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**HISTORY AND EVALUATION OF THE WEB**

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# **The History of the Internet**

The internet has revolutionized the way we live, especially in communications amongst people in the world like nothing before. It took about 75 years for the telephone to connect 50 million users. The radio hit this goal in 38. It took only 13 years till 50 million people were sitting in front of their television screens in their homes. But the Internet reached this milestone in only four years. And when social media and online games were introduced, they just kept improving the record. Facebook only took 780 days to hit 50 million users and the record holder Pokémon Go took an astonishing 19 days to achieve this this. So how was the internet developed and how did it reach the stage it has now?

## **1.1 Origins of the Internet**

The first recorded description of the social interactions that could be enabled through networking was a series of memos written by J.C.R. Licklider of MIT in August 1962 discussing his "Galactic Network" concept. He envisioned a globally interconnected set through which everyone could quickly access data and programs from any site. In spirit, the concept was very much like the Internet of today. Licklider was the first head of the computer research program at the Defence Advanced Research Projects Agency (DARPA), starting in October 1962. While at DARPA he convinced his successors Ivan Sutherland, Bob Taylor, and MIT researcher Lawrence G. Roberts, of the importance of this networking concept.

Leonard Kleinrock at MIT published the first paper on packet switching theory in July 1961. Kleinrock convinced Roberts of the theoretical feasibility of communications using packets rather than circuits, which was a major step along the path towards computer networking. The other key step was to make the computers talk together. To explore this, in 1965 working with Thomas Merrill, Roberts connected the TX-2 computer in Massachusetts to the Q-32 in California with a low speed dial-up telephone line creating the first (although small) wide area network. The result of this experiment was the realization that the time-shared computers could work well together, running programs and retrieving data as necessary on the remote machine, but that the circuit switched telephone system was totally inadequate for the job. Kleinrock's conviction of the need for packet switching was confirmed.

## **1.2 The ARPANET**

In late 1966 Roberts went to DARPA to develop the computer network concept and quickly put together his plan for the Advanced Research Projects Agency Network (ARPANET), publishing it in 1967. At the conference where he presented the paper, there was also a paper on a packet network concept from the UK by Donald Davies and Roger Scantlebury of NPL. Scantlebury told Roberts about the NPL work as well as that of Paul Baran and others at Research and Development (RAND). The RAND group had written a paper on packet switching network for secure voice in the military in 1964. It happened that the work at MIT (1961-1967), at RAND (1962-1965), and at NPL (1964-1967) had all proceeded in parallel without any of the researchers knowing about the other work. The word "packet" was adopted from the work at NPL and the proposed line speed to be used in the ARPANET design was upgraded from 2.4 kbps to 50 kbps.

In August 1968, after Roberts and the DARPA funded community had refined the overall structure and specifications for the ARPANET, an RFQ was released by DARPA for the development of one of the key components, the packet switches called Interface Message Processors (IMP's). The RFQ was won in December 1968 by a group headed by Frank Heart at Bolt Beranek and Newman (BBN). As the BBN team worked on the IMP's with Bob Kahn playing a major role in the overall ARPANET architectural design, the network topology and economics were designed and optimized by Roberts working with Howard Frank and his team at Network Analysis Corporation, and the network measurement system was prepared by Kleinrock's team at UCLA.

Due to Kleinrock's early development of packet switching theory and his focus on analysis, design and measurement, his Network Measurement Center at UCLA was selected to be the first node on the ARPANET. All this came together in September 1969 when BBN installed the first IMP at UCLA and the first host computer was connected. Doug Engelbart's project on "Augmentation of Human Intellect" (which included NLS, an early hypertext system) at Stanford Research Institute (SRI) provided a second node. SRI supported the Network Information Center, led by Elizabeth Feinler and including functions such as maintaining tables of host name to address mapping as well as a directory of the RFC's. One month later, when SRI was connected to the ARPANET, the first host-to-host message was sent from Kleinrock's laboratory to SRI. Two more nodes were added at UC Santa Barbara and University of Utah. These last two nodes incorporated application visualization projects, with Glen Culler and Burton Fried at UCSB investigating methods for display of mathematical functions using storage displays to deal with the problem of refresh over the net, and Robert Taylor and Ivan Sutherland at Utah investigating methods of 3-D representations over the net. Thus, by the end of 1969, four host computers were connected together into the initial ARPANET, and the budding Internet was off the ground.

Computers were added quickly to the ARPANET during the following years, and work proceeded on completing a functionally complete Host-to-Host protocol and other network software. In December 1970 the Network Working Group (NWG) working under S. Crocker finished the initial ARPANET Host-to-Host protocol, called the Network Control Protocol (NCP). As the ARPANET sites completed implementing NCP during the period 1971-1972, the network users finally could begin to develop applications. In October 1972 Kahn organized a large, very successful demonstration of the ARPANET at the International Computer Communication Conference (ICCC). This was the first public demonstration of this new network technology to the public.

Following the addition of numerous computers to the ARPANET along with the increased use of its features like email and the invention of the World Wide Web the internet we now know today was created.

## **1.3 Key Moments in the History of Internet**

1969: ARPANET was developed. The first message sent over the network was supposed to be “Login” but it failed after reaching the letter ‘g’

1970: Interface Message Processor was produced and ARPANET network was created.

1971: Email was first developed by Ray Tomlinson who also made the decision to use the “@” symbol to separate the user name from the computer name (now domain name)

1972: France began its own Arpanet-like project in 1972, called CYCLADES. While Cyclades was eventually shut down, it did **pioneer a key idea**: the host computer should be responsible for data transmission rather than the network itself.

1973-74: The first trans-Atlantic connection was made and in 1974 lots of Arpa-like networks were linked to form the internet (the birth of TCP/IP)

1977: The first PC modem, developed by Dennis Hayes and Dale Heatherington, was introduced and initially **sold to computer hobbyists.**

1979: First forms of online multiplayer games (called MultiUser Dungeon/MUD) were started although they were completely text based.

1983: All Arpanet computers switch over to TCP/IP protocols.

1984: Domain Name Systems were created along with Domain Name Servers (DNS) which made addresses more human friendly.

1988: Internet Relay Chat (IRC) was first deployed, paving the way for real-time chat and the messaging applications of today. The first internet worm “The Morris Worm” was also released.

1989: America Online (AOL) was first launched and made the Internet popular among the average users. The World Wide Web (originally called Mesh) was also proposed by Tim Berners-Lee.

1990: The code for the World Wide Web was written by Tim Berners-Lee, based on his proposal from the year before, along with the standards for HTML, HTTP, and URLs.

1991: The first web page, which explained what the world wide web was, was launched. Also, the first content-based search protocol called Gopher was introduced. MP3 file format was accepted as well and became a very popular format for sharing audio via the internet. It was in this year that the first webcam was introduced.

1993: Mosaic, the first graphical web browser was introduced to the public. The .gov and .org domain names were also started.

1995: Considered as the year where web was commercialized, helped by introduction of Secure Sockets Layer (SSL) and online businesses namely Echo Bay (now eBay) and Amazon.

1998: Google was launched and it revolutionized the way people looked for information on the web.

2001: Wikipedia is launched and it paved the way for collective web content generation

2004: Facebook was introduced as “The Facebook” for college students only, but the “The” was soon dropped.

2005: YouTube was started bringing free online video sharing and hosting.

2006: Twitter was started, the first message sent being “just setting up my twttr”

2007: Hulu was launched to offer popular TV shows to watch online