**Internet**

The Internet is a global [wide area network](https://techterms.com/definition/wan) that connects computer systems across the world.

It includes several [high-bandwidth](https://techterms.com/definition/bandwidth) data lines that comprise the Internet "[backbone](https://techterms.com/definition/backbone)." These lines are connected to major Internet [hubs](https://techterms.com/definition/hub) that distribute data to other locations, such as [web servers](https://techterms.com/definition/web_server) and [ISPs](https://techterms.com/definition/isp).

In order to connect to the Internet, you must have access to an Internet service provider (ISP), which acts the middleman between you and the Internet. Most ISPs offer [broadband](https://techterms.com/definition/broadband) Internet access via a [cable](https://techterms.com/definition/cable_modem), [DSL](https://techterms.com/definition/dsl), or [fiber](https://techterms.com/definition/fiber_optic_cable) connection. When you connect to the Internet using a public [Wi-Fi](https://techterms.com/definition/wi-fi) signal, the Wi-Fi router is still connected to an ISP that provides Internet access. Even cellular data towers must connect to an Internet service provider to provide connected devices with access to the Internet.

The Internet provides different [online](https://techterms.com/definition/online) services. Some examples include:

* [Web](https://techterms.com/definition/www) – a collection of billions of webpages that you can view with a web browser
* [Email](https://techterms.com/definition/email) – the most common method of sending and receiving messages online
* [Social media](https://techterms.com/definition/social_media) – websites and [apps](https://techterms.com/definition/app) that allow people to share comments, photos, and videos
* Online gaming – games that allow people to play with and against each other over the Internet
* Software updates – [operating system](https://techterms.com/definition/operating_system) and [application](https://techterms.com/definition/application) updates can typically [downloaded](https://techterms.com/definition/download) from the Internet.

In the early days of the Internet, most people connected to the Internet using a home computer and a [dial-up](https://techterms.com/definition/dialup) modem. DSL and cable modems eventually provided users with "always-on" connections. Now [mobile](https://techterms.com/definition/mobile) devices, such as [tablets](https://techterms.com/definition/tablet) and [smartphones](https://techterms.com/definition/smartphone), make it possible for people to be connected to the Internet at all times. The [Internet of Things](https://techterms.com/definition/internet_of_things) has turned common appliances and home systems into "smart" devices that can be monitored and controlled over the Internet. As the Internet continues to grow and evolve, you can expect it to become an even more integral part of daily life.

## Origin And Development

## Early networks

The first computer networks were dedicated special-purpose systems such as SABRE (an airline reservation system) and AUTODIN I (a defense command-and-control system), both designed and [implemented](https://www.merriam-webster.com/dictionary/implemented) in the late 1950s and early 1960s. By the early 1960s computer manufacturers had begun to use [semiconductor](https://www.britannica.com/science/semiconductor) technology in commercial products, and both conventional batch-processing and [time-sharing](https://www.britannica.com/technology/time-sharing) systems were in place in many large, technologically advanced companies. Time-sharing systems allowed a computer’s resources to be shared in rapid succession with multiple users, cycling through the queue of users so quickly that the computer appeared dedicated to each user’s tasks despite the existence of many others accessing the system “simultaneously.” This led to the notion of sharing computer resources (called host computers or simply hosts) over an entire network. Host-to-host interactions were [envisioned](https://www.merriam-webster.com/dictionary/envisioned), along with access to specialized resources (such as [supercomputers](https://www.britannica.com/technology/supercomputer) and mass storage systems) and interactive access by remote users to the computational powers of time-sharing systems located elsewhere. These ideas were first realized in [ARPANET](https://www.britannica.com/topic/ARPANET), which established the first host-to-host network connection on October 29, 1969. It was created by the Advanced Research Projects Agency (ARPA) of the [U.S. Department of Defense](https://www.britannica.com/topic/US-Department-of-Defense). ARPANET was one of the first general-purpose computer networks. It connected time-sharing computers at government-supported research sites, principally universities in the [United States](https://www.britannica.com/place/United-States), and it soon became a critical piece of [infrastructure](https://www.merriam-webster.com/dictionary/infrastructure) for the [computer science](https://www.britannica.com/science/computer-science) research [community](https://www.merriam-webster.com/dictionary/community) in the United States. Tools and applications—such as the simple mail transfer [protocol](https://www.britannica.com/technology/protocol-computer-science) (SMTP, commonly referred to as e-mail), for sending short messages, and the file transfer [protocol](https://www.merriam-webster.com/dictionary/protocol) ([FTP](https://www.britannica.com/technology/FTP)), for longer transmissions—quickly emerged. In order to achieve cost-effective interactive communications between computers, which typically communicate in short bursts of data, ARPANET employed the new technology of [packet switching](https://www.britannica.com/technology/packet-switched-network). Packet switching takes large messages (or chunks of computer data) and breaks them into smaller, manageable pieces (known as packets) that can travel independently over any available circuit to the target destination, where the pieces are reassembled. Thus, unlike traditional voice communications, packet switching does not require a single dedicated circuit between each pair of users.

Commercial packet networks were introduced in the 1970s, but these were designed principally to provide efficient access to remote computers by dedicated terminals. Briefly, they replaced long-distance [modem](https://www.britannica.com/technology/modem) connections by less-expensive “virtual” circuits over packet networks. In the United States, Telenet and Tymnet were two such packet networks. Neither supported host-to-host communications; in the 1970s this was still the province of the research networks, and it would remain so for many years.

[DARPA](https://www.britannica.com/topic/Defense-Advanced-Research-Projects-Agency) (Defense Advanced Research Projects Agency; formerly ARPA) supported [initiatives](https://www.merriam-webster.com/dictionary/initiatives) for ground-based and satellite-based packet networks. The ground-based packet [radio](https://www.britannica.com/topic/radio) system provided mobile access to computing resources, while the packet satellite network connected the United States with several European countries and enabled connections with widely dispersed and remote regions. With the introduction of packet radio, connecting a mobile terminal to a [computer network](https://www.britannica.com/technology/computer-network) became [feasible](https://www.merriam-webster.com/dictionary/feasible). However, time-sharing systems were then still too large, unwieldy, and costly to be mobile or even to exist outside a climate-controlled computing [environment](https://www.merriam-webster.com/dictionary/environment). A strong motivation thus existed to connect the packet radio network to ARPANET in order to allow mobile users with simple terminals to access the time-sharing systems for which they had authorization. Similarly, the packet satellite network was used by DARPA to link the United States with satellite terminals serving the United Kingdom, Norway, Germany, and Italy. These terminals, however, had to be connected to other networks in European countries in order to reach the end users. Thus arose the need to connect the packet satellite net, as well as the packet radio net, with other networks.

**Foundation of the Internet**

The Internet resulted from the effort to connect various research networks in the United States and [Europe](https://www.britannica.com/place/Europe). First, DARPA established a program to investigate the interconnection of “heterogeneous networks.” This program, called Internetting, was based on the newly introduced concept of open architecture networking, in which networks with defined standard interfaces would be interconnected by “gateways.” A working demonstration of the concept was planned. In order for the concept to work, a new [protocol](https://www.britannica.com/technology/protocol-computer-science) had to be designed and developed; indeed, a system architecture was also required.

In 1974 [Vinton Cerf](https://www.britannica.com/biography/Vinton-Cerf), then at [Stanford University](https://www.britannica.com/topic/Stanford-University) in California, and [this author](https://www.britannica.com/biography/Robert-Elliot-Kahn), then at DARPA, [collaborated](https://www.merriam-webster.com/dictionary/collaborated) on a paper that first described such a [protocol](https://www.merriam-webster.com/dictionary/protocol) and system architecture—namely, the transmission control protocol (TCP), which enabled different types of machines on networks all over the world to route and assemble data packets. TCP, which originally included the Internet protocol (IP), a global addressing mechanism that allowed routers to get data packets to their ultimate destination, formed the [TCP/IP](https://www.britannica.com/technology/TCP-IP) standard, which was adopted by the [U.S. Department of Defense](https://www.britannica.com/topic/US-Department-of-Defense) in 1980. By the early 1980s the “open architecture” of the TCP/IP approach was adopted and [endorsed](https://www.merriam-webster.com/dictionary/endorsed) by many other researchers and eventually by technologists and businessmen around the world.

By the 1980s other U.S. governmental bodies were heavily involved with networking, including the [National Science Foundation](https://www.britannica.com/topic/National-Science-Foundation) (NSF), the Department of Energy, and the [National Aeronautics and Space Administration](https://www.britannica.com/topic/NASA) (NASA). While DARPA had played a [seminal](https://www.merriam-webster.com/dictionary/seminal) role in creating a small-scale version of the Internet among its researchers, NSF worked with DARPA to expand access to the entire scientific and academic [community](https://www.merriam-webster.com/dictionary/community) and to make TCP/IP the standard in all federally supported research networks. In 1985–86 NSF funded the first five supercomputing centres—at [Princeton University](https://www.britannica.com/topic/Princeton-University), the [University of Pittsburgh](https://www.britannica.com/topic/University-of-Pittsburgh), the [University of California](https://www.britannica.com/topic/University-of-California), [San Diego](https://www.britannica.com/place/San-Diego-California), the [University of Illinois](https://www.britannica.com/topic/University-of-Illinois), and [Cornell University](https://www.britannica.com/topic/Cornell-University). In the 1980s NSF also funded the development and operation of the [NSFNET](https://www.britannica.com/topic/National-Science-Foundation-Network), a national “backbone” network to connect these centres. By the late 1980s the network was operating at millions of bits per second. NSF also funded various nonprofit local and regional networks to connect other users to the NSFNET. A few commercial networks also began in the late 1980s; these were soon joined by others, and the Commercial Internet Exchange (CIX) was formed to allow transit traffic between commercial networks that otherwise would not have been allowed on the NSFNET backbone. In 1995, after extensive review of the situation, NSF decided that support of the NSFNET [infrastructure](https://www.merriam-webster.com/dictionary/infrastructure) was no longer required, since many commercial providers were now willing and able to meet the needs of the research community, and its support was withdrawn. Meanwhile, NSF had fostered a competitive collection of commercial Internet backbones connected to one another through so-called network access points (NAPs).

From the Internet’s origin in the early 1970s, control of it steadily devolved from government [stewardship](https://www.merriam-webster.com/dictionary/stewardship) to private-sector participation and finally to private custody with government oversight and forbearance. Today a loosely structured group of several thousand interested individuals known as the Internet Engineering Task Force participates in a [grassroots](https://www.britannica.com/topic/grassroots) development process for Internet standards. Internet standards are maintained by the nonprofit Internet Society, an international body with headquarters in Reston, Virginia. The Internet Corporation for Assigned Names and Numbers ([ICANN](https://www.britannica.com/topic/ICANN)), another nonprofit, private organization, oversees various aspects of policy regarding Internet domain names and numbers.