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18th

Updated and Expanded Edition
by Harry Newton

NEWTON's TELECOM DICTIONARY

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Cable Shield / Cache

metallic members, strength members, or jackets. See Cable Shield.

Cable Shield A metallic component of the cable sheath which prevents outside electrical interference and drains off current induced by lightning.

Cable Signal Leakage Excessive levels of radio frequency (RF) energy that leak from cable television systems. Leak can cause interference to communications users, including safety service users such as aviation, police and fire departments. FCC rules specify the maximum RF leakage, and require that cable television systems be operated within certain guidelines.

Cable Stripper 1. Tool used to strip the jackets off ALPETH and lead-jacketed telephone cable. Cable strippers include cable knives and snips.

2. A professional or amateur stripper who appears on X-rated, or community access channels. Quality varies widely. Pay is often non-existent.

Cable Telephony Cable Telephony is transmitting anything other than TV pictures over a cable TV system. That "anything" might be anything from a data connection to the Internet to simple, standard, analog voice phone calls — local, long distance and international. Typically transmitting anything other than TV over the standard coaxial cable CATV providers install at your house requires a cable modem. See Cable Modem.

Cable Television CATV. See CATV.

Cable Television Laboratories, Inc. See CableLabs.

Cable Television Relay Station See CARS.

Cable Type The type of cable used. Also called the media. Examples are coaxial, UTP (Unshielded Twisted Pair), STP (Shielded Twisted Pair) and fiber. Factors including cost, connectivity and bandwidth are important in determining cable type. Choosing cable is getting more and more complex. Our tip: Choose and buy well in advance of when you'll need it. The cable you want will not always be in stock.

Cable Vault Room under the main distribution frame in a central office building. Cables from the subscribers lines come into the building through the cable vault. From here they snake their way up to the main distribution frame. The cable vault looks like a bad B-movie portrayal of Hell, replete with thousands of dangerous black snakes. Cable vaults are prime targets for the spontaneous starting of fires. They should be protected with Halon gas, but usually aren't because some parts of the phone industry think Halon is too expensive.

Cable Weight Expressed in lbs per 1000 (without reel weight included). Affects sag, span and size of the messenger in aerial applications.

CableB2B CableB2B is a trademarked term for an initiative led by CableLabs to develop interoperable interface specifications to support the automation of B2B (Business-to-Business) communications between CATV operators and Internet content providers. The B2B message set is anticipated to include specifications for service availability and order management, provisioning, network management, and customer care. See also CableLabs.

Cablecast Cablecasting. Non-broadcast radio or television programming transmitted by a cable television system to its subscribers. Cablecast programming may be originated by the cable operator itself ("origination cablecasting" or "local origination") or by an access organization.

Cablehead The point where a marine cable connects to terrestrial facilities.

CableHome CableHome is a trademarked term of CableLabs for a project to develop interface specifications to extend high quality cable-based (i.e., cable TV-based) services to network devices within the residence. The initiative addresses issues of device interoperability, QoS (Quality of Service), and network management. See also CableLabs.

CableLabs Cable Television Laboratories, Inc. A research and development consortium of cable television system operators established in 1988. CableLabs membership includes system operators in North, Central, or South America, and the Caribbean. CableLabs plans and funds research and development projects to help member companies and the cable industry take advantage of opportunities and meet challenges in the telecommunications industry. A good deal of emphasis is placed on digital cable and cable modem technologies. Current projects include CableModem (formerly known as DOCSIS), PacketCable, OpenCable, CableB2B, and CableHome. www.cablelabs.com. See also the definitions for the above projects.

CableLabs Certified CableModem CableLabs Certified CableModem is a trademarked term for a cable modem initiative previously known as DOCSIS, a project led by the MCNS (Multimedia Cable Network System Partners Limited), which consisted of leading CATV operators. The DOCSIS project, now spearheaded by CableLabs, the research and development organization supporting the CATV industry, was aimed at developing on behalf of the North American CATV industry a set of necessary communications and operations support interface specifications for cable modems and associated equipment. The

project led to the deployment of HFC (Hybrid Fiber-Coax) cable television systems in support of high-speed bi-directional data transfer, as well as entertainment TV. Activities are in phases, with the interfaces to be addressed including Cable Modem to CPE Interface (CMCI), Cable Modem Termination System-Network Side Interface (CMTS-NSI), Operations Support System Interface (OSSSI), Cable Modem Telco Return Interface (CMTRI), Cable Modem to RF Interface (CMRFI), Cable Modem Termination System-Downstream RF Interface (CMTS-DRFI), Cable Modem Termination System-Upstream RF Interface (CMTS-URFI), and Data Over Cable Security System (DOCSS). Overlaying the CableLabs Certified infrastructure is the PacketCable project, a set of interoperable interface specifications for delivering advanced, real-time multimedia services over two-way cable plants. PacketCable will use IP (Internet Protocol) technology in support of multimedia conferencing, IP telephone, interactive gaming, and a wide range of multimedia services. For more detail see CMCI, CMTS-NSI, OSSSI, CMTRI, CMRFI, CMTS-DRFI, CMTS-URFI, and DOCSS. See also CableLabs and MCNS.

Cableway An opening in a work surface that allows access to cords or cables from below, or mounting of an electrical receptacle or telephone jack. Cableways typically come with removable plastic grommets.

Cabling The combination of all cables, wire, cords, and connecting hardware installed. A term used to refer collectively to the installed wiring in a given space.

Cabling Reference Panel (of the ACIF) CRP. One of the five reference panels of the Australian Communications Industry Forum, the CRP is responsible for the formulation of telecommunications cabling standards and management of the cabling industry licensing arrangements.

CABS Carrier Access Billing System. Basically, when a company has a network in a CLEC environment, other companies can use that network for their own traffic. The CABS system allows each company to bill the others for the balance of traffic which they passed.

CABS BOS Carrier Access Billing Specifications - Billing Output Specifications.

CAC 1. Carrier Access Code. The digits you must dial in North America to reach the long distance carrier of your choice. Those digits fit the following format 101X-XXX.

2. Customer Administration Center. A type of terminal used by a PBX user to maintain and troubleshoot his PBX.

3. Connection Admission Control is defined as the set of actions taken by the network during the call setup phase (or during the call re-negotiation phase) in order to determine whether a connection request can be accepted or should be rejected (or whether a request for re-allocation can be accomplished).

CACH Call Appearance Call Handling.

Cache From the French "cacher," which translates "to press or hide," especially in terms of tools or provisions. In the context of computer systems and networks, information is cached by placing it closer to the user or user application in order to make it more readily and speedily accessible, and transparently so. At the same time, information which is cached places less strain on limited computer I/O (Input/Output) resources and limited network resources. Let's consider two specific definitions, the first of which relates to computer systems and the second of which relates to computer networks. Let's also consider a combination of the first two, in the context of the Internet.

1. In the context of a computer system, cache memory generally is a partition of SRAM (Static Random Access Memory). Since much of computing is highly repetitive or predictable in nature, and since solid state components (silicon chips) are much faster than mechanical disk drives, the speed of information access can be enhanced if certain information can be stored in RAM. That information typically is in the form of program information, memory addresses, or data. Thereby, the information can be stored in anticipation of your need for it, and can be presented to you faster than if the computer needed to access the hard drive through the execution of an I/O function. The cache memory sits (logically and, perhaps physically) between the CPU and the main memory (RAM). Caching works because of a phenomenon known as the locality principle which states that a von Neumann CPU (i.e., one that performs instructions and makes database calls sequentially, one after another) tends to access the same memory locations over and over again. A cache works like this. When the CPU needs data from memory, the system checks to see if the information is already in the cache. If it is, it grabs that information; this is called a cache hit. If it isn't, it's called a cache miss and the computer has to fetch the information by accessing the main memory or hard disk, which is slower. Data retrieved during a cache miss is often written into the cache in anticipation of further need for it. Let's assume that you open a CD-ROM application with hyperlinks. As the system can reasonably assume that you will exercise the hyperlink options, the information associated with them can be stored

Pin	Control Signal	From	To
4	Request-To-Send (RTS)	DTE	DCE
5	Clear-To-Send (CTS)	DCE	DTE
6	Data Set Ready (DSR)	DCE	DTE
8	Carrier Detect (CD)	DCE	DTE
20	Data Terminal Ready (DTR)	DTE	DCE
22	Ring Indicator (RI)	DCE	DTE

Control Station On a multi-access link, a station that is in charge of such functions as selection and polling.

Control Tier An AT&T term for the tier within the Universal Information Services network node that provides the transport network's connection control function.

Control Unit An architectural component of a processor chip which orchestrates processor activity and handles timing to make sure the processor doesn't overlap functions.

Controlled Access When access to a system is limited to authorized programs, processes or other systems (as in a network).

Controlled Environment Vault CEV. It is a low maintenance, water-tight concrete or fiberglass container typically buried in the ground which provides permanent housing for remote switches, remote line concentrators, pair gain and fiber transmission systems. Because it is buried, it can often be installed in utility easements or other places where local building laws may be a problem. This below ground room that houses electronic and/or optical equipment is under controlled temperature and humidity conditions.

Controller 1. In the truest sense, a device which controls the operation of another piece of equipment. In its more common data communications sense, a device between a host and terminals that relays information between them. It administers their communication. Controllers may be housed in the host, can be stand-alone, or can be located in a file server. Typically one controller will be connected to several terminals. The most common controller is the IBM Cluster Controller for their 370 family of mainframes. In an automated radio, a controller is a device that commands the radio transmitter and receiver, and that performs processes, such as automatic link establishment, channel scanning and selection, link quality analysis, polling, sounding, message store and forward, address protection, and anti-spoofing.

2. Participant in a conference call who sets up the conference call.

Controller Card Also called a hard disk/diskette drive controller. It's an add-in card which controls how data are written to and retrieved from your PC's various floppy and hard drives. Controller cards come in various flavors, including MFN and SCSI. Controller cards are the devices used to format hard drives. Controller cards are not hard drive specific (except within categories). Controller cards will format many drives. But once you have a hard drive that has been formatted by that one controller card, it tends to prefer talking to that controller card forever. If you switch your hard disk to another machine, but not the controller card, then format the hard disk. That's not a "100% Do It Or Else You'll Be Disappointed" rule. But just a "Play It Safe and Switch Them" rule.

Controllerless Modem A modem that shifts all the protocol management, error detection and correction, and data compression onto software running on the system's CPU. This allows the modem manufacturer to make a much cheaper modem that does not require the memory or processing power of a traditional modem. Also known as a soft modem.

Contouring In digital facsimile, density step lines in received copy resulting from analog-to-digital conversion when the original image has observable gray shadings between the smallest density steps of the digital system.

CONUS A term for CONTiguous United States (lower 48 states). See Contiguous United States.

Convection Cooling Design techniques used in switching system construction to permit safe heat dissipation from the equipment without the need for cooling fans.

Convector The device which covers the steam heating radiator in buildings and typically sits underneath a window. Also called a weathermaster.

Convective Area An area allocated for heat circulation and distribution. Convector areas, typically built into a wall, can be used as a satellite location only if a more suitable area is unavailable.

Convention A rule of conduct or behavior which has been reached by general agreement, commonly by a standards-making body, whether formal (e.g., the ITU) or ad hoc (e.g., Bell Telephone Laboratories) in nature. For example, the T-1 framing conventions were developed by Bell Labs for use within the Bell System network in North America, and later were formalized at the international level by the ITU-T. See also Bell Telephone Laboratories, ITU-T, and T-1.

Convergence 1. A measure of the clarity of a color monitor. A measure of how closely the red, green and blue guns in a color monitor track each other when drawing a color image. The other measures are focus and dot pitch.

2. A routing term. The point at which all the internetworking devices share a common understanding of the routing topology. The slower the convergence time, the slower the recovery from link failure.

3. The word to describe a trend - now that most media can be represented digitally - for the traditional distinctions between industries to blur and for companies from consumer electronics, computer and telecommunications industries to form alliances, partnerships and other relationships, as well as to raid each others markets.

4. The word "convergence" as a fashion word of the "new" management was set in motion in 1992 when Tele-Communications Inc. chairman John C. Malone told a cable-show audience that his vision of all-digital, fiber-optic networks would enable TCI and other cable operators to offer 500 TV channels, interactive programming, electronic mail, and telephony. According to Business Week Magazine of June 23, 1997 that picture of digital convergence was so compelling that cable, media and phone companies promptly hopped on the bandwagon. Business Week continued, "Several billion dollars later, it became clear that convergence was a bust. Cable companies, perennially strapped for cash, scaled back on their plans to upgrade their networks to handle huge amounts of interactive data. Phone companies that had hoped to offer television service - on their own wires or in joint ventures with cable companies - went back to their core businesses." However, such concerns should never let a good word die. In the May 17, 1998 issue of The New York Times, Richard C. Notebaert, chairman and chief executive of the Ameritech Corporation, wrote, "Conventional wisdom holds that convergence - the gradual blurring of telecommunications, computers and the Internet - is primarily about technology and the inevitable clash of voice and data networks. But that narrow viewpoint misses the bigger picture...Convergence is about fundamental changes in the way we work - even behave." Now the latest concept of convergence is that all communications - the Internet and the PSTN (the public switched telephone network) - shall run over one IP telephony network. As Notebaert says, "Our public voice network will become the public multimedia network and the Internet as we know it will cease to exist. With such a robust and ubiquitous network, we'll never have to go to the time and trouble of dialing into a private network when we want to surf the Web. In essence, we'll always be on line. And that will let us develop applications we can't even dream of today." No industry is immune from the convergence fever. Every year, a trade magazine or two changes its name to include the word convergence in the hope that major profits will magically appear. By far the most interesting obsession with the word convergence was the formation of a trade industry association called the National Convergence Alliance. See NCA.

Convergence Billing Also known as convergence or composite billing. This is a fancy name for one phone company - local or long distance - providing a total communications bill to the customer. That total bill would include everything the customer buys in telecommunications services

— from local, long distance, Internet access, cell phones, paging, etc. In late 1996, the belief developed in the telecom industry that if you "controlled" the bill to the customer, you would be in far better shape to sell the customer more services. The concept has some validity, especially if you also believe in fairies.

Convergence Sublayer CS. An ATM term. SEE CS.

Convergent Convergent billing software is software which allows telecom companies (such as local and long distance companies) to bundle services, such as long distance, cellular, paging and cable, together onto a single monthly invoice. Bundling helps service providers offer competitive rates, boost revenue per customer and reduce customer turnover. Customers love the simplicity and convenience of one bill for all their telecom services. One company calls itself a "one stop shop with an integrated bill."

Conversation Path The route from originating port to terminating port for a two-way call. A conversation thus typically requires two ports on most PBXs.

Conversation Time The time spent on a conversation from the time the person at the other end picks up to the time either of you hang up. Conversation time plus dialing, searching and ringing time equal the time your circuit will be used during a call.

Conversational Mode Also called chat mode. Interactive data communications carried on between data terminals in a fashion similar to speech conversation.

Conversational Mode Telex An MCI International product providing real time exchange between Telex terminals or other compatible devices that allows instantaneous, two-way conversations in writing.

it was shifted again in 1997 to Lockheed Martin. In November, 1999, it was shifted to NeuStar Inc., when it was discovered that Lockheed Martin had a conflict of interest. NeuStar originally was an independent business unit of Lockheed Martin, but was spun off in order to resolve the conflict. See North American Area Codes, North American Numbering Plan and NANC. www.nanpa.com. www.neustar.com.

NANPA North American Numbering Plan Administration. See also NAMP and NANC.

NAOM National Accounts Operations Manager.

NAP 1. Network Action Point. An AT&T term describing the switching point through which a call is processed. The NAP switches the call based on routing instructions received from the NCP.

2. Network Access Point. A point of access into the Internet used by ISPs and providers of Internet regional and local subnets. NAPs operate at Layer 2 (Link Layer) of the OSI Reference Model, providing meet points where ISPs exchange traffic and routes. Similar to the original concept of the CIX (Commercial Internet eXchange), the NAPs provide a means of direct connection to the Internet, rather than serving solely as an intermediate point of exchanging commercial traffic. The initial NAPs were located in San Francisco under the operation of PacBell; Chicago, Bellcore and Ameritech, and New York (actually, Pennsauken, New Jersey), SprintLink. A fourth was awarded for MAE-East (MERIT Access Exchange) in Washington, DC, and is operated by MFS (Metropolitan Fiber Systems), which now is a business unit of Worldcom. On April 30, 1995, the NSFNet backbone was essentially shut down, and the NAP architecture effectively became the Internet. See also GigaPOP, FIX and MAE.

3. Network Access Point, an AIN term. See Network Access Point.

4. Network Access Provider. The NAP provides a transit network service permitting connection of service subscribers to NSPs. The NAP is typically the network provider that has access to the copper twisted pairs over which the DSL-based service operates.

NAPI Numbering/Addressing Plan Identifier.

NAPLPS North American Presentation-Level Protocol Syntax. A protocol for videotex text graphics and screen formats, developed by AT&T and since standardized within ANSI, based on Canada's Telidon videographics protocol.

Napster Napster is a web-based service that allowed its "members" to download music from the hard disks of the PCs belonging to its "members." Napster's brilliance was creating the software that allowed "peer to peer" (P2P) computing. Napster's sin was making copyrighted material available for free to anyone who signed up for the service. Eventually the music industry howled Napster into court and sought injunctions to stop it. The final injunction, interestingly, didn't hold Napster solely responsible for stopping all unauthorized trading of copyrighted files. Rather, the responsibility for policing the network is shared between Napster and the record companies that filed suit. Napster only must show that it is making every effort, within the limits of its technology, to stop trading specific recordings on lists provided by the plaintiffs. As a result a number of companies have cropped up to provide sophisticated technology to identify music files. The companies use digital signal processing to measure essential parts of the music itself. That information provides a small fingerprint, on the order of a few hundred to a few thousand bytes, which cannot be altered without significantly changing the sound of the song. One company claimed each identification takes, on average, less than half a second. See also P2P.

NAR 1. Network Access Register. Centrex term describing a Central Office register which is required in order to complete a call involving access to the network outside the confines of that Centrex CO. NARs may be incoming, outgoing or two-way. NARs may be defined in support of local, intraLATA or interLATA traffic. The specifics of NAR implementation vary by Centrex provider.

2. Nothing Added Reseller. In contrast to a VAR, which is a Value Added Reseller. Clearly a lam joke.

3. National Accounts Representative.

Narrative Traffic Messages normally prepared in accordance with standardized procedures for transmission via optical character recognition equipment or teletypewriter. In contrast to data pattern traffic, narrative messages must contain additional message format lines.

Narrowband 1. An imprecise term. Some people think it's sub-voice grade channels capable of only carrying 100 to 200 bits per second. Others think it means lines or circuits able to carry data up to 2400 bits per second. So as lines get broader, narrowband gets broader. The latest definition of narrowband is up to and including T-1 — or 1.544 megabits per second. See also Bandwidth, Wideband, Broadband, N-ISDN and B-ISDN.

2. In cellular radio terminology, narrowband refers to the methodology of gaining more channels (and hence more capacity) by splitting FM channels into channels that are narrower in bandwidth. See NAMPs and NTACS.

3. PCS. Mobile or portable radio services which can be used to provide services to both individuals and businesses such as acknowledgement and voice paging and data services.

4. A WDM (Wavelength Division Term). Once upon a time, digital optical fiber transmission systems transmitted pulses of white light. Pulse on for a binary "1" bit, and pulse off for a binary "0" bit. White light is a combination of all of the light frequencies in the light spectrum. If you transmit white light, one optical fiber can carry only one signal. Now, they still pulse on and off. Increasingly, however, the laser diodes that create the light pulses are tunable so that they emit light pulses that are narrowly defined to specific frequencies that we would relate, at the most basic level, to specific colors of light such as ruby red or violet. Each specific frequency, or wavelength, is known as a "lambda" in the optical domain. An optical fiber simultaneously can support a vast range of narrowly defined lambdas, which do not interfere with each other as they are separated by frequency. While each lambda operates at broadband speed (i.e., equal to or greater than 45 Mbps), in the context of a WDM transmission system each lambda is referred to as "narrowband."

Narrowband Advanced Mobile Phone Service NAMPs.

Narrowband AMPS. NAMPs triples the capacity of AMPS, by compressing three 10 KHz analog FM channels into a signal 30 kHz analog FM AMPS channel, along with improved signaling. Pronounced "N-AMPS."

Narrowband FM Narrowband FM is an FM signal with a bandwidth approximately equal to that of an AM signal modulated with the same audio information. Narrowband FM is used on many emergency bands because it conserves bandwidth while being clear and free from static.

Narrowband ISDN Any ISDN speed up to 1.544 Mbps, which is called PRI or PRA. But this definition is imprecise. And as speeds get faster, so the definition of narrowband ISDN means faster and faster. See N-ISDN and B-ISDN.

Narrowband Signal Any analog signal or analog representation of a digital signal whose essential spectral content is limited to that which can be contained within a voice channel of nominal 4-kHz bandwidth.

Narrowband TACS N-TACS. The narrowband version of TACS from Motorola which doubles the capacity of TACS by splitting the 25 kHz TACS channel into two 2.5 kHz channels.

Narrowcasting First, there was broadcasting. One signal went to many people. Radio and TV are the classic concepts of broadcasting. One signal — the same signal — to many people. Then came the idea of narrowcasting. One signal to a select number of people — maybe only those people who subscribed to the service and had the equipment to receive it. Then there came pointcasting. This is a fancy name for sending someone a collection of customized information — snippets of stuff that they chose from a palette of information offerings.

NARS 1. Network Audio Response System.

2. A Nortel switching term for Network Automatic Route Selection.

NARTE National Association of Radio and Telecommunications Engineers. A worldwide, non-profit, professional organization which certifies engineers and technicians in the areas of telecommunications and electromagnetic compatibility (EMC). NARTE was founded in 1983 to address the professional testing and certification void created when the FCC reduced its role in that regard. www.narte.org

NARUC National Association of Regulatory Utility Commissioners. Members are commissioners of utility regulatory agencies of the states, the federal government and U.S. territories (i.e., the District of Columbia, Puerto Rico, and the Virgin Islands). Objectives are the advancement of uniform regulation, coordinated action, and protection of the common interests of the people with respect to utility regulation. www.erols.com/naruc

NAS 1. NetWare Access Server. See Remote Access Server.

2. Network-Attached Storage. See Storage Area Network (SAN).

NASA National Aeronautics and Space Administration.

NASC Number Administration and Service Center. Provides centralized administration of the Service Management System (SMS) database of 800 numbers. The NASC keeps track of the 800 numbers that are in use, or available for use, by new 800 users.

Nasdaq An exchange where stocks are traded electronically across vast computer networks. This contrasts, for example, with the New York Stock Exchange, which is a physical place (i.e. a building) and stocks are traded by people at that building. Nasdaq stands for The National Association of Securities Dealers Automated Quotation System.

Nasdaq Composite Index An index representing the movement of stocks traded by the National Association of Securities Dealers (NASD).

NAT Network Address Translation. An Internet standard that enables a local area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for

N

NATA / National Information Infrastructure

external traffic. This allows a company to shield internal addresses from the public Internet. According to Cisco, NAT has several applications. You want to connect to the Internet, but not all your hosts have globally unique IP addresses. NAT enables private IP internetworks that use nonregistered IP addresses to connect to the Internet. NAT is configured on the router at the border of a stub domain (referred to as the inside network) and a public network such as the Internet (referred to as the outside network). NAT translates the internal local addresses to globally unique IP addresses before sending packets to the outside network. You must change your internal addresses. Instead of changing them, which can be a considerable amount of work, you can translate them by using NAT. You want to do basic load sharing of TCP traffic. You can map a single global IP address to many local IP addresses by using the TCP load distribution feature. As a solution to the connectivity problem, NAT is practical only when relatively few hosts in a stub domain communicate outside of the domain at the same time. When this is the case, only a small subset of the IP addresses in the domain must be translated into globally unique IP addresses when outside communication is necessary, and these addresses can be reused when no longer in use.

A significant advantage of NAT, according to Cisco, is that it can be configured without requiring changes to hosts or routers other than those few routers on which NAT will be configured. NAT may not be practical if large numbers of hosts in the stub domain communicate outside of the domain. Furthermore, some applications use embedded IP addresses in such a way that it is impractical for a NAT device to translate. These applications may not work transparently or at all through a NAT device. NAT also hides the identity of hosts, which may be an advantage or a disadvantage. A router configured with NAT will have at least one interface to the inside and one to the outside. In a typical environment, NAT is configured at the exit router between a stub domain and backbone. When a packet is leaving the domain, NAT translates the locally significant source address into a globally unique address. When a packet is entering the domain, NAT translates the globally unique destination address into a local address. If more than one exit point exists, each NAT must have the same translation table. If the software cannot allocate an address because it has run out of addresses, it drops the packet and sends an ICMP Host Unreachable packet. A router configured with NAT must not advertise the local networks to the outside. However, routing information that NAT receives from the outside can be advertised in the stub domain as usual.

NATA 1. North American Telecommunications Association. A trade association of manufacturers and distributors of telephone equipment that was formed in 1970, two years after the FCC's Carterfone decision, which said that the Carterfone and other customer phone devices could be connected to the nation's phone network — if they were "privately beneficial, but not publicly harmful." The Carterfone decision was a landmark. It allowed the connection of non-telephone company equipment to the public telephone network. This decision marked the beginning of the telephone interconnect business as we know it today. And NATA's mission was to fight all the restrictive rules and regulations which the telephone companies subsequently threw up to make connection of customer-owned equipment difficult and expensive. At that time the phone companies (especially AT&T and GTE) were among the largest manufacturers of phone equipment. Eventually NATA won the legal fight and lost its mission, its reason for being. In the early 1990s, NATA collapsed. The remaining bits of it were re-assembled into a new trade association called the MMTA, which stood for MultiMedia Telecommunications Association. MMTA is organized around five divisions — computer telephony integration, conferencing/collaboration and messaging, LAN/WAN internetworking, Voice/Multimedia and Wireless Communications. www.mmta.org.

2. National Association of Testing Authorities. Australian body that accredits services that test equipment against standards.

NATD National Association of Telecommunications Dealers. A national association of dealers in used telecommunications equipment. www.natd.com.

NATI Kirk Forman works for a company with 3,000 employees. Turns out that the network and workstation folks are two different groups. It seems that 85% of the problem calls he in telecom get from the workstation group are NATI, Not A Telecom Issue.

National Association Of Regulatory Utility Commissioners NARUC. An organization supporting the needs of the commissioners of U.S. federal and state regulatory agencies. www.naruc.org

National Association of Telecommunications Dealers See NATD.

National Association of Testing Authorities See NATA.

National Bureau Of Standards NBS. The U.S. government organization that helps prepare non-Department of Defense communications standards and operates a testing service to indicate conformity to existing standards. Address: Institute for Computer Sciences and Technology, National Bureau of Standards, Gaithersburg, MD 20899.

National Cable Television Association NCTA. An organization repre-

senting the major U.S. cable television operators in the United States. Founded in 1952, the NCTA's mission is to advance the public policies of the CATV industry before the legislative, judicial and regulatory bodies, as well as before the American public. www.ncta.com

National Code, The Telecommunications National Code (of Australia). Carriers were formerly required to comply with the provisions of this code when installing or making out telecommunications facilities and infrastructure.

National Communications System NCS. The NCS was set up by President John F. Kennedy in 1963 after a snarl in communications during the Cuban missile crisis among the United States, The Soviet Union and NATO. The system has continued over the years to try to maintain communications among emergency service officials during times of crises. Formally, the NCS was established by Section 1(a) of Executive Order No. 12472 to assist the President, the National Security Council, the Director of the Office of Science and Technology Policy, and the Director of the Office of Management and Budget, in the discharge of their national security emergency preparedness telecommunications functions. See also Priority Access Methods.

National Coordinating Center NCC. The joint telecommunications industry-Federal Government operation established by the National Communications System to assist in the initiation, coordination, restoration, and reconstitution of NS/EP telecommunications services or facilities.

National Electrical Code NEC. A nationally recognized safety standard for the design, construction, and maintenance of electrical circuits. The NEC also gives rules for the installation of electrical and telephone cabling. The NEC is developed by the NEC Committee of the American National Standards Institute (ANSI), sponsored by the National Fire Protection Association (NFPA) and identified by the description ANSI/NFPA 70-1990. This code has been adopted and enforced by many states and municipalities as law. NEC Article 800 covers telephone and telegraph electrical communications circuits, and telephone systems. Article 810 covers commercial radio and television receiving equipment, and amateur radio transmitting and receiving equipment. Article 820 covers CATV (Community Antenna Television) coaxial cable systems.

National Electrical Manufacturers Association See NEMA.

National Emergency Number Association NENA. A US non-profit organization promoting 911 as the standard emergency number, including technical support, public awareness, certification programs, and legislative representation. www.nena.org

National Exchange Carrier Association NECA. An association of local exchange carriers mandated by the U.S. Federal Communications Commission in 1983, in anticipation of the breakup of the Bell System. NECA's primary responsibility was to file new interstate access tariffs and to perform the "settlement" functions previously performed by AT&T and the BOCs (Bell Operating Companies). Under the direction of the FCC, NECA administers approximately \$2 billion in annual revenues, based on pooled tariff rates. Through the pooling process, the LECs (Local Exchange Carriers) bill the IXCs (InterExchange Carriers) for the use of their local exchange networks in originating and terminating long distance calls. Individual revenues and costs then are submitted to NECA, which distributes them to the member companies on an averaged basis. NECA also administers the Universal Service Fund (USF), the Lifeline Assistance Programs, and the Telecommunications Relay Services Fund. See also Division of Revenues, Lifeline Assistance Programs, Separations and Settlements, Telecommunications Relay Services Fund, and Universal Service Fund. www.neca.org

National Fire Protection Association NFPA. A not-for-profit association which works with the U.S. Congress and federal agencies to promote the adoption and use of fire protection codes and standards, and to promote a uniform national approach to combating the problem of fires. The NFPA has published the National Electrical Code (NEC) since 1897. The NEC, published as NFPA 70, includes all sorts of provisions for electrical wires, connectors, and outlets. Included in the NEC are specifications for the cable jackets used in telecommunications inside wire and cable systems. www.nfpa.org. See National Electric Code.

National Information Infrastructure NII. What the Clinton Administration prefers to call the Information Superhighway — basically a switched, broadband network that could, in theory, deliver everything from switched video to high-speed access to the Internet. The NII is intended to connect people, businesses, institutions and governments with one another. Its purpose is to expand the availability of a wide variety of information and communications services.

trical energy.

Optoelectric Transducer Electronic components that turn light energy into electrical energy and electrical energy into light energy.

Optronics Opt(o-Elect)ronics. See Opto-Electronics.

Optus Communications Ltd Historically, Australia's second general communications carrier, licensed by the government in 1991 to provide competition to then government-owned Telstra Corporation. Initially formed from a consortium of Mayne Nickless, AMP Society, National Mutual, AIDC Telecommunications Fund, Bell South and Cable and Wireless. Optus provides mobile and fixed network services.

OPX Off Premise Extension. An extension or phone terminating in a location other than the location of the PBX. The station uses a line circuit out of the PBX. OPX is commonly used to provide a company executive with an extension off the PBX in his home. This way he can pretend to be at the office when he's really at home. He can also make toll calls and have them easily charged to the office.

OR Gate A digital device which outputs a high state if either or both of its inputs are high.

Or Statement See Not Statement.

Orange Book The common name for the U.S. Department of Defense's Trusted Computer System Evaluation Criteria (TSEC).

ORB 1. Office Repeater Bay.

2. Object Request Broker. See Object Request Broker and CORBA.

Order Entry A voice processing application which allows someone with a touchtone phone to buy something, i.e. enter their order.

Order Wire 1. A circuit used by telephone personnel for fixing, installing and removing phone lines. See also Order Wire Circuit.

2. Equipment and the circuit providing a telephone company with the means to establish voice contact between central office and carrier repeater locations.

3. A SONET/SDH term for a connection request, and consisting of one octet contained within the SOH (Section Overhead).

Order Wire Circuit A voice or data circuit used by telephone company technical control and maintenance personnel for the coordination and control action relating to activation, deactivation, change, rerouting, reporting and maintenance of communication systems and services. See also Order Wire.

Orderwire See Order Wire.

Organic There are two ways you can grow a company's revenues. You can buy other companies and add their revenues to yours. Or you can grow the revenues in your own business by thinking up and creating new products, then marketing and selling more, adding more customers and selling more to your existing customers. Growing your present business' revenues without acquiring other businesses is called organic growth.

Organic Growth See Organic.

Originate Mode The "originate mode" sets the modem to begin a data phone call — i.e. dial the phone, listen for a carrier tone from a remote modem and connect to that modem. The modem at the receiving end must be set to "Answer" mode. In any asynchronous data conversation, one side must be set to "Originate" and the other to "Answer." Such settings are usually made in software.

Originate/Answer The two modes of operation for a modem. Originate and answer states define the frequencies used to transmit and receive. In a two-way communication system, one modem must be set to originate and the other to answer.

Originating Office The central office that serves the calling party.

Originating Restriction A phone line with this restriction cannot place calls at any time. Calls directed to the phone, however, will be completed normally.

Origination A call that is placed by the mobile subscriber, calling either a land-line circuit or another mobile subscriber.

Origination Cablecasting Programming over which a cable television system operator exercises editorial control. This term includes programming produced by the operator; Non-broadcast local programming produced by other entities and carried voluntarily by the system. Example: PRISM; regional news channels; Satellite-delivered non-broadcast programming carried voluntarily by the system, such as HBO, ESPN, CNN, C-SPAN, QVC, etc. This term does not include programming over which the operator does not exercise editorial control, including any broadcast signal, including satellite-delivered broadcast "superstations" (WGN-TV, WWOR, etc.); Any access channel designated by franchise for public, educational, or governmental use; Leased-access channels.

The cable system operator is required by Section 76.225c of the FCC Rules to maintain

records, in the PIF, to verify compliance with rules governing commercial matter in children's programming carried on origination-cablecasting channels. See PIF.

Originator The user that is the ultimate source of a message or probe.

ORM Optically Remote Module. A type of switching module made by AT&T which connects directly to the SESS switch communications module via optical fibers.

Orphan A Windows NT term. A member of a mirror set or a stripe set with parity that has failed in a severe manner, such as a loss of power or a complete head crash. When this happens, the fault-tolerance driver determines that it can no longer use the orphaned member and directs all new reads and writes to the remaining members of the fault-tolerant volume.

Orthogonal Having, meeting or determined at right angles.

Orthogonal Frequency Division Multiplexing See OFDM.

OS 1. Outage Seconds.

2. Operating System, as in MS-DOS (Microsoft Disk Operating System), Windows NT or OS/2. See Operating System.

3. Operator Services. See Operator Services.

4. Operations System. Includes SCOTS, FMAS, etc.

OS-9 OS-9 was developed by Microware for the Motorola 68000 family of processors and under the name CR-RTOS it is used as the operating system in CD-I players.

OS/2 Operating System/2. An operating system originally developed by IBM and Microsoft for use with Intel's microprocessors and for use with IBM personal system/2 personal computers. Now OS/2 is the prime responsibility of IBM and it will run on many PCs, including those using the Intel family of PC microprocessors. OS/2 is a multitasking operating system. This means many programs can run at the same time. See OS/2 Extended Edition.

OS/2 2.0 A 32-bit version of the IBM's OS/2 operating system. Apple Macintosh's operating system is 32-bit.

Osborne Effect Once there was a personal computer company called Osborne Computer Company. One day, the president announced a revolutionary new computer. It was so good not one of his dealers wanted to (or could) sell the existing product and they sent all their inventory back. Meantime, it was six months before the company could deliver the new product. But without any sales in the meantime, it had no money and Osborne went broke. There is a lesson here for companies who are attempting to manage transition between old and new product lines. Be careful, or suffer the horrible consequences of The Osborne Effect.

Oscillator 1. A device for generating an analog test signal.

2. Electronic circuit that creates a single frequency signal.

Oscilloscope Electronic testing device that can display wave forms and other information on a TV-screen-like cathode ray tube. A basic fixture in sci-fi movies.

OSDM Optical Spatial Division Multiplexing is a technology developed to improve the efficiency with which SONET (Synchronous Optical Network) supports bursty packet data traffic such as LAN traffic. OSDM accomplishes this by dynamically allocating arbitrary levels of bandwidth to such traffic, guaranteeing minimum levels that are supplemented by higher levels of bandwidth as it becomes available. OSDM is a protocol-independent, self-contained technology that adapts to various current and developing physical layer technologies such as digital wrappers and DWDM (Dense Wavelength Division Multiplexing).

OSF Open Software Foundation. An industry organization founded in 1988 to deliver technology innovations in all areas of open computer systems, including interoperability, scalability, portability and usability. The OSF was an international coalition of vendors and users in industry, government and academia that worked to provide technology solutions for a distributed computing environment. In February 1996, the OSF consolidated with X/Open Company Ltd. to form The Open Group. See The Open Group. www.open-group.org.

OSF/1 Version 1 of the Open Software Foundation's Unix-based operating system

OSI Open Systems Interconnection. A Reference Model developed by the ISO (International Organization for Standardization, as translated into English). The OSI Reference Model is the only internationally accepted framework of standards for communication between different systems made by different vendors. ISO's goal is to create an open systems networking environment where any vendor's computer system, connected to any network, can freely share data with any other computer system on that network or a linked network. Most of the dominant communications protocols used today have a structure based on the OSI model. Although OSI is a model and not an actively used protocol, and there are still very few pure

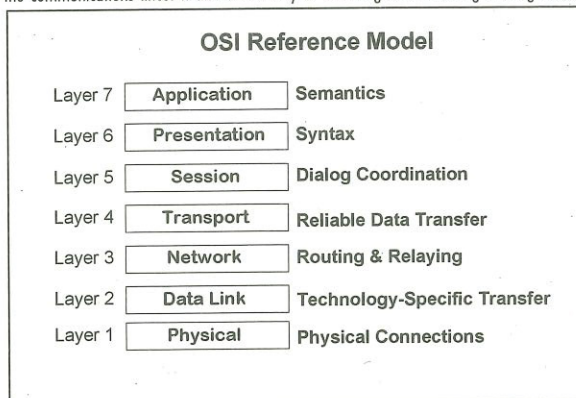


OSI Model / OTASP

OSI-based products on the market today, it is still important to understand its structure. The OSI model organizes the communications process into seven different categories and places these categories in a layered sequence based on their relation to the user. Layers 7 through 4 deal with end to end communications between the message source and the message destination, while layers 3 through 1 deal with network access.

Layer 1 — The Physical Layer deals with the physical means of sending data over lines (i.e., the electrical, mechanical and functional control of data circuits). Examples include T-carrier and SONET.

Layer 2 — The Data Link Layer is concerned with procedures and protocols for operating the communications lines. It also has a way of detecting and correcting message errors.



Examples include Frame Relay, PPP (Point-to-Point Protocol), and X.25.

Layer 3 — The Network Layer determines how data is transferred between computers. It also addresses routing within and between individual networks. The most visible example is IP (Internet Protocol).

Layer 4 — The Transport Layer defines the rules for information exchange and manages end-to-end delivery of information within and between networks, including error recovery and flow control. TCP (Transmission Control Protocol) is an example.

Layer 5 — The Session Layer is concerned with dialog management. It controls the use of the basic communications facility provided by the Transport layer. If you've ever lost your connection while Web surfing, you've likely experienced a session time-out, so you have some sense of the Session Layer.

Layer 6 — The Presentation Layer provides transparent communications services by masking the differences of varying data formats (character codes, for example) between dissimilar systems. Conversion of coding schemes (e.g., ASCII to EBCDIC to Unicode), and text compression and decompression exemplify Presentation Layer functions.

Layer 7 — The Applications layer contains functions for particular applications services, such as file transfer, remote file access and virtual terminals. Examples include TCP/IP extensions such as UDP (User Datagram Protocol) and SMTP (Simple Mail Transfer Protocol).

See also OSI Standards.

OSI Model Open Systems Interconnection Model. See OSI.

OSI Network Address The address, consisting of up to 20 octets, used to locate an OSI Transport entity. The address is formatted into an Initial Domain Part which is the responsibility of the addressing authority for that domain and a domain-specific part which is the responsibility of the addressing authority for that domain.

OSI Presentation Address The address used to locate an OSI Application entity. It consists of an OSI Network Address and up to three selectors, one each for use by the Transport, Session, and Presentation entities.

OSI Standards The International Standards Organization (ISO) has established the Open Systems Interconnection (OSI) Reference Model. The idea of the Reference Model is to provide a network design framework to allow equipment from different vendors to be able to communicate. Standards allow us to buy items such as batteries and light bulbs. Many of us have learned "the hard way" that the lack of computer standards can make it impossible for computers from different vendors to talk to each other. Because a major goal of a LAN (Local Area Network) is to connect varied systems, standards have been developed to specify the set of rules networks will follow. The OSI Model is a design in which

groups of protocols, or rules for communicating, are arranged in layers. Each layer performs a specific data communications function. The concept of layered protocols is analogous to the steps we follow in making a phone call:

Step 1 — Listen for dial tone.

Step 2 — Dial a phone number.

Step 3 — Wait for a ring.

Step 4 — Exchange greetings.

Step 5 — Communicate message.

Step 6 — Say Good-bye.

Step 7 — Hang up.

Each of these steps, or OSI "layers," builds upon the one below it. Although each step must be performed in preset order, within each layer there are several options. Within the OSI model, there are seven layers. The first three are the Physical (PHY), Data Link (DLL), and Network layers, all of which are concerned with data transmission and routing. The last three — Session, Presentation and Application — focus on user applications. The fourth layer, Transport, provides an interface between the first and last three layers. The X.25 Protocol which created a standard for data transmission and routing is equivalent to the first three layers of the OSI Reference Model." See also OSI and X.25.

OSINet A test network sponsored by the National Bureau of Standards (NBS) designed to provide vendors of products based on the OSI model a forum for doing interoperability testing.

Osmics The science of smells. See Snortal.

OSN Operations System Network.

OSP 1. Operator Service Provider. A new breed of long distance phone company. It handles operator-assisted calls, in particular Credit Card, Collect, Third Party Billed and Person-to-Person. Phone calls provided by OSP companies are often more expensive than phone calls provided by "normal" long distance companies, i.e. those which have their own long distance networks and which you see advertised on TV. You normally encounter an OSP only when you're making a phone call from a hotel or hospital phone, or privately-owned payphone. It's a good idea to ask the operator what the cost of your call will be before you make it.

2. Online Service Provider. A company that provides content only to subscribers of their service. This content is not available to regular Web surfers. The idea was to build subscription and other revenues from a closed knit group of people. The problem with this idea was the Internet came along and no one any longer could afford a team to compete with the Web's exploding and varied content. So, some online service providers dropped their attempt at content altogether. Others severely limited it. But all were forced to offer (and do offer) access to the Internet. As a result the term "online service provider" has virtually become obsolete, to be replaced by the term, Internet Service Provider.

OSPF Open Shortest Path First. A link-state routing algorithm that is used to calculate routes based on the number of routers, transmission speed, delays and route cost.

OSPFIGP Open Shortest-Path First Internet Gateway Protocol. An experimental replacement for RIP. It addresses some problems of RIP and is based upon principles that have been well-tested in non-Internet protocols. Often referred to simply as OSPF. See OSPF.

OSPR Optical Shared Protection Ring.

OSPS An AT&T word for Operator Services Position System.

OSS Operations Support System. Methods and procedures (mechanized or not) which directly support the daily operation of the telecommunications infrastructure. The average LEC (Local Exchange Carrier) has hundreds of OSSs, including automated systems supporting order negotiation, order processing, line assignment, line testing and billing.

OSS7 Operator Services Signaling System Number 7.

OSSI Operations Support System Interface. An element of DOCSIS (Data Over Cable Service Interface Specification), a project intended to develop a set of specifications for high-speed data transfer over cable television systems. At the head-end of the network, the OSSI provides the interface between the cable modem system and the OSSs. The OSSs, according to the OSI (Open Systems Integration) model, provide for the management of faults, performance, configuration, security and accounting. See also DOCSIS and OSI.

OSTA The Optical Storage Technology Association. An international trade association dedicated to promoting the use of writable optical technology for storing computer data and images. With a membership of more than 60, OSTA helps the optical storage industry define practical implementations of standards to assure the compatibility of resulting products. www.osta.org

OTASP Over-The-Air Service Provisioning. The ability of a wireless carrier to provision new

Packet Switching Exchange / Page Train

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.

Packet-centric A growing focus in the telecom industry away from voice-dominant (circuit-centric) networks and toward IP packet networks as the future delivery system for combined data and telephony. Definition courtesy Wireless Magazine.

PacketCable PacketCable is a project managed by CableLabs on behalf of its member companies. PacketCable is a fast-track initiative aimed at developing interoperable interface specifications for delivering advanced, real-time multimedia services over IP-based packet channels carved out of two-way CATV cable plants. PacketCable is built on the infrastructure set by CableLabs Certified, previously known as DOCSIS (Data Over Cable Service Interface Specification), which sets standards for CATV modems and related network elements supporting high-speed Internet access over CATV networks. The PacketCable architecture is built around the NCS (Network-based Call Signaling) specification, which is a CATV-specific enhancement to MGCP (Media Gateway Control Protocol). MGCP is the de facto standard for multimedia call control between the traditional PSTN (Public Switched Telephone Network) and IP-based packet networks. PacketCable includes specifications for call signaling, QoS (Quality of Service) control, PSTN interconnection, security, network management, codec support, billing event messages, and network announcements. See also CableLabs, CableLabs Certified, MGCP, and NCS.

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.

Pad 1. A device inserted into a circuit to introduce loss, i.e., to reduce the level of a signal. "Level" is a measurement of amplitude (signal power) at a specified point in a circuit known as a Transmission Level Point (TLP). "Loss" is the measurement of the decrease in amplitude between two TLPs, and is measured in decibels (dB). A pad may consist of any combination of inductors, resistors and capacitors.

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. PADs generally are associated with X.25, an ITU-T Standards Recommendation for an access protocol used in older packet-switched networks. See also X.25.

3. A concrete slab used as the foundation for a microwave radio tower or satellite dish.

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, links postcodes to full addresses. When using a PAF file, an agent can save time by entering only the postcode. The PAF file automatically inserts post town, street and country.

Page A chunk of information, like a document or file, on the Web. A hypermedia document as viewed through a World Wide Web browser. Pages are the way you make information available on the Web. They can contain text, black and white and color photographs, audio and video.

Page hits A measure of the number of Web pages accessed at a particular site, or of the number of times a single page is accessed.

Page Mirroring You're surfing the Internet. You come upon a Web site and find something you want to buy. It has a button that says, "To speak to an Agent, push here." You do. An agent in a distant office calls you on another phone line. You're now both speaking to each other and your agent is also seeing the screen you're seeing. As you move to different screens (to different pages), the agent sees the same screens you are looking at. This is called page mirroring. At present, the technology won't allow the agent to move the pages which you see. Only you can move the screens.

Page Recall A feature which allows subscribers to telephone a toll-free number to check messages at any time. Messages are stored in the IVR (Interactive Voice Response) device for a period of 99 hours.

Page Scan State A Bluetooth term. A mode where a device listens for page strains containing its own device access code (DAC). A mode that a RemDev enters when advertising that a service is available.

Page State A Bluetooth term. A mode that a LocDev enters when searching for services. The LocDev sends out a page to notify other devices that it wants to know about the other devices and/or their services.

Page train A Bluetooth term. A series of paging messages sent over the baseband.

3. Pacific Digital Cellular.

PDF 1. Portable Document Format. Let's say you produce a document. You use Microsoft Word to write it. On a PC, that program will produce a file with an extension .doc. You now want to send someone your document. You send them your file electronically. They will need a copy of Microsoft Word to read it. What happens if they don't have it? Tough. They're out of luck. They can't read it. Of course, you say Harry, everyone has Word. What happens if you write the document in QuarkXpress? Few people have copies of that program. Here's how to solve the problem. Write the program with whatever program you wish, then use a program called Adobe Acrobat to convert it to an Adobe Acrobat file, which typically ends with a .pdf. PDF is the file format for documents viewed and created by Adobe's Acrobat. The PDF file format was developed to allow everyone to be able to read documents — even though they don't have the program which created them. Note that PDF files are read-only, which also means that the reader can't change them or otherwise steal your work. All you need to view a PDF document is a free version of Acrobat Reader, which is available from www.adobe.com. In order to create a PDF file, however, you must buy a copy of Adobe Acrobat. PDF documents can include text, colors, diagrams, and photographs. A PDF image of a document is very good quality. You can typically read even the smallest type.

2. Power Distribution Frame.

PDH Plesiochronous Digital Hierarchy. Developed to carry digitized voice over twisted pair cabling more efficiently. This evolved into the North American, European, and Japanese Digital Hierarchies where only a discrete set of fixed rates is available, namely, nxDSO (DSO is a 64 kbps rate) and then the next levels in the respective multiplex hierarchies. See also Plesiochronous. See T Carrier for hierarchy detail.

PDI A Versit term. Personal Data Interchange, a collaborative application area which involves the communication of data between people who have a business or personal relationship, but do not necessarily share a common computing infrastructure.

PDAia PDA Industry Association. A not-for-profit industry organization formed to create a marketplace for PDAs by promoting the awareness of the usage of PDAs and hand-held technology, in general. Although the PDAia does not develop standards, it does act as a clearinghouse for standards being discussed. Working relationships exist with IrDA, PCCA, PCMCIA, and other associations which relate to the PDA market. www.pdaia.org.

PDL A page description language (PDL) is a clever short-cut for transmitting bit-mapped images from a PC application to a printer. They save processing time, by sending only "instructions" to a printer, rather than the entire bitmapped image. They also allow the printer to print any font, any size. PDL is the generic term. Hewlett-Packard has been the major proponent of the concept of PDLs. And they include something called PCL with all their printers. PCL stands for Printer Command Language. Postscript is also a PDL, but different to PCL. HP includes PCL with all its laser printers, but has only included What we really meant was that HP had never built PostScript into their printers. They still haven't, really. You still have to buy PostScript as either a plug-in cartridge or an add-on "SIM" chip from HP, Adobe or third parties for most of the HP line. The exception is the top-of-the-line LaserJet IIIsi, for which built-in PostScript is an option that you pay extra for. That may change. For now, if you're using Windows applications, Windows' built-in "True Type" scalable fonts — which do work on HP and other non-PostScript printers — will satisfy most of your printing needs.

PDm 1. Pulse Duration Modulation.

2. See Personal Data Module.

PDN 1. An ISDN Term. Primary Directory Number (7 digits for 5ESS switch; 10 digits for DMS-100 switch)

2. Public Data Network. A public network for the transmission of data, particularly a network compatible with X.25 protocol. A public data network is to data what the Public Switched Voice Network is to voice. To access a public data network, you typically dial a local number, receive a carrier tone and then follow very specific instructions. Public data networks send their digital data in packets over high speed channels. The major reason to use a PDN is that it may be cheaper than dialing directly on a switched voice line. Also, they get you into some databases and services which are hard to get into by dialing direct. There are many public data networks in the United States. The two best-known public data networks are Tymnet and Telenet. But there are probably 30 more. Every industrialized foreign country has at least one, usually owned by the local government phone company.

3. Premises Distribution Network. The electronics and cabling system which connect terminal equipment to the NTI (Network Terminating Interface). The PDN may be either point-to-point or multipoint, may be configured as either a bus or star, and may be either active

or passive in nature. In an ADSL Asymmetric Digital Subscriber Line) implementation, for example, a PDN system would be used to connect the ATU-R (ADSL Termination Unit-Remote) to Service Modules which perform terminal adaptation functions. See also NTI, ADSL and ATU-R.

PDP 1. See Power Distribution Panel.

2. Plasma Display Panel.

3. Packet Data Protocol. A GPRS (General Packet Radio Service) term for a range of protocols which support the transfer of packet data over a 3G (3rd Generation) wireless cellular network. See also GPRS.

4. Programmed Data Processor. A family of minicomputers developed by Digital Equipment Corporation in the 1970s, the most popular of which was the PDP-11. PDP systems used the PAL (Paradox Application Language) programming language.

5. Policy Decision Point. A network-based server that makes decisions relative to traffic priorities in an IP network running the COPS (Common Open Policy Server) protocol. See COPS.

PDP-11 Programmed Data Processor-11. On the last day of March, 1970 Digital Equipment Corporation (DEC) shipped its first PDP-11/20 minicomputer to a customer in Tennessee. The PDP-11 family was among the first minicomputers that incorporated open standards into its operations. And the PDP-11 software platform has continued through subsequent generations of hardware. It's now obsolete. DEC got bought by Compaq and is now effectively closed down. See also PDP.

PDS 1. Premise Distribution System. Lucent's proprietary structured cable and wire system for intrabuilding application. Such a cabling system provides a number of options for deploying various combinations of UTP, STP, coax and fiber optic cables contained within a single cable sheath. Thereby, various media can be deployed in appropriate combination, considerably reducing overall deployment costs.

2. Processor Direct Slot. Some non-NuBus Apple Macintosh computers have one PDS that allows for expansion cards.

PDU Protocol Data Unit. OSI (Open Systems Interconnection) terminology for a generic "packet." A PDU is a message of a given protocol comprising payload and protocol-specific control information, typically contained in a header. PDUs pass over the protocol interfaces which exist between the layers of protocols (per OSI model). Basically, PDU is OSI (Open Systems Interconnection) terminology for "packet". A PDU is a data object exchanged by protocol machines (entities) within a given layer. PDUs consist of both data and control (protocol) information that allows the two to coordinate their interactions. The native PDU may be altered through a process of Segmentation and Reassembly (SAR) in order to achieve compatibility with a service offering. For example, an Ethernet PDU in the form of a frame becomes known as an SMDS Service Data Unit (SDU) when considered in the context of a SMDS network service. The SDU then is encapsulated with control information to become a Level 3 (SMDS)-PDU, which subsequently is segmented into 48-octet payloads, each of which is preceded with another 5 octets of control data to constitute a 53-octet SMDS cell, also known as a Level 2 PDU. The cells are transported over the SMDS network, with the process of reassembly being performed on the receiving end. As a result, the receiving device is presented with the data in its native PDU format.

PDV Path Delay Value

PE 1. Processing Element.

2. PolyEthylene. A type of plastic material used to manufacture jackets for outside plant cable systems.

Peak That part of the business day in which customers expect to pay full service rates. For cellular customers, peak hours are generally 7:00 a.m. to 7:00 p.m. For business land-line customers, peak hours are generally 8:00 a.m. to 5:00 p.m.

Peak Emission Wavelength Of an optical emitter, the spectral line having the greatest power.

Peak Envelope Power PEP. The average power supplied to the antenna transmission line by a radio transmitter during one radiofrequency cycle at the crest of the modulation envelope taken under normal operating conditions.

Peak Hour When used with an automatic call distributor, the peak hour is when the number of calls coming into your center are at their highest level. ACDs allow you to track and report on calls by hour. Some allow you to also track peak half-hours, or peak delays of the week or months of the year.

Peak Load A higher than average quantity of traffic. Peak Load is usually expressed for a one-hour period, often the busiest hour of the busiest day of the year. See Busy Hour.

Peak Mount An antenna mounting system (tripod or ridge mount) used for erecting

ringing. Ring splash solves the problem. See also Glare and Ring Cycle.

Ring Tone An audible, call-progress signal connected to the calling line to indicate that the called station is being rung. The industry standard is a mixture of 440 Hz and 480 Hz, interrupted at the same rate, or ring cycle, as the ringing current being applied to the called station. See also Ring Cycle.

Ring Topology A network topology in which nodes are connected to a closed loop, no terminators are required because there are no unconnected ends.

Ring Trip The process of stopping the AC ringing signal at the central office when the telephone being rung is answered.

Ring Wiring Concentrator A site through which pass the links between repeaters, for all or a portion of a ring.

Ring Wiring Configuration The same as daisy chain wiring, except the last jack is connected to jack 1, thus completing a ring.

Ringback The tone heard by a calling device when, at the called-device's end, the telephone is ringing or the system is otherwise being alerted of the incoming call.

Ringdown A circuit or method of signaling where the incoming signal is started by alternating current over the circuit.

Ringer A bell in a telephone which indicates if a phone call is coming in. These days "ringers" are electromechanical and clunky (old-style) or small and electronic (new style). The new electronic ones are cheaper, but less interesting to listen to. Most sound like bleating sheep in heat.

Ringer Equivalence Number REN. A number required in the U.S. for registering your telephone equipment with the phone company. Add together the RENs of all the telephones on a single line. The sum of those numbers should never exceed five otherwise none of your bells will work and you won't hear an incoming call. (Your central office simply doesn't send sufficient current down the line.) The alphabetic character after the number refers to the ringing frequency of the alternating current sent down the line to ring the bell. If the letter is "A", the ringer frequency is about 20 Hertz. Most single line phones have a Ringer Equivalence of 1.0A. If the letter is "B", the ringer will respond to any current coming down the line. Any other letter, and you are probably on a party line where the ringer frequency is used for party selection. In Canada, they use the term "Load Number" instead of Ringer Equivalence. The numbers are different, but the concept is the same. See Load Number.

Ringer Isolator A device in the phone which disconnects the ringer when ringing voltage is not present.

Ringing Alternating Current (AC) sent out from the central office along the local loop to the subscriber. It's typically 70 to 90 volts at 17 Hz to 20 Hz. You can get a mild shock if you have your hands on a telephone circuit when ringing current comes along. The rest of the time, the lines are harmless.

Ringing Generator A device in a phone system that generates the AC ringer voltage. Typically, this voltage is 90 to 115 (nominally 105) VAC at 30 Hertz.

Ringing Key A key that sends a ringing current.

Ringing Signal Any AC or DC signal transmitted over a line or trunk for the purpose of alerting someone or some thing at the distant end of an incoming call.

Ringing Tone A low tone which is one second ON and three seconds OFF. It indicates that ringing current is being sent by the central office to the person receiving the call. Ringing tone is not produced by the calling party's central office — but by the called party's central office. Thus, it is possible for you to hear ringing tone but for the person you are calling not to hear anything. As a general rule, if the person doesn't answer, call them a second time. Often, they'll say "The phone never rang." This will not be a lie, but simply a temporary glitch in their central office.

Ringing Transfer A PBX feature which allows you to choose which bells in a group of phones will ring when a call is coming in for that group.

Ringing Voltage In addition to talk battery, a Central Office provides ringing signaling. Ring Voltage is generally 70 to 90 volts at 17 Hz to 20 Hz. See also Ringing.

RIP Routing Information Protocol. RIP is based on distance-vector algorithms that measure the shortest path between two points on a network, based on the addresses of the originating and destination devices. The shortest path is determined by the number of "hops" between those points. Each router maintains a routing table, or routing database, of known addresses and routes; each router periodically broadcasts the contents of its table to neighboring routers in order that the entire network can maintain a synchronized database. See also Distance Vector Protocol.

Rip Cord A cord placed directly under the jacket of a cable in order to facilitate strip-

ping (removal) of the jacket.

RIPE Reseaux IP Europeens, a group formed to coordinate and promote TCP/IP based networks in Europe. RIPE is responsible for management and assignment of IP (Internet Protocol) addresses in Europe, just as are ARIN and APNIC in the regions of the Americas and Asia-Pacific, respectively. RIPE holds periodic conferences to coordinate technical issues (similar to the IF) as well as running a Network Control Center (NCC) to handle operational issues such as the administration of the European domain names and routing tables. RIPE is a collaborative organization with no formal membership (over 1,000 organizations participate); all activities are performed on a voluntary basis. See also APNIC, ARIN and IP.

RIPscrip Graphics Emulation Supports RIPscrip Graphics Emulation. Popular on many bulletin board systems, RIPscrip Graphics Emulation allows users to view screens mixing text and graphics. On-screen buttons can be clicked to send commands to a remote system. Now effectively obsolete by the World Wide Web.

RIR Regional Internet Registries. A collective term for the three non-profit organizations (ARIN, RIPE NC, and APNIC) established to register and administer IP number allocations and assignments. See also ARIN, RIPE, and APNIC.

RISC Reduced Instruction Set Computing. A microprocessor architecture that favors the speed at which individual instructions execute over the robustness of the instruction set. Computers based on RISC use an unusual high speed processing technology that uses a far simpler set of operating commands. These commands greatly speed a computer's performance, especially for calculation-intensive operations such as those performed by scientists and computer-aided design (CAD) and computer-aided manufacture (CAM) engineers. RISC is a design that achieves high performance by doing the most common computer operations very quickly. In contrast, the microprocessors used in most PCs are based on a design called CISC (Complex Instruction Set Computing). CISC does not execute instructions as quickly as RISC but it has more commands and accomplishes more with each command. Programs written for RISC are typically not compatible with those written for CISC processors. RISC is the prevailing technology for workstations today. The RISC semiconductor was an IBM baby, born in its Yorktown Heights, NY lab in 1974. But internal arguments over, and even whether the chip should be used kept IBM fiddling while Sun and other companies decisively powered ahead. IBM got its first good RISC product, the RS/6000, to market in 1990. The PowerPC architecture is one example of a RISC microprocessor design. See also CISC.

Riser The conduit or path between floors of a building into which telephone and other utility cables are placed to bring service from one floor to another. Your risers should be twice the size you ever think you'll need in the next 30 years. It's expensive to build risers after the building is built. Very expensive.

Riser Cable High strength cables intended for use in vertical shafts between floors in multi-story buildings. Such shafts are called riser shafts. (What else would they be called?)

Riser Closet The closet where riser cable is terminated and cross connected to either horizontal distribution cable or other riser cable. The riser closet houses cross connect facilities, and may contain auxiliary power supplies for terminal equipment located at the user work location. See also Satellite Closet.

Riser Subsystem The part of a premises distribution system that includes a main cable route and facilities for supporting the cable from an equipment room (often in the building) to the upper floors, or along the same floor, where it is terminated on a cross connect in a riser closet, at the network interface, or other distribution components of the campus subsystem. The subsystem can also extend out on a floor to connect a satellite closet or other satellite location.

Risk A potential liability, caused by a threat.

Risk Assessment The process of quantifying the potential impact on an organization from various security threats.

RISLU Remote Integrated Services Line Unit. One of the remoting arrangements that the Lucent 5ESS switch architecture permits. The RISLU terminates DSLs and connects to the switch DLTU via T-1.

RSU Remote indoor Service Unit. A cable telephony term for a Remote Service Unit which interfaces the coax-based CATV system to the twisted pair inside wire and cable system in support of voice and high-speed Internet access, as well as cable TV. The RSU is mounted indoors, and contains a battery backup, as well as an A/C (alternating current) transformer. See RSU for more detail.

RT Rate of Information Transfer. The amount of information that can be communicated from a sender to a receiver in a given length of time.

RJ Registered Jacks. They're telephone and data plugs registered with the FCC. RJ-XX

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Harry Newton

Harry Newton has 31 years studying, writing, lecturing and investing in telecommunications. He founded LAN (now Network), Teleconnect, Call Center and Computer Telephony magazines. He also founded the enormously successful trade shows, Computer Telephony Conference and Exposition (CT Expo) and Call Center Demo. Newton has an MBA from the Harvard Business School and an Economics degree from the University of Sydney, Australia.

He is not an engineer. He wrote this dictionary to learn enough to be dangerous in front of engineers. That, he says, is the ultimate thrill. Newton explains complex technology in non-technical business language even he can understand. He believes (perhaps naively) that anyone in business should be able to understand complex technical terms — whatever it takes. As a result, some of his definitions are short. Some are long. He strives to be 100% explanatory and 100% practical — explaining what the technology means, what it does, what its benefits are and what its pitfalls are.

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