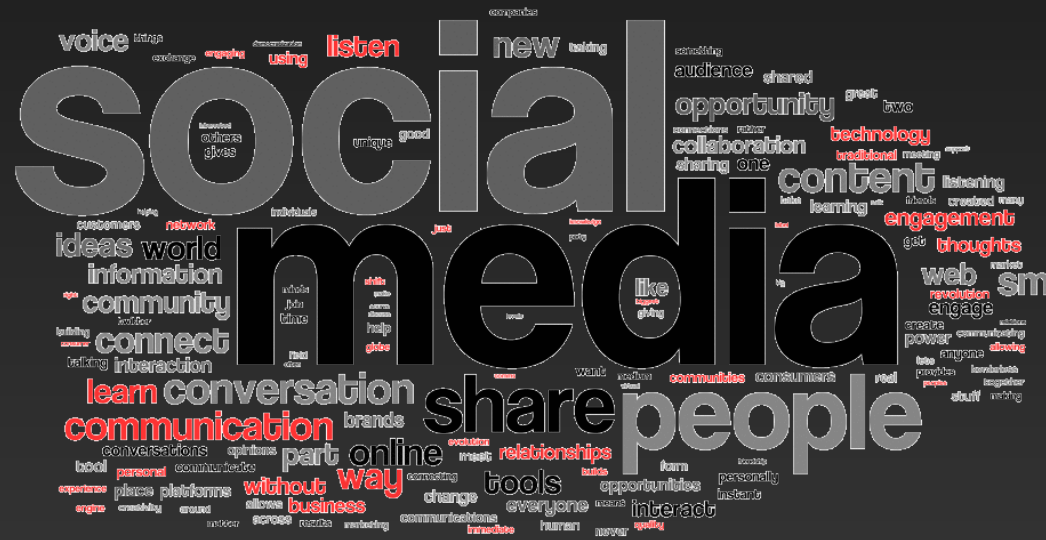
YouTube

facebook

Sources: http://en.wikipedia.org/wiki/Technorati, http://www.youtube.com/t/press_statistics, http://www.facebook.com/press/info.php?statistics

Today's Forecast

"[…] the rate of change and development of new features of social media will continue for the foreseeable future." p. 256



Source: Poynter, R. (2010). The Handbook of Online and Social Media Research: Tools and Techniques for Market Researchers. John Wiley & Sons.

Addiction to Social Media

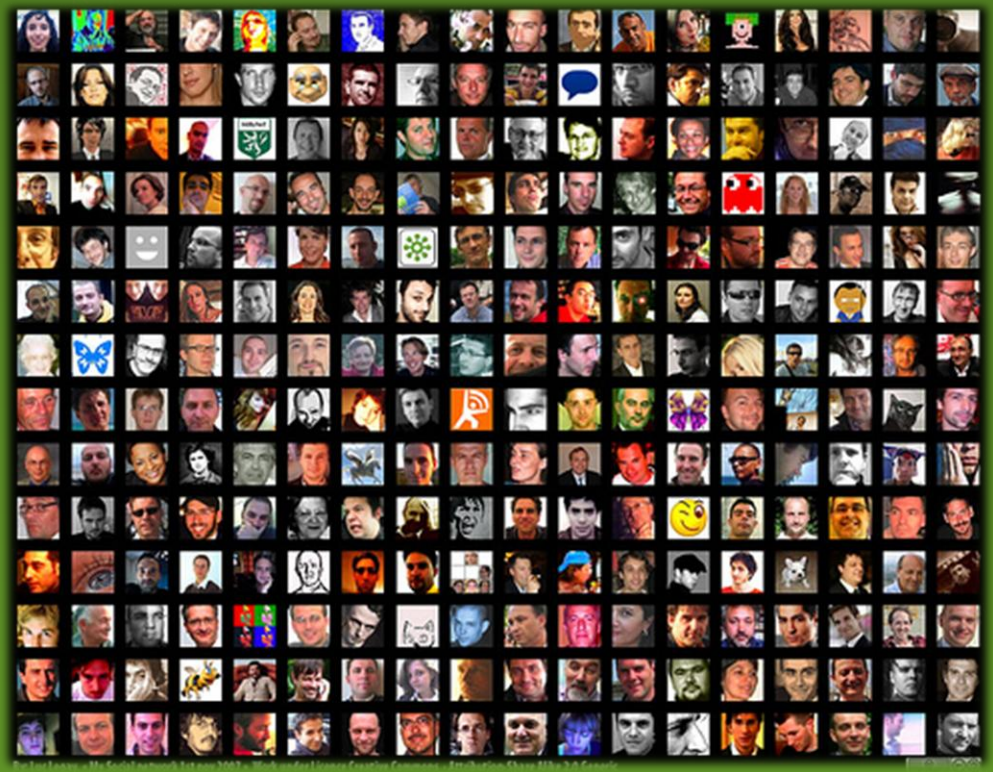
- Social media services “may be addictive.”
- The average user spends approximately 55 minutes a day engaging in a social media service, which may make the user develop a “fear of missing out,” or withdrawal symptoms if such a user is deprived of it for a certain amount of time.

Source: A day without social media, University of Maryland, College Park, USA - http://withoutmedia.wordpress.com/

Highlights: Addiction to Social Media

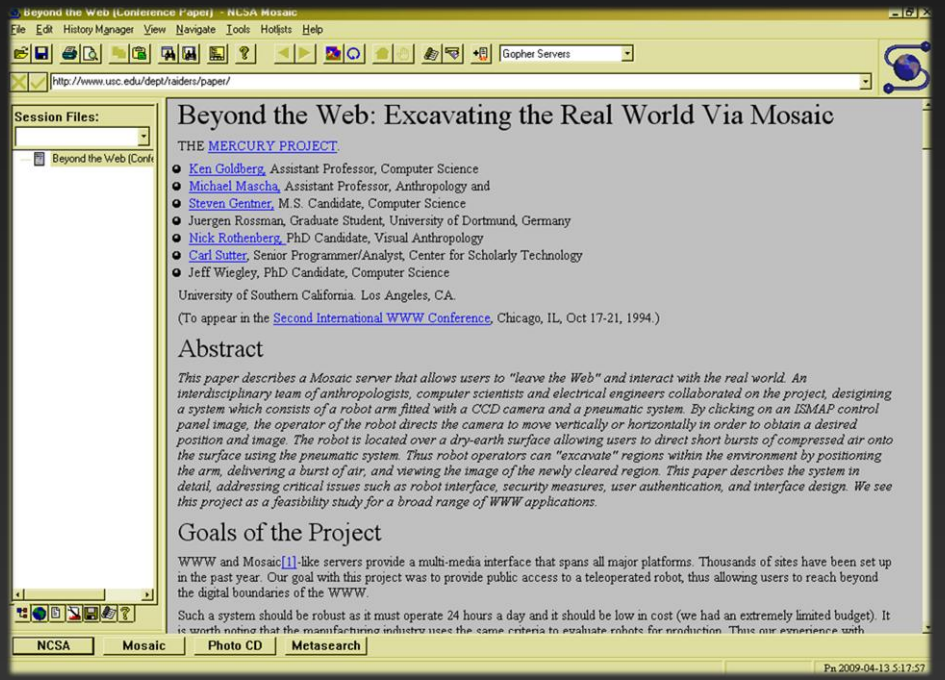
- Students use literal terms of addiction to characterize their dependence on media.
- Students hate going without media. In their world, going without media, means going without their friends and family.
- Students show no significant loyalty to a news program, news personality or even news platform. They get news in a disaggregated way, often via friends.
- 18-21 year old college students are constantly texting and on Facebook—with calling and email distant seconds as ways of staying in touch, especially with friends.
- Students could live without their TVs and the newspaper, but they can’t survive without their iPods.

Could you live for two weeks without access to social media?

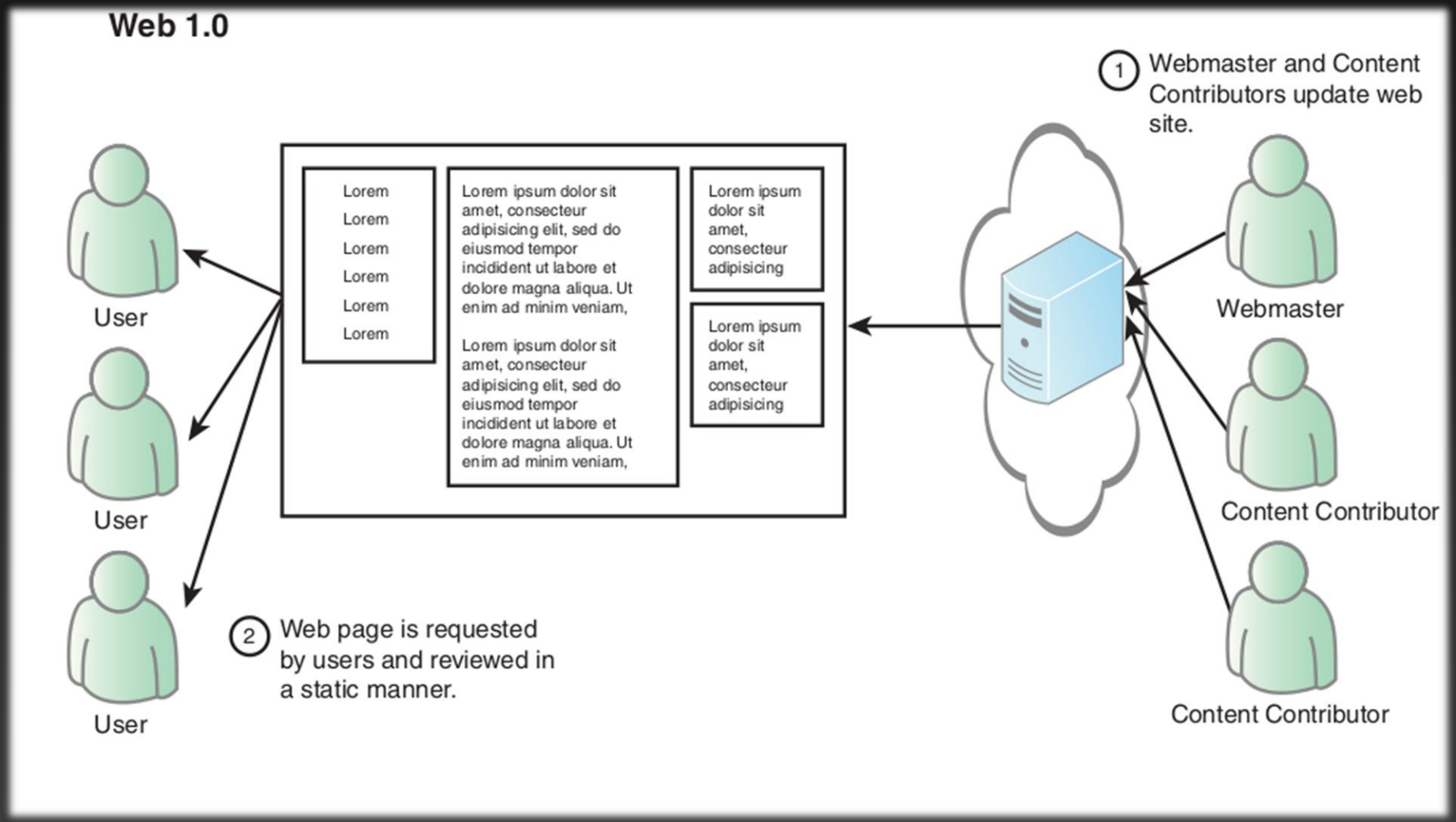


First popular web browser: Mosaic (1993)

- Protocols supported: Archie, FTP, gopher, HTTP, NNTP, telnet, WAIS
- Display images inline with text instead of displaying images in a separate window



How the web worked during the 1990s

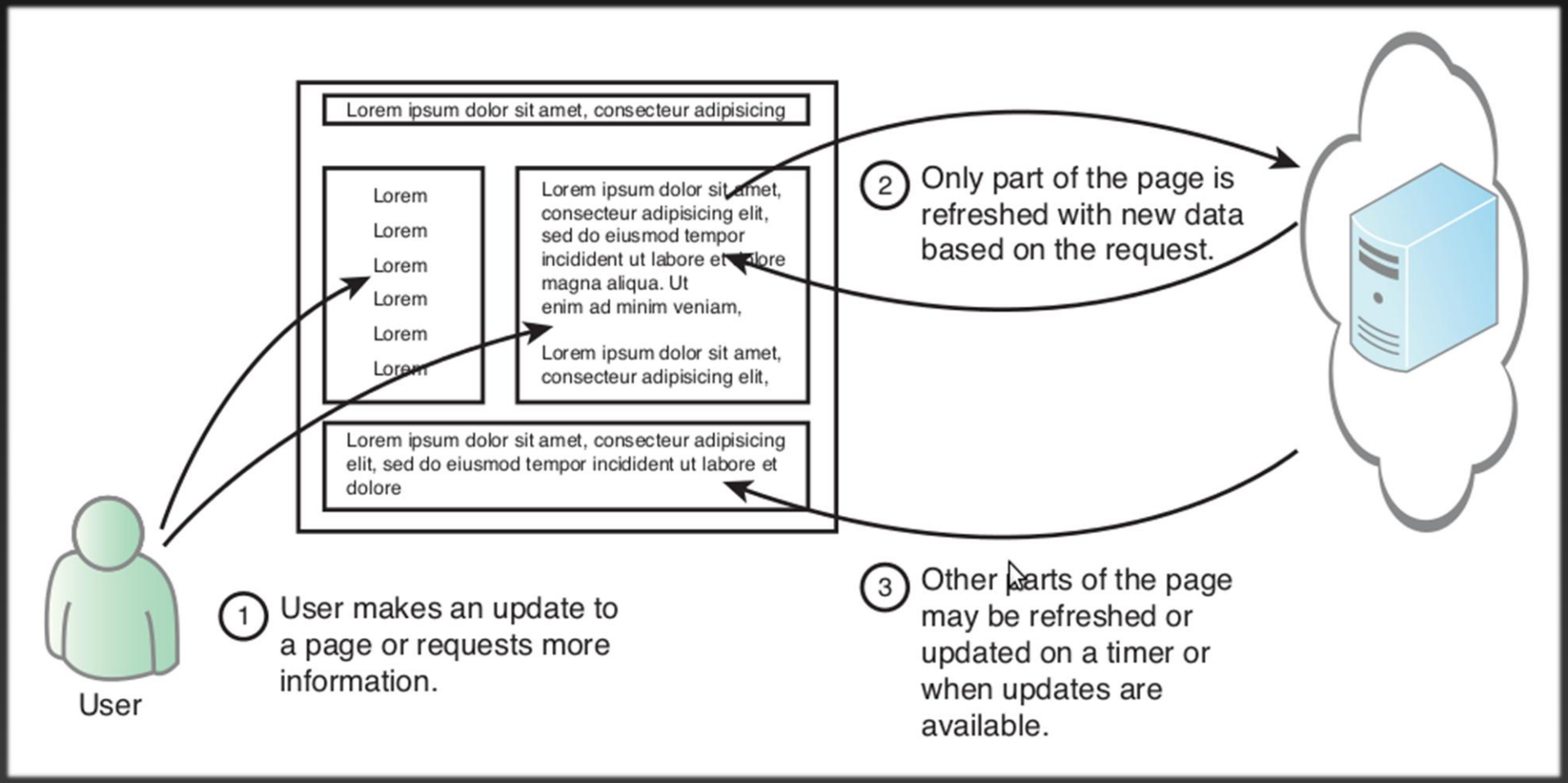


Joey Bernal. (2009). Web 2.0 and Social Networking for the Enterprise. Pearson Education.

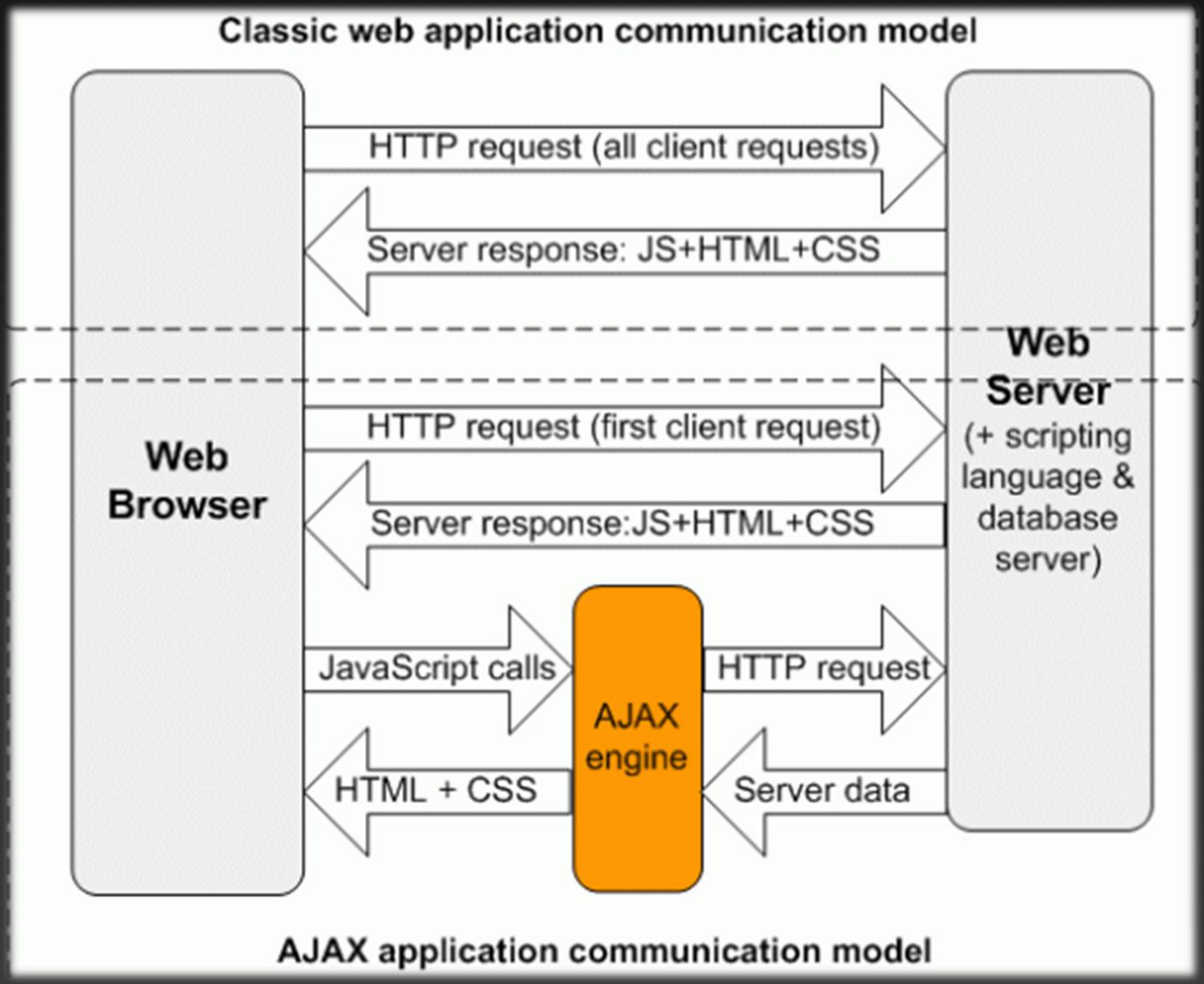
Web 2.0 Darcy DiNucci (January 1999)

"The Web we know now, which loads into a browser window in essentially static screenfuls, is only an embryo of the Web to come. The first glimmerings of Web 2.0 are beginning to appear, and we are just starting to see how that embryo might develop. The Web will be understood not as screenfulls of text and graphics but as a transport mechanism, the ether through which interactivity happens. It will [...] appear on your computer screen, [...] on your TV set [...] your car dashboard [...] your cell phone [...] hand-held game machines [...] maybe even your microwave oven."

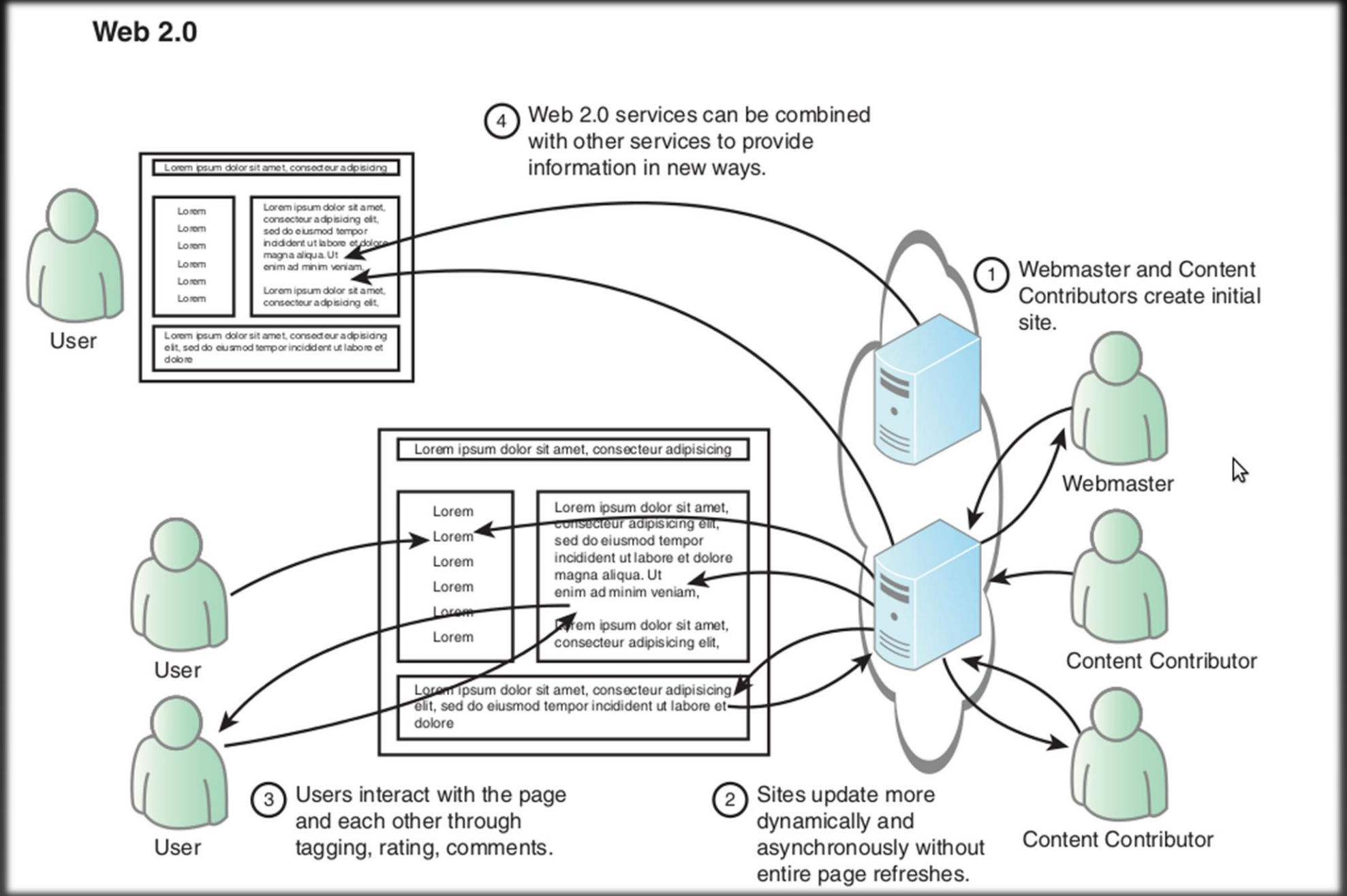
Graphical representation of AJAX



A more technical depiction AJAX



Web 2.0 and Social Media



Tremendous Change in our Lives

Social Media are Here to Stay

What is a Social Network?

A *social network* is a social structure made up of individuals (or organizations) called "nodes", which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige.

Online communities are Web sites where user relationships develop.

Source: Wikipedia (2011). http://en.wikipedia.org/wiki/Social_network . Accessed November 2011.
Source: Buss, A. and Strauss, N., Online Community Handbook: Building Your Business and Brand on the Web, 2009

Comparison of Social Networks and Online Communities (1)

A social network	An online community
• Has an organizational structure focused around an individual's one-to-one relationships. • Has weak secondary connections between members. • Allows its users to be members of many communities in the network at the same time.	• Has an organizational structure focused around a shared purpose rather than one-to-one relationships. • Has strong, predictable secondary relationships among members. • Is distinct from other communities because of differences in purpose, policies, and computing environment.

Source: Tharon Howard, Elsevier - Morgan Kaufmann Design to Thrive Creating Social Networks Edition 2010

Comparison of Social Networks and Online Communities (2)

A social network	An online community
• Is good for sharing activities. • Is less effective at activities requiring cooperation and collective action. • Makes it easier for users to build communities.	• Is good for activities requiring sharing and cooperation. • Is effective at providing the framework for activities requiring collective action. • Should not be confused with “adhocracies”, “discussion groups”, “forums”, or “lists”.

Source: Tharon Howard, Elsevier - Morgan Kaufmann Design to Thrive Creating Social Networks Edition 2010

Shirky's ladder

- Sharing
  Ideal for social networks, i.e. exchanging photos
- Cooperation
  takes more effort and demands more complexity, organizing activity for gathering resources for a party, strong secondary connections needed
- Collective action
  dealing with large organizational structures, such as unions, government agencies, corporations.

Source: Shirky, C. (2009). Here Comes Everybody: How Change Happens When People Come Together (p. 344). Penguin.

Social network sites

Social network sites are defined as web-based services that allow individuals to:

construct a public or semi-public profile within a bounded system	articulate a list of other users with whom they share a connection	view and traverse their list of connections and those made by others within the system.

Source: boyd, d. m. and Ellison, N. B. (2007), Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication, 13: 210–230.

“social network site” ≠ “social networking sites”

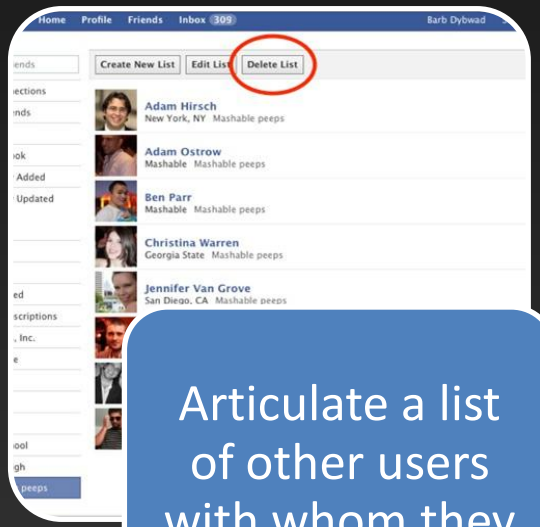
- “‘*Networking*’ emphasizes relationship initiation, often between strangers.”
- In a *network*, “Participants are not necessarily ‘networking’ or looking to meet new people; instead, they are primarily communicating with people who are already a part of their extended social network.”

> “What makes social network sites unique is not that they allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social networks.”

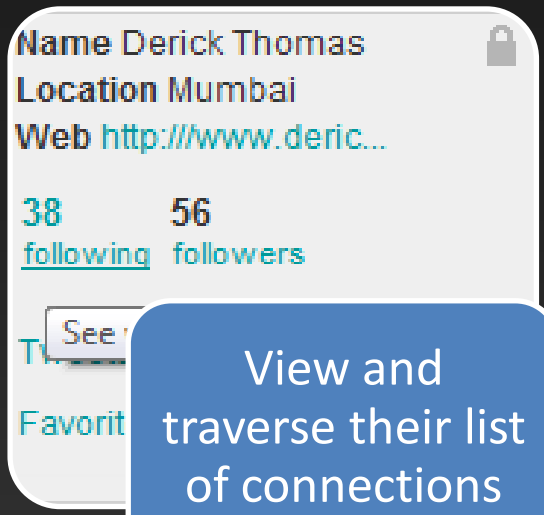
Source: boyd, d. m. and Ellison, N. B. (2007), Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication, 13: 210–230.

Ingredients for a social network site

Construct a public or semi-public profile within a bounded system



Articulate a list of other users with whom they share a connection



View and traverse their list of connections and those made by others within the system.

Source: boyd, d. m. and Ellison, N. B. (2007), Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication, 13: 210–230.

Technological Considerations for Social Media & SNS

Examples of Web 2.0 Core technologies

Client-side

- AJAX
- Adobe Flash
- Adobe Flex framework
- JavaScript/Ajax frameworks such as Dojo Toolkit or jQuery

Server-side

- PHP
- Ruby
- Perl
- Python
- JSP

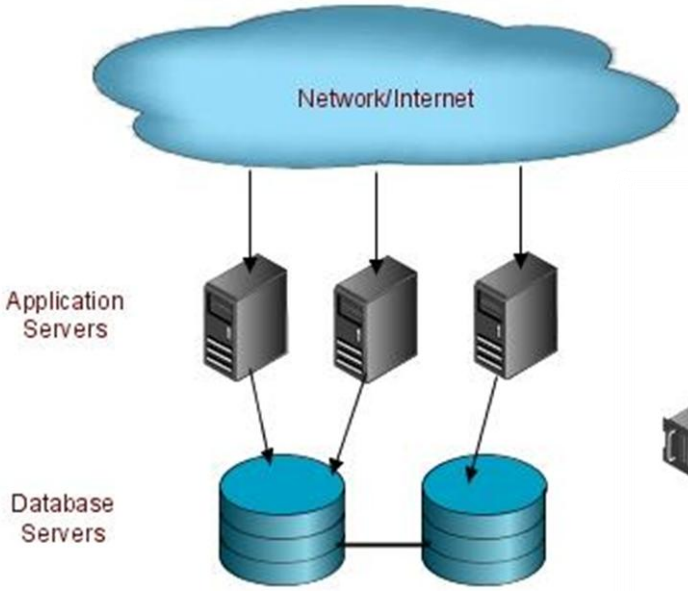
Facebook technologies

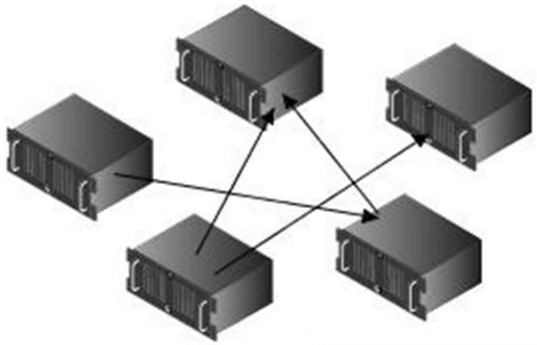
- The company is the largest user in the world of memcached, an open source caching system, and has one of the largest MySQL database clusters anywhere.
- Second most-trafficked PHP site in the world (Yahoo is #1)
- Lightweight but powerful multi-language RPC framework that allows us to seamlessly and easily tie together subsystems written in any language, running on any platform.
- Facebook is built in PHP, C++, Perl, Python, Erlang, Java.
- We've created a custom-built search engine serving millions of queries a day, completely distributed and entirely in-memory, with real-time updates.

What is memcached?

- Free & open source, high-performance, distributed memory object caching system, generic in nature, but intended for use in speeding up dynamic web applications by alleviating database load.
- Memcached is an in-memory key-value store for small chunks of arbitrary data (strings, objects) from results of database calls, API calls, or page rendering.
- Memcached is simple yet powerful. Its simple design promotes quick deployment, ease of development, and solves many problems facing large data caches. Its API is available for most popular languages.

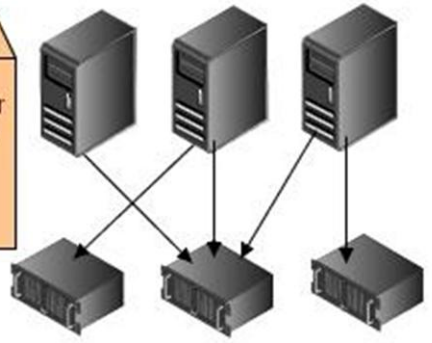
Why memcached?





Common load distribution. But memcached **do not** work this way.

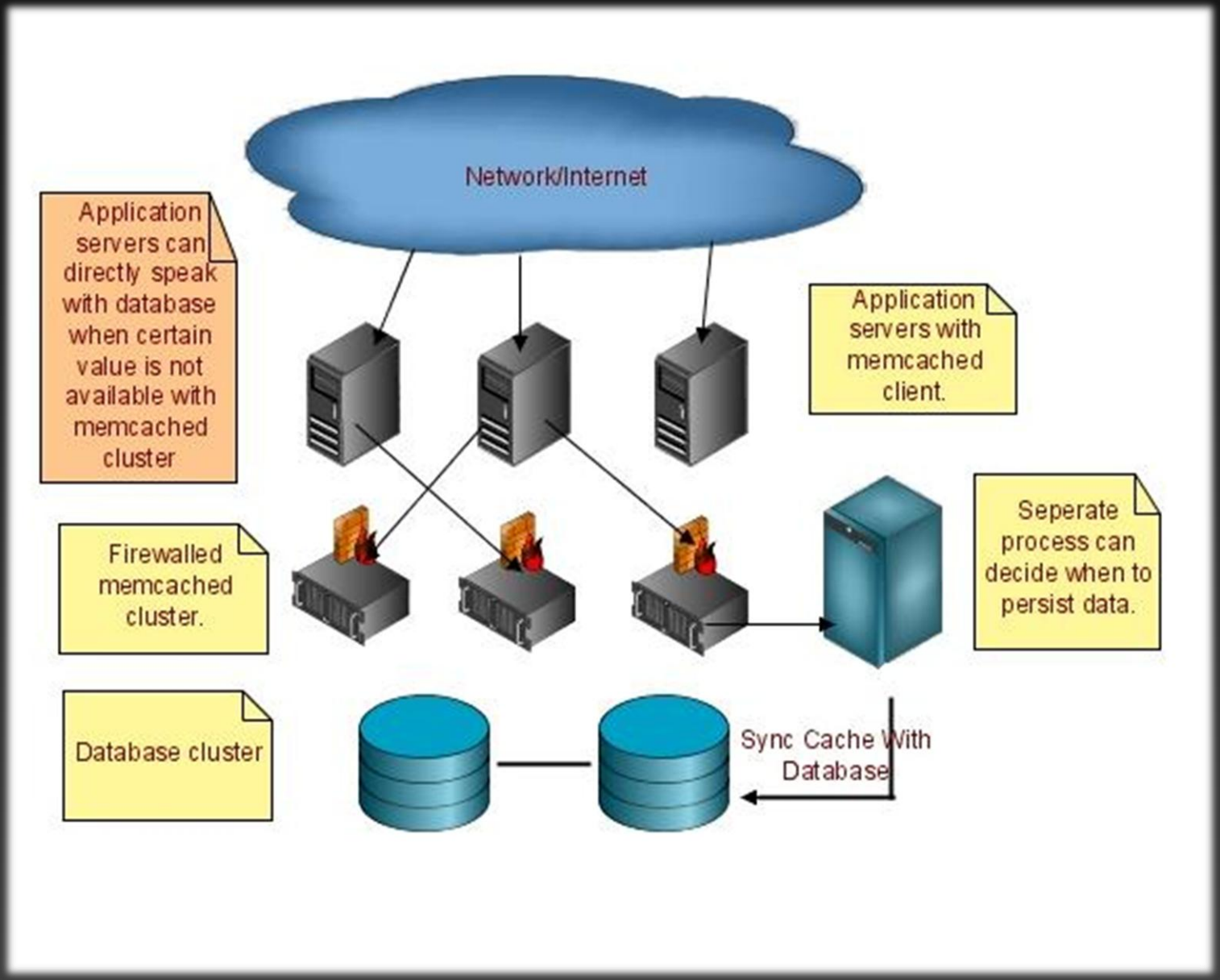
Client decides from which server to read or write based on hashing scheme.



Memcached client code running as part of application code.

Memcached servers running independent of each other.

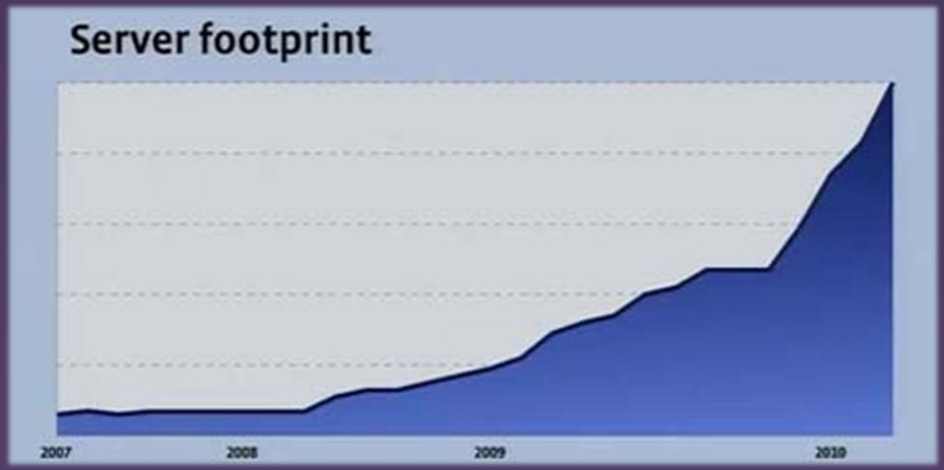
A memcached example



How many servers does Facebook have?

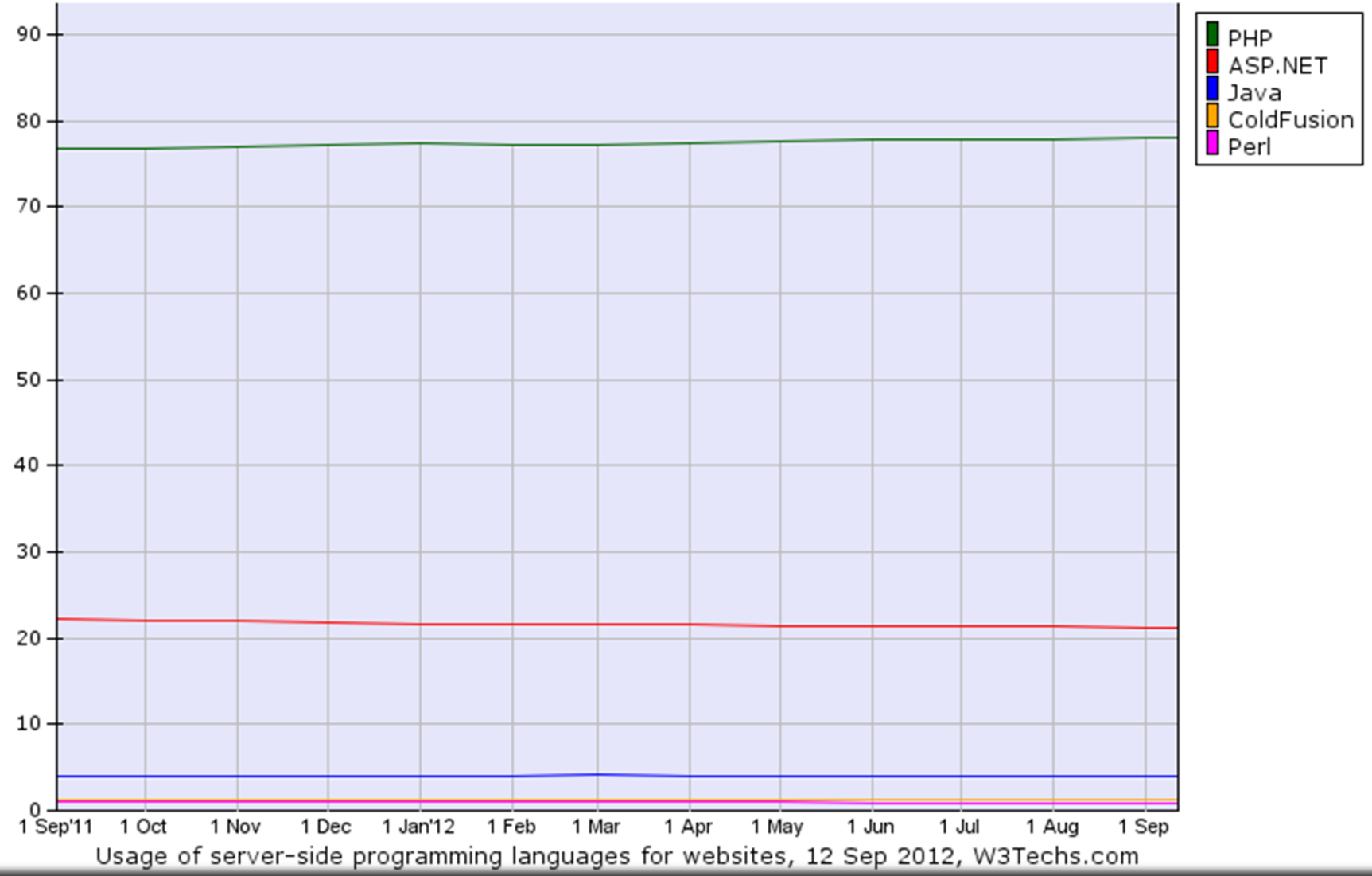
Facebook Server Estimate

- In a presentation in November 2009, Facebook vice president of technology Jeff Rothschild disclosed that the company had more than 30,000 servers.
- Tom Cook at last week's Velocity 2010 conference presented this figure in his presentation. Effectively making the servers 60.000 or more!

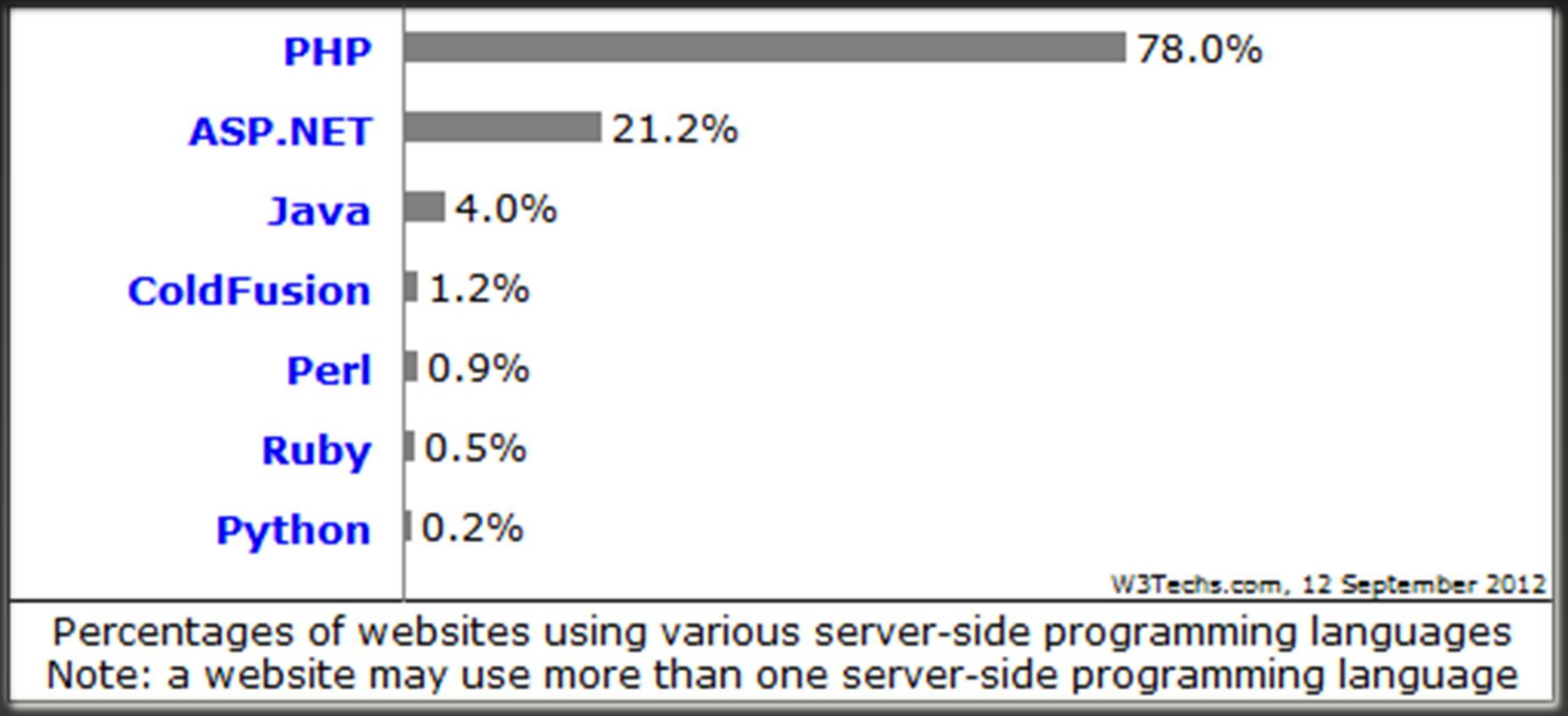


Facebook's infrastructure probably doesn't look like this

Server-Side Programming Trend
September 2011 – September 2012

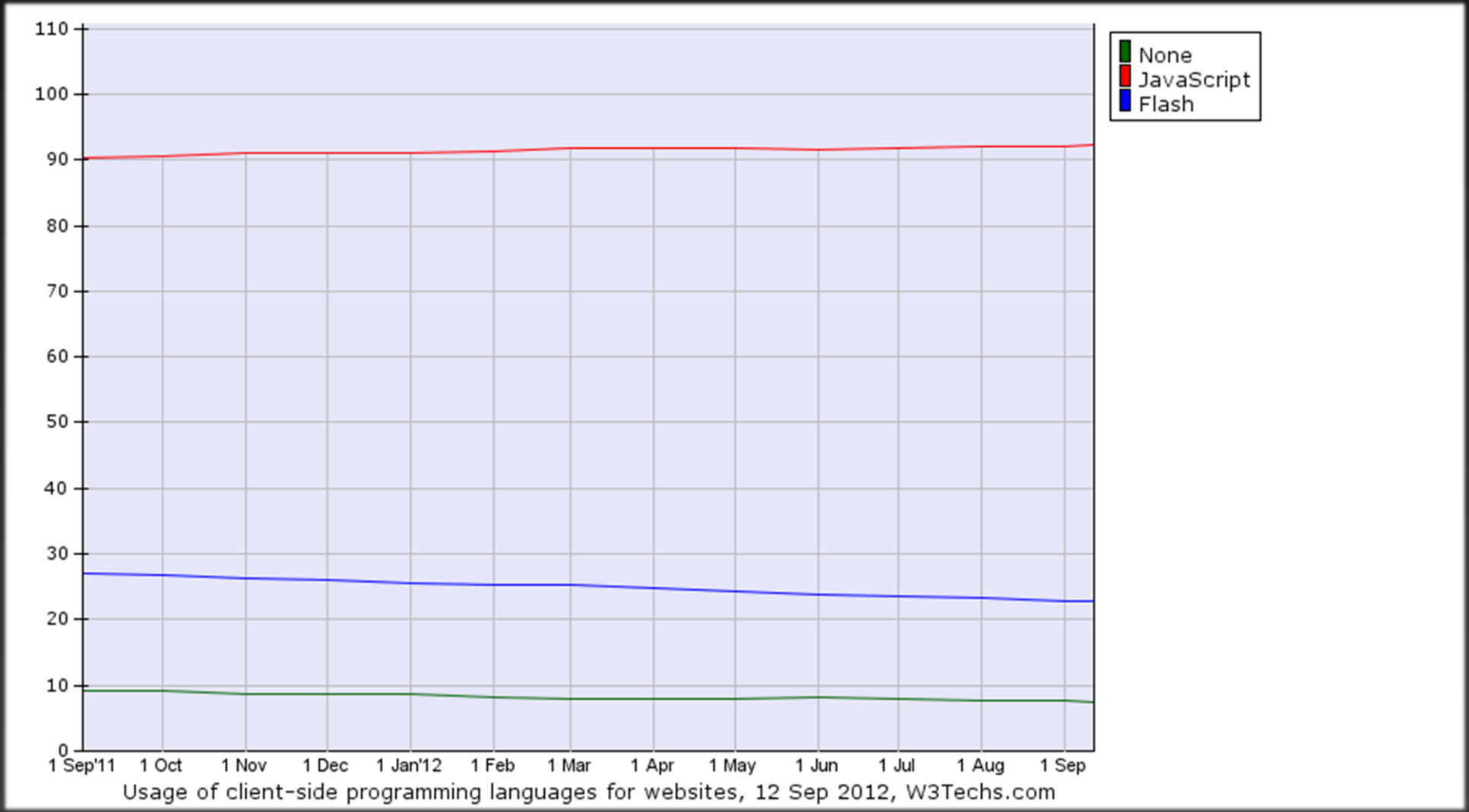


September 2012 Usage of server-side programming languages

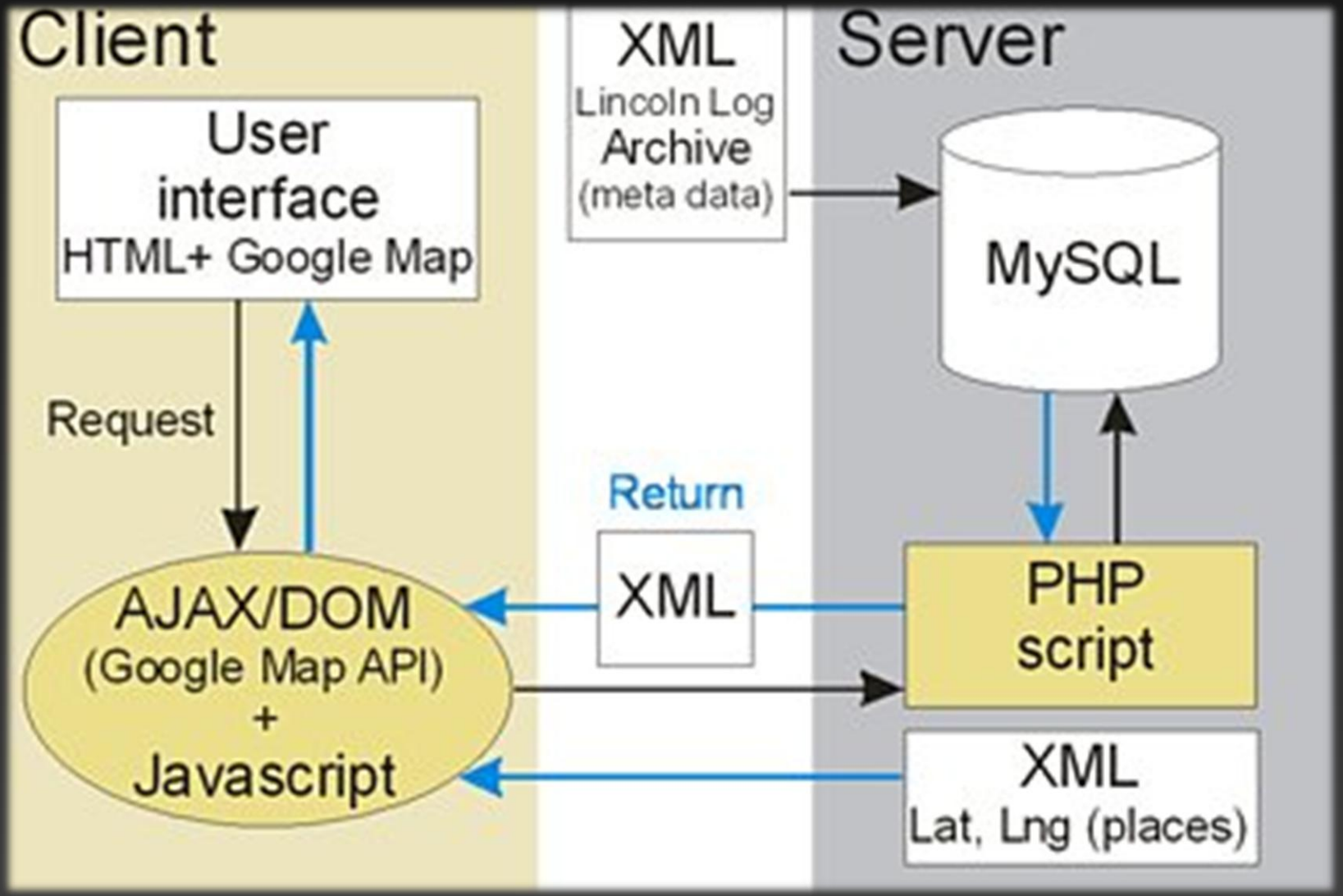


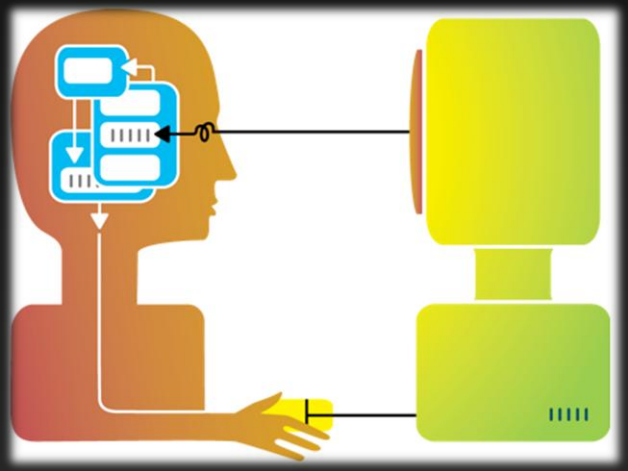
Percentages of websites using various server-side programming languages
Note: a website may use more than one server-side programming language

Client-Side Programming Trend September 2011 – September 2012



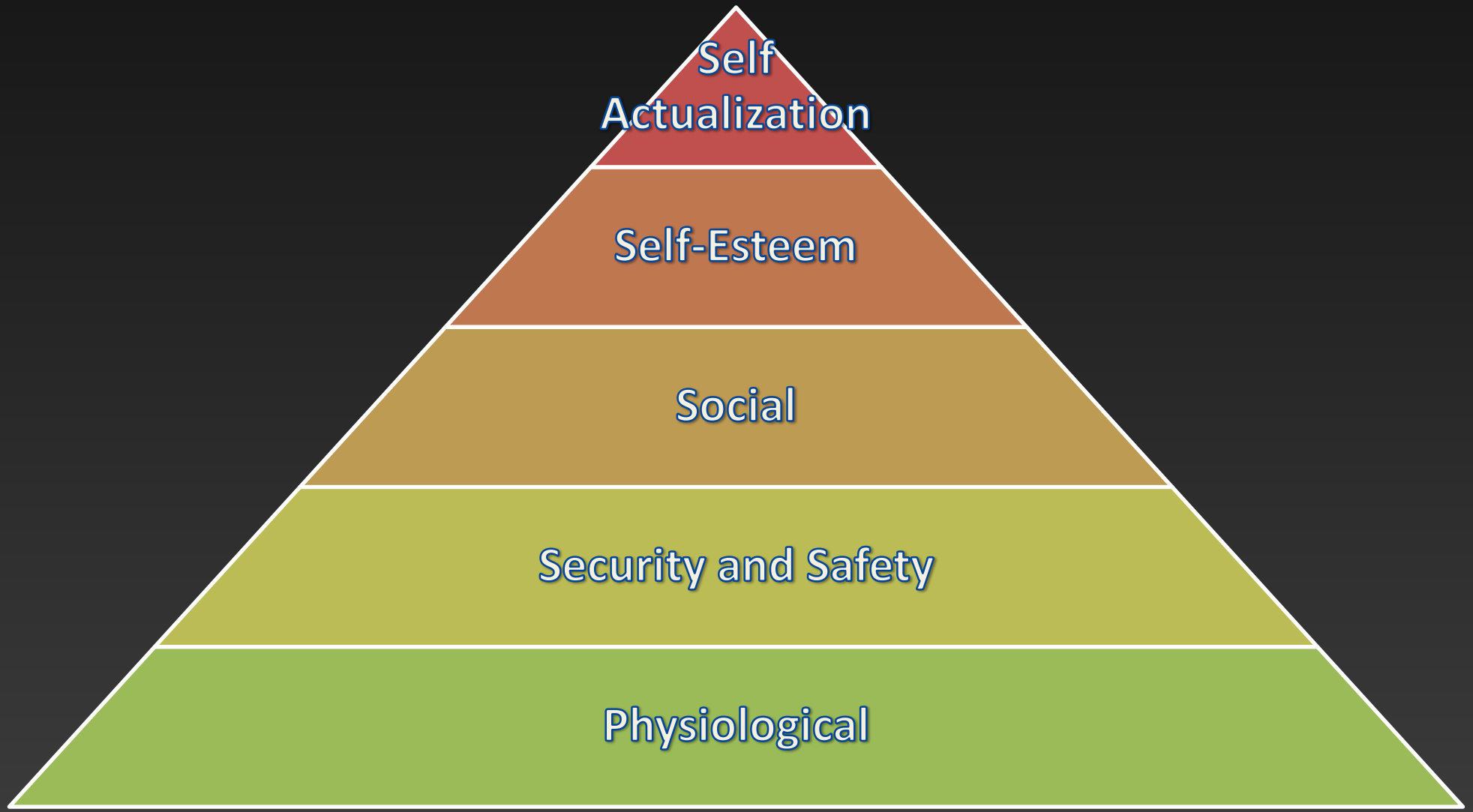
An example of binding all the technologies





Designing Interaction for Social Media and SNS

Maslow's Hierarchy of Needs

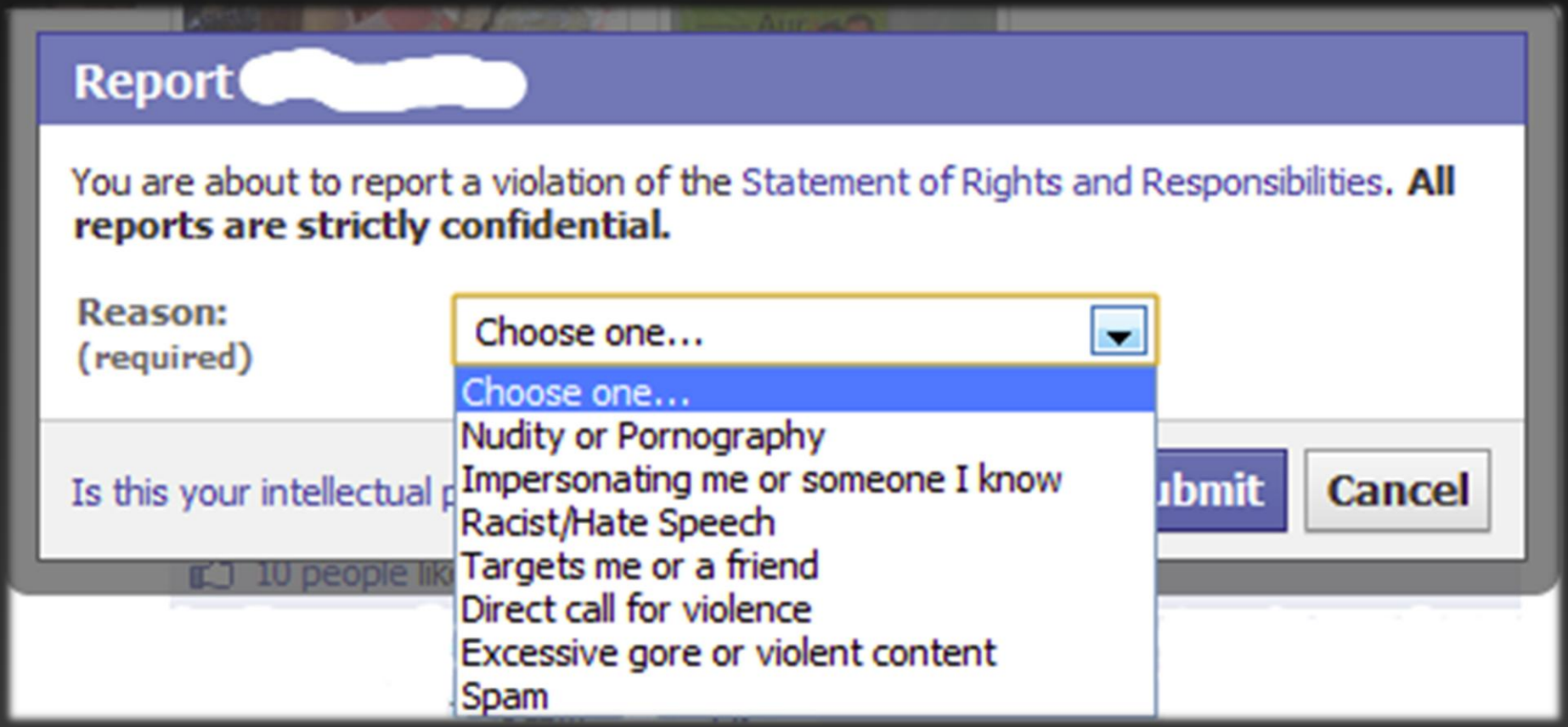


Source: Kim, A. J. (2000). Community Building on the Web. Peachpit Press.

Examples of satisfying needs for Security and Safety & Self-Esteem

Protecting against Aggressive content	Protecting against Racist content	Controlling for Pornographic content
Safeguarding against Abusive content	Eliminating Cyberbullying	Dealing with Copyright Issues

Moderating the content



Youtube's automated approach: What is the Content ID tool?

The Content ID tool is the latest way YouTube offers copyright holders to easily identify and manage their content on YouTube. The tool creates ID files which are then run against user uploads and, if a match occurs, the copyright holders policy preferences are then applied to that video. Rights owners can choose to block, track or monetize their content.

Source: http://www.youtube.com/t/contentid

Youtube's Content ID Video

Software moderation: Bullytracer's example

- Rules based on a dictionary of keywords are used to classify a window of posts.
- A truth set of MySpace threads was created.
- Identified correctly windows containing cyberbullying 85.30%, and identified innocent 51.91%
- *The overall accuracy is 58.63%.*

Source: Bayzick, Jennifer and Kontostathis, April and Edwards, Lynne (2011) Detecting the Presence of Cyberbullying Using Computer Software. pp. 1-2. In: Proceedings of the ACM WebSci'11, June 14-17 2011, Koblenz, Germany.

Best approach: Mixed-Methods(?)

- Moderators as the main protective force of a social network site
- Users contributing by reporting what moderators cannot see or do not have enough time to see(such as personal messages)
- Software used to detect suspicious messages which moderators can investigate later on and evaluate them

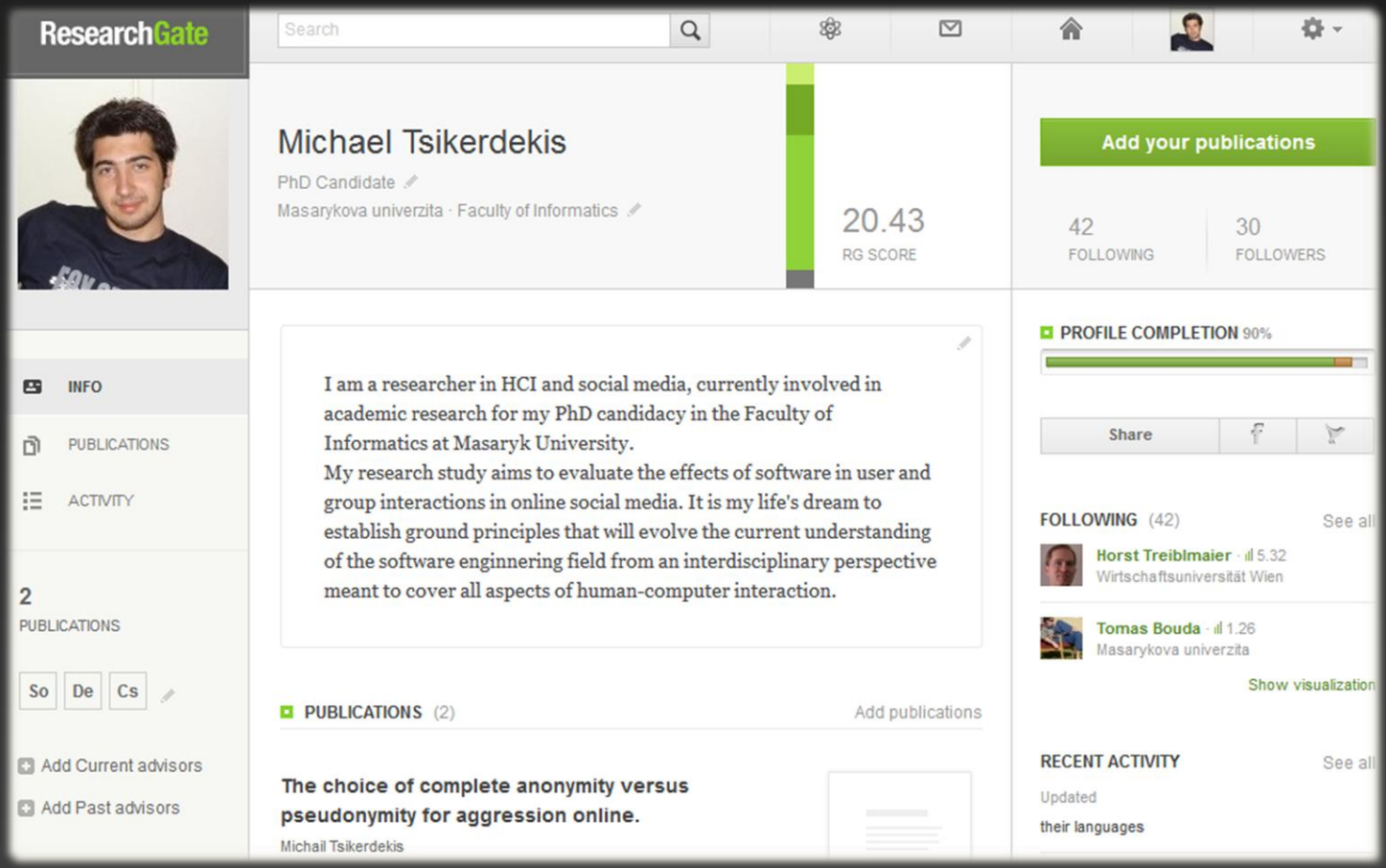
Cooperative principle

Maxim of Quality	• Be Truthful: Do not say what you believe to be false. Do not say that for which you lack adequate evidence.
Maxim of Quantity	• Make your contribution as informative as is required and not more informative than required.
Maxim of Relevance	• Relevance: Be relevant.
Maxim of Manner	• Be Clear: Avoid obscurity of expression. Avoid ambiguity. Be brief. Be orderly.

Source: Grice, Paul (1975). "Logic and conversation". In Syntax and Semantics, 3: Speech Acts, ed. P. Cole & J. Morgan. New York: Academic Press. Reprinted in Studies in the Way of Words, ed. H. P. Grice, pp. 22–40. Cambridge, MA: Harvard University Press (1989)

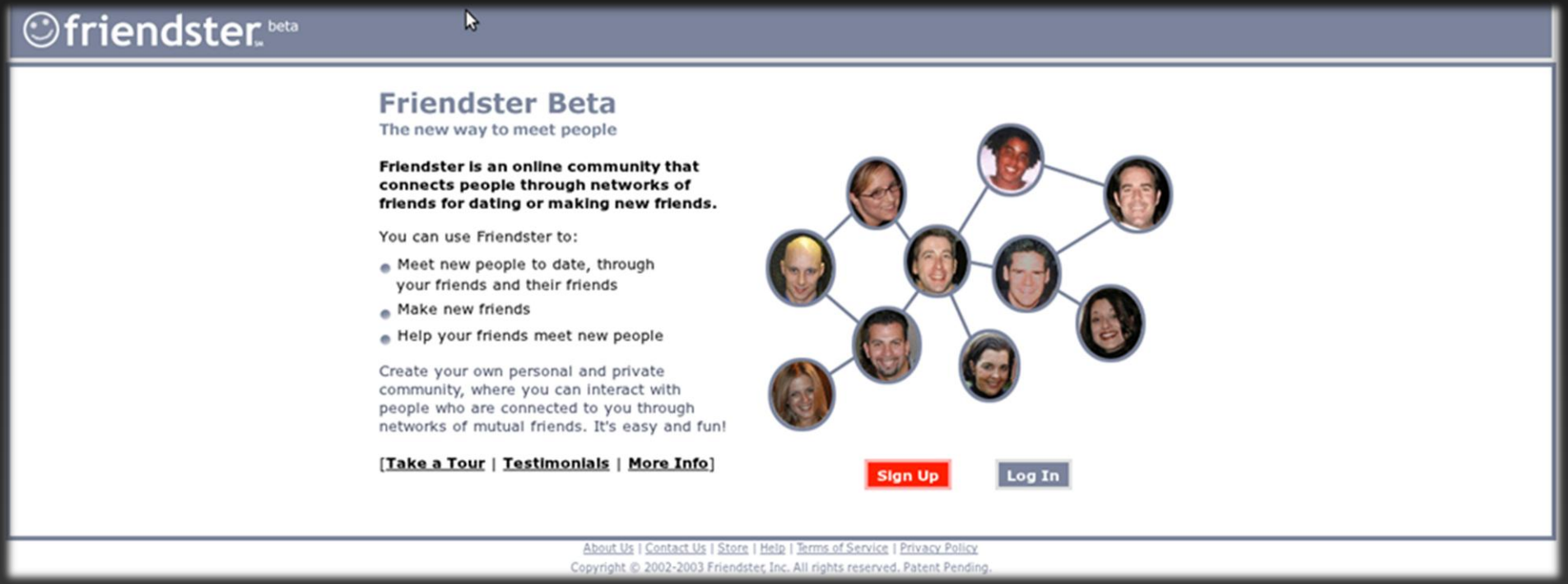
Example: Maxim of Quality

65% of people believe in ghosts.[*citation needed*]



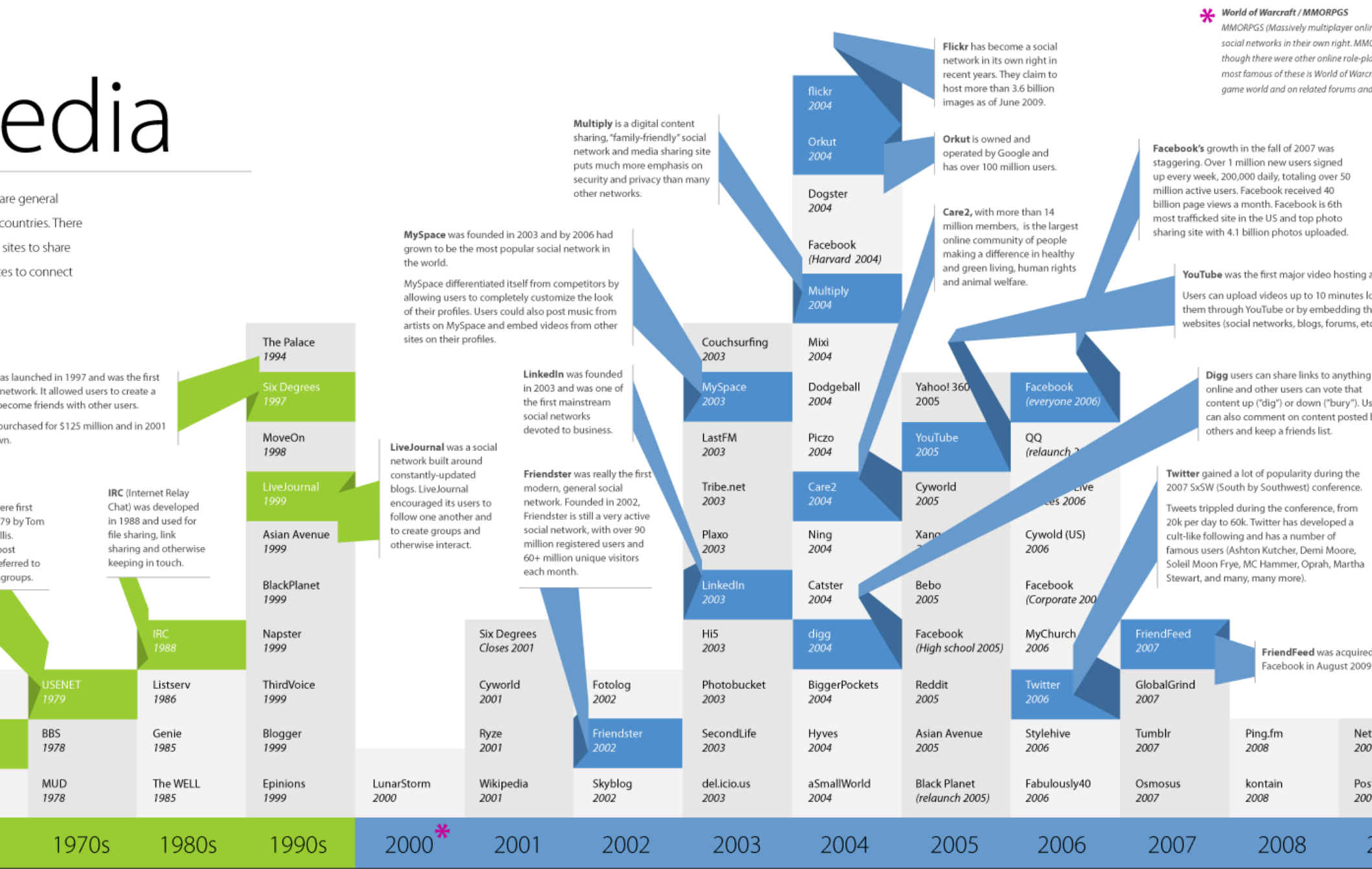
Design, Development and Management of a Social Network/ing Site

The Friendster case



How old is Friendster?

Image Source: Skloog. http://www.ritholtz.com/blog/2010/12/history-of-social-media/. Accessed September 11, 2012



Friendster highlights

- Friendster is built on the assumption that friends-of-friends are more likely to be good dates than strangers.
- While Stanley Milgram argues that everyone is connected within 6 degrees, Friendster only allows you to see or communicate with those who are within 4 degrees.
- Friendster encourages users to join even if they are not looking for dates Friendster launched into public beta in the fall of 2002. By mid-August 2003, the site had 1.5 million registered accounts and was still growing exponentially.

danah boyd (2003). "Reflections on Friendster, Trust and Intimacy." Ubiquitous Computing (Ubicomp 2003), Workshop application for the Intimate Ubiquitous Computing Workshop. Seattle, WA, October 12-15, 2003.

Technical Difficulties

- Friendster's servers and databases were ill-equipped to handle its rapid growth, and the site faltered regularly, frustrating users who replaced email with Friendster.

Social difficulties

- Upset cultural balance
- Collapse in social contexts
- Fakesters & Trophy Friends

Friendster's solution

- Active deletion of Fakesters (and genuine users who chose non-realistic photos) signaled to some that the company did not share users' interests.
- Many early adopters left because of the combination of technical difficulties, social collisions, and a rupture of trust between users and the site.

Source: boyd, d. m. and Ellison, N. B. (2007), Social Network Sites: Definition, History, and Scholarship. Journal of Computer-Mediated Communication, 13: 210–230.

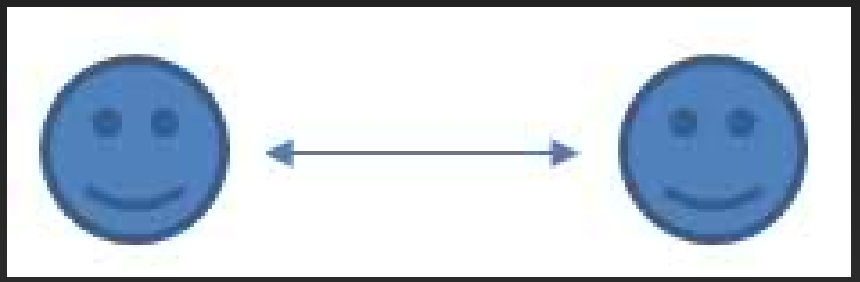
Friendster's Violations of Maslow's Hierarchy

- Psysiological (Restricting access either intentionally or unintentionally)
- Social (Not allowing users to form subgroups based on their interests)
- Self Actualization (Not allowing users to form their identities as they wish or use pictures other than the ones with their real faces)

Social network analysis

Social Network Analysis

- It is useful for investigations of kinship patterns, community structure, interlocking directorships and so forth
- It is mainly an analysis for **relational data**



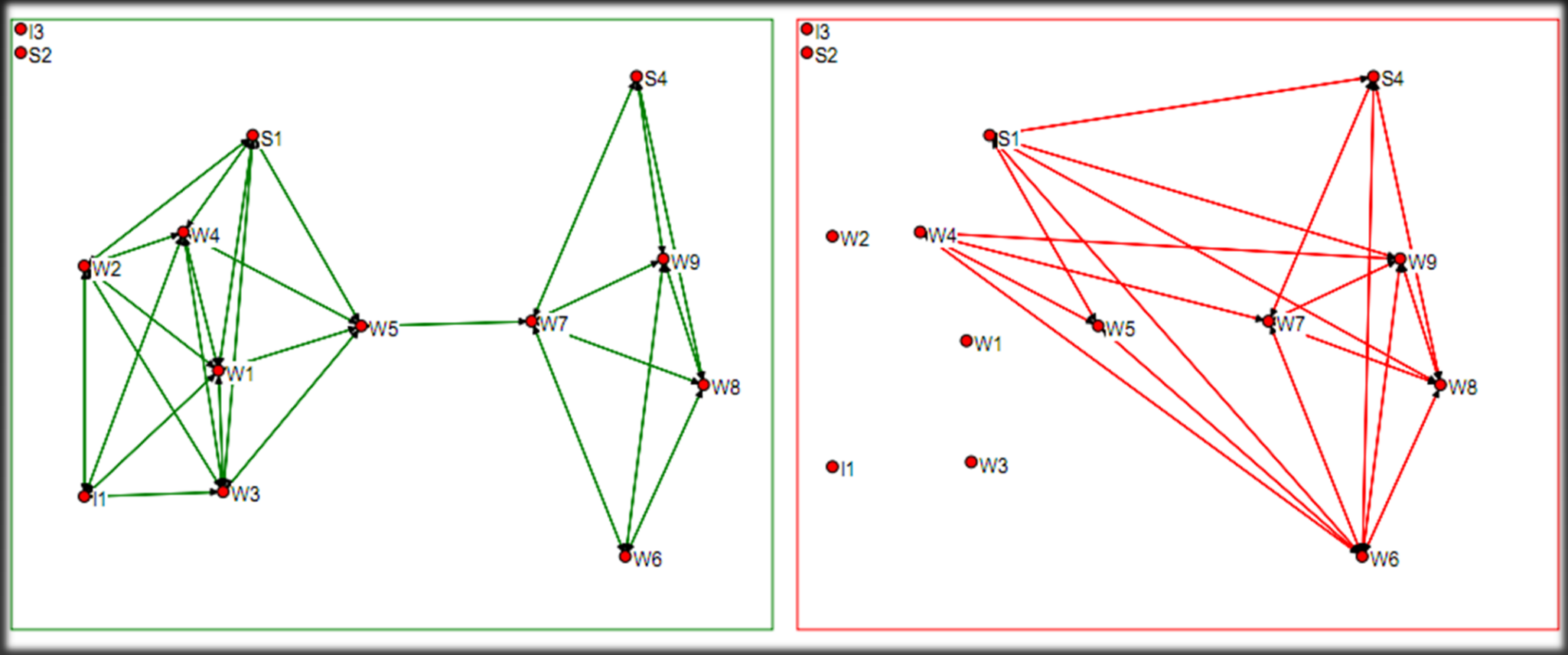
Types of Nodes

- Individuals: persons, other animals
- Collectivities: organizations, departments, teams, troops, countries, cities, species

Relations Among People

- Kinship: - mother of, wife of
- Other role-based: boss of, teacher of, friend of
- Cognitive/perceptual: knows, aware of what they know
- Affective: likes, trusts
- Interactions: give advice, talks to, fights with
- Affiliations: belongs to same clubs, is physically near
- Each relations yields a different structure & has different effect!

Examples of Networks



An example of Social Network Analysis study

Goals

- How network analysis could allow us to capture the social structure of the high school staff and teachers at the start of a whole-school health promotion intervention?
- Identify key players or gatekeepers who might be crucial to getting the intervention off the ground
- Mapping networks systematically at the start of an intervention, and analyzing them mathematically

Location and sample

- High school in Alberta, Canada with total student population 556.
- Mental health promotion intervention modeled on the experience of the successful Gatehouse project in Australia
- Staff and teachers were our focus for the first stage of the intervention.

Design method

Map five relations across all teachers and staff in the school based on initial consultation and pilot.

Relations:

– knew a person by name
– knew a person more personally
– engaged in regularly occurring conversations with a person
– sought advice from a person in relation to a school matter
– socialized with that person outside of school hours

Self administered questionnaires sent to staff and teachers with questions focused on usual transactions and routine relationships.

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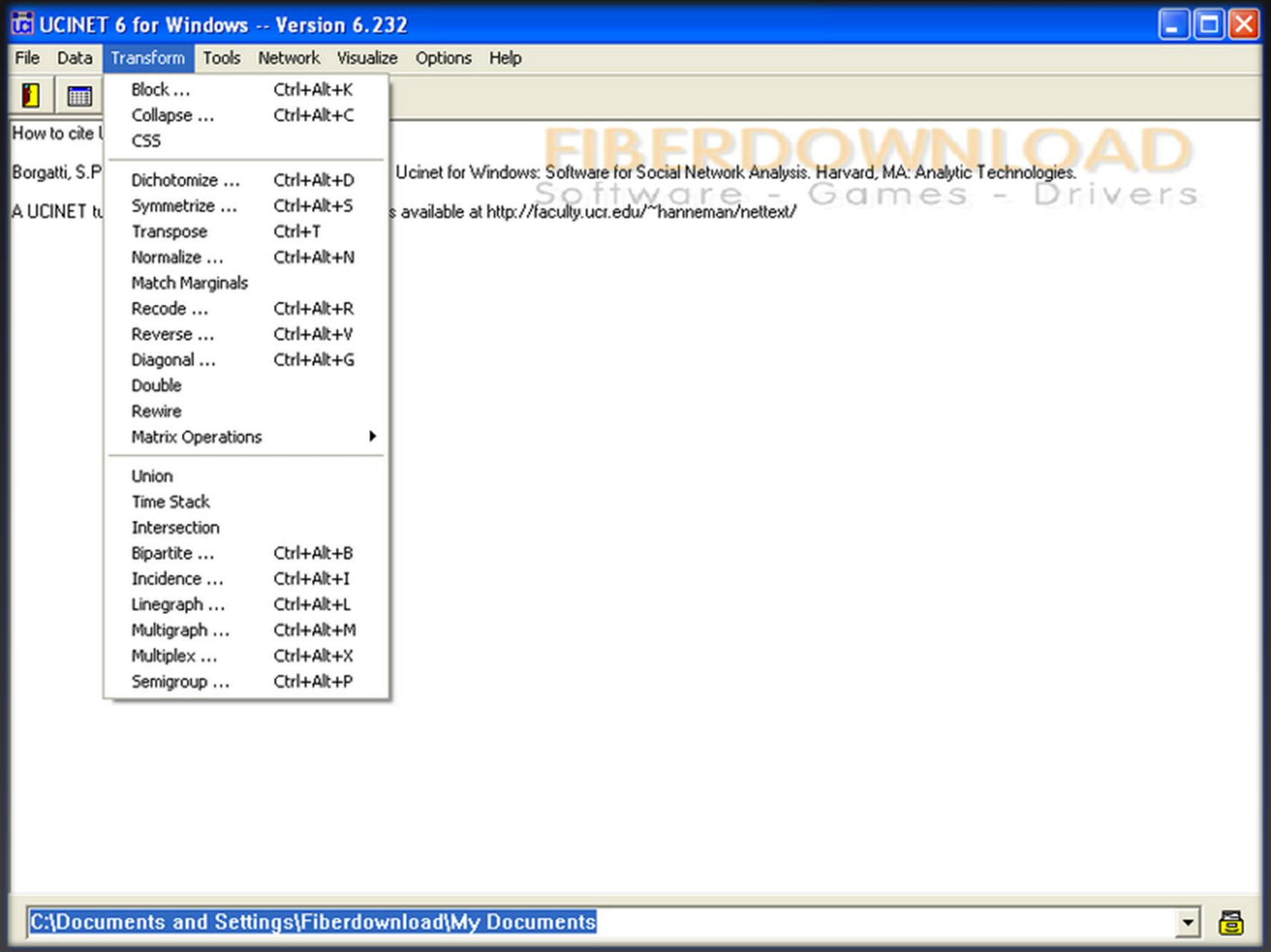
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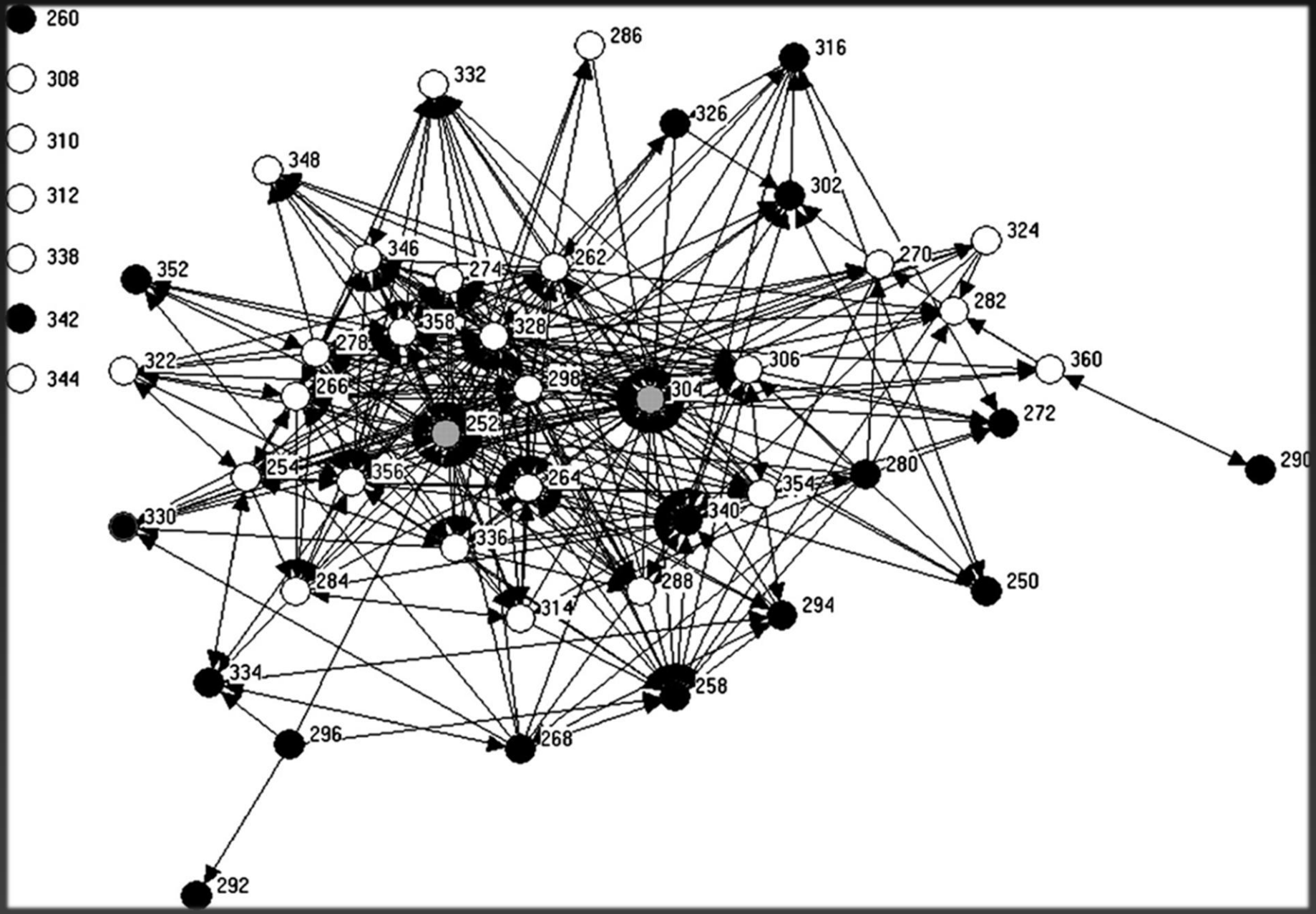
Analysis Methods

- Network degree centralization score
- Network betweenness centralization score: measure of strategic advantage and information control.
- Two-step reach measure of the extent to which any person could mobilize resources or convey information by reaching out to others.
- Others are measures about an individual person's position in the network.
- Classified people as: teachers, support staff, administration
- Also conducted analysis of gender

Basic characteristics of the five networks (n = 50)

Relationship	Density (%)	Degree centralization (%)	Betweenness centralization (%)
Socialize with outside school	5.9	19.4	14.4
Seek advice	15.2	54.0	23.4
Engage in conversation regularly	25.5	39.3	4.8
Know personally	29.0	38.9	4.63
Recognize by name	65.9	27.4	1.47

Advice seeking network



Principal and Vice principal

- The Principal has 37 direct ties and the Vice Principal has 35 direct ties in the advice-seeking network.
- Freeman's degree centrality measure: 76%, 71%
- Betweenness centrality: The Principal has four times the score of Vice Principal for betweenness centrality because the Principal is connected to some people who otherwise seek advice from no one.
- This increases his power and potentially makes him more important or crucial.

Conclusions (1)

- Density was related to what might thought of as the intensity of the relationship.
- Network density was higher for more superficial relationships, such as knowing a person by name, and smaller for socializing.
- The density for knowing-by-name was lower than we had expected at 65%.
- That is, more people are in that awkward position of encountering other staff and teachers, but not being addressed by their name.

Conclusions (2)

- No isolates in the know-by-name network. Everyone was linked to someone, including all 10 newcomers.
- Seeking advice was centered around the Principal and Vice Principal
- Seven people were unconnected in the advice-seeking network, a phenomenon which could be addressed, if perceived as a problem.

Applications

- As an example, low density in the socializing network is acceptable, but that low density, and in particular the presence of isolated people, in the advice-seeking network is not
- Another common type of analysis is to search for cliques or closely connected subgroups. Diagnostics depend on the goals and purpose of the researcher.
- Identifying people of strategic influence, so that interventions can be tailored to them. Identify and recruit natural leaders or helpers in communities.

Summary (1)

- Social media and social network sites are tools, online communities may use many of these tools
- There is a great variety of technologies out there for developing social media & social networks (php, HTML5, python, MySQL, Memcached, Javascript, AJAX, Adobe Flash)
- Scaling up poses multiple technological and sociological challenges even for famous social network sites today
- There are many ways of developing and maintaining a social network site. The options for the software and the overall design are highly depended to the purpose of each service.

Summary (2)

- Technology changes rapidly; Humans don't! Social media & SNS science is an interdisciplinary field where the social part is intertwined with technological.
- Maslow's hierarchy, RIBS and similar models can help understand online user needs and be general guidelines for developing tools. Providing access and security should be the first and most important steps for building a community.
- Extracting information from social networks requires planning head during the design stage. Relational data are required for social network analysis.

Further Reading

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