Dial-up internet access

From Wikipedia, the free encyclopedia
(Redirected from Dial-up)

Dial-up Internet Access is a form of Internet access via telephone lines.[1] The user's computer or router uses an attached modem connected to a telephone line to dial into an Internet service provider's (ISP) node to establish a modem-to-modem link, which is then used to route Internet Protocol packets between the user's equipment and hosts on the Internet.

Contents

Availability

Dial-up connections to the Internet require no infrastructure other than the telephone network. As telephone access is widely available, dial-up remains useful to travelers. Dial-up is usually the only choice available for rural or remote areas where broadband installations are not prevalent due to low population and demand. Dial-up access may also be an alternative for users on limited budgets as it is offered for free by some ISPs, though broadband is increasingly available at lower prices in many countries due to market competition.

Dial-up requires time to establish a usable telephone connection (several seconds, depending on the location) and perform handshaking for protocol synchronization before data transfers can take place. In locales with telephone connection charges, each connection incurs an incremental cost. If calls are time-metered, the duration of the connection incurs costs.

Dial-up access is a transient connection, because either the user or the ISP terminates the connection. Internet service providers will often set a limit on connection durations to prevent hogging of access, and will disconnect the user — requiring reconnection and the costs and delays associated with it.

A 2008 Pew Internet and American Life Project study states that only 10 percent of American adults still use dial-up Internet access. Reasons for retaining dial-up access span from lack of infrastructure to high broadband prices. [2]

Performance

Modern dial-up modems typically have a maximum theoretical transfer speed of 56 kbit/s (using the V.90 or V.92 protocol), although in most cases 40-50 kbit/s is the norm. Factors such as phone line noise as well as the quality of the modem itself play a large part in determining connection speeds. Some connections may be as low as 20 kbit/s in extremely noisy environments, such as in a hotel room where the phone line is shared with many, many extensions.

Dial-up connections usually have latency as high as 400 ms or even more, which can make online gaming or video conferencing difficult, if not impossible. First person shooter style games are the most sensitive to latency, making playing them impractical on dial-up, however some games such as *Star Wars: Galaxies*, *The Sims Online*, *Warcraft 3*, *Guild Wars*, *Unreal Tournament*, and *Audition* are capable of running on 56k dial-up.

An increasing amount of Internet content such as streaming media will not work at dialup speeds.

Using compression to exceed 56k

Today's V.42, V.42bis and V.44 standards allow the modem to transmit data faster than its basic rate would imply. For instance, a 53.3 kbit/s connection with V.44 can transmit up to 53.3*6 == 320 kbit/s using pure text. One problem is that the compression tends to get better and worse over time due to noise on the line, or due to the transfer of already-compressed files (ZIP files, JPEG images, MP3 audio, MPEG video). [3] At some points the modem will be sending compressed files at approximately 50 kbit/s, uncompressed files at 160 kbit/s, and pure text at 320 kbit/s, or any value in between. [4] In such situations a small amount of memory in the modem, a buffer, is used to hold the data while it is being compressed and sent across the phone line, but in order to prevent overflow of the buffer, it sometimes becomes necessary to tell the computer to pause the datastream. This is accomplished through *hardware flow control* using extra pins on the modem–computer connection. The computer is then set to supply the modem at some higher rate, such as 320 kbit/s, and the modem will tell the computer when to start or stop sending data.

Compression by the ISP

As telephone-based 56 kbit/s modems began losing popularity, some Internet Service Providers such as Netzero and Juno started using pre-compression to increase the throughput & maintain their customer base. As an example, the Earthlink ISP uses a compression program that squeezes images, text, and other objects at the server, just prior to sending them across the phone line. The server-side compression operates much more efficiently than the "on-the-fly" compression of V.44-enabled modems. Typically website text is compacted to 5% thus increasing effective throughput to approximately 1000 kbit/s, and images are lossy-compressed to 15-20% increasing throughput to ~350 kbit/s.

The drawback of this approach is a loss in quality, where the graphics acquire more compression artifacts taking-on a blurry appearance, however the speed is dramatically improved and the user can manually choose to view the uncompressed images at any time. The ISPs employing this approach advertise it as "DSL speeds over regular phone lines" or simply "high speed dialup".

Replacement by broadband

Broadband Internet access (cable and DSL) has been replacing dial-up access in many parts of the world. Broadband connections typically offer speeds 700 kbit/s or higher for approximately the same price as dialup.

However, many areas still remain without high speed Internet despite the eagerness of potential customers. This can be attributed to population, location, or sometimes ISPs' lack of interest due to little chance of profitability and high costs to build the required infrastructure. Some Dialup ISPs have responded to the increased competition by lowering their rates to as low as $5 a month making dialup an attractive option for those who merely want email access or basic web browsing.

List of dialup speeds

See also: List of device bandwidths

Note that the values given are maximum values, and actual values may be slower under certain conditions (for example, noisy phone lines). [5]

Connection	Bitrate
Modem 110 baud	0.1 kbit/s
Modem 300 (300 baud) (Bell 103 or V.21)	0.3 kbit/s
Modem 1200 (600 baud) (Bell 212A or V.22)	1.2 kbit/s
Modem 2400 (600 baud) (V.22bis)	2.4 kbit/s
Modem 2400 (1200 baud) (V.26bis)	2.4 kbit/s
Modem 4800 (1600 baud) (V.27ter)	4.8 kbit/s
Modem 9600 (2400 baud) (V.32)	9.6 kbit/s
Modem 14.4 (2400 baud) (V.32bis)	14.4 kbit/s
Modem 28.8 (3200 baud) (V.34)	28.8 kbit/s
Modem 33.6 (3429 baud) (V.34)	33.6 kbit/s
Modem 56k (8000/3429 baud) (V.90)	56.0/33.6 kbit/s
Modem 56k (8000/8000 baud) (V.92)	56.0/48.0 kbit/s
Hardware compression (variable) (V.90/V.42bis)	56.0-220.0 kbit/s
Hardware compression (variable) (V.92/V.44)	56.0-320.0 kbit/s
Server-side web compression (variable) (Netscape ISP)	100.0-1000.0 kbit/s

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