Types of Internet Connections

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A Guide to the many ways people can connect to the Internet

As technology grows, so does our need for bigger, better and faster Internet connections. Over the years, the way content is presented via the Web has changed drastically. Ten years ago being able to center bold, colored text was something to admire, while today Flash, animations, online gaming, streaming video, database-driven Web sites, e-commerce and virtual offices — to name but a few — are becoming standards. The need for speed has changed the options available to consumers and businesses alike in terms of how and how fast we can connect to the Internet.

While technology changes at a rapid pace, so do Internet connections. The connection speeds listed below represent a snapshot of general average to maximum speeds at the time of publication. This is no doubt will change over time and Internet connection speeds also vary between Internet Service Providers (ISP).

Analog (up to 56k)

Also called dial-up access, it is both economical and slow. Using a modem connected to your PC, users connect to the Internet when the computer dials a phone number (which is provided by your ISP) and connects to the network. Dial-up is an analog connection because data is sent over an analog, public telephone network. The modem converts received analog data to digital and vise versa. Because dial-up access uses normal telephone lines the quality of the connection is not always good and data rates are limited.

Typical Dial-up connection speeds range from 2400 bps to 56 Kbps.

ISDN

Integrated services digital network (ISDN) is an international communications standard for sending voice, video, and data over digital telephone lines or normal telephone wires.

Typical ISDN speeds range from 64 Kbps to 128 Kbps.

B-ISDN

Broadband ISDN is similar in function to ISDN but it transfers data over fiber optic telephone lines, not normal telephone wires. SONET is the physical transport backbone of B-ISDN. Broadband ISDN has not been widely implemented.

DSL

DSL is also called an always on connection because it uses existing 2-wire copper telephone line connected to the premise and will not tie up your phone as a dial-up connection does. There is no need to dial-in to your ISP as DSL is always on. The two main categories of DSL for home subscribers are called ADSL and SDSL.

ADSL

ADSL is the most commonly deployed types of DSL in North America. Short for asymmetric digital subscriber line ADSL supports data rates of from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate). ADSL requires a special ADSL modem.

ADSL+2

ADSL+2A is an extension to ADSL broadband technology that provides subscribers with significantly faster download speeds when compared to traditional ADSL connections. ADSL+2 works in the same fashion as ADSL a special filter is installed on a subscriber's telephone line to split existing copper telephone lines (POTS) between regular telephone (voice) and ADSL+2. ADSL2+ service is most commonly offered in highly-populated metropolitan areas and subscribers must be in close geographical locations to the provider's central office to receive ADSL2+ service.

SDSL

SDSL is still more common in Europe. Short for symmetric digital subscriber line, a technology that allows more data to be sent over existing copper telephone lines (POTS). SDSL supports data rates up to 3 Mbps. SDSL works by sending digital pulses in the high-frequency area of telephone wires and can not operate simultaneously with voice connections over the same wires. SDSL requires a special SDSL modem. SDSL is called symmetric because it supports the same data rates for upstream and downstream traffic.

VDSL

Very High DSL (VDSL) is a DSL technology that offers fast data rates over relatively short distances — the shorter the distance, the faster the connection rate.

All types of DSL technologies are collectively referred to as xDSL.

xDSL connection speeds range from 128 Kbps to 8 Mbps.

Cable

Through the use of a cable modem you can have a broadband Internet connection that is designed to operate over cable TV lines. Cable Internet works by using TV channel space for data transmission, with certain channels used for downstream transmission, and other channels for upstream transmission. Because the coaxial cable used by cable TV provides much greater bandwidth than telephone lines, a cable modem can be used to achieve extremely fast access.

Cable speeds range from 512 Kbps to 20 Mbps.

Quick Reference

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Wireless Internet Connections

Wireless Internet, or wireless broadband is one of the newest Internet connection types. Instead of using telephone or cable networks for your Internet connection, you use radio frequency bands. Wireless Internet provides an always-on connection which can be accessed from anywhere — as long as you geographically within a network coverage area. Wireless access is still considered to be relatively new, and it may be difficult to find a wireless service provider in some areas. It is typically more expensive and mainly available in metropolitan areas.

See the Wireless Networking Standards page of Webopedia for data rates, Modulation schemes, Security, and More info on Wireless networking.

T-1 Lines

T-1 lines are a popular leased line option for businesses connecting to the Internet and for Internet Service Providers (ISPs) connecting to the Internet backbone. It is a dedicated phone connection supporting data rates of 1.544Mbps. A T-1 line actually consists of 24 individual channels, each of which supports 64Kbits per second. Each 64Kbit/second channel can be configured to carry voice or data traffic. Most telephone companies allow you to buy just one or some of these individual channels. This is known as as fractional T-1 access.

Bonded T-1

A bonded T-1 is two or more T-1 lines that have been joined (bonded) together to increase bandwidth. Where a single T-1 provides approximately 1.5Mbps, two bonded T1s provide 3Mbps or 46 channels for voice or data. Two bonded T-1s allow you to use the full bandwidth of 3Mbps where two individual T-1s can still only use a maximum of 1.5Mbps at one time. To be bonded the T-1 must run into the same router at the end, meaning they must run to the same ISP.

T-1 Lines support speeds of 1.544 Mbps

Fractional T-1 speeds are 64 Kbps per channel (up to 1.544 Mbps), depending on number of leased channels.

Typical Bonded T-1 (two bonded T-1 lines) speed is around 3 Mbps.

T-3 Lines

T-3 lines are dedicated phone connections supporting data rates of about 43 to 45 Mbps. It too is a popular leased line option. A T-3 line actually consists of 672 individual channels, each of which supports 64 Kbps. T-3 lines are used mainly by Internet Service Providers (ISPs) connecting to the Internet backbone and for the backbone itself.

Typical T-3 supports speeds ranging from 43 to 45 Mbps.

OC3

Short for Optical Carrier, level 3 it is used to specify the speed of fiber optic networks conforming to the SONET standard. OC3 is typically used as a fiber optic backbone for large networks with large voice, data, video, and traffic needs.

Speeds are 155.52 Mbps, or roughly the speed of 100 T1 lines.

Satellite

Internet over Satellite (IoS) allows a user to access the Internet via a satellite that orbits the earth. A satellite is placed at a static point above the earth's surface, in a fixed position. Because of the enormous distances signals must travel from the earth up to the satellite and back again, IoS is slightly slower than high-speed terrestrial connections over copper or fiber optic cables.

Typical Internet over Satellite connection speeds (standard IP services) average around 492 up to 512 Kbps.

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bandwidth shaping	downstream	T-1 carrier
channel bonding	ICS	walled garden
connect time	Internet sharing	Winsock
dial-up access	leased line	XSP

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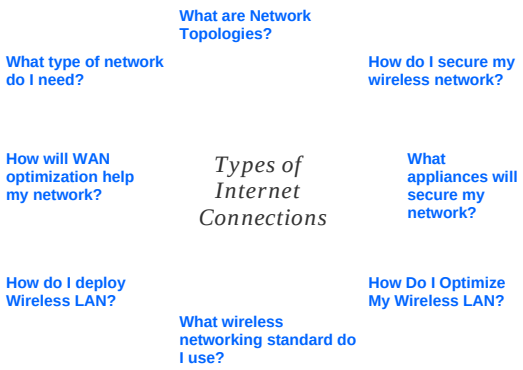
Based in Nova Scotia, Vangie Beal is has been writing about technology for more than a decade. She is a frequent contributor to EcommerceGuide and managing editor at Webopedia. You can tweet her online @AuroraGG.



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