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The Official Dictionary
of Telecommunications,
Networking and the Internet

17th Updated and Expanded Edition
by Harry Newton

NEWTON'S TELECOM DICTIONARY

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from a distant or local PC, list directories, delete and rename files on the foreign machine, and perform wildcard transfers between machines. That distant or local PC (also called an FTP host) might be on your local area network, or a phone line across the world or connected to the Internet. It might also be your web site. I use FTP to transfer files to and from my various web sites, such as www.HarryNewton.com and www.TechnologyInvestor.com. Most versions of Windows come with elementary ftp software. Frankly, I prefer software called called WS_FTP Pro., which comes from a company called Ipswitch. See www.Ipswitch.com. FTP is an application layer (Layer 7 of the OSI Reference Model) extension of the TCP/IP protocol suite, and was originally developed for transfers of large files of 50 KB (Kilobytes) or more. FTP is best known as an Internet tool for accessing file archives around the world that are linked to the Internet. If you have a modem with a terminal emulation program or are running Windows, you have all the software you need to visit ftp sites. Here's what it's like to visit the a ftp site. The site address may be ftp.phd.com. Most public ftp sites accept anonymous login. That is, when the site asks who you are, you answer "anonymous." Then when they ask for your password, you give them your Internet email address. See also Anonymous FTP, FSP, OSI Reference Model, and TCP/IP.

2. Foil Twisted Pair. A type of STP (Shielded Twisted Pair) cable which is employed to protect the signal-carrying conductors from EMI (ElectroMagnetic Interference). FTP uses a thin metallic foil; ScTP (Screened Twisted Pair) uses a heavy braided mesh for this purpose. See also STP.

FTP Mail Server A server which permits the retrieval of files via e-mail. See FTP.

FTS Federal Telecommunications System is a private telephone network sometimes shared enthusiastically by all federal government agencies. And sometimes not. See FTS2000.

FTS2000 The U.S. General Services Administration in Washington, D.C. describes the FTS2000 as "the state of the art, digital, long distance telecommunications program that provides voice, data and video transmission services to federal government agencies."

FTTB Fiber To The Building. See FTTC, FTN, FTTP and HFC.

FTTC Fiber To The Curb. A hybrid transmission system which involves fiber optics to the curb, and either twisted pair or coaxial cable to the premises. FTTC is less extreme than FTTH, but more so than FTN. See also FTTH, FTN and HFC.

FTTCab Fiber To The Cabinet. Also known as FTN (Fiber To The Neighborhood). A Hybrid Fiber Coax (HFC) network architecture involving an optical fiber which terminates in either a street-side or neighborhood cabinet which converts the signal from optical to electrical. The subscriber connection is over either UTP (Unshielded Twisted Pair) or coaxial cable. FTTCab can be either FTTC or FTN. See HFC.

FTTH Fiber to the Home. The fiber deployment architecture in which optical fiber is carried all the way to the customer's home (or premises). This is the ideal architecture and also the most costly to implement. See FTN and FTTP.

FTTN Fiber To The Neighborhood. Also known as FTTCab (Fiber To The Cabinet). A hybrid network architecture involving optical fiber from the carrier network, terminating in a neighborhood cabinet which converts the signal from optical to electrical. The connection from the cabinet to the user premises is over UTP (Unshielded Twisted Pair) or coaxial cable. ILECs (Incumbent Local Exchange Carriers), i.e., local telephone companies, use the embedded UTP for this purpose; CATV providers use the embedded coaxial cable. The advantages of the fiber include incredible levels of bandwidth, outstanding error performance, and transmission over long distances without the requirement for expensive and troublesome repeaters. The advantage of the UTP and coax is simply it is already there. The advantage of the neighborhood cabinet is that the expensive optoelectric conversion process takes place at a single location per neighborhood of perhaps 100 or 200 users. The cabinet also serves as a sophisticated multiplexer, allowing all the users to share the single, high-capacity fiber optic system for connection to the carrier network. FTN is the preferred local loop architecture in a full convergence scenario, which involves the delivery of voice, Internet access, and entertainment TV over the same hybrid cable plant. While FTTH (Fiber To The House) is preferable in terms of overall performance, it currently is too expensive for serious consideration. Further, ADSL (Asymmetric Digital Subscriber Line) technologies will support the necessary levels of bandwidth over considerable distances, assuming the UTP is of good quality. See also ADSL, Fiber Optics, FTTH, FTN, FTTP, HFC and SONET.

FTTP Fiber To The Premise. Also known as FTTB (Fiber To The Building) and FTTH (Fiber To The House). FTTP is the most extreme implementation of fiber optic transmission systems. FTTP literally involves a fiber optic system which connects directly from the carrier network to the user premises. The advantages of the fiber include incredible levels of bandwidth, outstanding error performance, and transmission over long distances without the requirement for

expensive and troublesome repeaters. Taking the fiber optic transmission system to the premise extends all of these advantages to the user's front door. FTTP is used extensively by CAPs (Competitive Access Providers) and CLECs (Competitive Local Exchange Carriers). It also is used increasingly by ILECs (Incumbent LECs) and IXCs (InterExchange Carriers) to provide the optimum level of service to medium and large businesses, which can make full use of the unparalleled performance of the fiber local loop. FTTP also was highly touted as the ultimate solution for residential application (FTTH) in a full convergence scenario. Full convergence involves the support of voice, Internet access, high-speed data communications, entertainment TV, videoconferencing, and other forms of communications—all over a single local loop. While FTTH certainly is attractive, it's just too expensive at the moment. FTN (Fiber To The Neighborhood) is a much more cost-effective approach. See also FTN.

Fu Fu Dust See Foo Foo Dust.

FUBAR F...d Up Beyond All Recognition. In short, a mess. A term often used in electronic mail messages.

FUD Fear, Uncertainty, Doubt. A marketing tactic which a dominant player (once IBM) has used to discourage its customers from buying from its competitors.

Fugitive Glue Glue used by printers to affix stuff into magazines. The glue is designed to stick until the magazine is delivered. At that point, the stuck-in thing becomes easier to remove and/or falls into your lap. This definition contributed by Rich Kubik.

Fugitive Odor A smell that leaks out of a composting plant or landfill.

Full Availability Idealized condition which exists when your phone system can provide connections for every telephone connected to it. Also called Non-Blocking.

Full Duplex FDx. A transmission mode which supports transmission in two directions simultaneously, or, more technically, bidirectional, simultaneous two-way communications. Simplex mode supports transmission in one direction, only. Half-duplex (HDX) mode supports transmission in both directions, but in only one direction at a time. The best two-direction phone conversations take place on four-wire circuits, which traditionally are physical four-wire. That is to say that there are four physical wires, with two (i.e., one pair) for transmission in one direction and two (i.e., one pair) for transmission in the other. (Note: There also are logical four-wire circuits, which comprise two wires, or even one wire, but which behave as though there were four wires.) All long distance circuits are four-wire—they have to be in order to support multichannel communications and, thereby, to haul large numbers of separate conversations. Most local loops are two wire, which also can support full-duplex communications, but for only one conversation at a time. It's important to contrast full duplex with symmetrical, or symmetric, and asymmetrical, or asymmetric. Again, full duplex means simultaneous transmission in both directions. Asymmetric means more bandwidth (or speed) in one direction than in the other. Symmetric means the same bandwidth (or speed) in both directions. For example, V.90 (56 Kbps) modems operate in full-duplex mode on an asymmetrical basis, while older V.34 (28.8 Kbps and 33.6 Kbps) modems operate in full-duplex mode on a symmetrical basis. T-1 operates in full-duplex mode on an asymmetric basis, as does ISDN. All DSL (Digital Subscriber Line) technologies run in full-duplex mode, and most (e.g., ADSL and G.lite) operate on an asymmetrical basis. Most speakerphones (except the newer more expensive ones, and the really old toadstool-looking ones made by Western Electric) are half-duplex, meaning they only transmit in one direction at one time. The speakerphone flips its direction based on who's talking, or, more precisely, who's talking the loudest. Full duplex speakerphones are the best. See ADSL, Asymmetric, DSL, Four-Wire, Half-Duplex, Simplex, Speakerphones, Symmetric, T-1, Two-Wire, V.34, and V.90.

Full Duplex Audio Audio that allows remote sites to speak simultaneously without losing audio contact (two-way simultaneous audio). See Full Duplex.

Full Duplex Transmission The process of operating a circuit so that each end can transmit and receive simultaneously. See Full Duplex for bigger explanation.

Full Echo Suppressor An echo suppressor in which the speech signals on each path are used to control the suppression loss in the other path of a 4-wire circuit. Used for long-distance communications. Compare with split echo compressor.

Full Motion Video Television transmission where images are sent and displayed in real-time and motion is continuous. Video reproduction at 30 frames per second (NTSC-original signals) or 25 frames per second. (PAL-original signals). Compare with freeze frame. See Freeze Frame Video.

Full Name What you call your child when you're mad at him.

Full Period In private line telephone and telegraph service, a circuit rented for the exclusive use of a single customer on a month-by-month basis. Archaic in the sense that part-time circuits have not been rented for years.

Neal Stephenson in his colossal article for *Wired* on FLAG, a fiber-optic cable now being built from England to Japan.

Hairpinning Hairpinning is a term for data going into a network element (NE), making a hairpin turn, and going right back out. The term is fairly descriptive, if you visualize a hairpin and its u-shaped bend. Let's consider some examples of hairpinning. Specifically, let's consider hairpinning in the context of SONET fiber optics rings and routers.

A SONET OC-192 backbone metropolitan ring in Manhattan (NY) running at 10 Gbps might support multiple tributary subtending (i.e., lower level) OC-48 rings running at 2.5 Gbps, with each subtending ring serving a smaller geographic area of Manhattan. Each of the subtending rings is connected to the metro ring by a device in the form of an integrated ADM/OCX (Add/Drop Multiplexer and Optical Cross-Connect), with perhaps one such device serving to interconnect all of the rings. Traffic originating on the West Side Manhattan ring and terminating on the West Side ring is presented to the ADM/OCX and is hairpinned right back to the West Side ring without ever riding over either the internal bus of either the ADM/OCX or the transmission facility of the metro ring. Similarly, traffic originating on one West Side ring and intended for another West Side ring (assuming that there is more than one) can be hairpinned on a port-to-port basis. This low speed-to-low speed, port-to-port direct interconnection is a very commonsense approach that eliminates congestion on the metro ring. Expand this example to include metro rings connected over long-haul rings, and the advantage becomes even clearer and more compelling.

A VoIP (Voice over Internet Protocol) gateway router also can take advantage of hairpinning. Using the Manhattan example again, you are calling from your West Side apartment to another address on the West Side. To access your IP-based CLEC (Competitive Local Exchange Carrier), who also is your ISP (Internet Service Provider), you use an ILEC (Incumbent LEC) local loop that connects to the CLEC through a traditional PSTN (Public Switched Telephone Network) circuit-switched CO (Central Office). When your call hits the CLEC gateway router that performs the conversion of your voice call to an IP packet format, the router hairpins the call right back to the ILEC PSTN, without going through the process of conversion to packet format and reconversion to PCM (Pulse Code Modulation) format. There really is no point in going through the process, and congesting the gateway router in the process. See also ADN, CLEC, CO, Gateway, ILEC, IP, ISP, OXC, PCM, PSTN, Router, SONET, Subtend, and VoIP.

HAL 1. The computer from the movie 2001: A Space Odyssey. HAL is an acronym for "Heuristically programmed ALgorithmic computer." The one-letter-shift transposition to "IBM" (The I became H. The B became A. The M became L) was noted shortly after the film's release and was widely accepted as a subtle Kubrick/Clarke joke directed at the computer giant. Clarke himself has pointed out that when he named HAL, he didn't catch the one-letter-shift bit, and if he had, he would have changed the name. IBM had been a huge supporter of the film project, and he wouldn't have dreamed of poking fun at them, however subtly. (Incidentally, according to Clarke, the one intentional joke in the film was the scene where a knuckle-chewing Heywood Floyd read the instructions for the Zero Gravity Toilet.)

Half T-1 It's exactly half a T-1, i.e., a Fractional T-1 providing 12 channels at 64 Kbps, or 768 Kbps. It's provisioned exactly the same way as a T-1. In reality, it is a T-1 with half the channels turned off. Priced at a little over half a T-1. See T-1 and T Carrier.

Half-Bridge Apple Computer term for a device linking LANS over a low-speed link such as a telephone line or X.25 link. It is termed a half-bridge as one is required at each end of the link.

Half-duplex A circuit designed for data transmission in both directions, but not at the same time. Telex is an example of a half duplex system, as is speaking on with most speakerphones. (The best speakerphones are full duplex. They're rare and expensive.)

Half-duplex M-ES A cellular radio term. A Mobile End System (M-ES) that can either transmit or receive, but cannot do both simultaneously, for example, an M-ES that has a single transceiver (radio).

Half-duplex Transmission A technique of operating a communications circuit so that each end can transmit or receive, but not simultaneously. Normal operation is alternate, one-way-at-a-time transmission. See Half Duplex.

Half-life In science, the time it takes for half the radioactivity of a substance to disappear. Among techies, it is a gauge of an individual's usefulness. "He may have a short half-life here."

Half-repeater A device which extends the distance a LAN can cover by joining two lengths of cable over another communication medium.

Half-tapping The action of making an analog trunk appear in two places for simultaneous service.

Half-tapping refers to the duplication of service on the customer side of the demarcation point and back-tapping is the description used by the telephone company when the duplicate service originates from their side of the demarcation point. Half-tapping is useful when new telephone equipment is being installed in the same location as the current equipment because the new system can be tested while the old system is still in use.

Half-tone Any photomechanical printing surface or the impression therefrom in which detail and tone values are represented by a series of evenly spaced dots in varying size and shape, varying in direct proportion to the intensity of tones they represent.

Half-transponder A method of transmitting two TV signals through a single transponder through the reduction of each TV signal's deviation and power level. Half-transponder TV carriers each operate typically 4 dB to 7 dB below single-carrier saturation power.

Half-wave Antenna An antenna which is half as long as the wave being received.

Halo Effect, The Websters defines a halo as a conventional, geometric shape, usually in the form of a disk, circle, ring or rayed structure representing a radiant light around or above the head of a divine or sacred personage. A company or person acquiring "the Halo Effect" suggests that the company is doing that most outside observers really view as "right." In short, the company or person is on a major roll.

HAM HAM or HAM-radio. Home Amateur radio. A person who operates a HAM radio. www.ham.org and www.fcc.gov

HAM Operator A person who operates a HAM radio. See HAM.

Hamming Code An code used in Forward Error Correction (FEC). Named after R. W. Hamming of Bell Labs, the basic code has four information bits and three check bits per character. Extended Hamming Code involves a set of data viewed as a two-dimensional data block which, for example, might be 11 bits horizontal (wide) and 11 bits vertical (deep). Along both the horizontal and vertical planes in this example, "16,11" Extended Hamming Code" takes 11 information bits, computes 5 parity bits, appends the parity bits to the information bits, and sends the entire data block across the transmission facility. In total, the result is a (256,121) code, as $16 \times 16 = 256$ and $11 \times 11 = 121$. (The number of information bits can be greater in the vertical plane. This would be advantageous if the size of the data blocks is large, as the level of overhead would be less, relative to the data bits to be transmitted.) The receiving (i.e., Forward) device re-computes the parity bits, and compares the resulting bit sequences to those sent along with the data. If the two sets of parity bits do not match exactly, there almost certainly was an error created as the data transited the network. If errors are detected, the receiving device almost always has enough information to isolate the error, and to correct it without the requirement for a retransmission. See also Forward Error Correction and SISO.

HAN Home Area Network. A residential network for data communication and control based on the same concepts as a LAN, but using standard electrical wiring. For more detail, see CEBus.

Han Characters Han characters are Chinese language symbols which are used to represent whole words or concepts in Chinese, Japanese and Korean. See Unicode.

Hand Off 1. To connect a phone call or service from one telephone company to another. These usually occur in a place called co-location.

2. The process of transferring cellular-based calls from one cell site to another as the mobile or portable moves through the service area.

Handhole A buried box whose lid is even with the surface of the ground. It provides a space for splicing and terminating cables.

Handle 1. In the Windows 95 user interface, an interface added to the object that facilitates moving, sizing, reshaping, or other functions pertaining to an object.

2. In programming, a pointer to a pointer that is, a token that lets a program access a resource identified in another variable. See also object handle.

3. The name you use in an online computer service. It's typically not your own name. You adopt this name to give yourself anonymity for whatever reasons you find convenient. A handle is called a "Nom de ligne" in some circles.

Handled Call A call center term. A call that is answered by an employee, as opposed to being blocked or abandoned.

Handoff 1. The process by which the Mobile Telephone Switching Office (MTSO) passes a cellular phone conversation from one cell to another. There are two forms of handoff: hard and soft. A hard handoff is performed on a "break and make" basis, requiring the connection to be broken in the original cell before it is made in the successor cell. Hard handoffs are required in cellular systems using FDMA (Frequency Division Multiple Access),