UC Berkeley School of Information

The Advent of the Internet

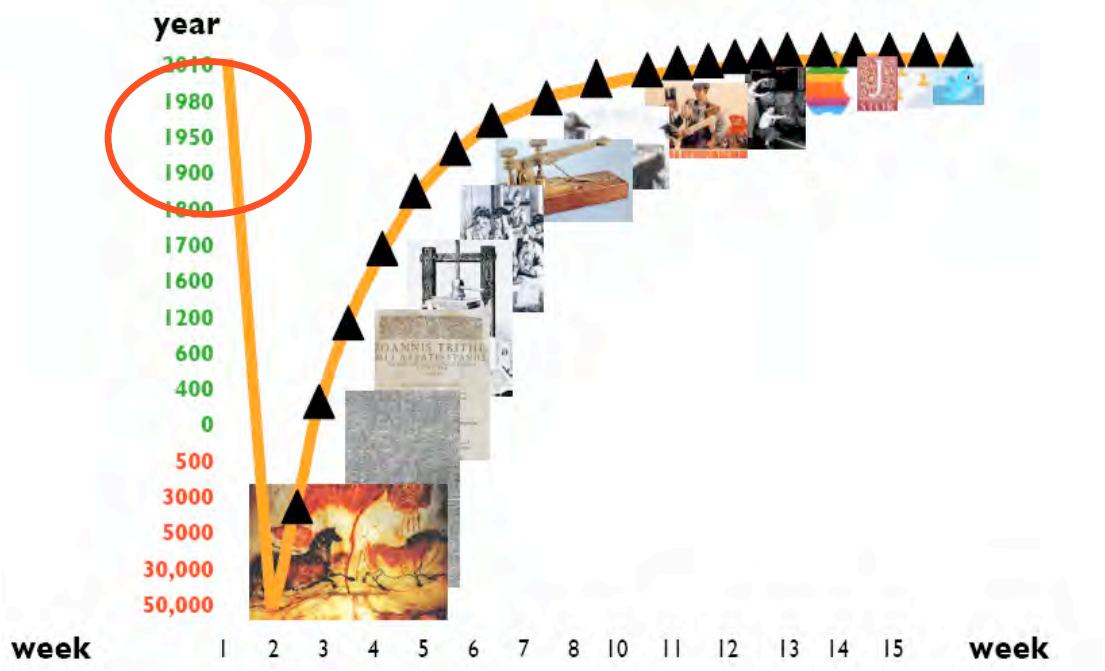
Geoff Nunberg

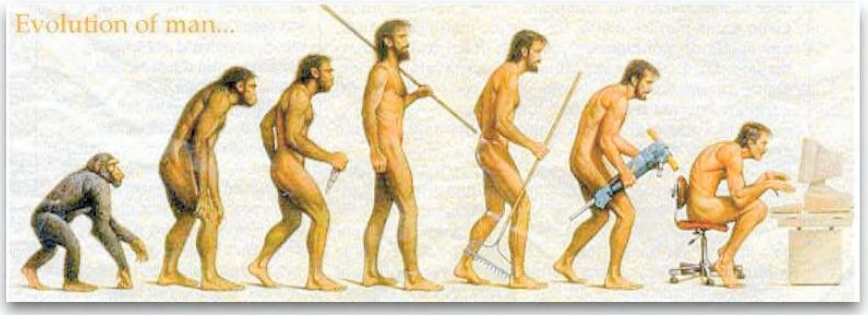
i103 History of Information

April 12, 2012

Where We Are

The dénoument!!!





Puzzler

What is the significance of woodchucks to the history of the World Wide Web?

Itinerary, 4/12

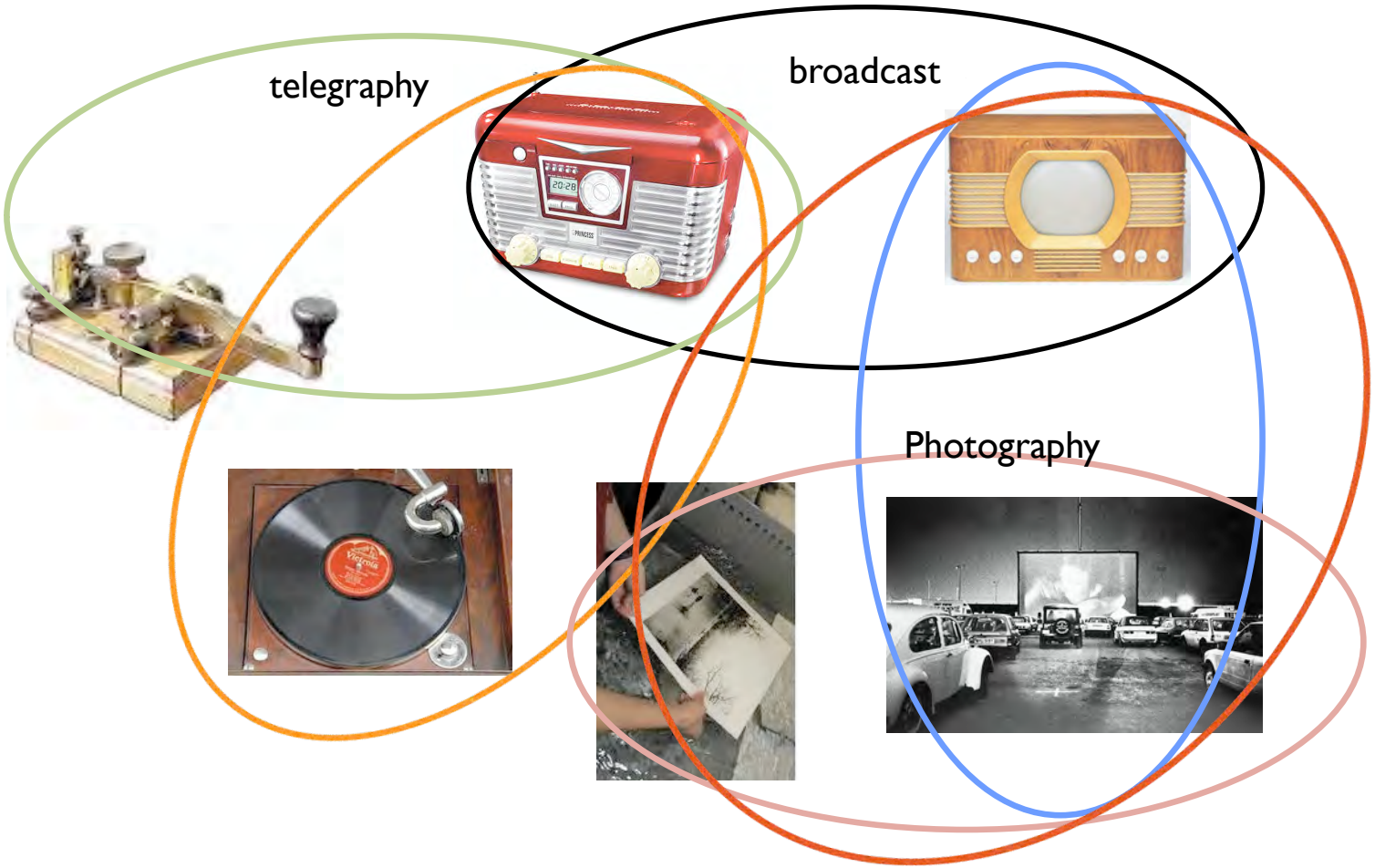
What ~~is the Internet~~ are the Internets?

Technological bases of the Internet and WWW

Effects of the Internet, I: One World Language?

What makes a "technology"?

How many technologies?



Where is the Internet? Where is the Web?

The path for Internet start-ups used to be quite clear: establish a presence on the Web first, then come up with a version of your service for mobile devices. Now, at a time when the mobile start-up Instagram can command $1 billion in a sale to Facebook, some start-ups are asking: Who needs the Web?

Smartphones are everywhere now, allowing apps like Foursquare and Path to be self-contained social worlds, existing almost entirely on mobile devices…

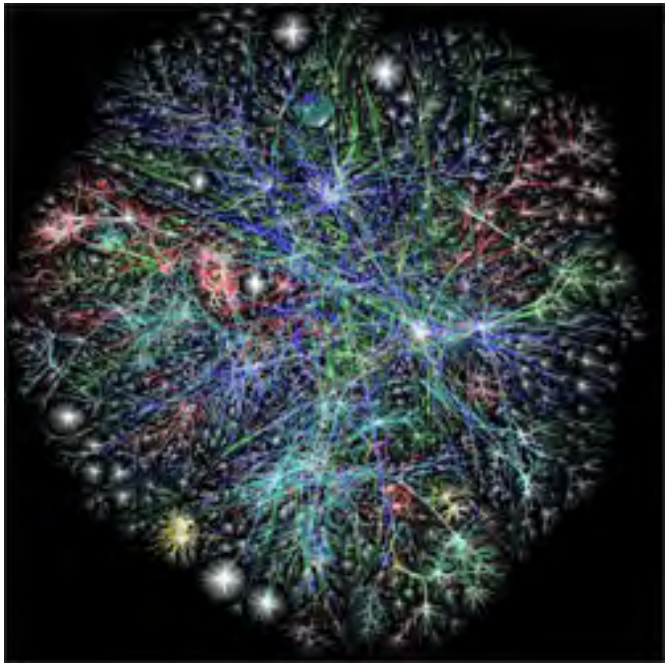
In that context, the Instagram deal looks like something of a turning point, as even the Web giant Facebook tries to get a better grasp on a market that requires a rethinking of old rules.

"For decades, the center of computing has been the desktop, and software was modeled after the experience of using a typewriter," said Georg Petschnigg, a former Microsoft employee who is one of the creators of Paper, a new sketchbook app for the iPad. …

What makes a "technology"?

The **Internet** is a global system of interconnected computer networks that use the standard Internet protocol suite … to serve billions of users worldwide. It is a *network of networks* that consists of millions of private, public, academic, business, and government networks…that are linked by a broad array of electronic, wireless and optical networking technologies.

--a well-known infallible source of conventional wisdom



Visualization from Opte Project
Asia Europe/Africa
Latin America
North America
Private Networks (RFC1918)

What makes a "technology": Devices

What makes for a "technology"?: Content

Looking for the Internet: W was right

The "internet": a technology, a channel, a medium, a "place," a set of applications…?

Contrast "radio," "television" etc.

a technology?

a network?

a set of applications?

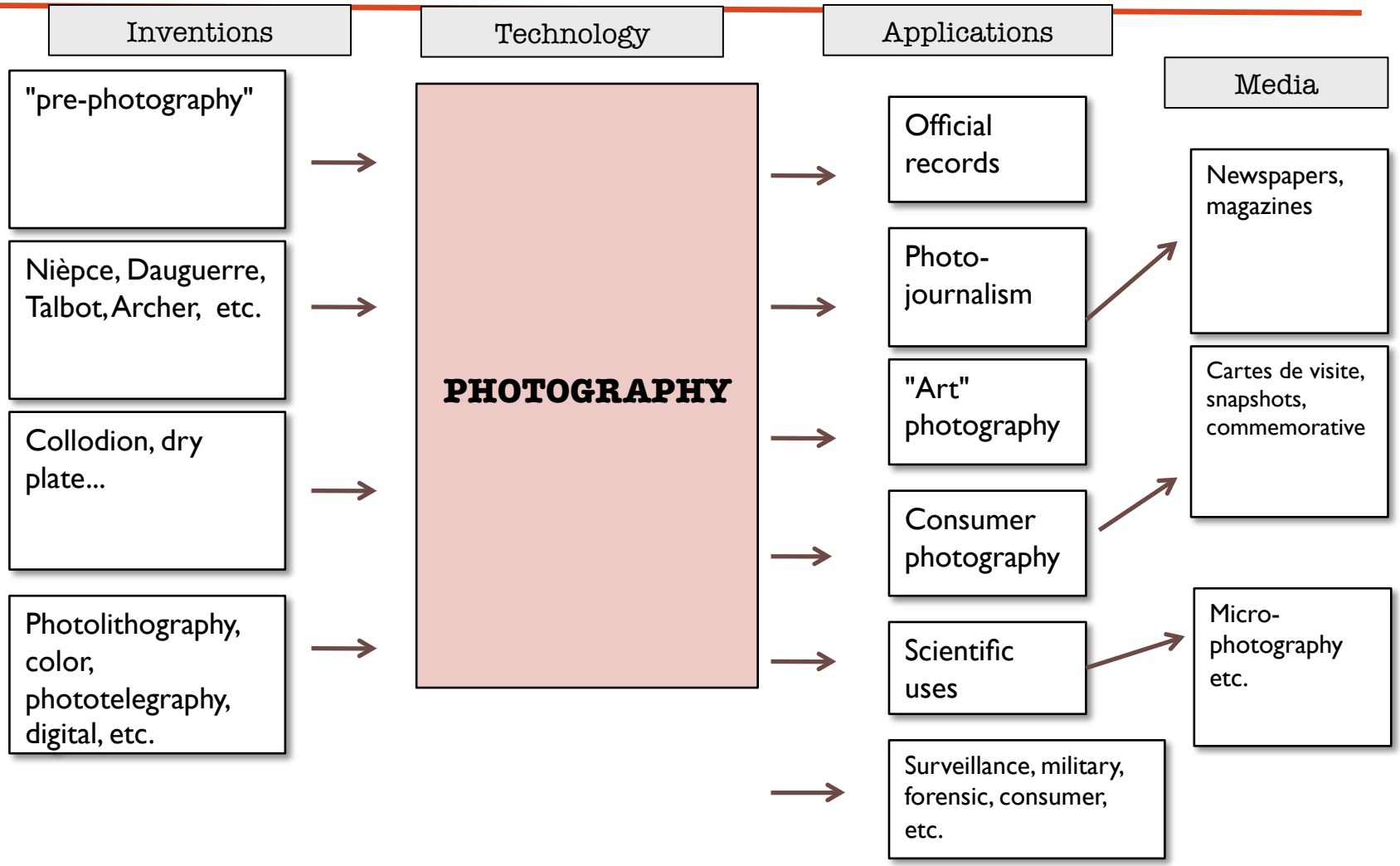
a communications channel?

media?

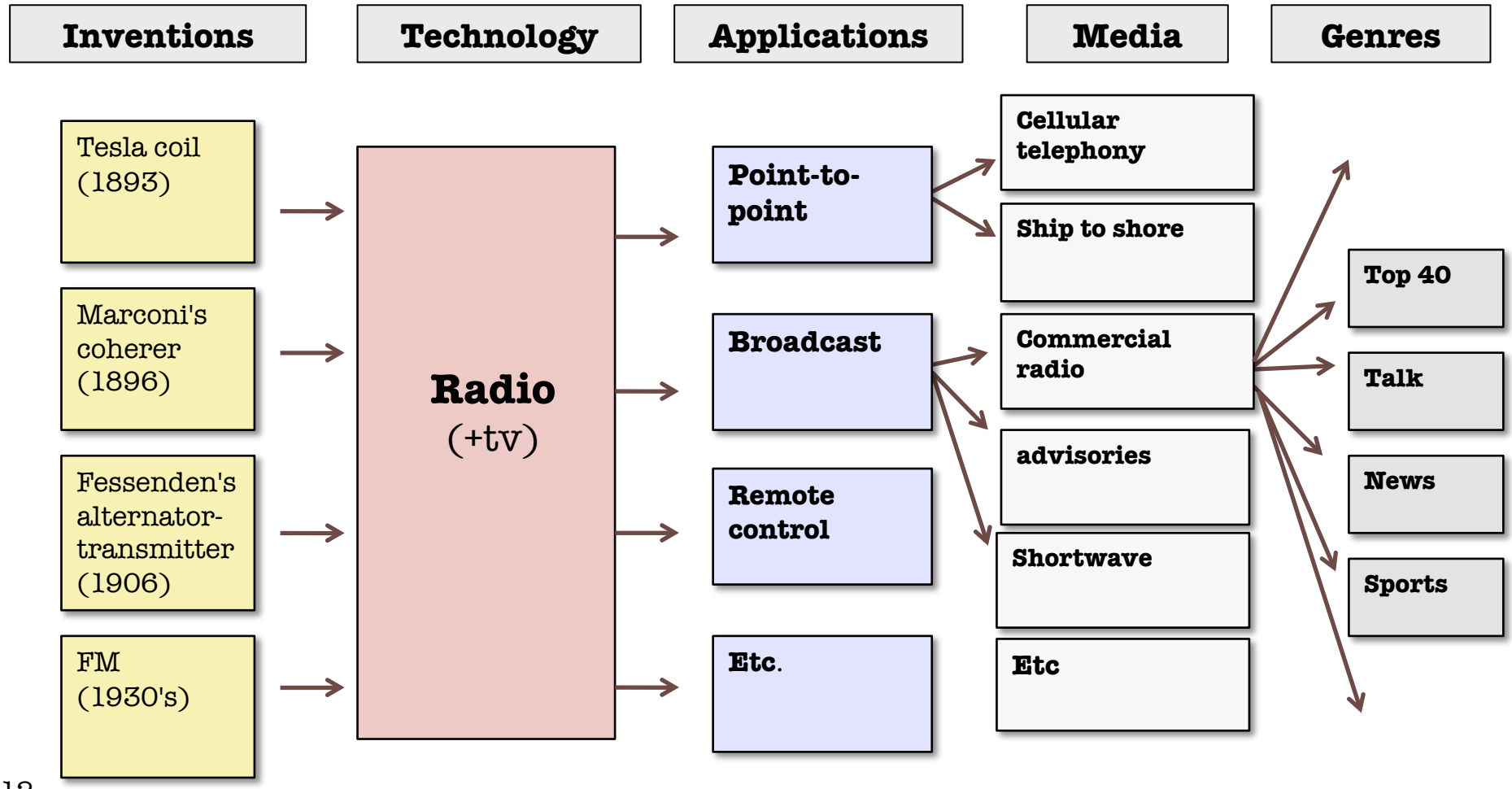
a place?

"a vast unintended consequence"

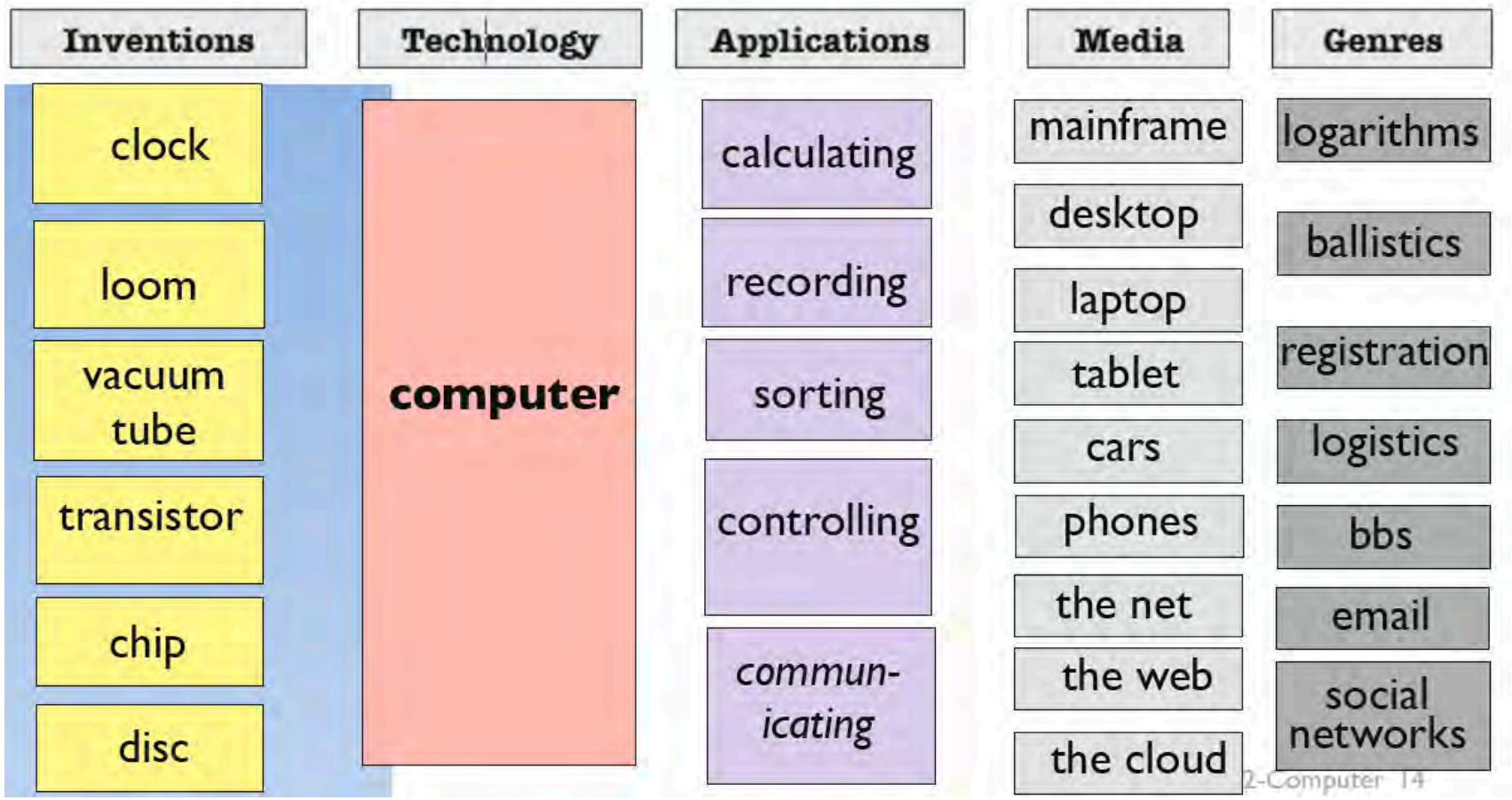
Inventions, Technologies, Applications, Media



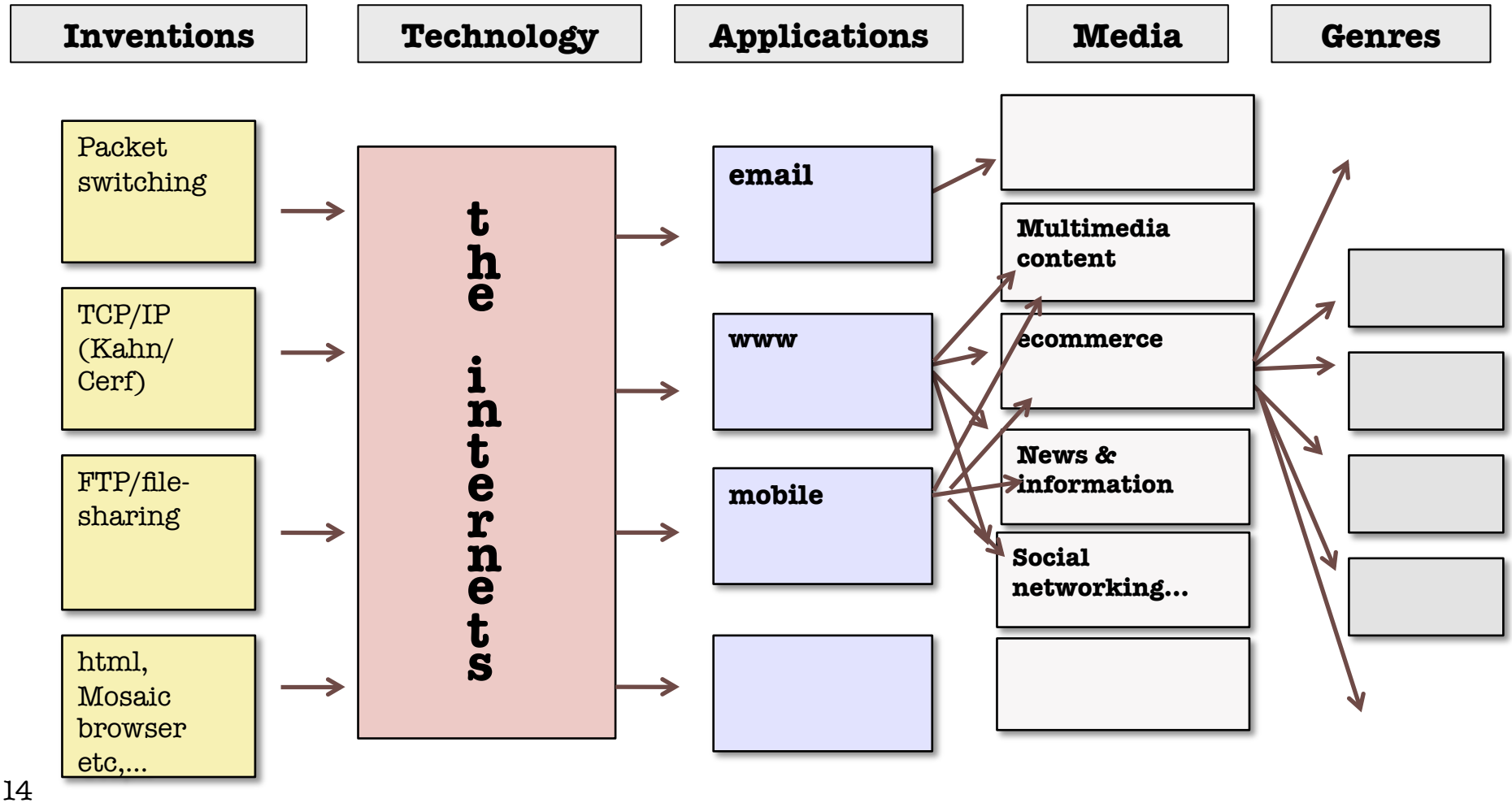
Inventions, Technologies, Applications, Media



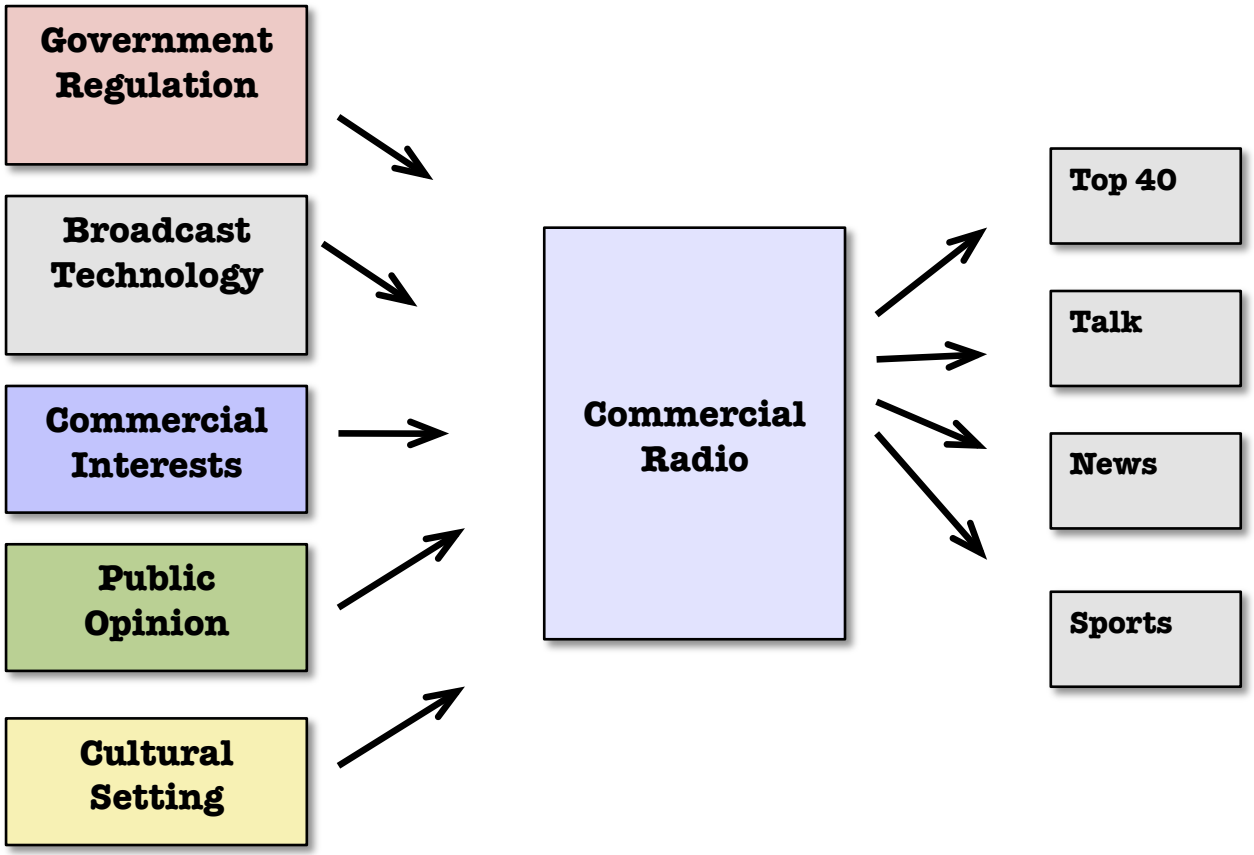
Inventions, Technologies, Applications, Media



Inventions, Technologies, Applications, Media: not an easy story to tell

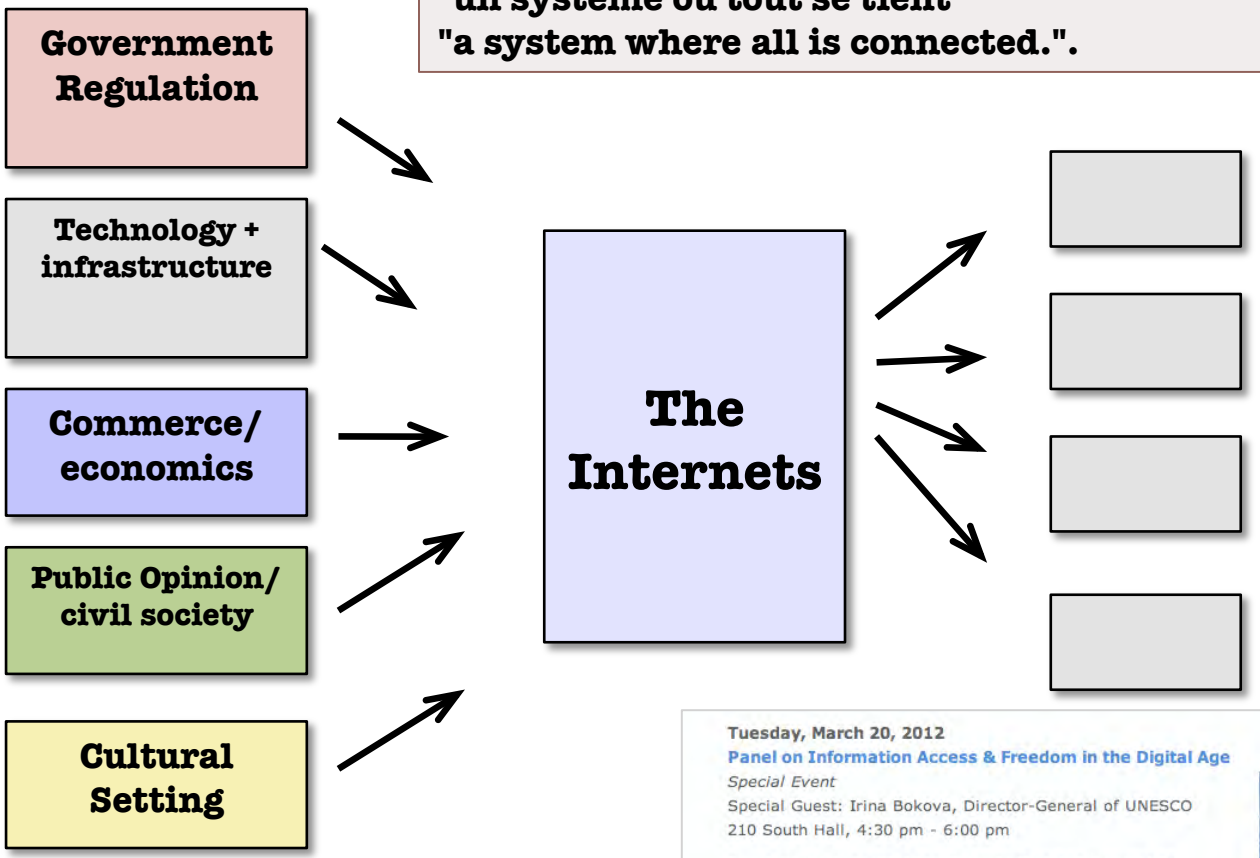


Multiple Influences



Multiple Influences

"un système ou tout se tient"
"a system where all is connected.".



Tuesday, March 20, 2012
Panel on Information Access & Freedom in the Digital Age
Special Event
Special Guest: Irina Bokova, Director-General of UNESCO
210 South Hall, 4:30 pm - 6:00 pm

Panel discussion with Irina Bokova, Director-General of UNESCO; privacy and censorship scholars Deirdre Mulligan & Nicole Wong; and Chinese human-rights activist Qiang Xiao; moderated by Geoffrey Nunberg.

Technological Bases of the Web

Communications protocols/Packet switching

Physical Networks

Addressing system

Hypertext transfer protocols

Browsers/ Graphical browsers

Indexing & search

Broadband

Hughes' telegraph, 1855

Edison Stock Ticker, 1869

Communicating

intra-machine

time-sharing

different machines

computer to printer

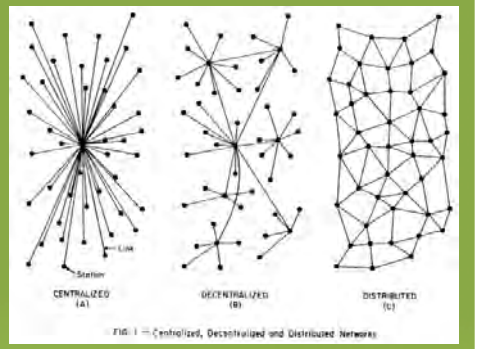
[the stock ticker]

Ethernet: computer to printer

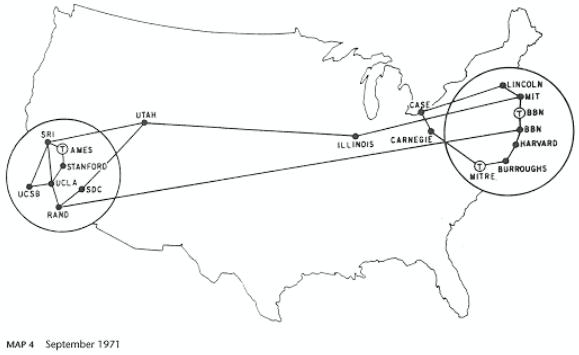
Arpanet

Technological Beginnings: The Arpanet

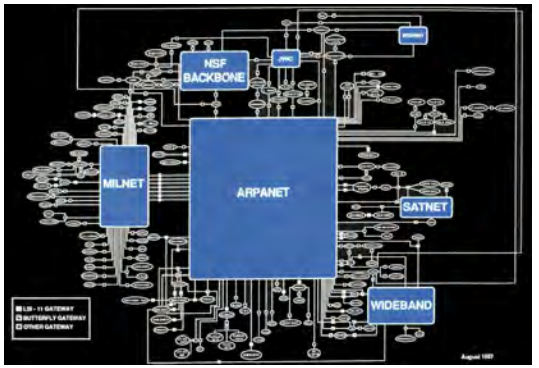
1969: ARPA (Advanced Research Projects Agency of DOD) (later DARPA) creates Arpanet, linking time-sharing computers at four research sites by telephone lines.



Paul Baran, "On Distributed Communications, 1964 RAND report



Arpanet 1971



Internet 1987, a "network of networks"

Technological Beginnings: 60s & 70s

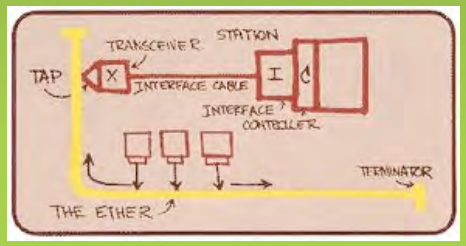
1969: ARPA (Advanced Research Projects Agency of DOD) (later DARPA) creates Arpanet, linking time-sharing computers at four research sites by telephone lines. Net makes use of packet-switching, rather than circuit switching, as with phone communication at the time.

1971: File Transfer Protocol (FTP permits easy exchange of files between sites.

1974 Bob Kahn and Vin Cerf ("Father of the Internet") demonstrate Transfer Control Protocol, which enables machines to route & assemble data packets.)

Communicating

1974: Ethernet developed at Xerox Palo Alto Research Center (PARC), allowing communication among machines on local networks.



PARC Alto (1st PC) 1973

Internet Development:80s

1980's: NSF funds national backbone to connect computer research centers. Other gov't-funded networks (BITNET, CSNET) emerge

1980's: Commercial networks begin to emerge

1983: Domain Name System (DNS) introduced to keep up with growing number of hosts, introduces domain names .com, .gov, .mil, .edu, etc./ name servers translate into IP numbers…

Late 1980's: First Internet Service Providers emerge

1989: Australia, UK, Germany, Italy, etc. join Internet

Internet Development:90s

1990: ARPANET shuts down

1991: NSF removes all restrictions on commercial use of Internet

1992: Internet Society (ISOC) formed, assumes responsibility for fixing standards through the Internet Engineering Task Force (IETF), a voluntary organization

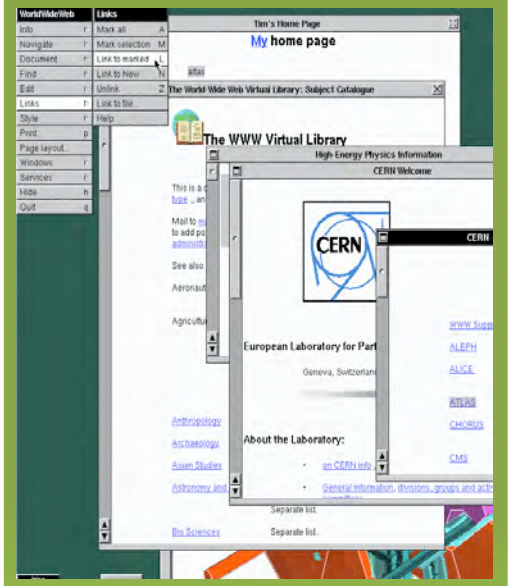
1995: NSF discontinues support of infrastructure

1998: Internet Corporaation for Assigned Names and Numbers (ICANN) established to oversee assignment of domain names and IP addresses, formerly under control of US government.

The Origins of Email

1971: First network email program created by Ray Tomlinson at Bolt, Beranek & Newman (BBN), with "USER@hostname.domain" addressing system.

- But public access to email doesn't begin until 1988, when MCI mail is linked to the Internet
- 1975: 1st email client MSG (permits "forward," "reply")



Sir Tim

The Emergence of the WWW

1945: Vannevar Bush writes "As We May Think" in *The Atlantic*; envisions Memex machine to follow links between documents on microfiche

1965: Ted Nelson coins the term "hypertext" to describe "compound documents" formed by links among documents

1990: Tim Berners-Lee of CERN coins the term "World Wide Web"; develops HTTP protocol for transmitting hypertext documents between clients and servers and and first Web browser making use of hypertext links.

World Wide Web

The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a la

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary of th Asked Questions .

What's out there?
Pointers to the world's online information, subjects , W3 servers, etc.
Help
on the browser you are using
Software Products
A list of W3 project components and their current state. (e.g. Line Mode ,X11 Viola , NeXTStep , Servers , Tools ,
Technical
Details of protocols, formats, program internals etc
Bibliography
Paper documentation on W3 and references.
People
A list of some people involved in the project.
History
A summary of the history of the project.
How can I help ?
If you would like to support the web..
Getting code
Getting the code by anonymous FTP , etc.

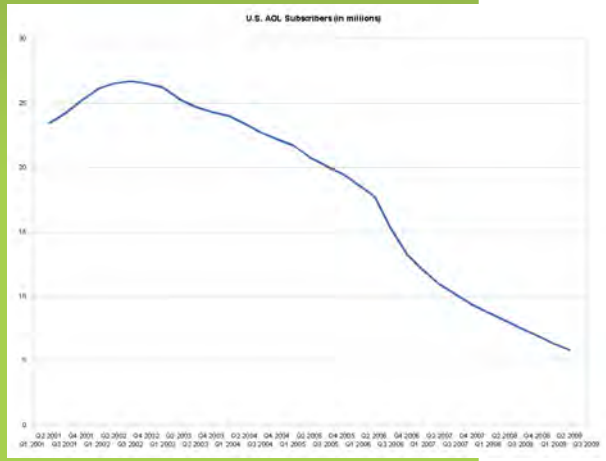
The First Web Page

The Emergence of the WWW

Gated communities:

ca 1990-: Pay-based online services like AOL, Compuserve, and Prodigy market connectivity + proprietary content (games, chat rooms, e-commerce, instant messaging etc.) to users unfamiliar with computers, first for hourly and then for monthly fee. By 1998, AOL has 15m. members.

AOL subscribers, 2001-2009



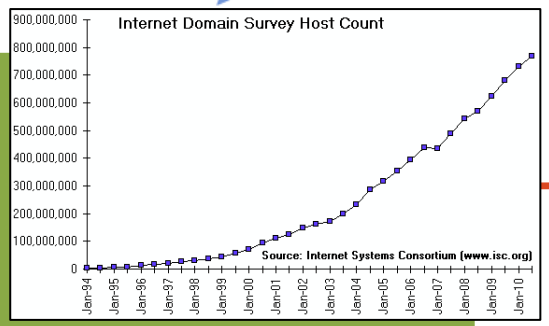
2000: AOL merges w/ Time-Warner

2005: gives away free email acc'ts

2009 spun off by Time-Warner

2010 eliminates chat rooms

2011 acquires Huffington post



The Growth of the WWW

1993: Mark Andreessen's Mosaic browser released by NCSA, which runs on Windows and permits easy integration of graphics in Web pages.

CERN announces that W3 technology will be available free to everyone.

1994: Over 200 HTTP servers; traffic on CERN server has grown 1000-fold since first launched. From the mid-90s on, Internet use roughly doubles every year.

1994: Andressen, now in private sector, releases Netscape Navigator browser.

1995: Microsoft releases Internet Explorer bundled with Windows 95 to compete with Netscape.

1995 AOL makes Internet available to all subscribers

The Addition of Search

1991: Gopher, developed at U. Minnesota, creates searchable index of FTP sites

1994: Infoseek and Lycos search engines launched.

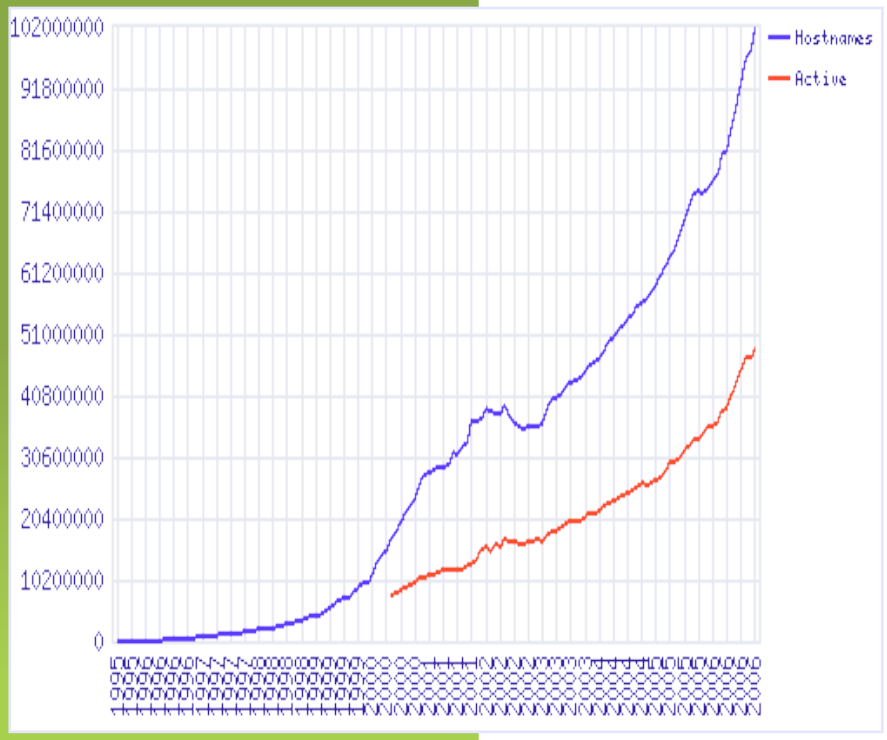
Jerry Yang and David Filo introduce Yahoo!, a directory of Web sites.

1995: AltaVista launched by DEC; company regards it as showpiece for its hardware

1997 Larry Page and Sergey Brin launch Google, which makes use of Page Rank algorithm to rank pages according to popularity.

1998: Goto.com (later Overture, later Yahoo! Search) introduces pay-per-click advertising

The Web Takes Off



1994-2005: Internet use increases rapidly, driven by email, E-commerce, news & information, pornography & gambling. By 2005 there are an estimated 100m Web sites.

~2000- Growth of broadband enables exchange of audio & video content; blogs and social networking sites proliferate, etc.

2005: 68 percent of American adults and 90 percent of American teenagers have used the Internet.

Hayes Smartmodem 1981

Infrastructural background

culture clash

home brew, fone freaks

1975 Altair

1976 Apple I

1983 Lisa

1984 Macintosh

21-Hofl12-Computer 58

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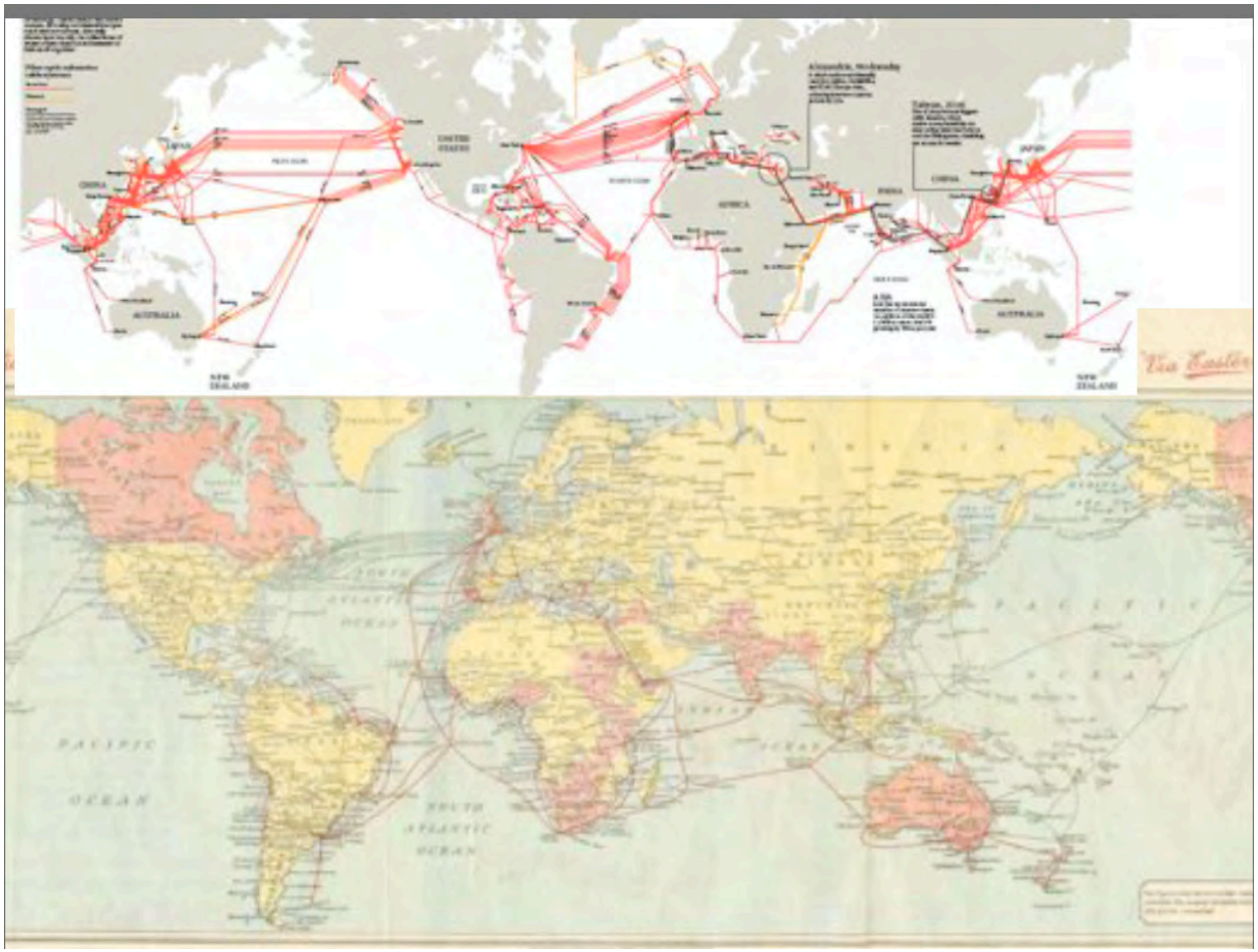
The Wired World



Cairncross: Everything is different(?)

1. Death of distance
2. Fate of Location
3. Improved Connections
4. Increased Mobility
5. More Customized Networks
6. Deluge of Information
7. Increased Value of Brand
8. More Minnows, more Giants
9. More Competition
10. Increased Value of Niches
11. Communities of Practices
12. Loose-Knit Corporation Culture
13. Openness
14. Manufacturers as Service Providers
15. Inversion of Home and Office
16. Proliferation of Ideas
17. Decline of National Authority
18. Loss of Privacy
19. Global Premium for Skills
20. Rebirth of Cities
21. Rise of English
22. Communities of Culture
23. A New Trust
24. People as Scarce Resource
25. Global Peace

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English on the Web

The decisive factor in modern history…

English on the Web

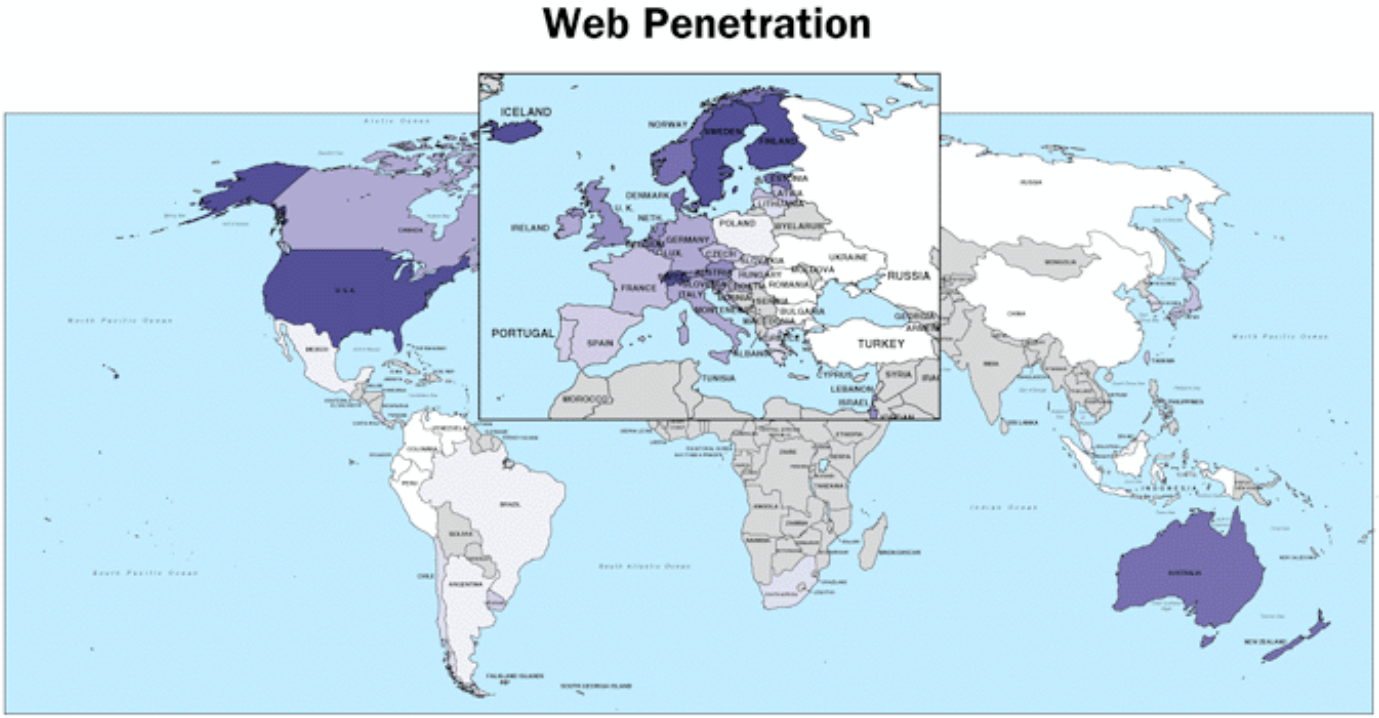
The decisive factor in modern history…

"that the North Americans speak English."
Otto von Bismarck, 1898

The Internationalization of the Web, 1

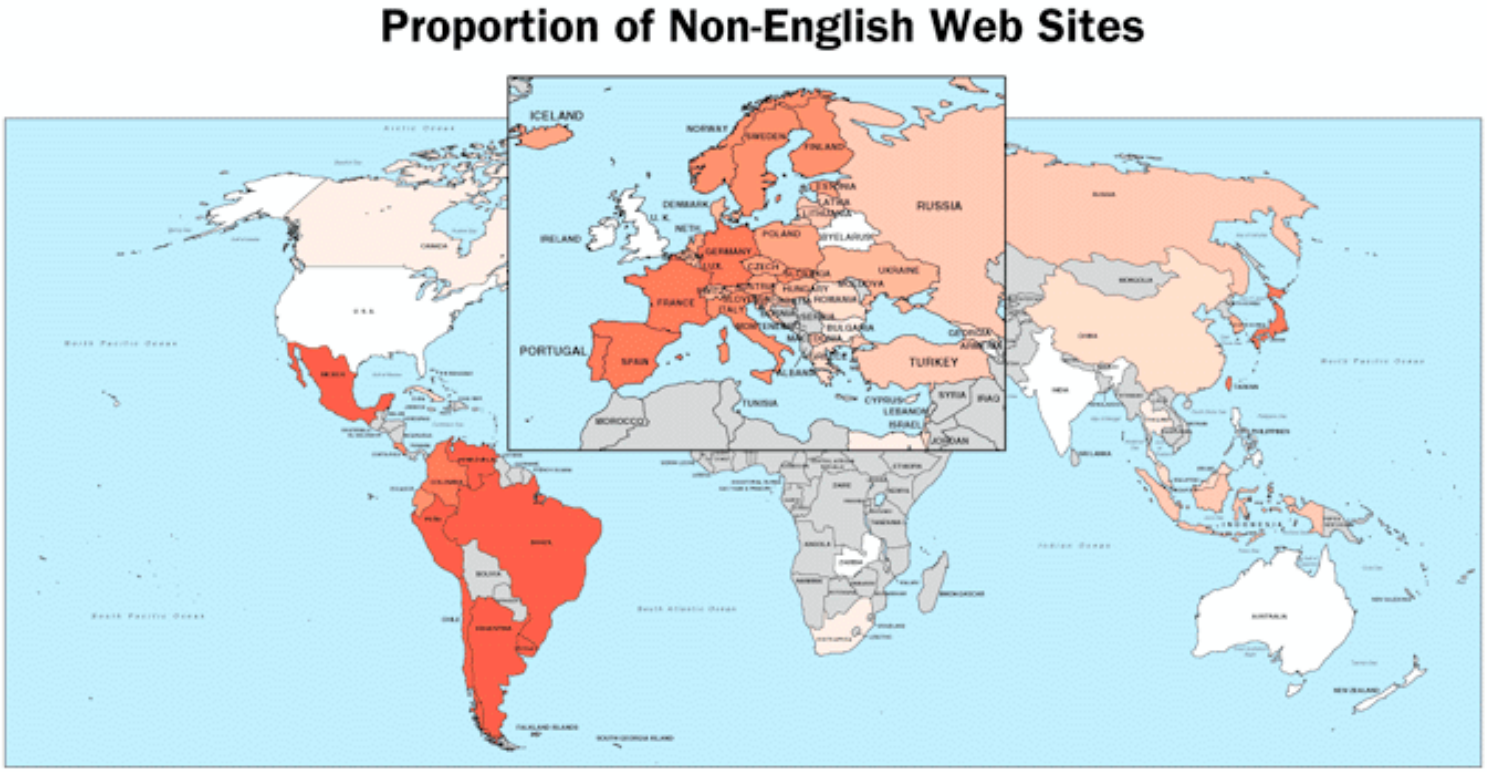
Relative size of Eng-speaking population in developed world

Cf. Web penetration, 1997



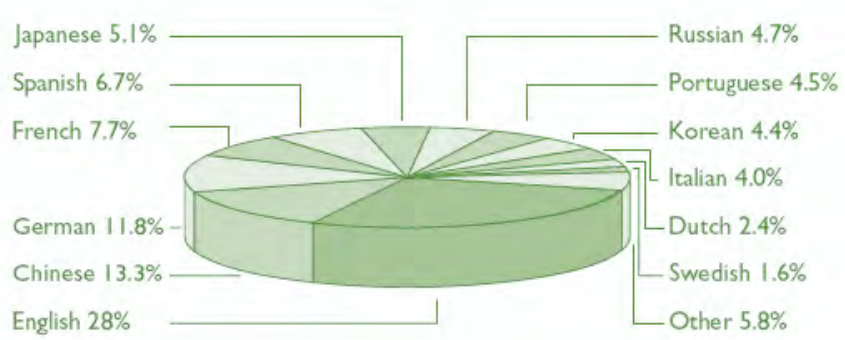
Reasons for Early English Domination

Need for language communities to achieve critical mass before using local lg



English as a Lingua Franca

English as dominant language of trade, science, diplomacy, tourism, etc.



Proportion of World's Books Annually Published in Each Language

Fears of English Hegemony…

"The Web is the ultimate act of intellectual colonialism." Director of Russian ISP, 1999

"Nearly 70 per cent of the world's Web sites are in English, at times crowding out voices and views." Kofi Annan, 12-Jan-04

English has consolidated its dominance as the language of the Internet, where 80 percent of the world's electronically stored information is in English, NYTimes 2007


Across cultures, English is the word

By Seth Mydans
Published: Monday, April 9, 2007

And Anglophone Triumphalism...

The Internet is "a great force for the Anglification of the planet."

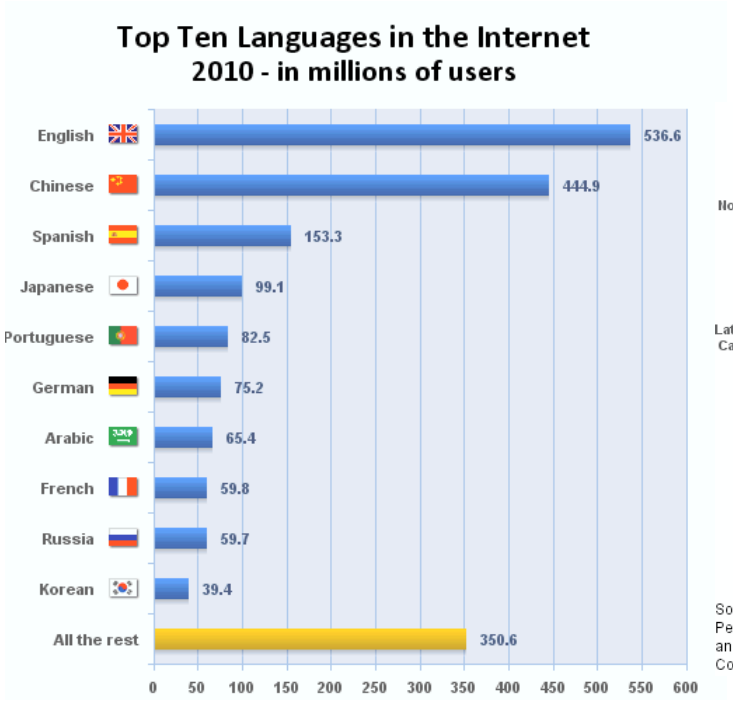
"[Thanks to the Internet,] English will be the native language of a majority of the world by some time in the next century." Editor, *The Futurist*

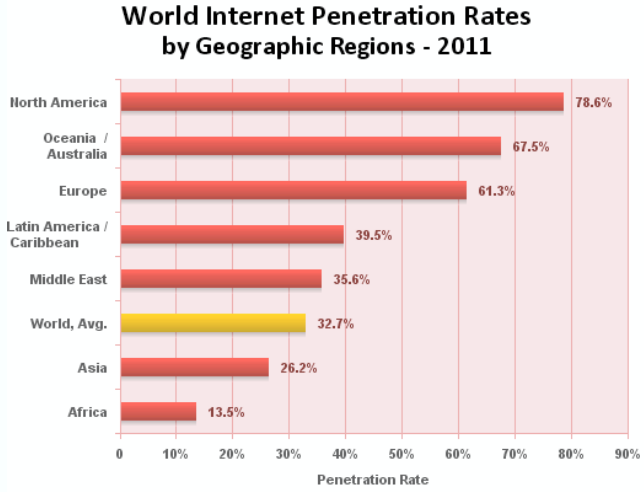
"There is no retreat from English as the world language; no retreat from and English-speaking world." Sridath Ramphal, chairman of Commission on Global Governance, 1996

The Internationalization of the Web, 1

Relative size of Eng-speaking population in developed world

Cf. Web penetration, 2010





Source: Internet World Stats - www.internetworldstsats.com/stats.htm
Penetration Rates are based on a world population of 6,930,055,154 and 2,267,233,742 estimated Internet users on December 31, 2011.

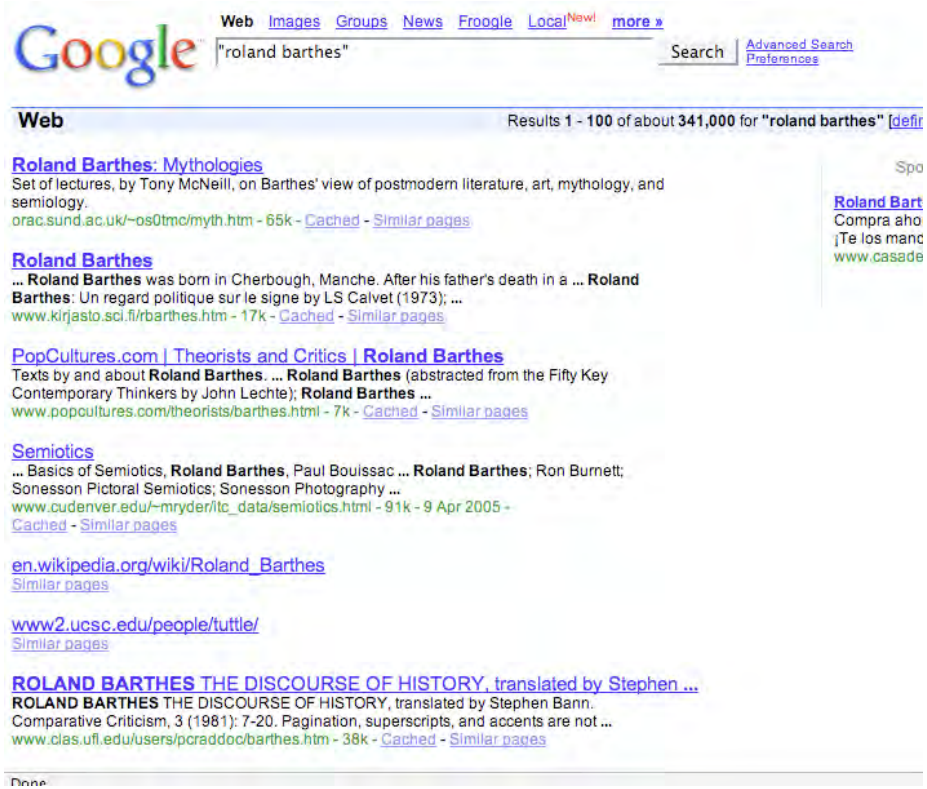
The Polyglot Web

... But the *perception* of English dominance persists

One reason: English still by far the most widely used single language...

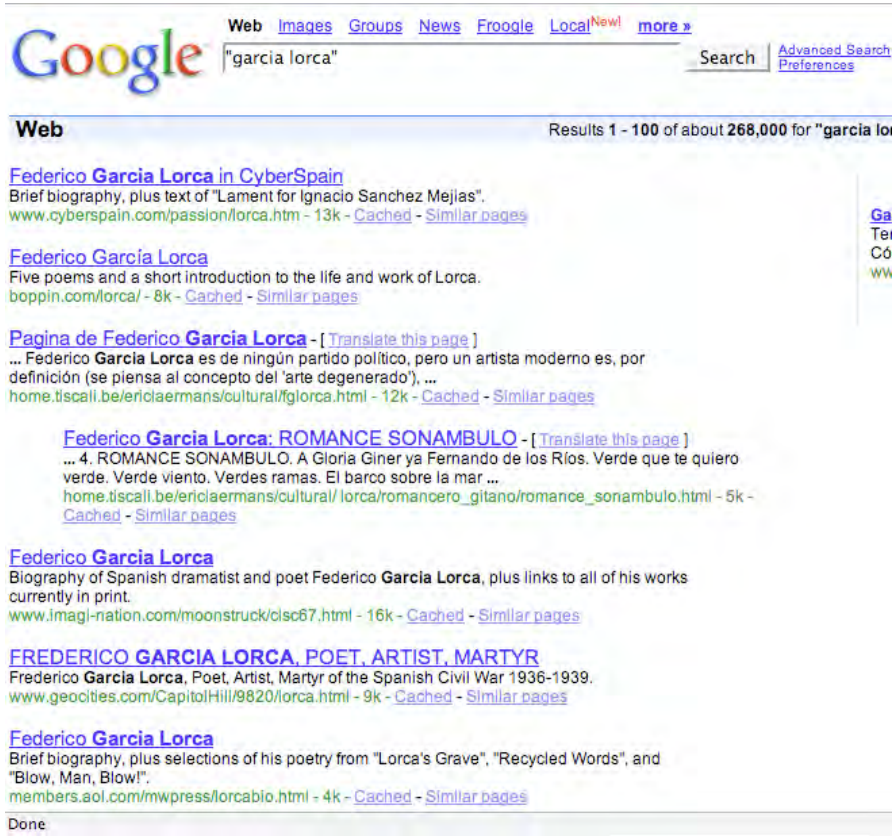
The "Omnigooglization" of the Web

1st 50 Google hits for "Roland Barthes":
44 English, 4 French, 1 Spanish, 1 German



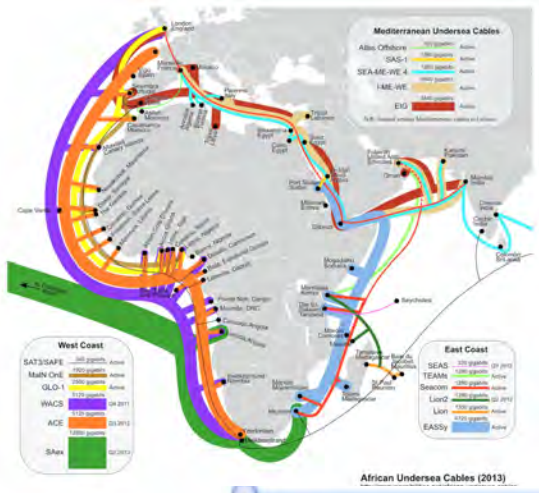
Omnigooglization, 2

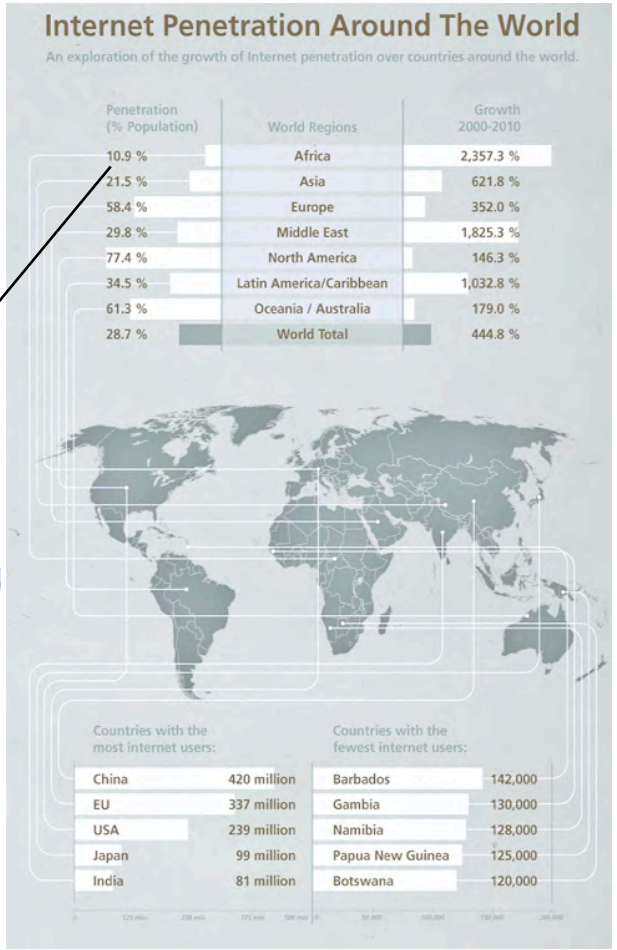
1st 50 Google hits for "Garcia Lorca":
45 English, 4 Spanish, 1 Italian



The Internationalization of the Web, 1

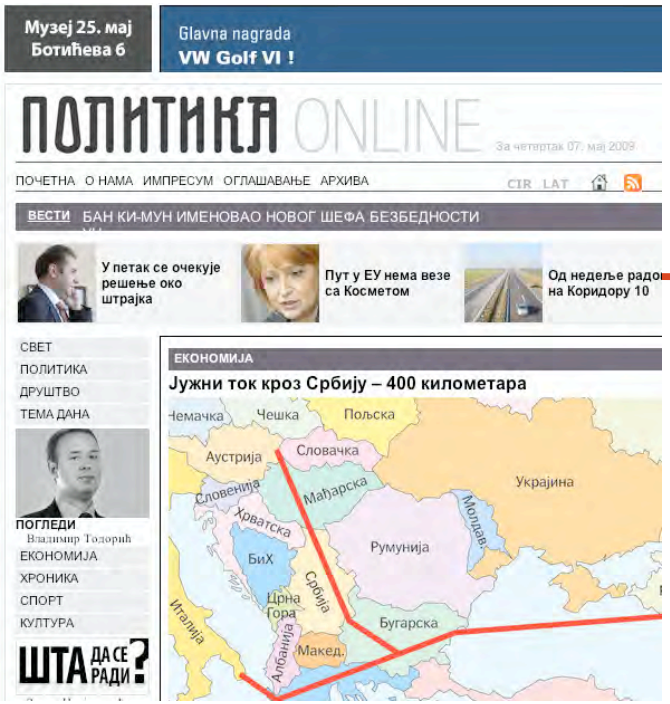
Growth is fastest in developing world:





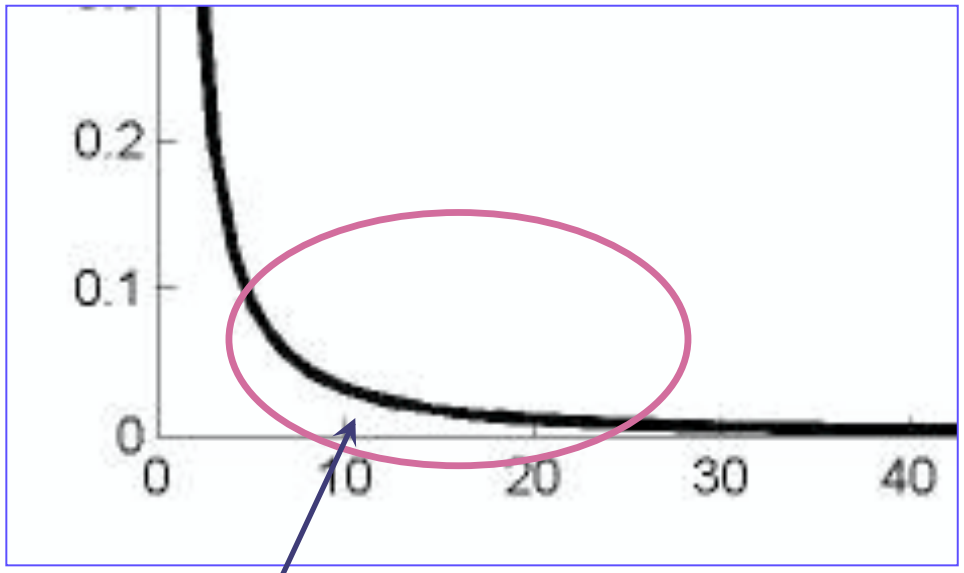
Space for Smaller Languages

Web encourages the spread of English….
And maintenance and spread of smaller national, regional, and ethnic languages



Where the action is:

The middle range of the powerlaw curve



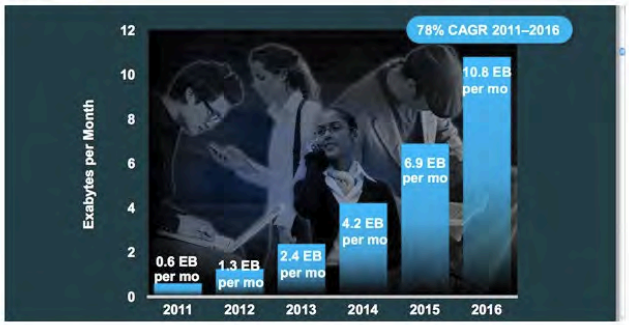
South of Wilshire

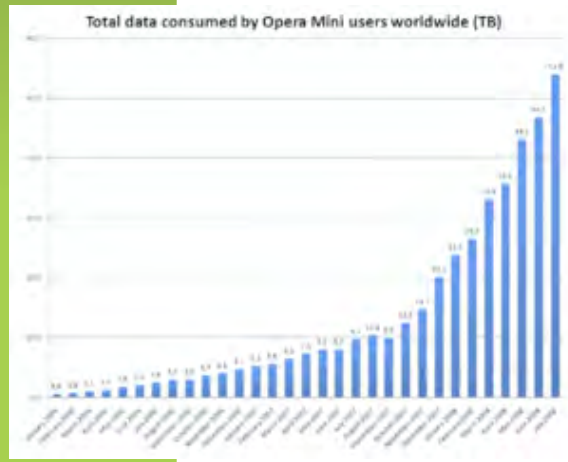
Faster than we expected

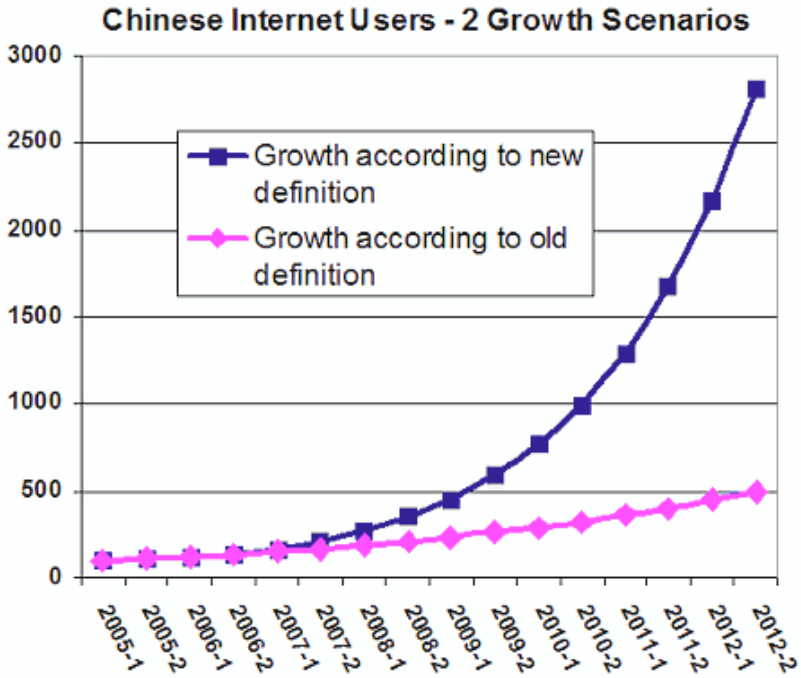
Cisco: mobile connections to hit 10 billion by 2016

By: Dan Graziano | Feb 15th, 2012 at 12:30AM 0 Comments

Filed Under: Mobile







AMD: By 2015 half of world will have an Internet connection

…and not so fast

But in much of world, desire for connectivity creates preference for fixed connections

Internet Café,
Accra, Ghana

Next Time

Required reading:

Auletta, Ken. 2010. "Publish or Perish." The New Yorker, April 26.

Additional:

Darnton, Robert. "Google and the Future of Books," The New York Review of Books, Feb. 12, 2009.

Assignment for 4/17

Auletta writes: "Amazon seems to believe that in the digital world it might not even need publishers at all." Twentieth-century publishers generally performed several tasks: they have been gatekeepers who selected the most authoritative or readable works; they have been editors who checked, edited, and corrected manuscripts; they have handled production and design of volumes and overseen printing; they have marketed books, helping them to find their appropriate audience; they have distributed books to bookstores; and they have handled publicity and advertising.

In a digital world, is it necessary to have a separate firm or organization to perform these functions? If so, do you see a continuing role for publishers in some of these functions, or can they be undertaken by someone else? Be sure to make *specific* reference to the discussion in Auletta's article of the roles of publishers and how they are now being questioned.