# 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 its 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

Date domain registered: 1987-02-19

Owned by Apple Inc.

The website of the one of the biggest tech companies of today was first recorded in the web archive back in December 1996. However, the domain was registered 1987. The website has changed many times in terms of its website over the years.

Points taken from observation

* The content provided by the website didn’t change that much through the years. However, considering that the website is a business website this is not that surprising.
* Many aesthetic changes can be observed through the years with the design evolving towards a clean and minimalist view.
* The website remained largely unchanged through the 1990’s only receiving minor visual changes. Only adding new products and pages for such products
* A major aesthetic change was made starting from Feb 26, 2000. The website included a menu bar like many of the websites we see today. The overall aesthetic for the website improved greatly.
* The buttons on the menu had drop shadows that added to the aesthetic of the website
* The next major change to the website came in 2007 with the website taking a sleeker and simpler website design
* The changes were mainly aesthetic with the website keeping its old menu design
* The colors used remained largely unchanged from the design in 2000
* The website received some changes in 2011 with the release of the iPhone 4, the menu bar also had some changes of color and gradient
* The website received yet another change in 2013. although it is a minor change, the design of buttons and article headers looked more coherent from color choices
* The next major change came in Oct 2014 with the launch of the iPhone 6
* The menu bar no longer had shadows but was a slab of color that covered the full width of the view port
* The color choices are gray and cream that blend together
* The menu items were classified into the store and the major product lines along with the familiar search bar
* In 2015, the website included a shifting landing page that displayed various products just below the menu bar
* With the launch of the iPhone 7 the grey color was turned darker but no other changes were there
* With the launch of the iPhone X in 2017, some aesthetic changes were introduced. With the inner pages being linked with large photographs of the items that represent tabs rather than text links
* Looking at the current state of the website, many things have changed about the website. Being a business website, it changes rapidly to display new products. The website’s aesthetic is minimal mainly focusing on well taken photographs with minimal text. Overall, it has evolved to become a very visually appealing website.

1. Reddit.com

Date domain registered: 2005-04-29

Owned by: Reddit Inc.

Reddit is one of the largest if not the largest online community. It is a network of communities based on people’s interests. It contains subreddits of various kinds that focus on an intended matter. Being a forum website, many aesthetic changes haven’t taken place since it’s creation in 2005 but the major changes have been listed down below.

* The first snapshot on the web archive shows that the website had a very simple design. It had options to login or register and articles and topics could be rearranged as either hot or new
* Only 39 captures are available for the site on the web archive and it goes many years without a snapshot
* The major change that can be observed about the website was in 2012.
* The majority of the website remained unchanged apart from making the site more intuitive with the addition of background colors.
* A large menu was added listing out some of the various subreddits that were popular at the time.
* We can also observe the usage of flash player in some components that do not load
* In 2013, we see the same thing as the years before with a similar layout. It is also worth noting that the article and discussion listing did not include a preview of the post
* The next snapshot that is available is in 2019 and many major changes can be seen here
* The first big change is that articles now show a preview of the post and each article is separated from other posts with a box that encloses it
* The buttons are bigger and more intuitive and the colors used make them stand out
* It can be seen that with major product launches, some aspect of the website launches such as the placement of product boxes or the content of the menu bar

1. Amazon.com

Date domain registered: 1994-11-01

Owned by: Amazon Technologies, Inc.

Amazon is not only the largest E-commerce platform in the world, but is a large multinational corporation that offer various services and products. With its most notable services being its online marketplace, its AI assistant know as Alexa and its cloud computing platform known as Amazon Web Services. The company was founded in 1994 and its domain was registered in the same year. The first snapshot of the website on the web archive dates back to 1998, however those pages are inaccessible and they redirect due to a 301 response at crawl time. Some notable observations are presented below

* From a snap shot of the site in 2005, we can observe that the user is provided with a lot of information
* The main content of the site lists new products and some description about the products
* A panel on the left shows a list of item categories and a menu bar classifies major item categories
* The design of the website remained largely unchanged with new products and deals being presented in the middle and categories being presented in a panel on the right
* Only some minor changes in color are observed

1. BBC.com

Date domain registered: 1989-07-15

The British Broadcasting Corporation is the world’s oldest national broadcaster. Its domain was registered in 1989 and it provides new through its website. The first capture taken of the website is on 1989, however the domain was registered to a different company and the BBC acquired it in 2001. The following observations were taken

* From the first snapshot, it can be sent that the website was mostly text-based displaying information with links
* It included a side panel for categories and a main panel for main stories with space for bulletins on the right
* From a snapshot in 2002, it can be seen the layout changed. The left panel was removed and content was stacked on top of each other
* Some background colors were added as well

1. Ebay.com
2. 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)

Authority

* we can find out the details of the authors on the about us page, this indicates good document structure
* The publishers describe the history of their organization as well as the credentials and biography of their board of trustees which shows that they are well qualified
* The website is of the .org domain which is a reputable affiliation

Objectivity

* The purpose of the organization is clearly stated and that is reflected in all of the websites various articles
* The resources presented on the website are factual and they are not opinion based
* The resources presented present facts and therefore the reader is not swayed
* The site is informative

Accuracy

* The facts presented here correspond to the facts presented on other websites
* The qualification of the authors is presented on many of the articles
* Email, Twitter or Facebook can be used to contact the authors
* The facts presented can be considered well-researched since the authors are qualified

Currency

* The content is current with many articles being added back to back
* Articles presented show a date of update
* I have not observed any dead links within the site

Usability and Coverage

* The site is easy to maneuver with an intuitive UI
* The website operated ideally with Chrome, Opera and Edge
* The site was available at all times of checking
* The articles are written in concise language that makes it easy for readers to understand
* The content is free for access

Final verdict

Internetsociety.org can be considered a valid place for information since all of the questions presented above are answered well.

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

Authority

* Credentials of authors are not listed, and the authors who made changes in articles might not even be known
* Qualifications are not listed, an unqualified person can make changes
* The URL is of the domain .org which indicates that it is a non-profit

Objectivity

* The purpose of documents or articles is not explicitly stated. However, the language used shows that it is informative. The scope of articles is sometimes stated and links are presented if any further reading is recommended
* The resources presented on the website may vary in factuality and some may tend to sway the reader
* The resources usually present facts. However, this cannot be guaranteed for all documents
* Most of the sites content appears informative but this cannot be guaranteed since documents can be edited by anyone for purposes other than informing

Accuracy

* The facts presented usually correspond to other facts on other websites and many include references to primary sources
* The qualification of the authors is not known
* Users who edited a specific article can be contacted
* There is no guarantee that the facts presented are factual and well researched

Currency

* Most of the content can be considered current. However, this varies from article to article
* All articles indicate the last time they were edited on
* I have not observed any dead links within the site

Usability and Coverage

* The site is easy to maneuver with an intuitive UI. All articles are presented in a familiar way that makes it easy for users to quickly look for information
* The website operated ideally with Chrome, Opera and Edge
* The site was available at all times of checking
* The content is free for access
* Most articles are written in language that is understandable with many. However, there are articles that may include technical jargon.

Final verdict

Thoughts about Wikipedia vary from article to article and from a study in 2008, its accuracy was rated at 80 percent. It is worth noting that Wikipedia is not considered a viable source in academic societies. Overall, any information found there should be thoroughly fact checked from other viable sources.

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

https://www.livescience.com/7946-wikipedia-accurate.html