Who Manages Internet?

There is no single body which manages the Internet.

INTERNET ENGINEERING

It runs through a host of independent or loosely coupled coordinating organizations.

The organizations below play a major role in the organization, management and development of it:

Internet Society (ISOC)
Internet Architecture Board (IAB)
Internet Engineering Task Force (IETF)
Internet Engineering Steering Group (IESG)
Internet Corporation for Assigned Names & Numbers ICANN)
W3C

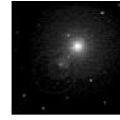# Internet Society (ISOC)

A nonprofit, non-governmental professional-membership organization of individuals and organizations interested in the development of Internet. More specifically, this is the legal umbrella for other coordinating bodies (such as IAB, IANA) for global cooperation and coordination for the Internet and its internetworking technologies and applications.

Internet Architecture Board (IAB)

IAB is a technical advisory group of the Internet Society. Its responsibilities include oversight of IETF, editorship of the RFC document series, administration of Internet assigned numbers, and liaison of the Internet Society in liaison relationships with other organizations concerned with standards.
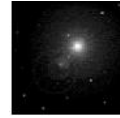
Internet
Engineering Task Force (IETF)

Body to address and resolve technical and operational problems on the Internet and to develop Internet standards and protocols.

The membership of IETF is international and completely voluntary. Members consist of network designers, operators, vendors, researchers and other interested individuals.

Internet Assigned
Numbers Authority (IANA):

Based at ICANN, IANA is in charge of all "unique parameters" on the Internet, including IP (Internet Protocol) addresses and manages the Root Domain Name Service.

Global Internet Assigned Numbers Authority

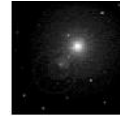Americas and sub-Saharan Africa:
The American Registry for Internet Numbers (ARIN)
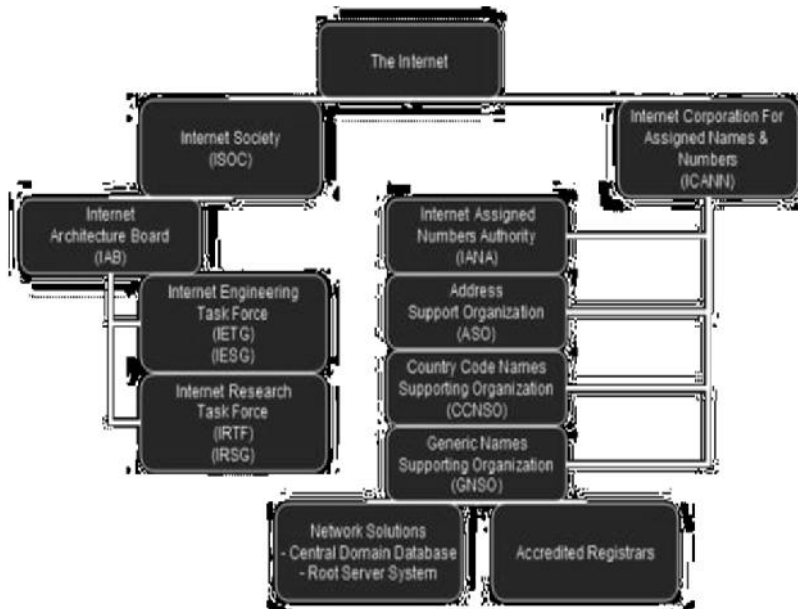
Europe and North Africa:
Reseais IP Europeens (RIPE) (http://www.ripe.net)

Asia and Australia:
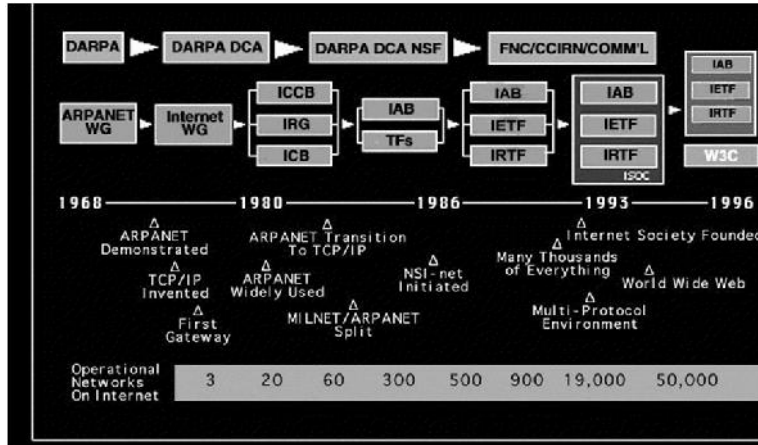Asian-Pacific Network Information Center (APNIC)
(http://www.apnic.net)

The Internet

Internet Society (ISOC)

Internet Corporation For Assigned Names & Numbers (ICANN)

Internet Architecture Board (IAB)

Internet Engineering Task Force (IETG) (IESG)

Internet Research Task Force (IRTF) (IRSG)

Internet Assigned Numbers Authority (IANA)

Address Support Organization (ASO)

Country Code Names Supporting Organization (CCNSO)

Generic Names Supporting Organization (GNSO)

Network Solutions
- Central Domain Database
- Root Server System

Accredited Registrars

Evolution of Internet's Management

Global Village

44

World Connectivity in 1991

INTERNET
ENGINEERING

INTERNATIONAL CONNECTIVITY
Version 2 - 9/91

- Internet
- Bitnet but not Internet
- EMail Only (UUCP, FidoNet)
- No Connectivity

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This map may be obtained via anonymous ftp
from ftp.cs.wisc.edu, connectivity_table directory.
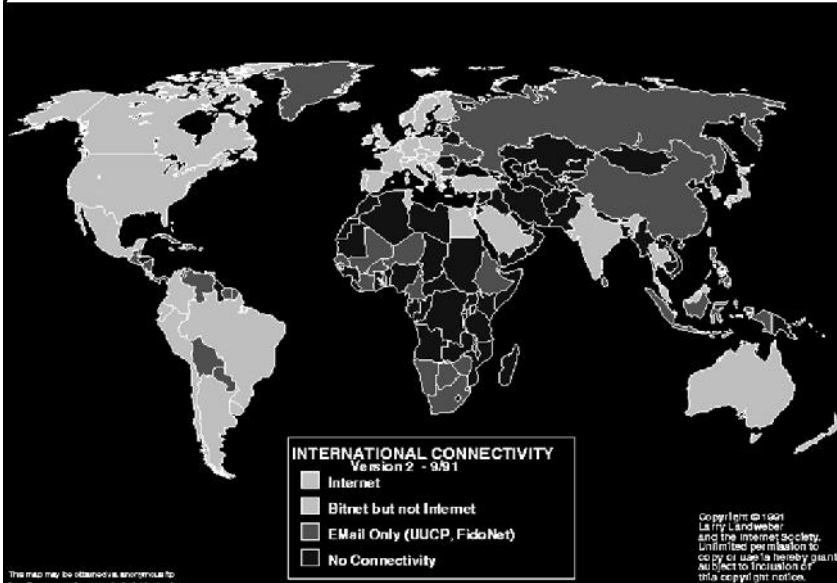
World Connectivity in 1995

INTERNET
ENGINEERING

INTERNATIONAL CONNECTIVITY
Version 13 - 2/15/95

- Internet
- Bitnet but not Internet
- EMail Only (UUCP, FidoNet)
- No Connectivity

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This map may be obtained via anonymous ftp
from ftp.cs.wisc.edu, connectivity_table directory.

World Connectivity 1997-2012
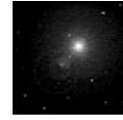
INTERNET
ENGINEERING

Internet Users 2012

INTERNET
ENGINEERING

Slide 1

Internet Users 2007

Internet Usage by World Region
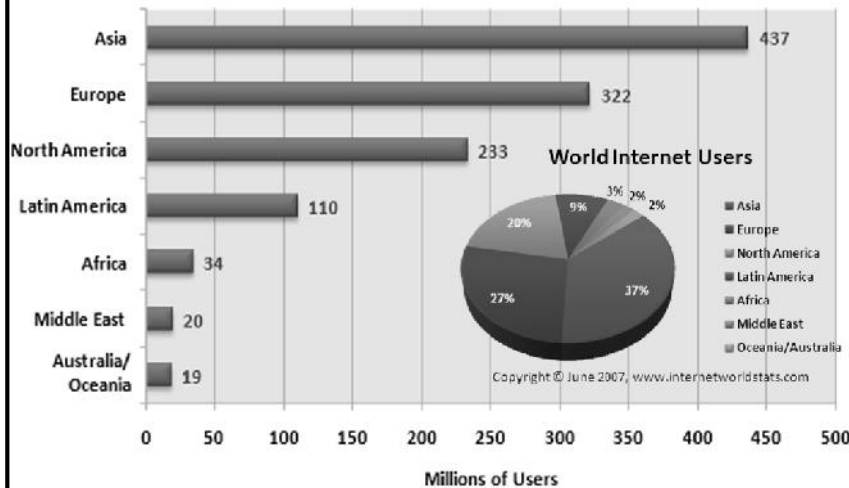
Region	Millions of Users
Asia	437
Europe	322
North America	233
Latin America	110
Africa	34
Middle East	20
Australia/Oceania	19

World Internet Users

- Asia 37%
- Europe 27%
- North America 20%
- Latin America 9%
- Africa 3%
- Middle East 2%
- Oceania/Australia 2%

Copyright © June 2007, www.internetworldstats.com

Copyright © 2007, www.internetworldstats.com

Slide 2

Internet Penetration

World Internet Penetration Rates by Geographic Regions - 2011

Region	Rate
North America	78.3%
Oceania / Australia	60.1%

WORLD INTERNET USAGE AND POPULATION STATISTICS
March 31, 2011

World Regions	Population (2011 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Growth 2000-2011	Users % of Table
	1,037,524,058	4,514,400	118,609,620	11.4 %	2,527.4 %	5.7 %
	3,879,740,877	114,304,000	922,329,554	23.8 %	706.9 %	44.0 %
A	816,426,346	105,096,093	476,213,935	58.3 %	353.1 %	22.7 %
st	216,258,843	3,284,800	68,553,666	31.7 %	1,987.0 %	3.3 %
erica	347,394,870	108,096,800	272,066,000	78.3 %	151.7 %	13.0 %
erica / Carib.	597,283,165	18,068,919	215,939,400	36.2 %	1,037.4 %	10.3 %
Australia	35,426,995	7,620,480	21,293,830	60.1 %	179.4 %	1.0 %
TOTAL	6,930,055,154	360,985,492	2,095,006,005	30.2 %	480.4 %	100.0 %

Source: Inter...
Penetration...
and 2,095,0...
Copyright ©...

(1) Internet Usage and World Population Statistics are for March 31, 2011. (2) CLICK on each world region name for regional usage information. (3) Demographic (Population) numbers are based on data from the US Census Bureau. ...t usage information comes from data published by Nielsen Online, by the International Telecommunications Union, ...cal Regulators and other reliable sources. (5) For definitions, disclaimer, and navigation help, please refer to the Site ...ide. (6) Information in this site may be cited, giving the due credit to www.internetworldstats.com. Copyright © 2001 - ...watts Marketing Group. All rights reserved worldwide.
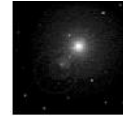
Face Book World

FACEBOOK USAGE AND INTERNET STATISTICS FOR DEC 31, 2011

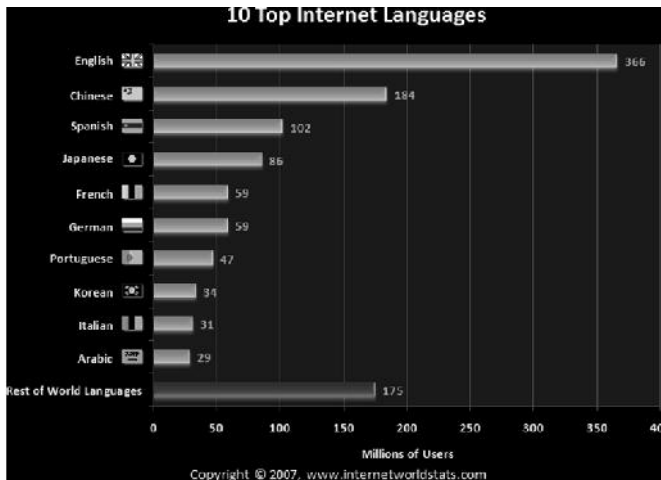| Geographic World Regions	Population (2011 Est.)	FB Users Aug. 31, 2010	FB Users June 30, 2011	FB Users Dec. 31, 2011	FB Penetration Dec. 31, 2011
Asia	3,879,740,877	93,584,580	152,957,480	183,963,780	4.7 %
Africa	1,037,524,058	17,607,440	30,665,460	37,739,380	3.6 %
Europe	816,426,346	162,104,640	208,907,040	223,376,640	27.4 %
Latin America	555,856,161	68,189,920	115,288,940	141,612,220	25.5 %
North America	347,394,870	149,054,040	167,999,540	174,586,680	50.3 %
Middle East	216,258,843	11,698,120	16,125,180	18,241,080	8.4 %
The Caribbean	41,427,004	3,925,060	5,903,520	6,218,960	15.0 %
Oceania / Australia	35,426,995	11,596,660	12,881,560	13,353,420	37.7 %
WORLD TOTAL	6,930,055,154	517,760,460	710,728,720	799,092,160	11.5 %

NOTES: (1) Facebook (FB) User Statistics and Facebook Penetration in the World for December 31, 2011, according to the official Facebook number of users reported in each individual country and/or world region. (2) The "**Facebook Penetration**" corresponds to the ratio of Facebook users in relation to the total number of estimated total population in each world region, expressed as a percentage. (3) World Demographic (Population) numbers are based on mid-year 2011 data from the US Census Bureau . (4) For definitions, disclaimers, and navigation help, please refer to the Site Surfing Guide. (6) Information in this site may be cited, giving the due credit to www.internetworldstats.com. Copyright © 2001 - 2012, Miniwatts Marketing Group. All rights reserved worldwide.

Internationalization

10 Top Internet Languages

Language	Millions of Users
English	366
Chinese	184
Spanish	102
Japanese	86
French	59
German	59
Portuguese	47
Korean	34
Italian	31
Arabic	29
Rest of World Languages	175

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- Approximately half a billion English users come from India and China.

Growth of Internet Domain Names (Recent)

INTERNET ENGINEERING

Total Domain Name Registrations

http://www.domaintools.com/internet-statistics/country-ip-counts.html

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History of Internet

54
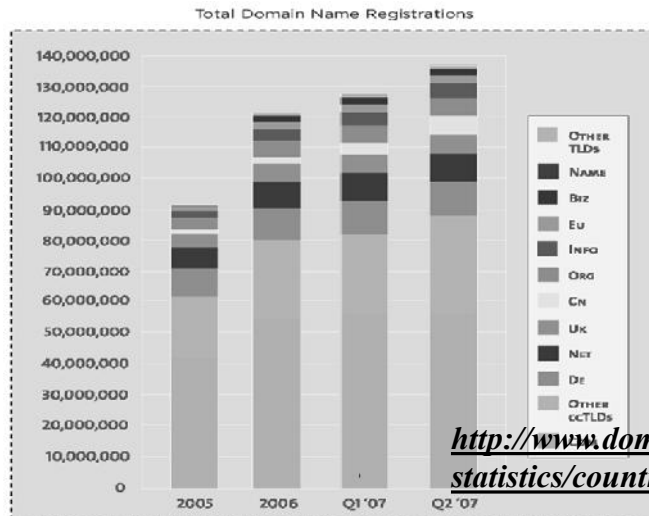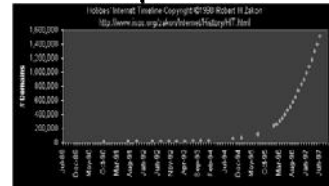
Looking Back..
The History of the Internet

- ARPANET (Advanced Research Projects Agency Network)

- TCP/IP (Transmission Control Protocol/Internet Protocol)

- NSFNET (National Science Foundation Network)

- Desktop computers

- Network upgrades

- Web Technology

1950's

1957 USSR launches Sputnik, first artificial earth satellite. In response, US forms the **Advanced Research Projects Agency (ARPA)** within the Department of Defense (DoD) to establish US lead in science and technology applicable to the military.

1960's

1969 - The Department of Defense Advanced Research Projects Agency creates an experimental network called ARPANET. This network provides a test-bed for emerging network technologies.
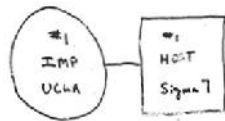
ARPANET originally connected four universities

> Node 1: UCLA - (September)
> Node 2: SRI - Stanford Research Institute (October)
> Node 3: UCSB
> Node 4: University of Utah

FIGURE 6.1 Drawing of September 1969
(Courtesy of Alex McKenzie)
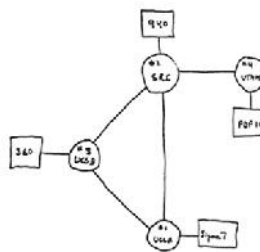
FIGURE 6.2 Drawing of 4 Node Network
(Courtesy of Alex McKenzie)

The first node on ARPANET at University California Los Angeles (UCLA) on the 2nd of September 1969. (Source : "Casting the Net", page 55) UCLA was the home of Len Kleinrock's Network Measurement Center. Doug Engelbart's Network Information Center resided at SRI. And some of the earliest graphics work was being done at Santa Barbara and Utah.
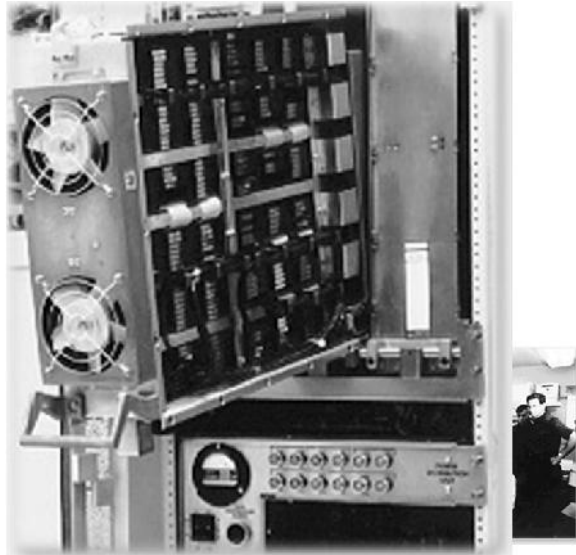
By the end of the year there are four nodes on the "ARPA NETWORK", as shown in schematic above. (Source : "Casting the Net", page 56. See also The Computer Museum Timeline.)

IMP

1960's (continued..)

Information Message Processors (IMP) [Honeywell 516 mini computer with 12K of memory] developed by Bolt Beranek and Newman, Inc. (BBN) First node-to-node message sent between UCLA and SRI (October, 1969)

First Request for Comment (RFC): "Host Software" by Steve Crocker (April 9, 1969)

Michigan State and Wayne State University establish X.25-based Merit network for students, faculty, alumni.

1970'S

1971 ALOHAnet developed by Norman Abrahamson, University of Hawaii, heart of Ethernet and connected to the ARPANET in 1972.

1972 The National Center for Supercomputing Applications (NCSA) develops the telnet application for remote login, making it easier to connect to a remote computer.

1973 **FTP** (file transfer protocol) is introduced, standardizing the transfer of files between networked computers.

1970'S

1972 Ray Tomlinson (BBN) writes basic email message send and read software (March) Larry Roberts writes first email utility to list, selectively read, file, forward, and respond to messages (July)

1973 Bob Metcalfe's Harvard Ph.D. Thesis outlines idea for Ethernet.

1976 Elizabeth II, Queen of the United Kingdom sends out an e-mail (various Net folks have e-mailed dates ranging from 1971 to 1978)

UUCP (Unix-to-Unix Copy) developed at AT&T Bell Labs and distributed with UNIX one year later.

1980's

1981 BITNET, the "Because It's Time NETwork" Started as a cooperative network at the City University of New York, with the first connection to Yale.

CSNET (Computer Science NETwork) built by a collaboration of computer scientists and University of Delaware, Purdue University, University of Wisconsin, RAND Corporation and BBN through seed money granted by NSF to provide networking services (especially email) to university scientists with no access to ARPANET.

1980's

• 1983 Name server developed at Univ of Wisconsin, no longer requiring users to know the exact path to other systems.

•Internet Activities Board (IAB) established, replacing ICCB

•Berkeley releases 4.2BSD incorporating TCP/IP.

•EARN (European Academic and Research Network) established. Very similar to the way BITNET works with a gateway funded by IBM. FidoNet developed by Tom Jennings.

•1984 Domain Name System (DNS) introduced. Number of hosts breaks 1,000

•JUNET (Japan Unix Network) established using UUCP.

1980's

• 1983 The TCP/IP suite of networking protocols, or rules, becomes the only set of protocols used on the ARPANET. This decision sets a standard for other networks, and generates the use of the term "Internet" as the network of networks which either use the TCP/IP protocols or are able to interact with TCP/IP networks.

• To keep military and non-military network sites separate, the ARPANET splits into two networks: ARPANET and MILNET.
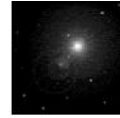
1980's Continued..

•In 1982 and 1983, the first desktop computers began to appear. Many are equipped with an operating system called Berkeley UNIX, which includes networking software. This allows for relatively easy connection to the Internet using telnet.

•The personal computer revolution continues through the eighties, making access to computer resources and networked information increasingly available to the general public.

1980's Continued..

1985-86: The National Science Foundation (NSF) connects the nation's six supercomputing centers together. This network is called the NSFNET, or NSFNET backbone.

To expand access to the Internet, the NSF supported the development of regional networks, which were then connected to the NSFNET backbone. In addition, the NSF supported institutions, such as universities, in their efforts to connect to the regional networks.

Here is a diagram of the N backbone, as it appeared in
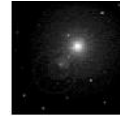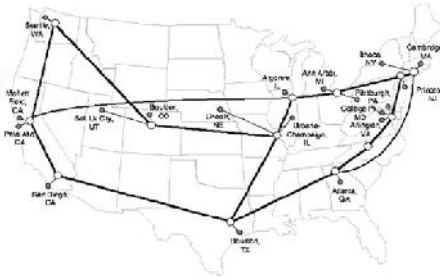
1980's

• **1987** - The NSF awards a grant to Merit Network, Inc. to operate and manage future development of the NSFNET backbone. Merit Network, Inc. collaborates with IBM and MCI to research and develop faster networking technologies.

• 1988 2 November - Internet worm burrows through the Net, affecting ~6,000 of the 60,000 hosts on the Internet.

• **1989** - The backbone network is upgraded to "T1" from 56Kbps which means that is able to transmit data at speeds of 1.5 million bits of data per second, or about 50 pages of text per second.
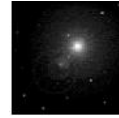
1990's

1990 - The ARPANET is dissolved.

1991 - Gopher is developed at the University of Minnesota. Gopher provides a hierarchical, menu-based method for providing and locating information on the Internet. This tool makes using the Internet much easier.

1992 - Internet Society (ISOC) is chartered
Number of hosts breaks 1,000,000

1993 - The European Laboratory for Particle Physics in Switzerland (CERN) releases the World Wide Web (WWW), developed by Tim Berners-Lee. The WWW uses hypertext transfer protocol (HTTP) and hypertext links, changing the way information can be organized, presented and accessed on the Internet.

1990's

1993 - The NSFNET backbone network is upgraded to "T3" which means that it is able to transmit data at speeds of 45 million bits of data per second, or about 1400 pages of text per second.

1993-1994 - The graphical web browsers Mosaic and Netscape Navigator are introduced and spread through the Internet community. Due to their intuitive nature and graphical interface, these browsers make the WWW and the Internet more appealing to the general public.

• **1995** - The NSFNET backbone is replaced by a new network architecture, called vBNS (very high speed backbone network system) that utilizes Network Service Providers, regional networks and Network Access Points (NAPs).

1995

1995 - RealAudio, an audio streaming technology, lets the Net hear in near real-time

1995 Radio HK, the first commercial 24 hr., Internet-only radio station starts broadcasting

1995 NSF establishes the very high speed Backbone Network Service (vBNS) linking super-computing centers: NCAR, NCSA, SDSC, CTC, PSC

Technologies of the Year: WWW, Search engines

Emerging Technologies: Mobile code (JAVA, JAVAscript), Virtual environments (VRML), Collaborative tools

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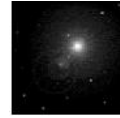
1996

ISP Meltdown: AOL (19 hours), Netcom (13 hours), AT&T WorldNet (28 hours - email only)

New Yorks' Public Access Networks Corp (PANIX) is shut down after repeated SYN attacks by a cracker using methods outlined in a hacker magazine (2600)

 Various US Government sites are hacked into and their content changed, including CIA, Department of Justice, Air Force
MCI upgrades Internet backbone adding ~13,000 ports, bringing the effective speed from 155Mbps to 622Mbps.

Technologies of the Year: Search engines, JAVA, Internet Phone

1997

2000th RFC: "Internet Official Protocol Standards"

The American Registry for Internet Numbers (ARIN) is established to handle administration and registration of IP numbers to the geographical areas currently handled by Network Solutions (InterNIC), starting March 1998.

Longest hostname registered with InterNIC: CHALLENGER.MED.SYNAPSE.UAH.

Technologies of the Year: Push, Multicasting
Emerging Technologies: Push, Streaming Media.
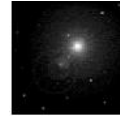
1998

Electronic postal stamps become a reality, with the US Postal Service allowing stamps to be purchased and downloaded for printing from the Web

Network Solutions registers its 2 millionth domain on 4 May.
San Francisco sites without off-city mirrors go offline as the city blacks out on 8 December.

Google (1998).

Technologies of the Year: E-Commerce, E-Auctions, Portals
Emerging Technologies: E-Trade, XML.

1999

Internet access becomes available to the Saudi Arabian (.sa) public in January, Somalia gets its first ISP - Olympic Computer (Sep), .ps is registered to Palestine (11 Oct)

MCI/Worldcom, the vBNS provider for NSF, begins upgrading the US backbone to 2.5GBps .

First Internet Bank of Indiana, the first full-service bank available only on the Net, opens on 22 February

MCI/Worldcom launches vBNS+, a commercialized version of vBNS

RFC 2550 Proposes the solution of Y10K and Beyond

Technologies of the Year: E-Trade, Online Banking, MP3
Emerging Technologies: Net-Cell Phones, Thin Computing, Embedded Computing

INTERNET ENGINEERING

2000

•2000: The US timekeeper (USNO) and a few other time services around the world report the new year as 19100 on 1 January.

•2001: .biz .museum begun to resolve

•2002: .name, .coop , .aero begin to resolve
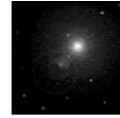
•2003: TeraGrid Computing

INTERNET ENGINEERING

2000-2005

- P2P Systems
  - Rise & Fall of Napster: P2P emerges as major technology (2000-2001).
  - BitTorrent (2004).

- Wikipedia (2001)
- Social Networks (Linkedin 2002, August 2003, Facebook 2004)
- Second Life (2003), World of Warcraft.

2006-2012

- Twitter (July 2006 by Jack Dorsey)
- Grid Computing to Cloud Computing (2007).
- WikiLeaks (2006, Julian Assange)

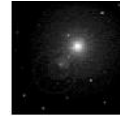Emerging Technologies: InternetTV, Amazon Kindle etc.

References

- WebBook: Living History of Internet Project
  - http://www.livinginternet.com/