

The Expansion Of The Internet

Introduction

In this assignment, I intend to outline the history of the internet, explain how and when it was invented, how it has developed in the last thirty years, how widespread the use of the internet has become, how computers have been improved with the expansion of the internet to run it effectively and various other areas which are related to the expansion of the internet. I am going to accomplish this piece of coursework by using various sources for research e.g. newspaper articles, books and the Internet itself.

The History Of The Internet

1970s

1970

First publication of the original ARPANET Host-Host protocol: C.S. Carr, S. Crocker, V.G. Cerf, "HOST-HOST Communication Protocol in the ARPANET Network," in AFIPS Proceedings of SJCC (:vgc:)

First report on ARPANET at AFIPS: "Computer Network Development to Achieve Resource Sharing" (March)

ALOHAnet, the first packet radio network, developed by Norman Abramson, Univ of Hawaii, becomes operational (July) (:sk2:)

- connected to the ARPANET in 1972

ARPANET hosts start using Network Control Protocol (NCP), first host-to-host protocol

First cross-country link installed by T&T between UCLA and BBN at 56kbps. This line is later replaced by another between BBN and RAND. A second line is added between MIT and Utah

1971

15 nodes (23 hosts): UCLA, SRI, UCSB, Univ of Utah, BBN, MIT, RAND, SDC, Harvard, Lincoln Lab, Stanford, UIUC, CWRU, CMU, NASA/Ames

BBN starts building IMPs using the cheaper Honeywell 316. IMPs however are limited to 4 host connections, and so BBN develops a terminal IMP (TIP) that supports up to 64 terminals (September)

Ray Tomlinson of BBN invents email program to send messages across a distributed network. The original program was derived from two others: an intra-machine email program (SENDMSG) and an experimental file transfer program (CPYNET) (:amk:irh:)

1972

Ray Tomlinson (BBN) modifies email program for ARPANET where it becomes a quick hit. The @ sign was chosen from the punctuation keys on Tomlinson's Model 33 Teletype for its "at" meaning (March)

Larry Roberts writes first email management program (RD) to list, selectively read, file, forward, and respond to messages (July)

International Conference on Computer Communications (ICCC) at the Washington D.C. Hilton with demonstration of ~~ARPANET~~ between 40 machines and the Terminal Interface Processor (TIP) organized by Bob Kahn. (October)

First computer-to-computer chat takes place at UCLA, and is repeated during ICCC, as psychotic ~~PARRY~~ (at Stanford) discusses its problems with the Doctor (at BBN).

International Network Working Group (INWG) formed in October as a result of a meeting at ICCC identifying the need for a combined effort in advancing networking technologies. Vint Cerf appointed first Chair. By 1974, INWG became [IFIP WG 6.1](#) (:vgc:)

Louis Pouzin leads the French effort to build its own ~~ARPANET~~ - CYCLADES

RFC 318: [Telnet specification](#)

1973

First international connections to the ~~ARPANET~~: University College of London (England) via [NORSAR](#) (Norway)

Bob Metcalfe's Harvard PhD Thesis outlines idea for [Ethernet](#). The concept was tested on Xerox ~~PARC's~~ ~~Alto~~ computers, and the first Ethernet network called the ~~Alto Aloha~~ System (May) (:amk:)

Bob Kahn poses Internet problem, starts internetting research program at ~~ARPA~~. Vinton Cerf sketches gateway architecture in March on back of envelope in a San Francisco hotel lobby (:vgc:)

Cerf and Kahn present basic Internet ideas at INWG in September at Univ of Sussex, Brighton, UK (:vgc:)

RFC 454: File Transfer specification

Network Voice Protocol (NVP) specification (RFC 741) and implementation enabling conference calls over ~~ARPANet~~. (:bb1:)

SRI (NIC) begins publishing ~~ARPANET~~ News in March; number of ~~ARPANET~~ users estimated at 2,000

~~ARPA~~ study shows email composing 75% of all ~~ARPANET~~ traffic

Christmas Day Lockup - Harvard IMP hardware problem leads it to broadcast zero-length hops to any ~~ARPANET~~ destination, causing all other IMPs to send their traffic to Harvard (25 December)

RFC 527: [~~ARPA~~WOCKY](#)

RFC 602: [The Stockings Were Hung by the Chimney with Care](#)

1974

Vint Cerf and Bob Kahn publish "~~Ar~~ Protocol for Packet Network Interconnection" which specified in detail the design of a Transmission Control Program (TCP). [IEEE Trans Comm] (:amk:)

BBN opens Telenet, the first public packet data service (a commercial version of ~~ARPANET~~) (:sk2:)

1975

Operational management of Internet transferred to DCA (now [DISA](#))

First ~~ARPANET~~ mailing list, [MsgGroup](#), is created by Steve Walker. Einar Stefferud soon took over as moderator as the list was not automated at first. ~~science~~ science fiction list, SF-Lovers, was to become the most popular unofficial list in the early days

John Vittal develops MSG, the first all-inclusive email program providing replying, forwarding, and filing capabilities.

Satellite links cross two oceans (to Hawaii and UK) as the first TCP tests are run over them by Stanford, BBN, and UCL

"[Jargon File](#)", by Raphael Finkel at ~~SAIL~~, first released (:esr:)

Shockwave Rider by John Brunner (:pds:)

1976

Elizabeth II, Queen of the United Kingdom sends out an email on 26 March from the Royal Signals and Radar Establishment (RSRE) in Malvern

UUCP (Unix-to-Unix CoPy) developed at ~~AT&T~~ Bell Labs and distributed with [UNIX](#) one year later.

Multiprocessing Pluribus IMPs are deployed

1977

THEORYNET created by Larry Landweber at Univ of Wisconsin providing electronic mail to over 100 researchers in computer science (using a locally developed email system over TELENET)

RFC 733: [Mail specification](#)

Tymshare spins out Tymnet under pressure from TELENET. Both go on to develop X.25 protocol standard for virtual circuit style packet switching (:vgc:)

First demonstration of ~~ARPANET~~/SF Bay Packet Radio Net/~~Atlantic~~ SATNET operation of Internet protocols with BBN-supplied gateways in July (:vgc:)

1978

TCP split into TCP and IP (March)

RFC 748: [TELNET RANDOMLY-LOSE Option](#)

1979

Meeting between Univ of Wisconsin, ~~DARPA~~, [National Science Foundation](#) (NSF), and computer scientists from many universities to establish a Computer Science Department research computer network (organized by Larry Landweber).

USENET established using UUCP between Duke and UNC by Tom Truscott, Jim Ellis, and Steve Bellovin. All original groups were under net.* hierarchy.

First MUD, MUD1, by Richard Bartle and Roy Trubshaw at U of Essex

ARPANET establishes the Internet Configuration Control Board (ICCB)

Packet Radio Network (PRNET) experiment starts with DARPA funding. Most communications take place between mobile vans. ARPANET connection via SRI.

On April 12, Kevin MacKenzie emails the MsgGroup a suggestion of adding some emotion back into the dry text medium of email, such as -) for indicating a sentence was tongue-in-cheek. Though flamed by many at the time, emoticons became widely used

1980s

1980

ARPANET grinds to a complete halt on 27 October because of an accidentally-propagated status-message virus

First C/30-based IMP at BBN

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 (:feg:)
- Original acronym stood for 'There' instead of 'Time' in reference to the free NJE protocols provided with the IBM systems
- Provides electronic mail and listserv servers to distribute information, as well as file transfers

CSNET (Computer Science NETwork) built by a collaboration of computer scientists and Univ of Delaware, Purdue Univ, Univ 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. CSNET later becomes known as the Computer and Science Network. (:amk,lhl:)

C/30 IMPs predominate the network; first C/30 TIP at SAC

Minitel (Teletel) is deployed across France by France Telecom.

True Names by Vernor Vinge (:pds:)

RFC 801: [NCP/TCP Transition Plan](#)

1982

Norway leaves network to become an Internet connection via TCP/IP over SATNET; UCL does the same

DCA and ARPANET establish the Transmission Control Protocol (TCP) and Internet Protocol (IP), as the protocol suite, commonly known as TCP/IP, for ARPANET. (:vgc:)

- This leads to one of the first definitions of an "internet" as a connected set of networks, specifically those using TCP/IP, and "Internet" as connected TCP/IP internets.
- DoD declares TCP/IP suite to be standard for DoD (:vgc:)

EUnet (European UNIX Network) is created by EUUG to provide email and USENET services. (:glg:)

- original connections between the Netherlands, Denmark, Sweden, and UK

Exterior Gateway Protocol (RFC 827) specification. EGP is used for gateways between networks.

1983

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

Cutover from NCP to TCP/IP (1 January)

No more Honeywell or Pluribus IMPs; TIPs replaced by TACs (terminal access controller)

Stuttgart and Korea get connected

Movement Information Net (MINET) started early in the year in Europe, connected to Internet in Sept

CSNET / ARPANET gateway put in place

ARPANET split into ARPANET and MILNET; the latter became integrated with the Defense Data Network created the previous year. 68 of the 113 existing nodes went to MILNET

Desktop workstations come into being, many with Berkeley UNIX (4.2 BSD) which includes IP networking software (:mpc:)

Networking needs switch from having a single, large time sharing computer connected to the Internet at each site, to instead connecting entire local networks

[Internet Activities Board \(IAB\)](#) established, replacing ICCB

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

[JANET](#) (Joint Academic Network) established in the UK using the Coloured Book protocols; previously SERCnet

Moderated newsgroups introduced on USENET (mod.*)

Neuromancer by William Gibson

Canada begins a one-year effort to network its universities. The NetNorth Network is connected to BITNET in Ithaca from Toronto (:kf1:)

[Kremvax](#) message announcing USSR connectivity to USENET

1985

[Whole Earth 'Lectronic Link \(WELL\)](#) started

Information Sciences Institute (ISI) at USC is given responsibility for DNS root management by DCA, and SRI for DNS NIC registrations

Symbolics.com is assigned on 15 March to become the first registered domain. Other firsts: cmu.edu, purdue.edu, rice.edu, berkeley.edu, ucla.edu, rutgers.edu, bbn.com (24 Apr); mit.edu (23 May); think.com (24 May); css.gov (June); mitre.org, .uk (July)

100 years to the day of the last spike being driven on the cross-Canada railroad, the last Canadian university is connected to NetNorth in a one year effort to have coast-to-coast connectivity. (:kf1:)

RFC 968: ['Twas the Night Before Start-up](#)

1986

NSFNET created (backbone speed of 56Kbps)

- NSF establishes 5 super-computing centers to provide high-computing power for all (JVNC@Princeton, PSC@Pittsburgh, SDSC@UCSD, NCSA@UIUC, Theory Center@Cornell).
- This allows an explosion of connections, especially from universities.

NSF-funded SDSCNET, JVNCNET, SURANET, and NYSERNET operational (:sw1:)

[Internet Engineering Task Force \(IETF\)](#) and Internet Research Task Force (IRTF) comes into existence under the IAB. First IETF meeting held in January at Linkabit in San Diego

The first Freenet (Cleveland) comes on-line 16 July under the auspices of the Society for Public Access Computing (SoPAC). Later Freenet program management assumed by the National Public Tele computing Network ([NPTN](#)) in 1989 (:sk2,rab:)

Network News Transfer Protocol ([NNTP](#)) designed to enhance Usenet news performance over TCP/IP.

Mail Exchanger (MX) records developed by Craig Partridge allow non-IP network hosts to have domain addresses.

The great USENET name change; moderated newsgroups changed in 1987.

BARRNET (Bay Area Regional Research Network) established using high speed links. Operational in 1987.

New England gets cut off from the Net as ~~AT~~T&T suffers a fiber optics cable break between Newark/NJ and White Plains/NY. Yes, all seven New England ~~ARPANET~~ trunk lines were in the one severed cable. Outage took place between 1:11 and 12:11 EST on 12 December

1987

NSF signs a cooperative agreement to manage the NSFNET backbone with [Merit Network, Inc.](#) (IBM and MCI involvement was through an agreement with Merit). Merit, IBM, and MCI later founded ~~ANS~~.

[UUNET](#) is founded with Usenix funds to provide commercial UUCP and Usenet access. Originally an experiment by Rick ~~Adams~~ and Mike O'Dell

First TCP/IP Interoperability Conference (March), name changed in 1988 to INTEROP

Email link established between Germany and China using CSNET protocols, with the first message from China sent on 20 September. (:wz1:)

The concept and plan for a national US research and education network is proposed by Gordon Bell et al in a report to the Office of Science and Technology, written in response to a congressional request by ~~Al~~ Gore. (Nov) It would take four years until the establishment of this network by Congress (:gb1:)

[1000th RFC](#): "Request For Comments reference guide"

Number of hosts breaks 10,000

Number of BITNET hosts breaks 1,000

1988

2 November - [Internet worm](#) burrows through the Net, affecting ~6,000 of the 60,000 hosts on the Internet (:ph1:)

[CERT](#) (Computer Emergency Response Team) formed by ~~DARPA~~ in response to the needs exhibited during the Morris worm incident. The worm is the only advisory issued this year.

DoD chooses to adopt OSI and sees use of TCP/IP as an interim. US Government OSI Profile (GOSIP) defines the set of protocols to be supported by Government purchased products (:gck:)

Los Nettos network created with no federal funding, instead supported by regional members (founding: Caltech, TIS, UCL~~A~~, USC, ISI).

NSFNET backbone upgraded to T1 (1.544Mbps)

CERFnet (California Education and Research Federation network) founded by Susan Estrada.

Internet ~~Assigned~~ Numbers ~~Authority~~ (~~IANA~~) established in December with Jon Postel as its Director. Postel was also the RFC Editor and US Domain registrar for many years.

Internet Relay Chat (IRC) developed by Jarkko Oikarinen (:zby:)

First Canadian regionals join NSFNET: ONet via Cornell, RISQ via Princeton, BCnet via Univ of Washington (:ec1:)

FidoNet gets connected to the Net, enabling the exchange of email and news (:tp1:)

The first multicast tunnel is established between Stanford and BBN in the Summer of 1988.

Countries connecting to NSFNET: Canada (CA), Denmark (DK), Finland (FI), France (FR), Iceland (IS), Norway (NO), Sweden (SE)

1989

Number of hosts breaks 100,000

[RIPE](#) (Reseaux IP Europeens) formed (by European service providers) to ensure the necessary administrative and technical coordination to allow the operation of the pan-European IP Network. (:glg:)

First relays between a commercial electronic mail carrier and the Internet: MCI Mail through the Corporation for the National Research Initiative (CNRI), and Compuserve through Ohio State Univ (:jg1,ph1:)

Corporation for Research and Education Networking ([CREN](#)) is formed by merging CSNET into BITNET (August)

~~AR~~NET - ~~A~~ustralian ~~A~~cademic Research Network - set up by ~~AV~~CC and CSIRO; introduced into service the following year (:gmc:)

First link between ~~A~~ustralia and NSFNET via Hawaii on 23 June

Cuckoo's Egg by Clifford Stoll tells the real-life tale of a German cracker group who infiltrated numerous US facilities

UCL ~~A~~sponsors the ~~A~~ct One symposium to celebrate ~~ARPANET~~'s 20th anniversary and its decommissioning (August)

RFC 1121: [Act One - The Poems](#)

RFC 1097: [TELNET SUBLIMINAL-MESSAGE Option](#)

Countries connecting to NSFNET: ~~A~~ustralia (~~AU~~), Germany (DE), Israel (IL), Italy (IT), Japan (JP), Mexico (MX), Netherlands (NL), New Zealand (NZ), Puerto Rico (PR), United Kingdom (UK)

1990s

1990

~~ARPANET~~ ceases to exist

[Electronic Frontier Foundation \(EFF\)](#) is founded by Mitch Kapor

~~Archie~~ released by Peter Deutsch, ~~Alan~~ Emtage, and Bill Heelan at McGill

Hytelnet released by Peter Scott (Univ of Saskatchewan)

The World comes on-line (world.std.com), becoming the first commercial provider of Internet dial-up access

ISO Development Environment (ISODE) developed to provide an approach for OSI migration for the DoD. ISODE software allows OSI application to operate over TCP/IP (:gck:)

Canet formed by 10 regional networks as national Canadian backbone with direct connection to NSFNET (:ec1:)

The first remotely operated machine to be hooked up to the Internet, the Internet Toaster by John Romkey, (controlled via SNMP) makes its debut at Interop.

RFC 1149: [Standard for the Transmission of IP Datagrams on Avian Carriers. Implementation](#) is completed 11 years later by the Bergen Linux Users Group (28 Apr 2001)

RFC 1178: [Choosing a Name for Your Computer](#)

Countries connecting to NSFNET: Argentina (AR), Austria (AT), Belgium (BE), Brazil (BR), Chile (CL), Greece (GR), India (IN), Ireland (IE), Korea (KR), Spain (ES), Switzerland (CH)

1991

First connection takes place between Brazil, by [Fapesp](#), and the Internet at 9600 baud.

Commercial Internet eXchange (CIX) Association, Inc. formed by General Atomics (CERFnet), Performance Systems International, Inc. (PSInet), and UUNET Technologies, Inc. (AlterNet), after NSF lifts restrictions on the commercial use of the Net (March) (:glg:)

Wide Area Information Servers (WAIS), invented by Brewster Kahle, released by Thinking Machines Corporation

Gopher released by Paul Lindner and Mark P. McCahill from the Univ of Minnesota

[World-Wide Web \(WWW\)](#) released by [CERN](#); Tim Berners-Lee developer (:pb1:)

PGP (Pretty Good Privacy) released by Philip Zimmerman (:ad1:)

US High Performance Computing Act (Gore 1) establishes the National Research and Education Network (NREN)

NSFNET backbone upgraded to T3 (44.736Mbps)

NSFNET traffic passes 1 trillion bytes/month and 10 billion packets/month

Defense Data Network NIC contract awarded by DISA to Government Systems Inc. who takes over from SRI in May

Start of JANET IP Service (JIPS) which signalled the changeover from Coloured Book software to TCP/IP within the UK academic network. IP was initially 'tunneled' within X.25. (:gst:)

RFC 1216: [Gigabit Network Economics and Paradigm Shifts](#)

RFC 1217: [Memo from the Consortium for Slow Commotion Research \(CSCR\)](#)

Countries connecting to NSFNET: Croatia (HR), Czech Republic (CZ), Hong Kong (HK), Hungary (HU), Poland (PL), Portugal (PT), Singapore (SG), South Africa (ZA), Taiwan (TW), Tunisia (TN)

1992

Internet Society (ISOC) is chartered (January)

ISOC reconstituted as the Internet Architecture Board and becomes part of the Internet Society

Number of hosts breaks 1,000,000

First MBONE audio multicast (March) and video multicast (November)

[RIPE](#) Network Coordination Center (NCC) created in April to provide address registration and coordination services to the European Internet community (:dk1:)

Veronica, a gopherspace search tool, is released by Univ of Nevada

[World Bank](#) comes on-line

The term "[surfing the Internet](#)" is coined by Jean Armour Polly (:jap:)

[Zen and the Art of the Internet](#) is published by Brendan Kehoe (:jap:)

Internet Hunt started by Rick Gates

RFC 1300: [Remembrances of Things Past](#)

RFC 1313: [Today's Programming for KRFC](#) [M 1313 - Internet Talk Radio](#)

Countries connecting to NSFNET: Antarctica (AQ), Cameroon (CM), Cyprus (CY), Ecuador (EC), Estonia (EE), Kuwait (KW), Latvia (LV), Luxembourg (LU), Malaysia (MY), Slovakia (SK), Slovenia (SI), Thailand (TH), Venezuela (VE)

1993

[InterNIC](#) created by NSF to provide specific Internet services: (:sc1:)

- directory and database services (AT&T)
- registration services (Network Solutions Inc.)
- information services (General Atomics/CERFnet)

US White House comes on-line (<http://www.whitehouse.gov/>):

- President Bill Clinton: president@whitehouse.gov
- Vice-President Al Gore: vice-president@whitehouse.gov

Worms of a new kind find their way around the Net - WWW Worms (W4), joined by Spiders, Wanderers, Crawlers, and Snakes ...

Internet Talk Radio begins broadcasting (:sk2:)

[United Nations](#) (UN) comes on-line (:vgc:)

US National Information Infrastructure Act

Businesses and media begin taking notice of the Internet

InterCon International KK (IICK) provides Japan's first commercial Internet connection in September. TWICS, though an IICK leased line, begins offering dial-up accounts the following month (:tb1:)

Mosaic takes the Internet by storm; WWW proliferates at a 341,634% annual growth rate of service traffic. Gopher's growth is 997%.

RFC 1437: [The Extension of MIME Content-Types to a New Medium](#)

RFC 1438: [IETF Statements of Boredom \(SOBs\)](#)

Countries connecting to NSFNET: Bulgaria (BG), Costa Rica (CR), Egypt (EG), Fiji (FJ), Ghana (GH), Guam (GU), Indonesia (ID), Kazakhstan (KZ), Kenya (KE), Liechtenstein (LI), Peru (PE), Romania (RO), Russian Federation (RU), Turkey (TR), Ukraine (UA), UAE (AE), US Virgin Islands (VI)

1994

ARPANET/Internet celebrates 25th anniversary

Communities begin to be wired up directly to the Internet (Lexington and Cambridge, Mass., USA)

US [Senate](#) and [House](#) provide information servers

Shopping malls arrive on the Internet

First cyberstation, RT-FM, broadcasts from Interop in Las Vegas

The National Institute for Standards and Technology (NIST) suggests that GOSIP should incorporate TCP/IP and drop the "OSI-only" requirement (:gck:)

Arizona law firm of [Canter & Siegel](#) "spams" the Internet with email advertising green card lottery services; Net citizens flame back

NSFNET traffic passes 10 trillion bytes/month

Yes, it's true - you can now order pizza from the Hut online

WWW edges out telnet to become 2nd most popular service on the Net (behind ftp-data) based on % of packets and bytes traffic distribution on NSFNET

Japanese Prime Minister on-line (<http://www.kantei.go.jp/>)

UK's HM Treasury on-line (<http://www.hm-treasury.gov.uk/>)

New Zealand's Info Tech Prime Minister on-line (<http://www.govt.nz/>)

First Virtual, the first cyberbank, open up for business

Radio stations start rockin' (rebroadcasting) round the clock on the Net: WXYC at Univ of NC, KJHK at Univ of KS-Lawrence, KUGS at Western WA Univ

IPng recommended by IETF at its Toronto meeting (July) and approved by IESG in November. Later documented as RFC 1752

The first banner ads appear on hotwired.com in October. They were for Zima (a beverage) and ATT

Trans-European Research and Education Network Association ([TERENA](#)) is formed by the merger of [RARE](#) and [EARN](#), with representatives from 38 countries as well as [CERN](#) and ECMWF. TERENA's aim is to "promote and participate in the development of a high quality international information and telecommunications infrastructure for the benefit of research and education" (October)

After noticing that many network software vendors used domain.com in their documentation examples, Bill Woodcock and Jon Postel register the domain. Sure enough, after looking at the domain access logs, it was evident that many users were using the example domain in configuring their applications.

RFC 1605: [SONET to Sonnet Translation](#)

RFC 1606: [Historical Perspective On The Usage Of IP Version 9](#)

RFC 1607: [VIEW FROM THE 21ST CENTURY](#)

Countries connecting to NSFNET: [Algeria](#) (DZ), [Armenia](#) (AM), Bermuda (BM), Burkina Faso (BF), China (CN), Colombia (CO), Jamaica (JM), Jordan (JO), Lebanon (LB), Lithuania (LT), Macao (MO), Morocco (MA), New Caledonia (NC), Nicaragua (NI), Niger (NE), Panama (PA), Philippines (PH), Senegal (SN), Sri Lanka (LK), Swaziland (SZ), Uruguay (UY), Uzbekistan (UZ)

Top 10 Domains by Host #: com, edu, uk, gov, de, ca, mil, au, org, net
1995

[NSFNET reverts back to a research network](#). Main US backbone traffic now routed through interconnected network providers

The new NSFNET is born as NSF establishes the [very high speed Backbone Network Service \(vBNS\)](#) linking super-computing centers: NCAR, NCSA, SDSC, CTC, PSC

Neda Rayaneh Institute (NRI), Iran's first commercial provider, comes online, connecting via satellite to Cadvision, a Canadian provider (:rm1:)

Hong Kong police disconnect all but one of the colony's Internet providers for failure to obtain a license; thousands of users are left without service (:kf2:)

Sun launches [Java](#) on May 23

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

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

WWW surpasses ftp-data in March as the service with greatest traffic on NSFNet based on packet count, and in April based on byte count

Traditional online dial-up systems ([Compuserve](#), [America Online](#), [Prodigy](#)) begin to provide Internet access

Thousands in Minneapolis-St. Paul (USA) lose Net access after transients start a bonfire under a bridge at the Univ of MN causing fiber-optic cables to melt (30 July)

number of Net related companies go public, with [Netscape](#) leading the pack with the 3rd largest ever NASDAQ IPO share value (9 August)

Registration of domain names is no longer free. Beginning 14 September, a \$50 annual fee has been imposed, which up until now was subsidized by NSF. NSF continues to pay for .edu registration, and on an interim basis for .gov

The Vatican comes on-line (<http://www.vatican.va/>)

The Canadian Government comes on-line (<http://canada.gc.ca/>)

The first official Internet wiretap was successful in helping the Secret Service and Drug Enforcement Agency (DEA) apprehend three individuals who were illegally manufacturing and selling cell phone cloning equipment and electronic devices

Operation Home Front connects, for the first time, soldiers in the field with their families back home via the Internet.

Richard White becomes the first person to be declared a munition, under the USA's arms export control laws, because of an RSA file security encryption program tattooed on his arm (:wired496:)

RFC 1882: [The 12-Days of Technology Before Christmas](#)

Country domains registered: Ethiopia (ET), Cote d'Ivoire (CI), Cook Islands (CK) Cayman Islands (KY), Anguilla (AI), Gibraltar (GI), Vatican (VA), Kiribati (KI), Kyrgyzstan (KG), Madagascar (MG), Mauritius (MU), Micronesia (FM), Monaco (MC), Mongolia (MN), Nepal (NP), Nigeria (NG), Western Samoa (WS), San Marino (SM), Tanzania (TZ), Tonga (TO), Uganda (UG), Vanuatu (VU)

Top 10 Domains by Host #: com, edu, net, gov, mil, org, de, uk, ca, au

~~Technologies of the Year~~ WWW, Search engines

~~Emerging Technologies~~ Mobile code (JAVA, JavaScript), Virtual environments (VRML), Collaborative tools

~~Incidents of the Year~~ The Spot (Jun 12), Hackers Movie Page (12 Aug)

1996

Internet phones catch the attention of US telecommunication companies who ask the US Congress to ban the technology (which has been around for years)

Malaysian Prime Minister Mahathir Mohamad, PLO Leader Yasser Arafat, and Phillipine President Fidel Ramos meet for ten minutes in an online interactive chat session on 17 January.

The controversial US Communications Decency Act (CDA) becomes law in the US in order to prohibit distribution of indecent materials over the Net. A few months later a three-judge panel imposes an injunction

against its enforcement. Supreme Court unanimously rules most of it unconstitutional in 1997.

9,272 organizations find themselves unlisted after the InterNIC drops their name service as a result of not having paid their domain name fee

Various ISPs suffer extended service outages, bringing into question whether they will be able to handle the growing number of users. AOL (19 hours), Netcom (13 hours), T&T WorldNet (28 hours - email only)

Domain name tv.com sold to CNET for US\$15,000

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

MCI upgrades Internet backbone adding ~13,000 ports, bringing the effective speed from 155Mbps to 622Mbps.

The [Internet Ad Hoc Committee](#) announces plans to add 7 new generic Top Level Domains (gTLD): .firm, .store, .web, .arts, .rec, .info, .nom. The IAHC plan also calls for a competing group of domain registrars worldwide.

A malicious cancelbot is released on USENET wiping out more than 25,000 messages

The WWW browser war, fought primarily between Netscape and Microsoft, has rushed in a new age in software development, where by new releases are made quarterly with the help of Internet users eager to test upcoming (beta) versions.

RFC 1925: [The Twelve Networking Truths](#)

Restrictions on Internet use around the world:

- ~~China~~ requires users and ISPs to register with the police
- ~~Germany~~ cuts off access to some newsgroups carried on CompuServe
- ~~Soviet Union~~ confines Internet access to universities and hospitals
- ~~Singapore~~ requires political and religious content providers to register with the state
- ~~New Zealand~~ classifies computer disks as "publications" that can be censored and seized
- ~~source: ~~Internet~~ IS W~~

Country domains registered: Qatar (QA), Central African Republic (CF), Oman (OM), Norfolk Island (NF), Tuvalu (TV), French Polynesia (PF), Syria (SY), Aruba (AW), Cambodia (KH), French Guiana (GF), Eritrea (ER), Cape Verde (CV), Burundi (BI), Benin (BJ), Bosnia-Herzegovina (BA), Andorra (AD), Guadeloupe (GP), Guernsey (GG), Isle of Man (IM), Jersey (JE), Lao (LA), Maldives (MV), Marshall Islands (MH), Mauritania (MR),

Northern Mariana Islands (MP), Rwanda (RW), Togo (TG), Yemen (YE), Zaire (ZR)

Top 10 Domains by Host #: com, edu, net, uk, de, jp, us, mil, ca, au

~~Events of the Year~~ US Dept of Justice (17 Aug), CIA (19 Sep), Air Force (29 Dec), UK Labour Party (6 Dec), NASA DDCSOL - USAFE - US Air Force (30 Dec)

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

~~Emerging Technologies~~ Virtual environments (VRML), Collaborative tools, Internet appliance (Network Computer)

1997

[2000th RFC](#): "Internet Official Protocol Standards"

71,618 mailing lists registered at [Liszt](#), a mailing list directory

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.

Canet II launched in June to provide Canada's next generation Internet using ATM/SONET

In protest of the DNS monopoly, AlternIC's owner, Eugene Kashpureff, hacks DNS so users going to www.internic.net end up at www.alternic.net

Domain name business.com sold for US\$150,000

Early in the morning of 17 July, human error at Network Solutions causes the DNS table for .com and .net domains to become corrupted, making millions of systems unreachable.

Longest hostname registered with InterNIC:

CHALLENGER.MED.SYNAPSE.UAH.UALBERTA.CA

101,803 Name Servers in whois database

RFC 2100: [The Naming of Hosts](#)

Country domains registered: Falkland Islands (FK), East Timor (TP), R of Congo (CG), Christmas Island (CX), Gambia (GM), Guinea-Bissau (GW), Haiti (HT), Iraq (IQ), Libya (LY), Malawi (MW), Martinique (MQ), Montserrat (MS), Myanmar (MM), French Reunion Island (RE), Seychelles (SC), Sierra Leone (SL), Somalia (SO), Sudan (SD), Tajikistan (TJ), Turkmenistan (TM), Turks and Caicos Islands (TC), British Virgin Islands (VG), Heard and McDonald Islands (HM), French Southern Territories (TF), British Indian Ocean Territory (IO), Svalbard and Jan Mayen Islands (SJ), St Pierre and Miquelon (PM), St Helena (SH), South Georgia/Sandwich Islands (GS), Sao Tome and Principe (ST), Ascension Island (AC), US Minor Outlying Islands (UM), Mayotte (YT), Wallis and Futuna Islands (WF), Tokelau Islands (TK), Chad Republic (TD), Afghanistan (AF), Cocos Island (CC), Bouvet Island (BV), Liberia (LR),

American Samoa (AS), Niue (NU), Equatorial New Guinea (GQ), Bhutan (BT), Pitcairn Island (PN), Palau (PW), DR of Congo (CD)

Top 10 Domains by Host #: com, edu, net, jp, uk, de, us, au, ca, mil

~~Events of the Year~~ Indonesian Govt (19 Jan, 10 Feb, 24 Apr, 30 Jun, 22 Nov), NASA (5 Mar), UK Conservative Party (27 Apr), Spice Girls (14 Nov)

~~Technologies of the Year~~ Push, Multicasting

~~Emerging Technologies~~ Push

1998

~~Internet's Best Achievement~~ is released as [RFC 2235](#) & FYI 32

US Dept of Commerce (DoC) releases the [Green Paper](#) outlining its plan to privatize DNS on 30 January. This is followed up by a [White Paper](#) on June 5

[La Fête de l'Internet](#), a country-wide Internet fest, is held in France 20-21 March

Web size estimates range between 275 (Digital) and 320 (NEC) million pages for 1Q

Companies flock to the Turkmenistan NIC in order to register their name under the .tm domain, the English abbreviation for trademark

Internet users get to be judges in a performance by 12 world champion ice skaters on 27 March, marking the first time a television sport show's outcome is determined by its viewers.

Network Solutions registers its 2 millionth domain on 4 May

Electronic postal stamps become a reality, with the [US Postal Service](#) allowing stamps to be purchased and downloaded for printing from the Web.

Canada kicks off C*net 3, the first national optical internet

Compaq pays US\$3.3million for altavista.com

CD*II and a ban on Net taxes are signed into US law (21 October)

ABCNews.com accidentally posts test US election returns one day early (2 November)

Indian ISP market is deregulated in November causing a rush for ISP operation licenses

US DoC enters into an [agreement](#) with the [Internet Corporation for Assigned Numbers \(ICANN\)](#) to establish a process for transitioning DNS from US Government management to industry (25 November)

San Francisco sites without off-city mirrors go offline as the city blacks out on 8 December

Chinese government puts Lin Hai on trial for "inciting the overthrow of state power" for providing 30,000 email addresses to a US Internet magazine (December) [He is later sentenced to two years in jail]

French Internet users give up their access on 13 December to boycott France Telecom's local phone charges (which are in addition to the ISP charge)

Open source software comes of age

RFC 2321: [RITA -- The Reliable Internetwork Troubleshooting Agent](#)

RFC 2322: [Management of IP numbers by peg-dhcp](#)

RFC 2323: [IETF Identification and Security Guidelines](#)

RFC 2324: [Hyper Text Coffee Pot Control Protocol \(HTCPCP/1.0\)](#)

Country domains registered: Nauru (NR), Comoros (KM)

~~Stacks of the Year~~ Winter Olympics (Feb), World Cup (Jun-Jul), Starr Report (11 Sep), Glenn space launch

Top 10 Domains by Host #: com, net, edu, mil, jp, us, uk, de, ca, au

~~Stacks of the Year~~ US Dept of Commerce (20 Feb), New York Times (13 Sep), China Society for Human Rights Studies (26 Oct), UNICEF (7 Jan)

~~Technologies of the Year~~ E-Commerce, E-Auctions, Portals

~~Emerging Technologies~~ E-Trade, XML, Intrusion Detection

1999

Internet access becomes available to the Saudi Arabian (.sa) public in January

vBNS sets up an OC48 link between CalREN South and North using Juniper M40 routers

[First Internet Bank of Indiana](#), the first full-service bank available only on the Net, opens for business on 22 February

IBM becomes the first Corporate partner to be approved for Internet2 access

European Parliament proposes banning the caching of Web pages by ISPs

[The Internet Fiesta](#) kicks off in March across Europe, building on the success of La Fête de l'Internet held in 1998

US State Court rules that domain names are property that may be garnished

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

A forged Web page made to look like a Bloomberg financial news story raised shares of a small technology company by 31% on 7 April.

ICANN announces the five testbed registrars for the competitive Shared Registry System on 21 April: AOL, CORE, France

Telecom/Oléane, Melbourne IT, Register.com. 29 additional post-testbed registrars are also selected on 21 April, followed by 8 on 25 May, 15 on 6 July, and so on for a total of 98 by year's end. The

testbed, originally scheduled to last until 24 June, is extended until 10 September, and then 30 November. The first registrar to come online is Register.com on 7 June

First large-scale Cyberwar takes place simultaneously with the war in Serbia/Kosovo

Atilene, the Internet2 network, reaches across the Atlantic and connects to NORDUnet and SURFnet

The Web becomes the focal point of British politics as a list of MI6 agents is released on a UK Web site. Though forced to remove the list from the site, it was too late as the list had already been replicated across the Net. (15 May)

Activists Net-wide target the world's financial centers on 18 June, timed to coincide with the G8 Summit. Little actual impact is reported.

MCI/Worldcom launches vBNS+, a commercialized version of vBNS targeted at smaller educational and research institutions

Somalia gets its first ISP - Olympic Computer (Sep)

ISOC approves the formation of the Internet Societal Task Force (ISTF). Vint Cerf serves as first chair

Free computers are all the rage (as long as you sign a long term contract for Net service)

.ps is registered to Palestine (11 Oct)

vBNS reaches 101 connections

business.com is sold for US\$7.5million (it was purchased in 1997 for US\$150,000 (30 Nov)

RFC 2549: [IP over Avian Carriers with Quality of Service](#)

RFC 2550: [Y10K and Beyond](#)

RFC 2551: [The Roman Standards Process -- Revision III](#)

RFC 2555: [30 Years of RFCs](#)

RFC 2626: [The Internet and the Millennium Problem \(Year 2000\)](#)

Top 10 TLDs by Host #: com, net, edu, jp, uk, mil, us, de, ca, au

~~Events of the Year~~ Star Wars (8 Jan), .tp (Jan), USA (23 Jan), E-Bay (13 Mar), US Senate (27 May), NSI (2 Jul), Paraguay Gov't (20 Jul), AntiOnline (5 Aug), Microsoft (26 Oct), UK Railtrack (31 Dec)

~~Technologies of the Year~~ E-Trade, Online Banking, MP3

~~Emerging Technologies~~ Net-Cell Phones, Thin Computing, Embedded Computing

~~Visions of the Year~~ [Melissa](#) (March), [ExploreZip](#) (June)

2000s

2000

The US timekeeper ([USNO](#)) and a few other time services around the world report the new year as 19100 on 1 Jan

↔ massive denial of service attack is launched against major web sites, including Yahoo, ↔amazon, and eBay in early February

Web size estimates by NEC-RI and Inktomi surpass 1 billion indexable pages

ICANN redelegates the .pn domain, returning it to the Pitcairn Island community (February)

Internet2 backbone network deploys IPv6 (16 May)

Various domain name hijackings took place in late May and early June, including internet.com, bali.com, and web.net

↔ testbed allowing the registration of domain names in Chinese, Japanese, and Korean begins operation on 9 November. This testbed, created by VeriSign without IETF authorization, only allows the second-level domain to be non-English, still forcing use of .com, .net, .org. The Chinese government blocks internal registrations, stating that registrations in Chinese are its sovereignty right

ICANN selects new TLDs: .aero, .biz, .coop, .info, .museum, .name, .pro (16 Nov)

Mexico's connection to Internet2 becomes fully operational as the California research network (CalREN-2) is connected with Mexico's Corporación Universitaria para el Desarrollo de Internet (CUDI) network. Though connected in November, the link's inauguration by California's Governor and Mexico's President was not until March of 2001.

↔ After months of legal proceedings, the French court rules Yahoo! must block French users from accessing hate memorabilia in its auction site (Nov). Given its inability to provide such a block on the Internet, Yahoo! removes those auctions entirely (Jan 2001).

The European Commission contracts with a consortium of 30 national research networks for the development of Géant, Europe's new gigabit research network meant to enhance the current capability provided by TEN-155 (6 Nov)

↔ Australian government endorses the transfer of authority for the .au domain to auDA (18 Dec). ICANN signs over control to auDA on 26 Oct 2001.

RFC 2795: [The Infinite Monkey Protocol Suite](#)

~~Events of the Year~~ RSA Security (Feb), ↔ Apache (May), Western Union (Sep), Microsoft (Oct)

~~Technologies of the Year~~ ↔ ASP, Napster

~~Emerging Technologies~~ ↔ Wireless devices, IPv6

~~Viral~~ ↔ ↔ [Love Letter](#) (May)

~~Controversies of the Year~~ ↔ Napster, DeCSS

2001

The first live distributed musical -- ~~The Vector~~ ~~to be~~ & ~~The Vector~~ -- over Internet2 networks debuts on 20 Feb

VeriSign extends its multilingual domain testbed to encompass various European languages (26 Feb), and later the full Unicode character set (5 Apr) opening up most of the world's languages

Forwarding email in Australia becomes illegal with the passing of the Digital Agenda Act, as it is seen as a technical infringement of personal copyright (4 Mar)

Radio stations broadcasting over the Web go silent over royalty disputes (10 Apr)

High schools in five states (Michigan, Missouri, Oregon, Virginia, and Washington) become the first to gain Internet2 access

US Dept of Commerce issues a notice of intent on 6 April to turn over management for the .edu domain from VeriSign to [Educase](#). Award agreement is reached on 29 October. Community colleges are finally be able to register under .edu

Napster keeps finding itself embroiled in litigation and is eventually forced to suspend service; it comes back later in the year as a subscription service

European Council finalizes an international cybercrime treaty on 22 June and adopts it on 9 November. This is the first treaty addressing criminal offenses committed over the Internet.

.biz and .info are added to the root server on 27 June with registrations beginning in July. .biz domain go live on 7 Nov.

Afghanistan's Taliban bans Internet access country-wide, including from Government offices, in an attempt to control content (13 Jul)

Code Red worm and Sircam virus infiltrate thousands of web servers and email accounts, respectively, causing a spike in Internet bandwidth usage and security breaches (July)

A fire in a train tunnel running through Baltimore, Maryland seriously damages various fiber-optic cable bundles used by backbone providers, disrupting Internet traffic in the Mid Atlantic states and creating a ripple effect across the US (18 Jul)

Brazil RNP2 is connected to Internet2's Abilene over 45Mbps line (21 Aug)

GEANT, the pan-European Gigabit Research and Education Network, becomes operational (23 Oct), replacing the TEN-155 network which was closed down (30 Nov)

First uncompressed real-time gigabit HDTV transmission across a wide-area IP network takes place on Internet2 (12 Nov).

Dutch SURFnet and Internet2's Abilene connect via gigabit ethernet (15 Nov)

us domain operational responsibility assumed by NeuStar (20 Nov)

RFC 3091: [Pi Digit Generation Protocol](#)

RFC 3092: [Etymology of "Foo"](#)

RFC 3093: [Firewall Enhancement Protocol \(FEP\)](#)

~~Vases of the Year~~ Code Red (Jul), Nimda (Sep), SirCam (Jul),
BadTrans (Apr, Nov)