# History of The Internet [The evolution]

Before discussing the history of the internet, it is vital to understand what the internet is and what it represents in today’s standards.

The internet, put in simple terms is a network of networks. The size of the internet as well as what the internet offers depends purely on the networks that make it up. from this, it is possible to infer that the internet is not controlled by a single entity and that it can’t be controlled by a single entity.

Going to the actual invention or birthdate of the internet, no one can pinpoint the date where it occurred and it can only be considered as a continuous change that brought about the end result.

The internet was the work of dozens of pioneering scientists, programmers and engineers who contributed various features and technologies to create the internet. Many scientists anticipated the existence of a worldwide network of information exchange long before the internet actually existed.

Still, the first practical schematics arrived in the early 1960’s and later on the creation of the ARPANET which can be considered as a monumental step that drove the internet to what it is today.

The history of the internet then, can only be studied through observing monumental developments that played a major role in its growth to what it is today.

1. The ARPANET (Advanced Research Projects Agency Network) and its creation

Even though many scientists had anticipated the existence of a worldwide network of information exchange, the first description of such a network that allowed for social interactions was written by J.C.R Licklider of MIT in August 1962. He described a Galactic Network Concept where he envisioned a globally interconnected set of computers through which everyone could quickly access data. And while at DARPA (Defense Advanced Research Projects Agency), which is an agency of the United Stated Department of Defense, he convinced his successors Ivan Sutherland, Bob Taylor and Lawrence G. Roberts, who was an MIT Researcher, the importance of such a network.

In 1964, Roberts would go on to create the first wide-area computer network ever built when he connected a TX-2 computer in Massachusetts to a Q-32 in California. The result was the realization that the time-shared computers could work well together. However, the line used to connect the two computers was a circuit switched telephone system that was inadequate for the job. At this point the work of Leonard Kleinrock of MIT on packet switching theory was confirmed to be superior to circuit switches.

Circuit switching is a system where each data unit knows not only it’s final destination but the specific path it must follow to reach its destination while packet switching is a system where each data unit just knows its final destination and the specific path followed by it is decided by routers. One of the main advantages of packet switching over circuit switching is that packet switching is suitable for handling bilateral traffic i.e. a transfer of data in both directions. While Kleinrock worked on his packet switching theory in 1961, other groups such as RAND (1965) and NPL (1967) had also worked on packet switching in parallel without any of the researchers knowing about the other’s work.

In late 1966 Roberts went to DARPA to develop the computer network and put together his plan for the “ARPANET” publishing it in 1967. In August 1968, after Roberts and the DARPA funded community had refined the overall structure and specification for the ARPANET. DARPA was looking for a company to build the packet switches called Interface Message Processors (IMP’s) that were vital for the ARPANET. Bolt Beranek and Newman (BBN) was given the contract. Roberts played a major role in designing the network topology.

The first computer connected to the ARPANET was the Network Measurement Center at UCLA. It was selected because of Kleinrock’s early development of packet switching and his focus on analysis, design and measurement. Hence, the first IMP was installed at UCLA and the first host computer was connected. The second node was connected at the SRI (Stanford Research Institute).

After the SRI was connected to the ARPANET, the first host-to-host message was sent from Kleinrock’s laboratory to SRI. The message that was sent was the word “Login” but the link between the two colleges crashed on the letter “g”. Soon, two more nodes were added at UC Santa Barbra and University of Utah. These last two nodes incorporated application visualization projects.

1. NCP created

Shortly after, computers were quickly added to the ARPANET and work proceeded on completing a fully functional Host-to-Host protocol and other networking software. In December 1970, the Network Working Group (NWG) finished the initial ARPANET Host-to-Host protocol called the Network Control Protocol (NCP). This protocol utilized two port addresses, establishing two connections. This would provide flow control between processes running on different ARPANET computers which gave the network functionalities.

1. Email Created

Email is thought of as being one of the main reasons the ARPANET grew into the internet. The initial idea of Email was simple, put a message in a user’s file directory so that they see it when they log in. and indeed, the initial implementation was no different. The first email system of this type was called MAILBOX and it was used at Massachusetts Institute of Technology from 1965 another email system of this type is SNDMSG. How this worked was that the mainframe computers of this era had up to one hundred users, each one accessing them from so called “dumb terminals”. These dumb terminals just connected to the main frame and so had no storage or memory of their own, they did all their work on the remote mainframe.

Since the users were all working on the same computer, the emails they sent could only send messages to various users on the same mainframe computer. However, after the advent of the ARPANET, emails needed some kind of addressing system since they would be sent across a network. This is where Ray Tomlinson comes in. He is credited with inventing electronic mail. He was a contractor that worked for BBN on the ARPANET and he picked the @ symbol to denote the destination of an electronic mail.

By 1976, 75% of all ARPANET traffic was electronic mail. But that was mail inside an internal network. The concept of communicating via email from organization to organization was the impetus for the advent of the internet itself. For many new internet users, email was the first practical application of this new medium.

By 1993, the word “electronic mail” had been replaced by “email” in the public lexicon and internet use had become more widespread.

1. Beginning of TCP/IP

Robert E. Kahn and Vinton Cerf are credited as the forefathers of TCP/IP. In the spring of 1973 Kahn and Cerf, who developed the existing NCP protocol, joined forces with the goal to create the next. The main goal Kahn and Cerf were working towards was reformulating the ARPANET so that instead of the network being responsible for the reliability, that was delegated to the hosts by using an interpersonal protocol to hid the differences between local network protocols.

This new protocol was implemented as the Transmission Control Program. Initially, TCP handled both data representation and routing buts as the protocol expanded, it was split into two parts TCP and IP. So, the final TCP/IP worked such that IP was in charge of addressing hosts, putting data into datagram and routing those datagrams from the source to host. While TCP keeps track of that data’s segments where it initially segments the data when sending and reassembling the data when receiving.

There were four goals that Kahn set for what would become of TCP:

* Network connectivity. Any network could connect to another network through a gateway.
* Distribution. There would be no central network administration or control.
* Error Recovery. Lost packets would be retransmitted.
* Black box design. No internal changes would have to be made to connect it to other networks.

In 1975, a two-network TCP/IP communications test was performed between Stanford and University College London (UCL) and it was observed to be successful.

1. International Link to the ARPANET

The first international link was setup in 1973 when the University College London and Norway’s National Defense Research Establishment joined the ARPANET via dedicated phone lines running at 9.6 Kilobits per second. The key people behind this were Larry Roberts and Donald Davies.

Mr. Davies had worked on packet switching theory as Kleinrock did in the U.S. and had created a working network at the UK’s National Physical Laboratory.

Initially, ARPA agreed to provide basic ARPANET hardware and fund a transatlantic link to Norway if the UK would pay. After some work, the link went live in July 1973 and it was publicly demonstrated in November of that year.

This was a major step that took the ARPANET to becoming the internet.

1. TCP/IP becomes the standard for internet protocol

Several TCP/IP prototypes were developed at multiple research centers between 1978 and 1983. With TCP/IP being vastly superior to the NCP, the migration of the ARPANET to TCP/IP was officially completed on January 1, 1983, when the new protocols were permanently activated.

In March 1982, the US Department of Defense declared TCP/IP as the standard for all military Computer networking.

1. DNS introduced

One of the major problems faced by the then still growing ARPANET was its lack of scalability. The ARPANET was using a huge directory of websites and their corresponding IP addresses. But as more computers accessed the ARPANET, it became harder for the workers in-charge to maintain, while the numerical IP addresses were getting more complex for the users to remember.

The solution came from Paul Mockapetris. He suggested that host names should include a Name and category or purpose describing appendage- for example .com for commercial purposes. After a year, the generic top-level domains were created.

Mockapetris designed the Domain Name System at the University of California in 1983. In 1984, four UC Berkeley students-Douglas Terry, Mark Painter, David Riggle, and Songnian Zhou – wrote the first Unix server name implementation, called the Berkeley Internet Name Domain (BIND) Server. BIND is the most widely used DNS software on the planet.

But the Domain Name System, as this system became known, is more than a naming scheme. It also translated website names to their respective IP addresses

1. ARPANET dissolved

Between 1969 and 1977, ARPANET grew from a network of four computer sites to one with 111 computers belonging to universities, research facilities and the military. Shortly after, other ARPANET networks began to go live, including USENET, Ethernet, CSNET and BITNET. The ARPANET request for comments 827 established an External Gateway Protocol that made it possible for separate networks to access each other. In 1983, the military section of the ARPANET split off from the network. The military renamed its smaller network MILNET, which would later become part of the Department of Defense Data Network.

In 1986, five supercomputer centers formed a network called NSFNET. Before long, NSFNET grew to include several universities in its network. People referred to this larger collection of networks and gateways as the internet. Even though the era of the personal computer began in the late 1970’s, the internet still remained a resource for universities, corporations and the government.

ARPANET’S infrastructure was beginning to show its age. The system’s IMP’s weren’t as efficient or powerful as the computer nodes in other networks. Organizations on ARPANET began to transition to other networks, mainly NSFNET. In 1990, DARPA pulled the plug on the ARPANET. The organization's goals had been met. The United States had a nationwide computer network that not only linked powerful resources together, but also could continue operating if a significant portion of the network stopped working. Even more impressive, this network now spanned the globe, connecting computers from one side of the world to the other.

And thus the internet was born.

1. Hypertext created
2. The world wide web

# 2. View the 5 – 10 popular websites of your choice from web archive URL and put your observation and assessment

1. Apple.com

The website of the one of the biggest tech companies of today was one of the first websites to go online. The website even went up eleven years before the internet archive started.

Date domain registered: 1987-02-19

Owned by Apple Inc.

1. Reddit.com

The front page of the internet claims the site of the largest online community.

1. Amazon.com
2. BBC.com
3. Ebay.com
4. Wikipedia.com

# 5 Websites from the 12 types of websites

1. Portals: Gateways that help to configure access to information
   1. Startpage
   2. AOL
   3. Yahoo
   4. AAIT Portal
   5. Bing
2. News
   1. CNN
   2. New York Times
   3. Fox News
   4. The Guardian
   5. Daily mail
3. Informational
   1. Mashable
   2. TechCrunch
   3. TripAdvisor
   4. IMDB
   5. Gov.uk
4. Business/Marketing
   1. Forbes
   2. Business Insider
   3. Trivago
   4. Rolex
   5. Dolce and Gabbana
5. Educational
   1. Coursera
   2. EdX
   3. Udacity
   4. Udemy
   5. Khan Academy
6. Entertainment
   1. Gawker
   2. TMZ
   3. Buzzfeed
   4. 9GAG
   5. Viral Nova
7. Advocacy
   1. Brite web
   2. Charity water
   3. Convey of hope
   4. David Shepherd Foundation
   5. Gates Foundation
8. Blog
   1. Word press
   2. Blogger
   3. Joomla
   4. Weebly
   5. Penzu
9. Wiki
   1. Fanlore
   2. Wikileaks
   3. Wikitravel
   4. Wikihow
   5. Wiktionary
10. Social
    1. Facebook
    2. Twitter
    3. LinkedIn
    4. Instagram
    5. Reddit
11. Network
    1. Eventbrite
    2. Meetup
    3. Groupspaces
    4. MEETin
    5. Wylo
12. Content Aggregator
    1. Flipboard
    2. Feedly
    3. AllTop
    4. News360
    5. Popurls
13. Personal
    1. Maria Sharapova
    2. John Grisham
    3. Usain Bolt
    4. Messi
    5. John Green

# Guidelines for evaluating the value of a website

Even though the world wide web is an effective means of disseminating information, anyone who has access to a web server can create and maintain a website on any topic they wish. This raises issues of quality and integrity.

While on the other hand, information on the web is ephemeral i.e. might last for a very short amount of time. Since the form and content on a website can be surprisingly fluid with a web address working today and disappearing tomorrow. Therefore, there are criteria for evaluating websites and the information they hold.

1. Authority

This refers to who created the site. The most important questions to ask when trying to determine the authority of a website are:

* What are the credentials of the author?
* Does the publisher list his or her qualifications?
* Does the URL suggest a reputable affiliation such as that of .edu or .org?

1. Objectivity

This refers to whether or not the information presented on the site is clear, unbiased or looks at things from a particular viewpoint. We can determine this by asking the following questions.

* Are the purpose and scope of the document clearly stated?
* Is the information clearly presented as being factual or opinion based?
* Does the information try to sway the audience?
* Is the site trying to explain, inform, persuade, or sell something?

1. Accuracy

This refers to the information presented being accurate or not. While this is a difficult quality to find out, we can try the following.

* Are the facts similar to those reported in related print or other online resources?
* It the author qualified to write this document?
* Can the author be contacted to verify the accuracy of the information?
* Are the facts documented or well-researched?

1. Currency

This refers to the information being current and up to date. The following questions should adequately address this.

* Is the content current?
* Is the content updated regularly and does it show a date of update?
* How up to date are the links and are there any dead links?

1. Usability and Coverage

This refers to the design and accessibility of a website. While this may be objective, we can ask the following questions to determine that.

* Is the site easy to maneuver?
* Is the page designed to operate ideally with all browsers or does it have a browser compatibility limit?
* Is the site reliably accessible?
* Is the content written at a level that is readable by the intended audience?
* Is the content free for access?

## 4 websites evaluated using the above guidelines

1. [www.internetsociety.org](http://www.internetsociety.org)
2. [www.wikipedia.org](http://www.wikipedia.org)

Resources

http://www.nethistory.info/History%20of%20the%20Internet/email.html

<https://www.internetsociety.org/internet/history-internet/brief-history-internet/>

<https://www.history.com/news/who-invented-the-internet>

<https://www.webfx.com/blog/web-design/the-history-of-the-internet-in-a-nutshell/>

<https://history-computer.com/Internet/Maturing/TCPIP.html>

<https://www.colocationamerica.com/blog/history-of-ip-address-part-2-tcp-ip>

<http://news.bbc.co.uk/2/hi/technology/3280897.stm>

<http://www.webhostingsearch.com/articles/history-of-domains-names.php>

<http://www.historyofdomainnames.com/dns/>

<https://computer.howstuffworks.com/arpanet4.htm>

<http://people.wcsu.edu/reitzj/res/evalweb.html>

https://www.library.kent.edu/criteria-evaluating-web-resources