

## Internet History

### 1957

The USSR launches Sputnik, the first artificial earth satellite. In response, the United States 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.

**Backbones:** None - Hosts: None

### 1962

RAND Paul Baran, of the RAND Corporation (a government agency), was commissioned by the U.S. Air Force to do a study on how it could maintain its command and control over its missiles and bombers, after a nuclear attack. This was to be a military research network that could survive a nuclear strike, decentralized so that if any locations (cities) in the U.S. were attacked, the military could still have control of nuclear arms for a counter-attack.

Baran's finished document described several ways to accomplish this. His final proposal was a packet switched network.

"Packet switching is the breaking down of data into datagrams or packets that are labeled to indicate the origin and the destination of the information and the forwarding of these packets from one computer to another computer until the information arrives at its final destination computer. This was crucial to the realization of a computer network. If packets are lost at any given point, the message can be resent by the originator."

**Backbones:** None - Hosts: None

### 1968

ARPA awarded the ARPANET contract to BBN. BBN had selected a Honeywell minicomputer as the base on which they would build the switch. The physical network was constructed in 1969, linking four nodes: University of California at Los Angeles, SRI (in Stanford), University of California at Santa Barbara, and University of Utah. The network was wired together via 50 Kbps circuits.

**Backbones:** 50Kbps ARPANET - Hosts: 4

**1972**

The first e-mail program was created by Ray Tomlinson of BBN.

The Advanced Research Projects Agency (ARPA) was renamed The Defense Advanced Research Projects Agency (or DARPA)

ARPANET was currently using the Network Control Protocol or NCP to transfer data. This allowed communications between hosts running on the same network.

**Backbones:** 50Kbps ARPANET - Hosts: 23

**1973**

Development began on the protocol later to be called TCP/IP, it was developed by a group headed by Vinton Cerf from Stanford and Bob Kahn from DARPA. This new protocol was to allow diverse computer networks to interconnect and communicate with each other.

**Backbones:** 50Kbps ARPANET - Hosts: 23+

**1974**

First Use of term Internet by Vint Cerf and Bob Kahn in paper on Transmission Control Protocol.

**Backbones:** 50Kbps ARPANET - Hosts: 23+

**1976**

Dr. Robert M. Metcalfe develops Ethernet, which allowed coaxial cable to move data extremely fast. This was a crucial component to the development of LANs.

The packet satellite project went into practical use. SATNET, Atlantic packet Satellite network, was born. This network linked the United States with Europe. Surprisingly, it used INTELSAT satellites that were owned by a consortium of countries and not exclusively the United States government.

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

The Department of Defense began to experiment with the TCP/IP protocol and soon decided to require it for use on ARPANET.

**Backbones:** 50Kbps ARPANET, plus satellite and radio connections - Hosts: 111+

## 1979

USENET (the decentralized news group network) was created by Steve Bellovin, a graduate student at University of North Carolina, and programmers Tom Truscott and Jim Ellis. It was based on UUCP.

The Creation of BITNET, by IBM, "Because its Time Network", introduced the "store and forward" network. It was used for email and listservs.

**Backbones:** 50Kbps ARPANET, plus satellite and radio connections - Hosts: 111+

## 1981

National Science Foundation created backbone called CSNET 56 Kbps network for institutions without access to ARPANET. Vinton Cerf proposed a plan for an inter-network connection between CSNET and the ARPANET.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, plus satellite and radio connections - Hosts: 213

## 1983

Internet Activities Board (IAB) was created in 1983.

On January 1st, every machine connected to ARPANET had to use TCP/IP. TCP/IP became the core Internet protocol and replaced NCP entirely.

The University of Wisconsin created Domain Name System (DNS). This allowed packets to be directed to a domain name, which would be translated by the server database into the corresponding IP number. This made it much easier for people to access other servers, because they no longer had to remember numbers.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, plus satellite and radio connections - Hosts: 562

**1984**

The ARPANET was divided into two networks: MILNET and ARPANET. MILNET was to serve the needs of the military and ARPANET to support the advanced research component, Department of Defense continued to support both networks.

Upgrade to CSNET was contracted to MCI. New circuits would be T1 lines, 1.5 Mbps which is twenty-five times faster than the old 56 Kbps lines. IBM would provide advanced routers and Merit would manage the network. New network was to be called NSFNET (National Science Foundation Network), and old lines were to remain called CSNET.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, plus satellite and radio connections - Hosts: 1024

**1985**

The National Science Foundation began deploying its new T1 lines, which would be finished by 1988.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, 1.544Mbps (T1) NSFNET, plus satellite and radio connections - Hosts: 1961

**1986**

The Internet Engineering Task Force or IETF was created to serve as a forum for technical coordination by contractors for DARPA working on ARPANET, US Defense Data Network (DDN), and the Internet core gateway system.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, 1.544Mbps (T1) NSFNET, plus satellite and radio connections - Hosts: 2308

**1987**

BITNET and CSNET merged to form the Corporation for Research and Educational Networking (CREN), another work of the National Science Foundation.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, 1.544Mbps (T1) NSFNET, plus satellite and radio connections - Hosts: 28,174

## 1988

Soon after the completion of the T1 NSFNET backbone, traffic increased so quickly that plans immediately began on upgrading the network again.

**Backbones:** 50Kbps ARPANET, 56Kbps CSNET, 1.544Mbps (T1) NSFNET, plus satellite and radio connections - Hosts: 56,000

## 1990

(Updated 8/2001) Merit, IBM and MCI formed a not for profit corporation called ANS, Advanced Network & Services, which was to conduct research into high speed networking. It soon came up with the concept of the T3, a 45 Mbps line. NSF quickly adopted the new network and by the end of 1991 all of its sites were connected by this new backbone.

While the T3 lines were being constructed, the Department of Defense disbanded the ARPANET and it was replaced by the NSFNET backbone. The original 50Kbps lines of ARPANET were taken out of service.

Tim Berners-Lee and CERN in Geneva implements a hypertext system to provide efficient information access to the members of the international high-energy physics community.

**Backbones:** 56Kbps CSNET, 1.544Mbps (T1) NSFNET, plus satellite and radio connections - Hosts: 313,000

## 1991

CSNET (which consisted of 56Kbps lines) was discontinued having fulfilled its important early role in the provision of academic networking service. A key feature of CREN is that its operational costs are fully met through dues paid by its member organizations.

The NSF established a new network, named NREN, the National Research and Education Network. The purpose of this network is to conduct high speed networking research. It was not to be used as a commercial network, nor was it to be used to send a lot of the data that the Internet now transfers.

**Backbones:** Partial 45Mbps (T3) NSFNET, a few private backbones, plus satellite and radio connections - Hosts: 617,000

## 1992

Internet Society is chartered.

World-Wide Web released by CERN.

NSFNET backbone upgraded to T3 (44.736Mbps)

**Backbones:** 45Mbps (T3) NSFNET, private interconnected backbones consisting mainly of 56Kbps, 1.544Mbps, plus satellite and radio connections - Hosts: 1,136,000

### 1993

InterNIC created by NSF to provide specific Internet services: directory and database services (by AT&T), registration services (by Network Solutions Inc.), and information services (by General Atomics/CERFnet).

Marc Andreessen and NCSA and the University of Illinois develops a graphical user interface to the WWW, called "Mosaic for X".

**Backbones:** 45Mbps (T3) NSFNET, private interconnected backbones consisting mainly of 56Kbps, 1.544Mbps, and 45Mbps lines, plus satellite and radio connections - Hosts: 2,056,000

### 1994

No major changes were made to the physical network. The most significant thing that happened was the growth. Many new networks were added to the NSF backbone. Hundreds of thousands of new hosts were added to the INTERNET during this time period.

Pizza Hut offers pizza ordering on its Web page.

First Virtual, the first cyberbank, opens.

ATM (Asynchronous Transmission Mode, 145Mbps) backbone is installed on NSFNET.

**Backbones:** 145Mbps (ATM) NSFNET, private interconnected backbones consisting mainly of 56Kbps, 1.544Mbps, and 45Mbps lines, plus satellite and radio connections - Hosts: 3,864,000

## 1995

The National Science Foundation announced that as of April 30, 1995 it would no longer allow direct access to the NSF backbone. The National Science Foundation contracted with four companies that would be providers of access to the NSF backbone (Merit). These companies would then sell connections to groups, organizations, and companies.

\$50 annual fee is imposed on domains, excluding .edu and .gov domains which are still funded by the National Science Foundation.

**Backbones:** 145Mbps (ATM) NSFNET (now private), private interconnected backbones consisting mainly of 56Kbps, 1.544Mbps, 45Mbps, 155Mbps lines in construction, plus satellite and radio connections - Hosts: 6,642,000

## 1996...

Most Internet traffic is carried by backbones of independent ISPs, including MCI, AT&T, Sprint, UUnet, BBN planet, ANS, and more.

Currently the Internet Society, the group that controls the INTERNET, is trying to figure out new TCP/IP to be able to have billions of addresses, rather than the limited system of today. The problem that has arisen is that it is not known how both the old and the new addressing systems will be able to work at the same time during a transition period.

**Backbones:** 145Mbps (ATM) NSFNET (now private), private interconnected backbones consisting mainly of 56Kbps, 1.544Mbps, 45Mbps, and 155Mbps lines, plus satellite and radio connections - Hosts: over 15,000,000, and growing rapidly