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# **NEWTON'S TELECOM DICTIONARY**

**The Official Dictionary  
of Telecommunications  
Networking and  
the Internet**

**16<sup>th</sup>  
EXPANDED  
& UPDATED  
EDITION**

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**BY HARRY NEWTON**

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use in the 1980s made space a respectable business in its own right. In America as of writing in the fall of 1991, the annual sales of space hardware are now bigger than those of civilian aircraft.

**AES** Advanced Encryption Standard. A standard for encryption which is intended to replace DES (Data Encryption Standard), a standard developed by IBM in 1977 and thought to be virtually uncrackable until 1997. The AES standard, which is expected to be developed and released in 2000, will be a symmetric, or private key, algorithm. It also will be a block cipher supporting key lengths ranging from 128 to 256 bits, and variable-length blocks of data. See also Block Cipher, DES, Encryption, and Private Key.

**AET** Application Entity Title. The authoritative name of an OSI application entity, usually a Distinguished Name from the Directory.

**AF** 1. Audio Frequency. The range of frequencies which theoretically are audible to the human ear; i.e., 30 Hz - 20 KHz. Truly high fidelity audio covers the entire range. Full AF is not practical over the PSTN, as to much bandwidth is required. Most of us can't hear the full AF range, anyway. As you get older, your hearing deteriorates. See also Bandwidth.

2. Assigned Frame. Motorola definition.

**AFAIK** As Far As I Know.

**AFCEA** Armed Forces Communications and Electronics Association. An organization of military communications personnel and suppliers who fulfill the specialized needs of government and military communications. They run a big convention each year in Washington in May-June. [www.afcea.org](http://www.afcea.org)

**AFE** See Analog Front End.

**AFI** An ATM term. Authority and Format Identifier. This identifier is part of the network level address header.

**Affiliate** 1. This definition from the Telecommunications Act of 1996. The term 'affiliate' means a person that (directly or indirectly) owns or controls, is owned or controlled by, or is under common ownership or control with, another person. For purposes of this paragraph, the term 'own' means to own an equity interest (or the equivalent thereof) of more than 10 percent. See the Telecommunications Act Of 1996.

2. A broadcast TV station not owned by a network, but one which includes the network's programs and commercials in its programming schedule.

**Affiliated Sales Agency** ASA. A term for a company which resells the service of a phone company. Typically, the phone company pays the ASA a commission. Sometimes the commission is so large that it blurs the thinking of the ASA into recommending to its customers telecom products and services they would be better without.

**Affiliates** Sites that steer user to another e-commerce site in return for a piece of the action, i.e. a percentage of any buy. Go to my site, [www.harrynewton.com](http://www.harrynewton.com). There you'll find a button that suggests you buy this dictionary via ecommerce. Click on the button. It gets you to Amazon. If you buy the dictionary, I get 7% of what you paid from Amazon. I'm an Amazon sales affiliate. Please buy the book. I need the money.

**AFI** Authority and Format Identifier. The portion of an NSAP format ATM address that identifies the type and format of the IDI portion of an ATM address. See also IDI and NSAP.

**AFIPS** American Federation of Information Processing Societies. A national, highly-respected organization formed by data processing societies to keep abreast of advances in the field. AFIPS organizes one of the biggest trade shows in the data processing industry — the NCC (National Computer Conference).

**AFNOR** Acronym for Association Francais Normal. France's national standards-setting organization.

**AFP** AppleTalk File Protocol. Apple's network protocol, used to provide access between file servers and clients in an AppleShare network. AFP is also used by Novell's products for the Macintosh.

**AFT** Automatic Fine Tuning; See AFC.

**After-call Wrap-up** The time an employee spends completing a transaction after the call has been disconnected. Sometimes it's a few seconds. Sometimes it can be minutes. Depends on what the caller wants.

**AGC** Automatic Gain Control. There are two electronic ways you can control the recording of something — Manual or Automatic Gain Control (AGC). AGC is an electronic circuit in tape recorders, speakerphones, and other voice devices which is used to maintain volume. AGC is not always a brilliant idea since it will attempt to produce a constant volume level, that is, it will try to equalize all sounds — the volume of your voice, and, when you stop talking, the circuit static and/or general room noise which you do not want amplified. Never record a seminar or speech using AGC. The recording will be decidedly amateurish. Manual Gain Control means there is record volume control and is thus, preferred in professional applications.

**AGCOMNET** US Department of Agriculture's voice and data communications network.

**Aged Packet** A data packet which has exceeded its maximum predefined node visit count or time in the network.

**Agent** 1. The classic definition of an agent is an entity acting on behalf of another.

2. This term comes from the huge telephone call-in reservation centers which the airlines, hotels and car rental services run. An agent is the person who answers your call, takes your order or answers your question. Agents are also called Telephone Sales Representatives or Communicators. The term "agent" was first used in the airline business. It came from gate or counter ticket agent.

3. An "Agent" is the person or persons you have legally authorized to order your telephone service and equipment from telephone companies.

4. In the computer programming sense of the word, an agent acts on behalf of another person or thing, with delegated authority. The agent's goals are those of the entity that created it. An agent is an active object with a mission, but agents are abstractions that can be implemented in any way, whereas an object has a formal definition.

Business Week in its February 14, 1994 issue wrote, "It's what computer scientists call an 'agent' — a kind of software program that's powerful and autonomous enough to do what all good robots should: help the harried humans by carrying out tedious, time-consuming, and complex tasks. Software agents just now emerging from the research labs can scan data banks by the dozen, schedule meetings, tidy up electronic in-boxes, and handle a growing list of clerical jobs."

5. Windows 95 Resource Kit defined agent slightly differently. It said that an agent was software that runs on a client computer for use by administrative software running on a server. Agents are typically used to support administrative actions, such as detecting system information or running services. See also Bot.

**Agent Logon/Logoff** A call center term. Agents begin their day by punching some buttons on their phone. This indicates to the automatic call distributor that they are now ready to take calls. Later in the day, they punch some other buttons

computer to which the controller is connected. See Buffer.

**Packet Burst Protocol** A protocol built on top of IPX that speeds the transfer of NCP data between a workstation and a NetWare server by eliminating the need to sequence and acknowledge each packet. With packet burst, the server sends a whole set (or burst) of packets before it requires an acknowledgement.

**Packet Controller** The hub of the AT&T ISDN system. It acts as a fast packet switch providing virtual circuit services to the devices hooked to the system.

**Packet Driver** The specification developed by John Romkey at FTP Software to allow TCP/IP and other transport protocols to share a common network interface card. Packet Drivers have been written for a variety of network interface cards, and in many cases provide NetWare compatibility.

**Packet Filter** A router-based firewall that can accept or reject packets based on predefined rules. The ability to search a packet to determine its destination and to then route it or block it accordingly. This ability helps to control network traffic. See Packet Filtering.

**Packet Filtering** The recognition and selective transmission or blocking of individual packets based on destination addresses or other packet contents.

**Packet Filtering Firewall** A packet filtering firewall is a router or a computer running software that has been configured to block certain types of incoming and outgoing packets. A packet-filtering firewall screens packets based on information contained in the packets' TCP and IP headers, including some or all of the following: Source address; Destination address; Application or protocol; Source port number; and Destination port number.

**Packet Forwarding** Copying the packet to another node without looking at the destination address.

**Packet Handler Function** The packet switching function within an ISDN switch, for the packet mode bearer service.

**Packet Interleaving** Refers to the process of multiplexing multiple incoming packets from multiple channels on to a single outgoing channel by sampling one or more packets from the first channel, then the next, and so on.

**Packet Level** In packet data networking technology, level 3 of X.25. Defines how user messages are broken into packets, how calls are established and cleared over the packet data network (PDN) and how data flows across the entire PDN. The packet level also handles missing and duplicate packets.

**Packet Level Procedure** PLP. A full-duplex protocol that defines the means of packet transfer between a X.25 DTE and a X.25 DCE. It supports packet sequencing, flow control (including maintenance of transmission speed), and error detection and recovery.

**Packet Mode Bearer Service** An ISDN term for X.25 packet data transmission over the D channel in a BRI application. Always a part of the ITU-T (nee CCITT) standards, the service has only recently been made available. The 16-Kbps D channel can accomplish its primary responsibilities for signaling and control while still leaving 9.6 Kbps free for end user transmission of low-speed data. Retailers make extensive use of this service for credit card authorization. Only in the very recent past has the D channel been made available to end users like you and me. See also AO/DI, BRI and ISDN.

**Packet Overhead** A measure of the ratio of the total packet bits occupied by control information to the number of bits of data, usually expressed as a percent.

**Packet Radio** Packet Radio is the transmission of data over radio using a version of the international standard X.25

data communications protocol adapted to radio (AX.25). It takes your information, and breaks it up into "packets" which are each sent and acknowledged separately. This assures error-free delivery from sender to receiver. A packet is a stream of characters consisting of a header, the information the user is sending, and a check sequence. The header gives the destination call sign, the call sign of the sender, and any digipeaters (digital repeater) call signs that will be used for relaying the packet. The check sequence makes certain that the data received is what was sent. AlohaNET, a packet radio network developed for a number of years ago for use at the University of Hawaii, was an early packet radio network for LAN networking among the islands and laying a foundation for subsequent packet networks, both wired and wireless. Packet radio data networks recently have been deployed by a number of carriers serving mobile and fleet applications, with such carriers including ARDIS, RAM Mobile Data and Nextel.

**Packet Size** The length of a packet, expressed in bytes (B). Packet size is of specified and fixed length in X.25 and other true packet networks. The size of the "packet" in other networks may be variable within limits, as is the case with an Ethernet frame or a Frame Relay frame.

**Packet Switching** Sending data in packets through a network to some remote location. The data to be sent is assembled by the PAD (Packet Assembler/Disassembler) into individual packets of data, involving a process of segmentation or subdivision of larger sets of data as specified by the native protocol of the transmitting device. Each packet has a unique identification and each packet carries its own destination address. Thereby, each packet is independent, with multiple packets in a stream of packets often traversing the network from originating to destination packet switch by different routes. Since the packets may follow different physical paths of varying lengths, they may experience varying levels of propagation delay, also known as latency. Additionally, they may encounter varying levels of delay as they are held in packet buffers awaiting the availability of a subsequent circuit. Finally, they may be acted upon by varying numbers of packet switches in their journeys through the network, with each switch accomplishing the process of error detection and correction. As a result, the packets may also arrive in a different order than they were presented to the network. The packet sequence number allows the destination node to reassemble the packet data in the proper sequence before presenting it to the target device.

Originally developed to support interactive communications between asynchronous computers for time-share applications, packet switched networks are shared networks, based on the assumption of varying levels of latency and, thereby, yielding a high level of efficiency for digital data networking. Isochronous data such as realtime voice and video, on the other hand, are stream-oriented and highly intolerant of latency. As a result, packet switched networks are considered to be inappropriate for such applications. Recent development of certain software and making use of complex compression algorithms, however, has introduced packetized voice and video to the corporate intranets and the Internet, which was the first public packet-switched data network and remains by far the most heavily used.

Here is another way of explaining packet switching: There are two basic ways of making a call. First, the one everyone's familiar with — the common phone call. You dial. Your local switch finds an unused path to the person you called and joins you. While you are speaking, the circuit is 100% all

yours. It's dedicated to the conversation. This is called circuit switched. Packet switching is different. In packet switching, the "conversation" (which may be voice, video, images, data, etc.) is sliced into small packets of information. Each packet is given a unique identification and each packet carries its own destination address — i.e. where it's going. Each packet may go by a different route. The packets may also arrive in a different order than how they were shipped. The identification and sequencing information on each packet lets the data be reassembled in proper sequence. Packet switching is the way the Internet works. Circuit switching is the way the worldwide phone system works, also called the PSTN (Public Switched Telephone Network).

Packet and Circuit Switching each have their own significant advantages. Packet switching for example does a wonderful job getting oodles of data into circuits. Think about a voice conversation. When you are talking, he's listening. Therefore half the circuit is dead. There are pauses between your voice. Packet switching takes advantage of those pauses to send data. Packet switching has been used primarily for data. But with the growth of the Internet, it has been used also for voice. Because of the need to re-assemble packets and other reasons, there's up to a half second delay between talking and the person at the other end hearing anything. Packet voice on the Internet is not as clear as circuit switched voice. But that's changing as the packets come faster and the technology improves. See Internet, IP Telephony and TAPI 3.0

**Packet Switching Exchange** PSE. The part of a packet switching network that receives the data from a PAD (Packet Assembly Disassembler) through a modem. The PSE makes and holds copies of each packet before sending them to the PSE they're addressed to. After the far-end PSE acknowledges receipt of the original, the copies are discarded.

**Packet Switching Network** A network designed to carry data in the form of packets. See Packet Switching.

**Packet Telephony** Another name for Internet Telephony. Also called Voice Over the Internet. See VoIP.

**Packet Tracing** The monitoring and reporting a particular packet addresses or types for diagnostic purposes.

**Packet Type Identifier** In packet data networking technology, the third octet in the packet header that identifies the packet's function and, if applicable, its sequence number.

**Packetized Video** First, read the definition of "Packet Switching." Then read the definition of "Packetized Voice" just below. The concept of packetized video is basically the same as that of packetized voice. A video camera feeds the signal into a codec, which converts the native analog signal into a digital format, and segments the data into data packets. The packets are sent across a packet network as a packet stream for reassembly by a codec on the receiving end of the transmission before presentation on a monitor. While packetized video performance is improving in quality through the application of increasingly sophisticated video compression techniques, it suffers from the same intrinsic packet-switching characteristics as does packetized voice. Namely, packet latency and loss. The result often is a video image which is less than pleasing. Note that voice and video are isochronous data, meaning that they are stream-oriented. In other words, the transmitting device must have regular and reliable access to the network. Further, the network must transport and deliver the data on a regular and reliable basis in order that a stream of information reach the presentation device. Such regular and reliable ingress, transport and egress of data results in a image of consistent quality. As packet-switched

networks are not designed to support isochronous data communications, they generally are considered unsuitable for voice and video communications. Additionally, video is very bandwidth-intensive, thereby placing additional stress on packet-switched networks such as the Internet, which already is overloaded.

An example might help. Let's say that you are using an inexpensive (\$200 or so) videoconferencing package consisting of a camera and software. Your friend has the same package. At a pre-arranged time, you place a call over the Internet to establish a videoconference. At two fps (frames per second) the videoconference goes along pretty smoothly, although both the video and voice quality are a bit rough. At some point, your friend turns his head quickly; at the same time, the Internet bogs down. The packet which contains the image of your friend's nose gets delayed or lost in the network. The video image of your friend now is missing a nose. Funny the first time, aggravating the second, maddening thereafter. The upside is that the videoconference is cheap, if not free, depending on your cost of Internet access. See also Packet Switching, Videoconferencing Internet and Isochronous.

**Packetized Voice** First read the definition of "Packet Switching" just above. The idea is to digitize voice and, compress it, and then slice it up into packets and send those packets from the sender by various routes and assemble them as they get to the receiver. Packet switching for data makes sense. Packet switching for voice has not made sense because the voice is too sensitive to latency, or delay, especially the variable delay which is part and parcel of packet-switched networking. Recently developed software and DSP hardware, which employs sophisticated compression techniques has improved the ability to conduct "reasonable" quality packet voice conversations over the Internet. See Packet Switching, IP Telephony, TAPI 3.0.

**PacketNet** Sprint's internal X.25 Packet Network.

**PACS** Personal Communications Access System. PACS is a cellular system providing limited, regional mobility in a given area. It provides mobility between that of a cordless phone and a full-fledged cellular system. Originally developed by Bell Labs in the early 1980s, PACS is a comprehensive framework for the deployment of PCS and applies to both licensed and unlicensed applications. Now it is approved by the TIA and Exchange Carriers Standards Associations. Today's currently implemented versions of PCS are "up-banded" versions of the 900 MHz AMPS and GSM cellular standards.

**PACT** Siemens' PBX And Computer Teaming. It defines protocols between Siemens PBXs and external computers. See **Pad 1**. A device inserted into a circuit to introduce loss.

**2. Packet Assembler/Disassembler.** A device that accepts characters from a terminal or host computer and puts the characters into packets that can be handled by a packet switching network. It also accepts packets from the network, and disassembles them into character streams that can be handled by the terminal or host.

**Pad Characters** In (primarily) synchronous transmission, characters that are inserted to ensure that the first and last characters of a packet or block are received correctly. Inserted characters that aid in clock synchronization at the receiving end of a synchronous transmission link. Also called Fill Characters.

**Pad Switching** A technique of automatically cutting a transmission loss pad into and out of a transmission circuit for different operating conditions.

**PAF File** A British term. Post Office Address file, a publicly available data file that, when integrated with an application,