

# Applications That Changed The World

Some slides adapted from UC  
Berkeley CS10 – Dan Garcia

# Lecture Overview

- What counts?
- For each application
  - Historical context
    - What world was like before
    - On what shoulders does it stand?
  - Key players
    - Sometimes origins fuzzy
  - How it changed world
- Summary



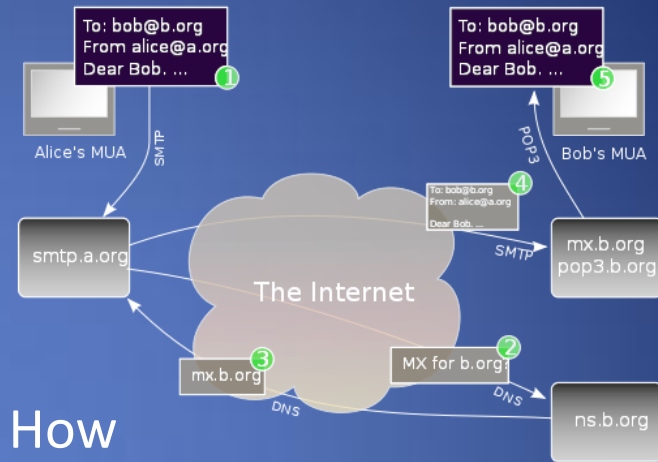
# Applications that Changed the World

- Lots of applications changed the world
  - Electricity, Radio, TV, Cars, Planes, AC, ...
- We'll focus on those utilizing Computing
- Important to consider historical apps
  - Too easy to focus on recent N years!



# Email (1965)

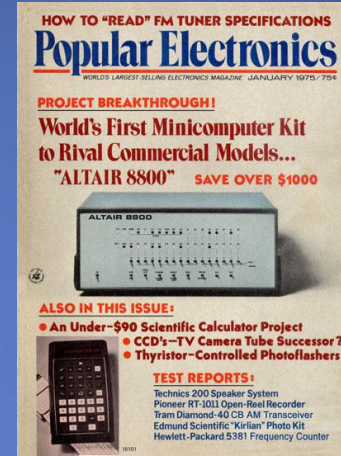
- Fundamentally changed the way people interact!
- 1965: MIT's CTSS
  - Compatible Time-Sharing Sys
- Exchange of digital info
  - Model: “Store and Forward”
  - “Push” technology
- Pros
  - Solves logistics (where) & synchronization (when)
- Cons
  - “Email Fatigue”
  - Information Overload
  - Loss of Context



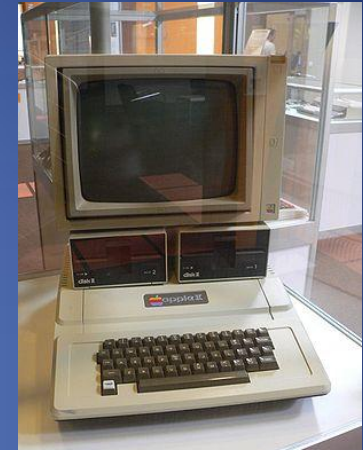
- How
  - Alice composes email to bob@b.org
  - Domain Name System looks up where b.org is
  - DNS server with the mail exchange server for b.org
  - Mail is sent to mx.b.org
  - Bob reads email from there

# The Personal Computer (1970s)

- First PCs sold as kits to hobbyists
  - Altair 8800 (1975)
- Early mass-prod PCs
  - Apple I, II (Jobs & Woz)
  - Commodore PET
  - IBM ran away w/market
- Microprocessor key
- Laptops → portability
- Created industry, wealth
  - Silicon Valley!
  - Bill Gates worth \$50 Billion



Altair 8800



Apple II



Commodore  
PET



IBM PC



# The World Wide Web (1989)

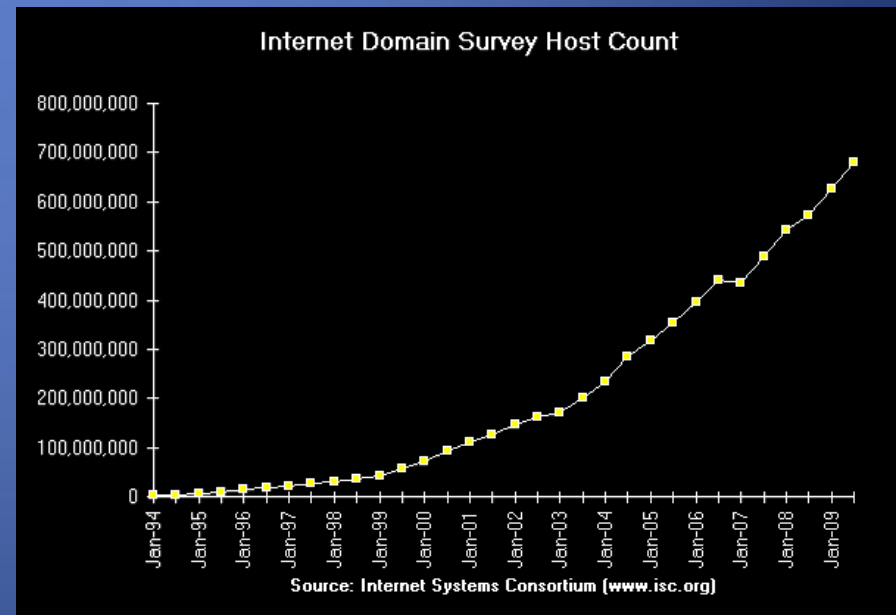
- “System of interlinked hypertext documents on the Internet”
- History
  - 1945: Vannevar Bush describes hypertext system called “memex” in article
  - 1989: Tim Berners-Lee proposes, gets system up '90
  - ~2000 Dot-com entrepreneurs rushed in, 2001 bubble burst
- Wayback Machine
  - Snapshots of web over time
- Today : Access anywhere!



Tim Berners-

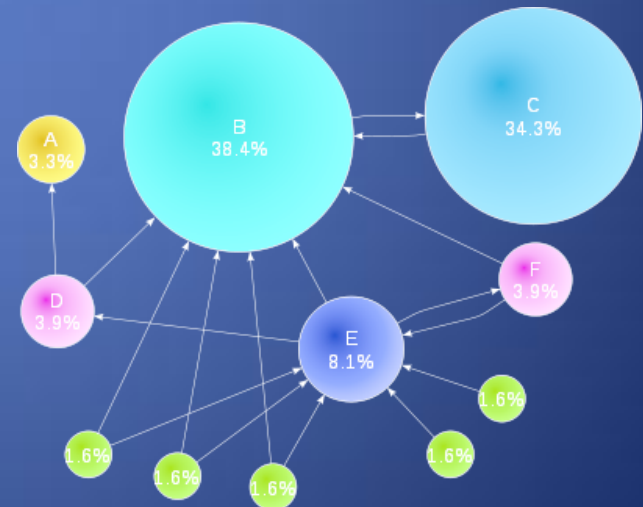


World's First web server in 1990



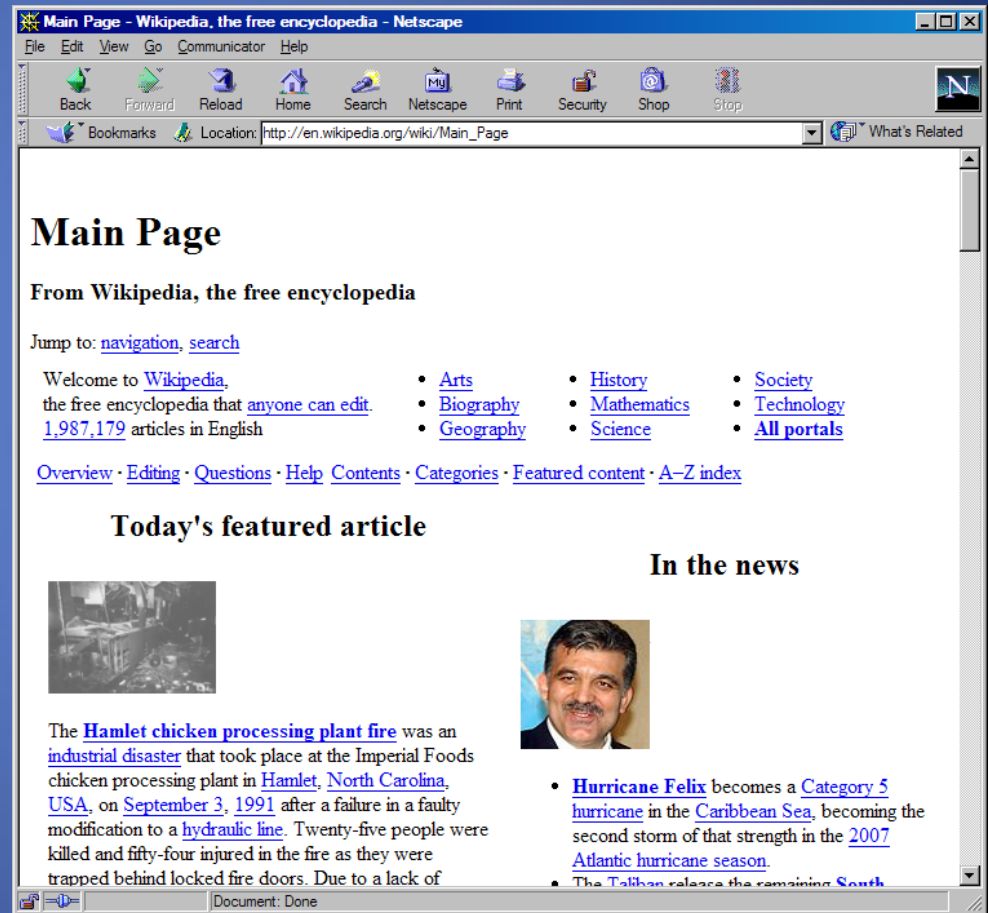
# WWW Search & Browser (1993)

- Browser
  - Marc L. Andreessen and Eric J. Bina @ NCSA create Mosaic, 1<sup>st</sup> popular WWW browser
    - First Internet “Killer App”
    - Later: Netscape Navigator
  - Now IE (68%), Firefox (22%)
- Search
  - Before engines, there was a complete list of all servers!
  - 1993 Martijn Koster Aliweb is 1<sup>st</sup> web search engine
  - 1997 Stanford Sergey Brin and Larry Page develop Google’s search, based on PageRank (each: \$12 Billion)



# Netscape Navigator

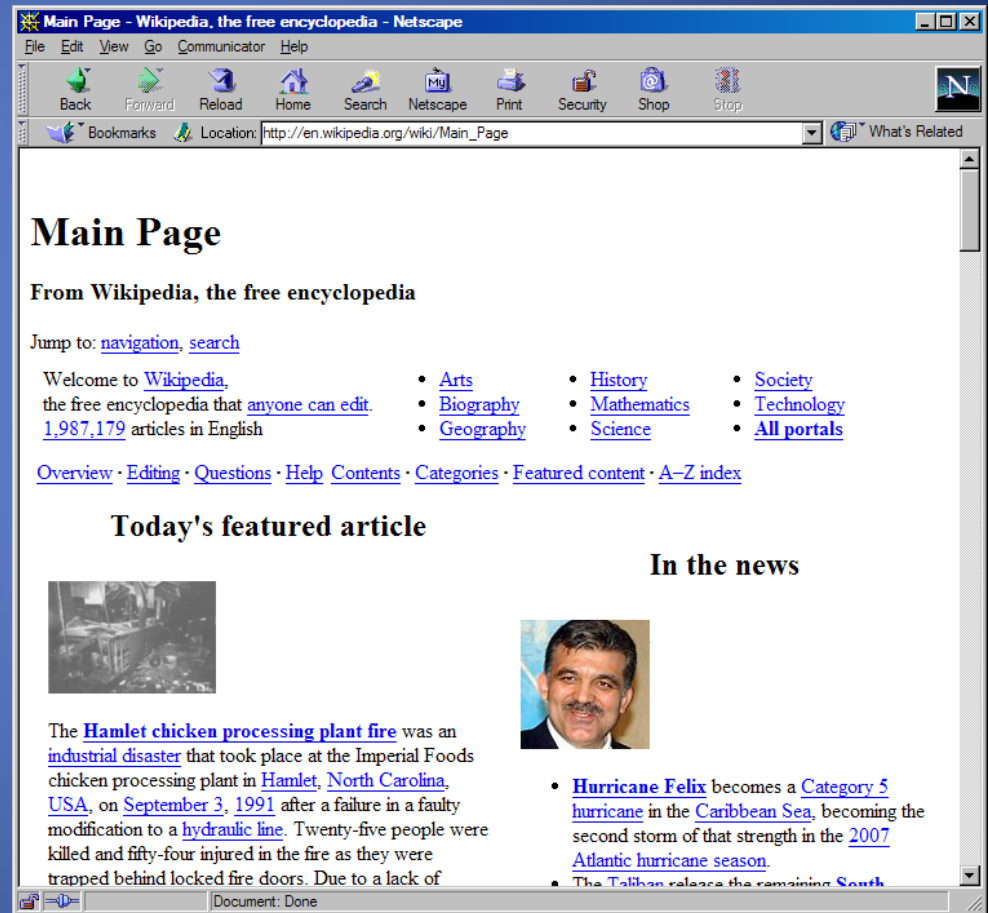
- Created in 1994
- Free web browser
- “Internet software should be distributed for free”
- Instant loading of web pages
  - As opposed to what?
  - Was the internet fast back then?





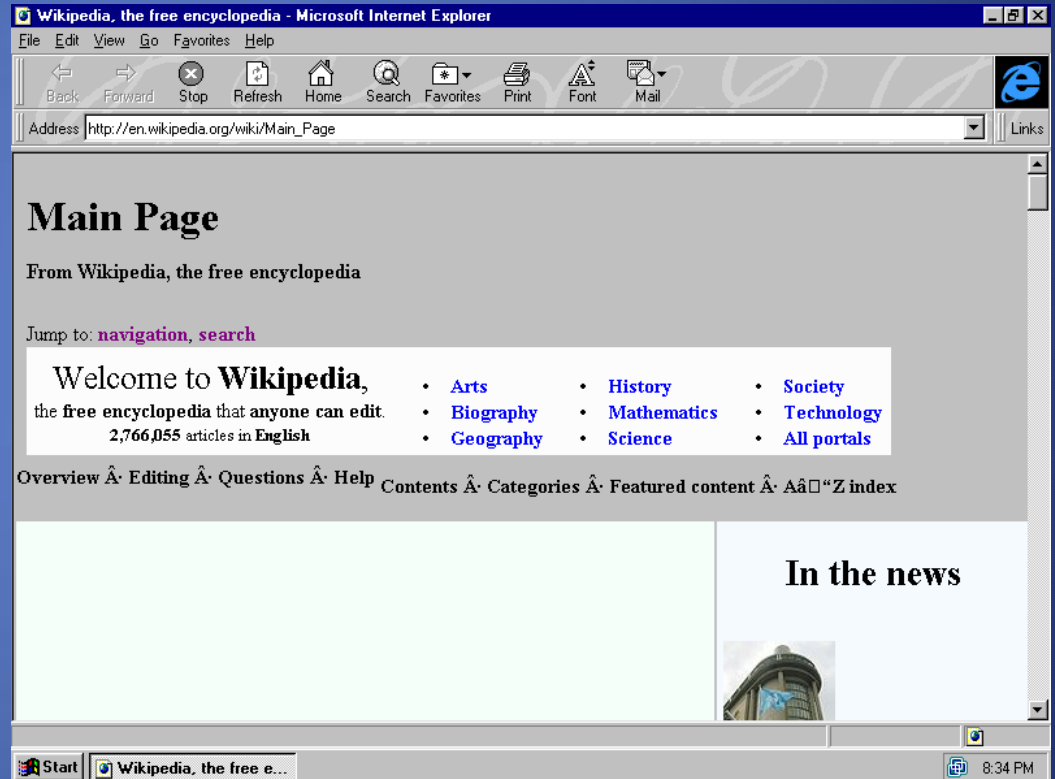
# Netscape

- New Features!
  - Cookies
  - Frames
  - JavaScript
- Over 50% usage share
- Underlying Operating System unimportant

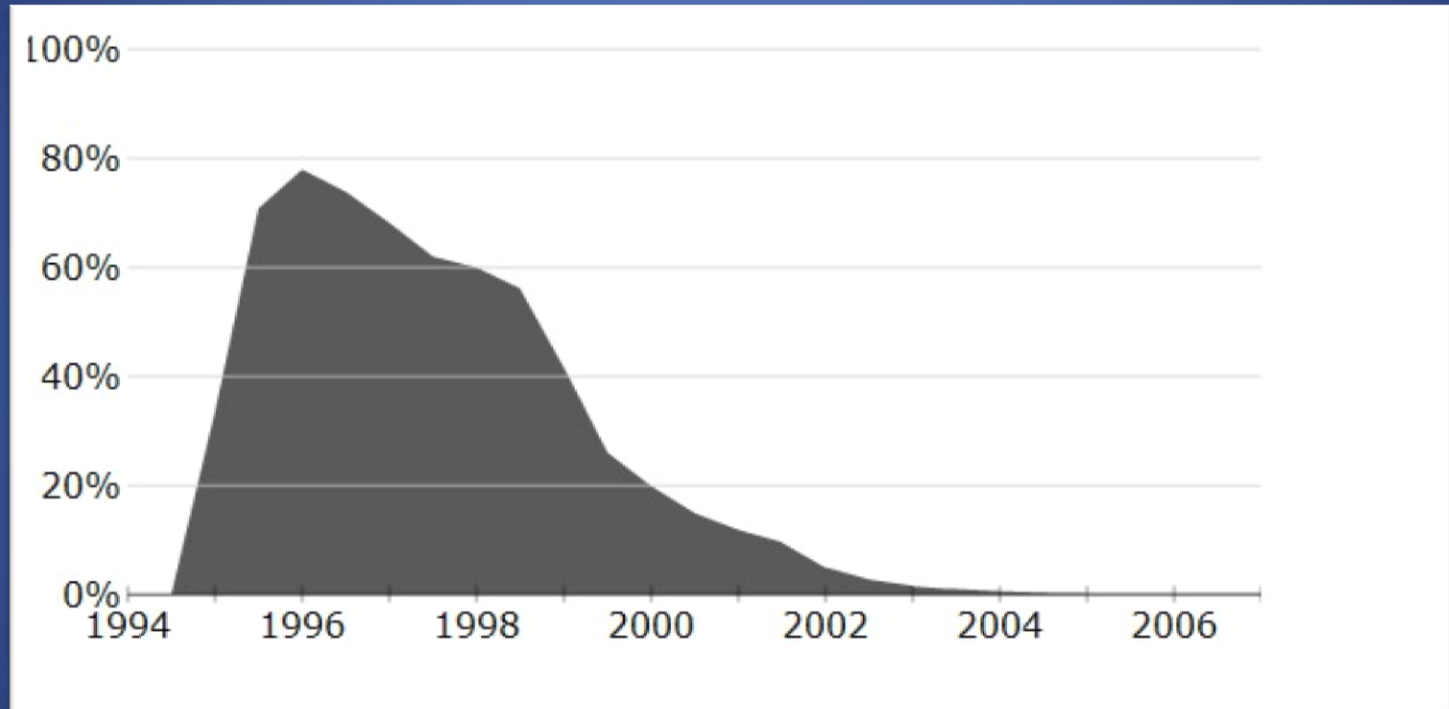


# Browser Wars

- In 1996, Microsoft jumped in to browser market
- Netscape couldn't keep up



# Browser Wars

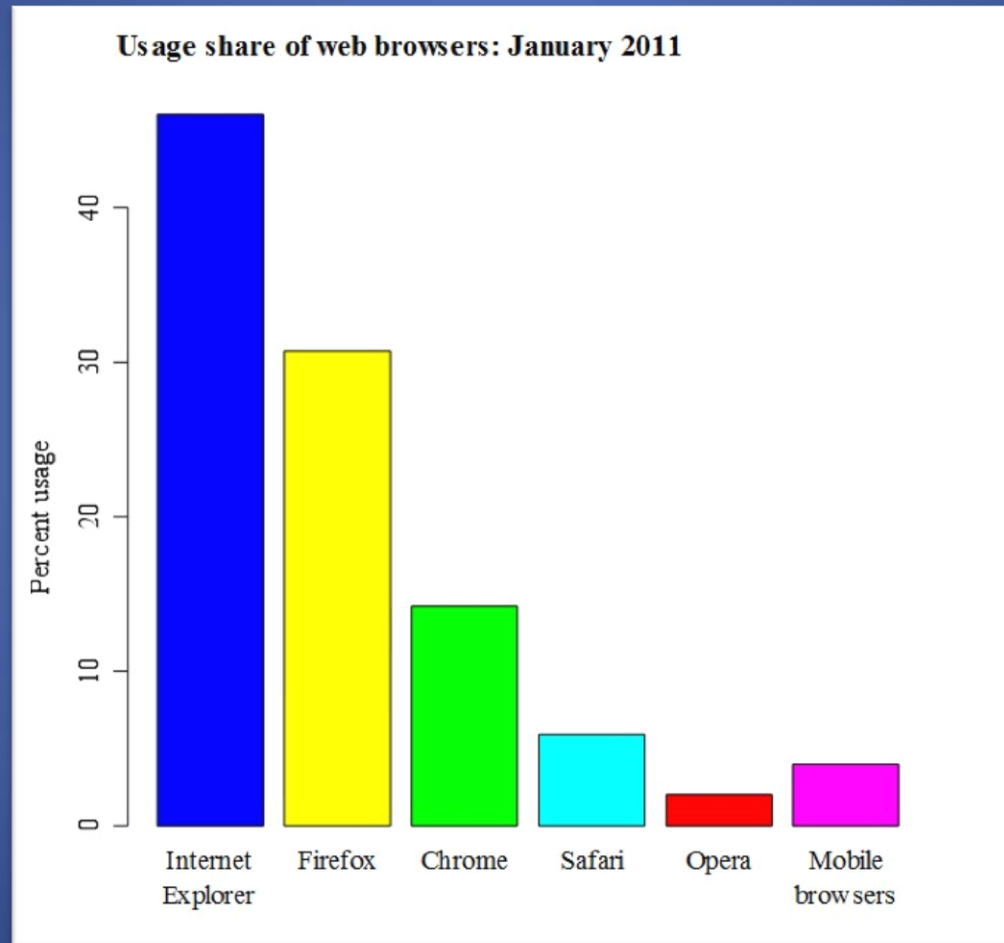


# Browser Wars

- Keeping with the idea of free internet applications, Netscape made its source code available to the public under an open-source license
- This code base was called...



# Browser Wars





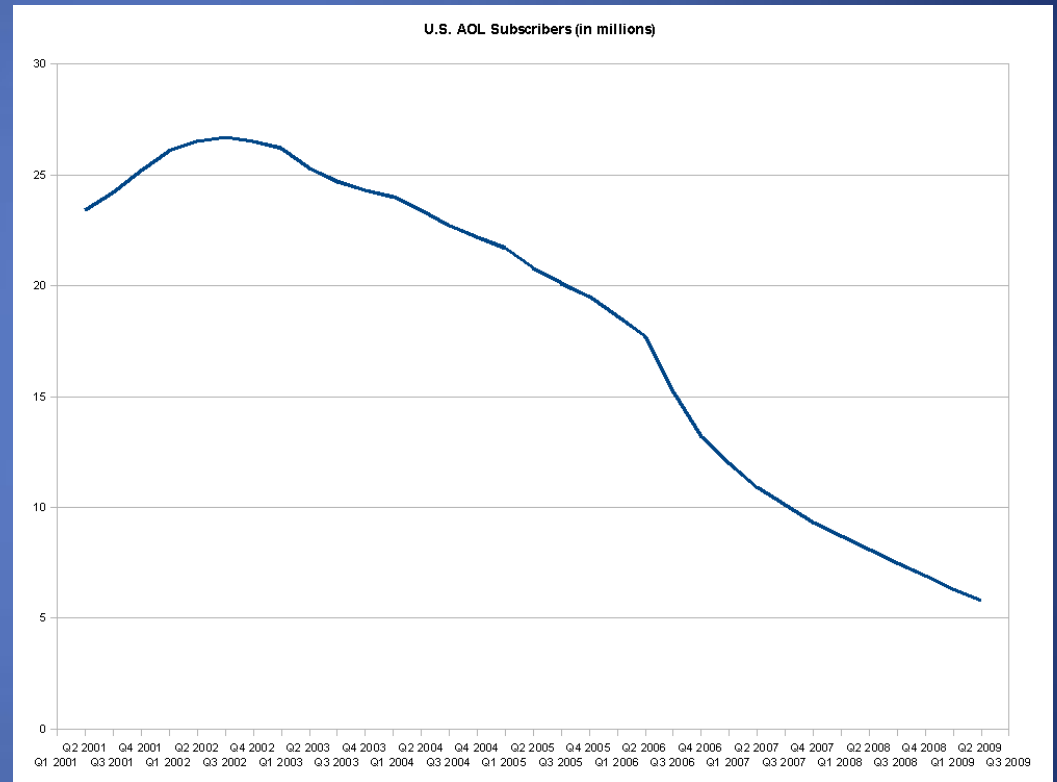
# AOL

- AOL Channels
- AOL Instant Messenger
- Buddy List
- “The Internet on a disc!”
- Chat Rooms



# AOL

- At it's peak, around 26 million users
- Valued at \$240 billion



# Web 2.0 : The Social Network (2004)

- “...web development & design that facilitates interactive information sharing, interoperability, user-centered design and collaboration on WWW”
  - Users change content via “architecture of participation”
- Examples
  - Web communities, apps, social networks, video & photo sharing, wikis, blogs, tweets, ...
- “Take back the web!”



“You” – Time’s 2006 Person of the Year

# Speaking of 2004...

- A young Harvard student had a thought...
  - How can we make the Internet more like real life
  - What's most important to us as humans?
  - How can I leverage technology to form communities?

# Towards a world of openness

- You share information with your friends
  - What your doing
  - Your classes
  - Complaints
  - Crushes
  - Relationship status
  - News
- What if we moved that personalized communication online?



# Social Networks

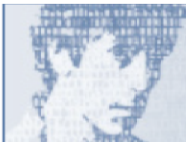
- Not a new thing at this point...



# Enter Facebook

- Began in Mark Zuckerberg's dorm room
  - His laptop was the server
  - Could only register with an @harvard.edu email.
  - 2 developers, 1 “business guy”
- Originally exclusively for Harvard
- Expanded to Ivy League Universities
- Eventually expanded to select universities
  - We got it in 2005!





# [ thefacebook ]

[login](#) [register](#) [about](#)

Email:

Password:

[register](#)

[login](#)

Welcome to Thefacebook!

## [ Welcome to Thefacebook ]

Thefacebook is an online directory that connects people through social networks at colleges.

We have opened up Thefacebook for popular consumption at **Harvard University**.

You can use Thefacebook to:

- Search for people at your school
- Find out who are in your classes
- Look up your friends' friends
- See a visualization of your social network

To get started, click below to register. If you have already registered, you can log in.

[Register](#)

[Login](#)

[about](#) [contact](#) [faq](#) [terms](#) [privacy](#)

a Mark Zuckerberg production

Thefacebook © 2004

# Enter Facebook

- Eventually expanded to everyone
- Only network that is exclusively centered around you.
- Contrary to popular opinion, Facebook respects and encourages privacy.
- “Openness” is what you make it to be.



# Facebook Growth

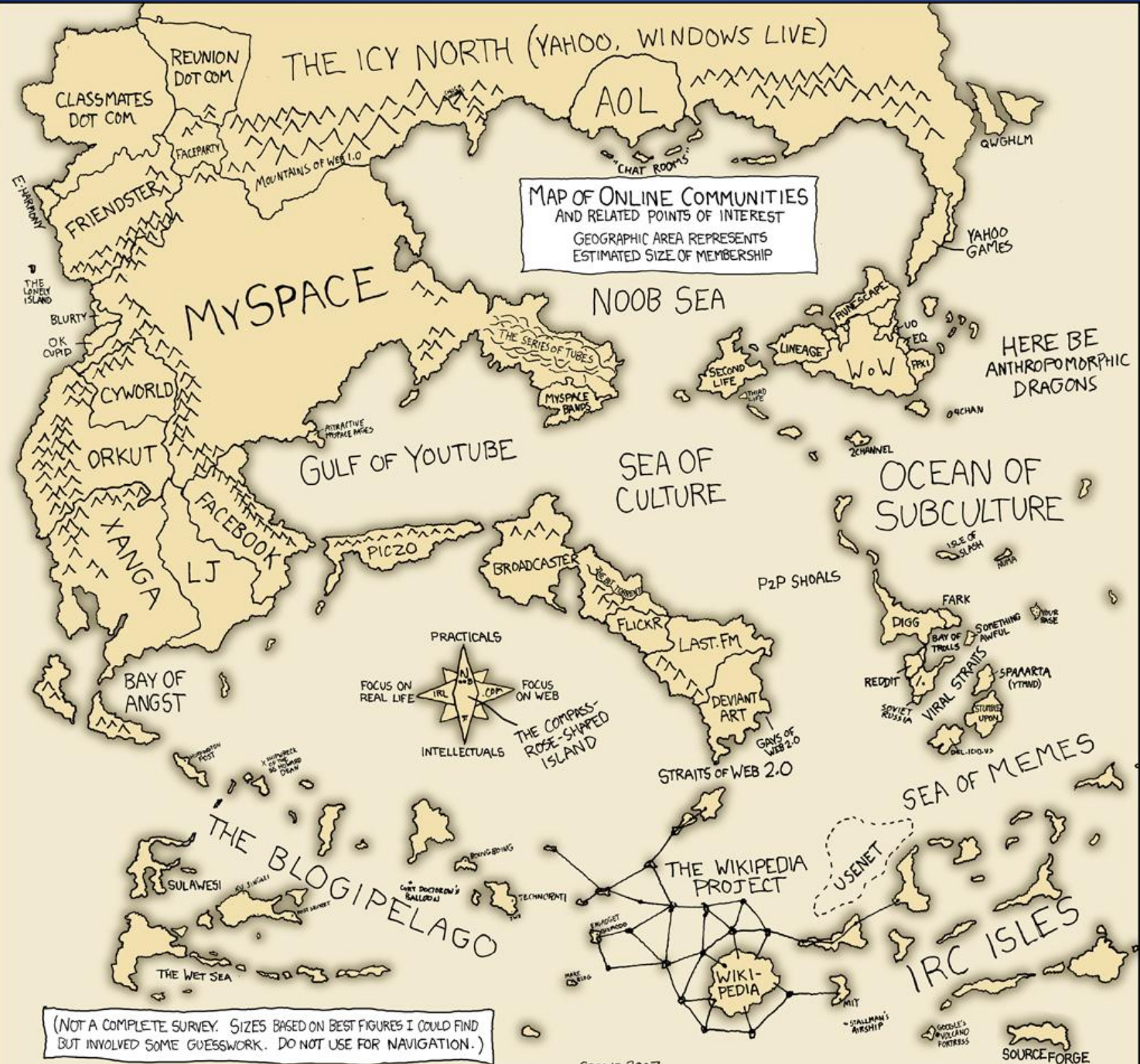
- Summer 2004 – 200,000 members
- December 2004 - 1 million members
  - Valued at \$5 million
- February 2005 - 2 million members
  - Valued at \$50 million
- April 2005
  - Valued at \$98 million
- March 2011 - 500 million members
  - Valued at \$65 billion

\*All of these figures are approximate



# Facebook Growth

- 2005 – Open to high schoolers and select universities
- 2006 – Open to anyone
- 2007 – Allowed development of Facebook Apps
- 2008 – Global expansion
  - Used crowdsourcing to translate most of Facebook
  - What is this similar to?

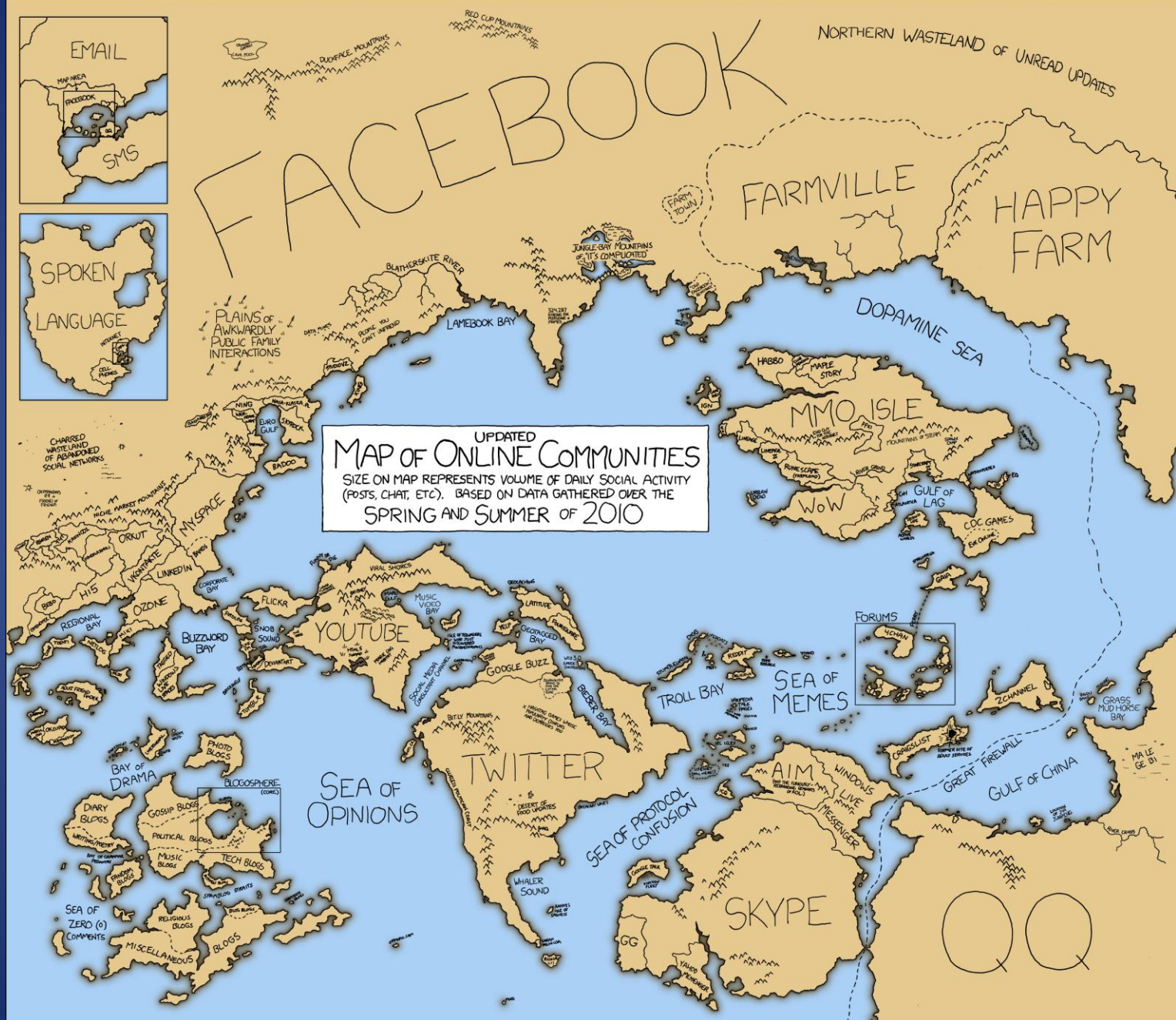




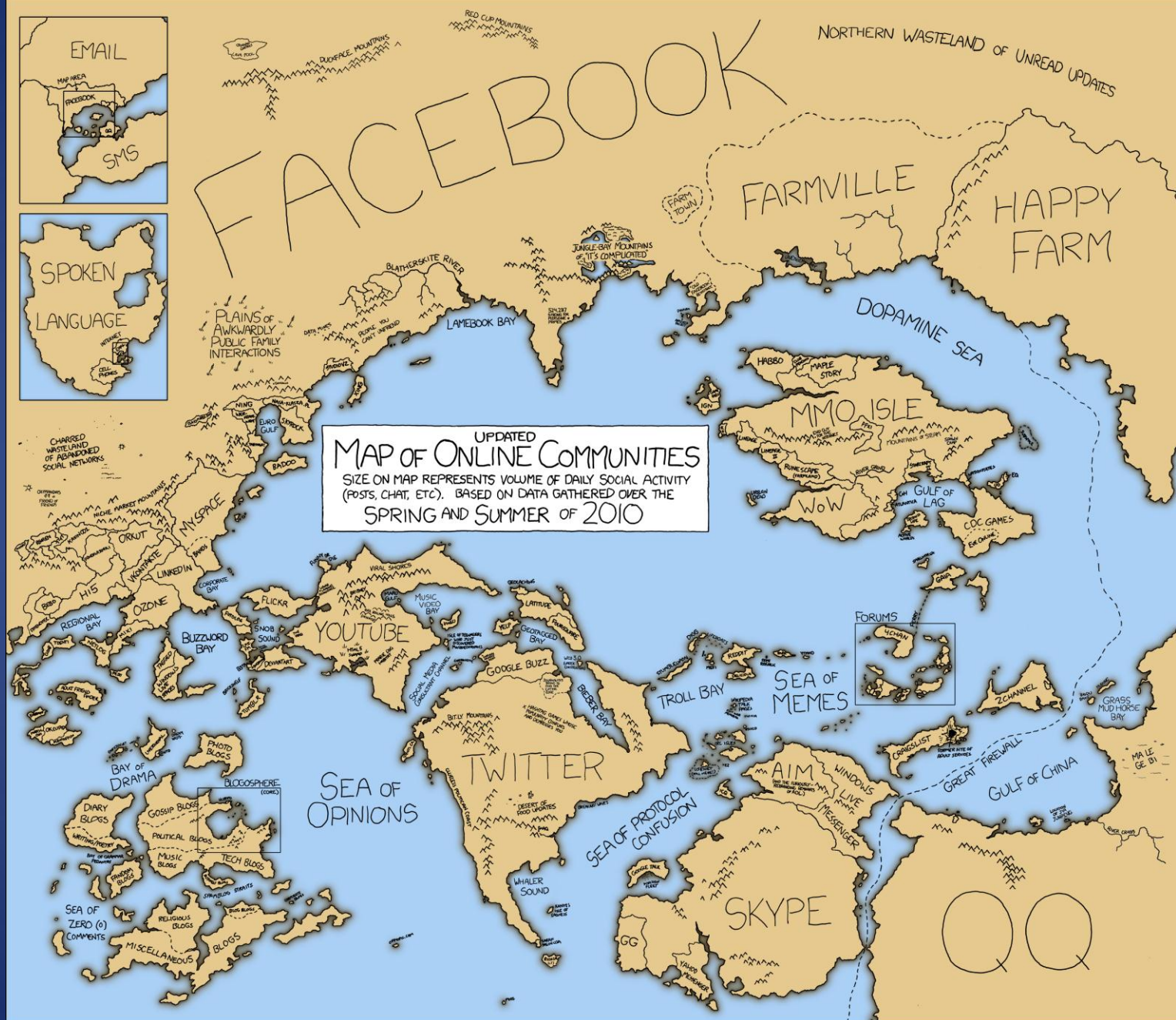


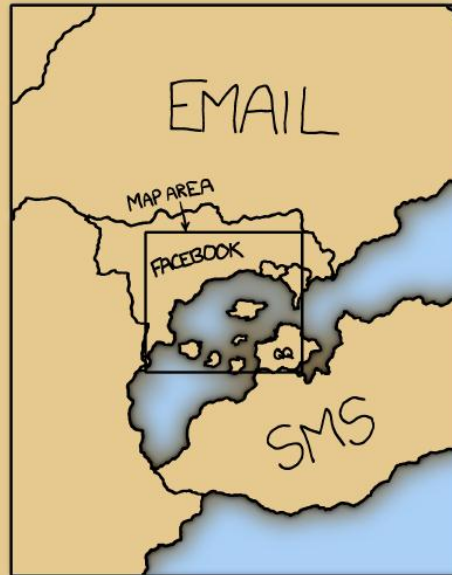
# FACEBOOK

NORTHERN WASTELAND OF UNREAD UPDATES



UPDATED  
MAP OF ONLINE COMMUNITIES  
SIZE ON MAP REPRESENTS VOLUME OF DAILY SOCIAL ACTIVITY  
(POSTS, CHAT, ETC). BASED ON DATA GATHERED OVER THE  
SPRING AND SUMMER OF 2010





# Facebook Growth

- <http://www.penn-olson.com/2010/02/10/infographic-facebooks-amazing-growth/>



# Facebook's Impacts

- How has Facebook affected you?
  - Personal Life
  - Academic / Professional Life
- How has Facebook affected the world?
  - Literally, has revolutionized countries and overthrown governments.

# Facebook

- What “shoulders” are they standing on?

# Google!



Search the web using Google!

Google Search

I'm feeling lucky

Special Searches  
[Stanford Search](#)  
[Linux Search](#)

[Help!](#)  
[About Google!](#)  
[Company Info](#)  
[Google! Logos](#)

Get Google!  
updates monthly:

your e-mail

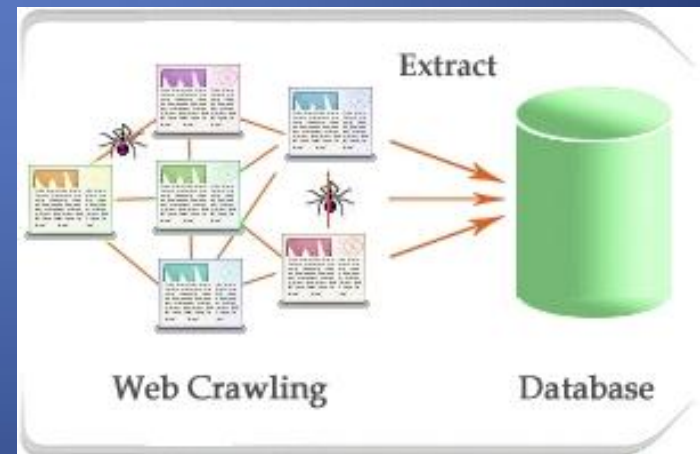
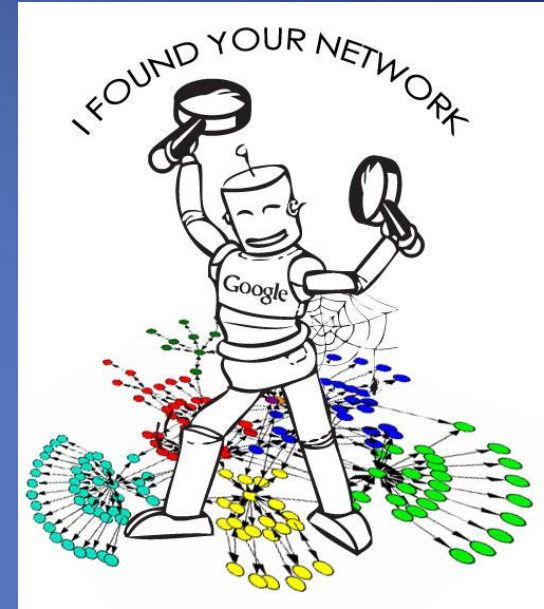
Subscribe

[Archive](#)

Copyright ©1998 Google Inc.

# Google

- Began in 1996
  - Larry Page, Sergey Brin
    - Both PhD students at Stanford
- PageRank algorithm
  - Website's relevance determined by number of pages and their importance that linked back to original site
- Web Crawling



# Google Growth

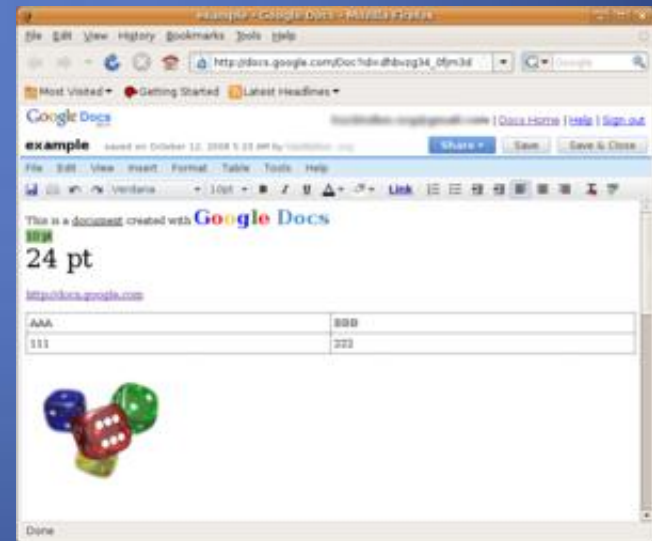
- Received \$100,000 in August 1998 by Sun Microsystems
- Tried to sell to Excite in 1999
  - Guess how much?
  - \$1,000,000
- Raised \$25 million in June 1999
- IPO valued at \$23 billion in August 2004

# Contributions to Google Growth

- Free services lead you to their site
- Very targeted ad platform
  - DoubleClick
  - Google Analytics
  - AdWords and AdSense

# Software as a Service (2006)

- Free, web-based word processor, spreadsheet, presentation and form application
- Single source of truth!
- Fundamentally changing the way people collaboratively author documents
  - No more attachments and versions!!
  - Much better than Wikis, which are not WYSIWYG, so folks grab local temp copy



# Google Apps





# Twitter

- Created in March 2006
- SMS-based social network
  - Why the 140 character limit?
- 1.6 million tweets in 2007
- 400 million tweets in 2008
- 65 million tweets PER DAY in June 2010
- 2940 tweets PER SECOND during World Cup



# Others

- Think of some other applications that changed the world.
- <http://www.fastcompany.com/1733627/mit-scientist-captures-his-sons-first-90000-hours-on-video>

# What's the most important in your life?



- a) Cell Phone
- b) Videoconferencing
- c) Email
- d) Facebook
- e) Web search



# Summary

- How many of the 21<sup>st</sup> cent engineering achievements are happening today?
- What's the next big thing?
  - Natural language processing?
  - 3D displays?
  - Robotics? Self-driving cars?
  - Optical or quantum computing?
  - Personal air vehicle?
  - Space travel?
  - Computer displays in glasses?
  - Flexible displays?
  - Brain machine interfaces?
  - Energy!

