

Analog Communications: A communication format in which information is transmitted by modulating a continuous signal, such as a radio wave. Voice and video messages originate in analog form since sound and light are wave-like functions; thus, they must be converted into digital messages in order to communicate along digital communications formats or media.

Bandwidth: The range of frequencies that can be transmitted along a communications channel. Also, the range of frequencies required to transmit a communications signal without undue distortion. The more information a signal contains, the more bandwidth it requires for transmission. For example, television signals require a bandwidth of 3 million hertz (cycles per second), whereas telephone conversations require only about 3,000 hertz. The higher the bandwidth the greater the amount of information that can be transmitted in a given timeframe.

Basic Exchange Telecommunications Radio System (BETRS): An FCC classification for digital microwave radio systems. See Digital Radio.

Bell Operating Companies (BOCs): As a result of AT&T's divestiture in 1984, the original Bell telephone system was divided into 22 local Bell operating companies. These now provide local telephone service across most of the country. These companies are managed by the seven "Baby Bells," the RBOCs or regional holding companies for the BOCs.

Bit (Binary digiT): The smallest unit of information a computer can use. A bit is represented as a "0" or a "1" (also "on" or "off"). A group of 8 bits is called a byte. Bits are often used to measure the speed of digital transmission systems.

Kilobit: 1,000 bits

Megabit: 1 million bits

Gigabit: 1 billion bits

Central Office: The telephone company facilities that house switching and related equipment, which serves the immediate geographical area. The central office is the most immediate point of interface between the telephone company and customers.

Centrex: A service offered by telephone companies that provides business customers direct inward dialing to their own lines allowing them to circumvent the public portion of the switching facilities. Centrex allows companies to more directly manage their telecommunications

Compact Disc Read-Only Memory (CD-ROM): An optical storage system for computers that permits data to be randomly accessed from a disc. With read only discs, new data cannot be stored nor can the disc be erased for reuse.

Digital Communications: A communications format used with both electronic and light-based systems that

transmits audio, video, and data as bits of information (see Bit). Digital communications is particularly suited to data communications, since computers communicate and function digitally. Digital technology also allows communications signals to be compressed for more efficient transmission. Codecs (abbreviation for "coderdecoder" are required for video and voice signals to be transmitted in digital form, since video and voice are analog messages.

Digital Radio (BETRS): Radio signals that transmit digital signals. It has greater capacity and is more secure than analog radio since messages must be encoded digitally for transmission. See Basic Exchange Telecommunications Radio System.

Digitalization: The process of converting analog information, such as voice and video messages, into digital signals.

Divestiture: The break-up of the AT&T monopoly into the 7 regional Bell operating companies, Bellcore, and the 22 Bell operating companies. Divestiture resulted from the 1984 Modified Final Judgment, which settled the government's long-standing antitrust suit against AT&T. See Modified Final Judgment.

DS3 Circuits: DS3 circuits—also called T3 circuits—operate at a capacity of 45 megabits per second (Mbps). See T1 Circuits, Kilobits Per Second.

Electronic Data Interexchange (EDI): The use of computers and telecommunications technologies to process common transaction functions, such as invoices, shipping notices, and bills, that traditionally have entailed the transfer and processing of paper documents. With EDI, computers exchange information via telecommunications and process the information without the delay typically entailed with paper transactions. EDI improves the efficiency and effectiveness of operations by empowering businesses to purchase supplies 'and to produce and distribute products precisely when and where they are needed.

Fiber Optics: Hair thin, flexible glass rods that use light to transmit audio, video, and data signals. Fiber optics are particularly suitable for digital communications since light impulses go "on" and "off" to transmit messages (see Digital Communications). Fiber optic cable has much higher capacity than copper wire or coaxial cable and is not as subject to interference or noise.

Holistic: Related to or concerned with whole systems, as opposed to examining the constituent parts of a system. A holistic approach to development treats the economy, its politics, and its human interactions as interdependent.

Host-remote Switch: A device that can provide local switching capabilities for communities located far from a telephone company central office (see Central

Office). Host-remote switching can improve the quality of service for remote communities since their local calls do not have to travel the long distances, along which signals can be attenuated, to the central office to be switched. While the remote switch can perform most of the functions of a regular switch, it is dependent on a host switch typically found in a larger community.

Independent Telephone Company: A local exchange carrier that is not part of the Bell System of Bell operating companies (BOCs) and regional Bell operating companies (RBOCs). See Bell Operating Companies.

Integrated Services Digital Networks (ISDN): A protocol for high-speed digital transmission. ISDN provides simultaneous voice and high-speed data transmission along a single conduit to the users' premises. Two ISDN protocols have been standardized: with Narrowband ISDN, or 2B+D, two 64 kilobits per second (kbps) channels carry voice or data messages and one 16 kbps channel is used for signaling-carrying addressing and other call-related information; with Broadband ISDN, or 23B+D, 23 64 kbps channels carry voice or data messages and one 64 kbps channel is used for signaling. See Kilobits Per Second.

Interexchange Carrier (IXC): A telephone company—such as AT&T, MCI, or Sprint—that carries long-distance calls. The IXCs are authorized by the Federal Communications Commission (FCC) to carry inter-LATA interstate traffic, and can be authorized by the State public service commissions to carry interLATA intrastate traffic (see Local Access and Transport Area).

Kilobits Per Second (kbps): A unit of measurement for the speed at which information travels. Also Mbps—Megabits per second, and Gbps—Gigabits per second. See Bit.

Local Access and Transport Area (LATA): LATAs were developed as a result of the divestiture settlement to define geographic areas within which the Bell operating companies (BOCs) can provide telephone service. (See Bell Operating Companies.) The settlement allows the BOCs to provide intraLATA service, but it forbids them from providing interLATA telecommunications.

Local Area Networks (LANs): Data communication networks that are relatively limited in their reach. They generally cover the premises of a building or a campus and are private networks—thus the equipment is not owned by a telephone company. Like all networking technologies, LANs facilitate communication and sharing of information and computer resources by the members of a group.

Local Calling Area: The area within which a customer may make a call without incurring long-distance charges.

Local Exchange: The geographic area in which there is a uniform price for telephone service. More than one

central office may serve a local exchange. See Central Office.

Local Exchange Carrier (LEC): A telephone company that carries local calls. In most exchanges the LEC is a Bell operating company, but hundreds of independent telephone companies are LECs. State public service commissions regulate the monopoly services of LECs. See Bell Operating Companies.

Local Loop: The portion of the telecommunications network between the customers' premises and the telephone company's central office. See Central Office.

Metropolitan Area Networks (MANs): Still in the field-testing stage, metropolitan area networks provide switched data networking services at very high speeds (45 to 50 megabits per second) within a geographic area of at least 50 miles. MANs connect LANs to LANs, as well as LANs to WANs. These networks are optimally designed for shared usage. See Area Area Networks, Wide Area Networks.

Microwave: High-frequency radio waves used for point-to-point and omnidirectional communication of audio, data, and video signals. Microwave frequencies require direct line of sight between the sending station and the receiving station to operate. Obstruction such as trees or buildings distort the signal.

Modified Final Judgment (MFJ): The 1984 agreement between AT&T and the U.S. Justice Department, which settled the government's long-standing antitrust suit against AT&T and resulted in AT&T's divestiture (see Divestiture). As a result of the MFJ, the Bell operating companies (BOCs) and regional Bell operating companies (RBOCs) are prohibited from offering information services and limited in the extent to which they can engage in manufacturing and designing equipment; BOCs cannot offer long-distance service; and RBOCs cannot offer local telephone service. In 1989, the court decided to let RBOCs provide gateway services in order to encourage the development of an information service industry.

Nontraffic Sensitive (NTS) Costs: The costs that a local telephone company incurs in providing its subscribers with a connection to the company's central offices. The NT-S portion of the company's plant is largely comprised of the telephone lines—local loops—running from the subscribers' premises to these central offices, and the switches located at the central offices. NTS costs depend primarily on the number of subscribers and the average length of the local loops. NTS costs do not vary with the amount of telephone traffic carried over the loops. Thus, NTS costs are often referred to as "fixed costs."

Open Network Architecture (ONA): A regulatory construct which was a product of the Federal Communications Commission's Computer Inquiries. ONA is a system in which the telephone companies allow enhanced service providers equal access to their

network facilities. This equal access is referred to as *comparably efficient interconnection (CEI)*. Enhanced services include such routine functions as call forwarding and voice mail, but also include more sophisticated database manipulations and other services not yet imagined. With CEI, enhanced service providers (ESPs) can purchase the unbundled components-or *basic service elements (BSEs)*—such as switching capabilities or information processing capabilities, of the formerly unified public switched network to bring their services to customers. ONA is the FCC's attempt to eliminate the structural separation requirements that required the telephone companies to maintain separate subsidiaries for competitively offered services. Without such separations, competition would be fostered and more products would become available to consumers.

Packet Switching: The process of transmitting digital information by means of addressed packets—which include data, call control signals, and error control information—so that a channel is occupied only during the transmission of the packet. In contrast, data sent using modems occupies a circuit for the entire duration of the transmission, even when no data is actually traveling over the lines. Using packet switching, the various packets of information can travel along different routes on the network allowing the carrier to optimize its network capacity.

Private Branch Exchange (PBX): A small telephone switch that typically serves extensions in a business or campus arrangement and also provides interconnectivity with the public network. A PBX offers similar capabilities as Centrex, except the equipment is owned by the customer rather than leased from the telephone company. See Centrex.

Rural Area Networks (RANs): As conceptualized by OTA, RANs would be shared-usage networks, configured to include a wide range of users in rural communities. RANs would allow rural communities to pool their demand for advanced telecommunications services in order to justify and share the cost of sophisticated equipment that individual users could not otherwise afford or fully utilize. RANs would not be isolated “technology islands,” but would connect rural areas with the rest of the world.

Signaling System Seven (SS7): A control system for the public telephone network, SS7 allows telephone company computers to communicate directly with each other using specialized signaling circuits. The information traveling along these circuits is related to the routing of telephone calls. By using separate circuits for these purposes, the carriers do not have to use bandwidth on the voice circuits, and telephone call processing becomes more efficient and faster, enabling more services to be made available to consumers.

Subscriber Line Charges (SLC): Subscriber line charges are a convention adopted after divestiture to defray the

portion of the cost of long-distance calls that use the local access plant. Prior to the divestiture of the Bell System, prices for long-distance service were set artificially high and the extra revenues were used to defray some of the costs of local service and keep local rates low. The Federal Communications Commission implemented SLCs after divestiture, when this cross-subsidization was no longer possible because long-distance service became competitive. SLCs range from about \$2.50 to \$6.00 per month.

Switch: A mechanical or solid-state device that opens or closes circuits, changes operating parameters, or selects paths or circuits, either on a bandwidth or time division basis. Digital switches typically switch signals by time division.

Switched Multimegabit Data Service (SMDS): SMDS is a high-speed, fast packet-switched service provided in a campus, or ring, type arrangement situated within a 50-mile radius.

T1 Circuits: T1 circuits have 24 channels—each carrying 64 kilobits per second (kbps) of information and operate at a capacity of 1.544 megabits per second (Mbps). T1 is a standard for transmission that is accepted in North America. See Kilobits Per Second.

Universal Service: A policy associated with the Communications Act of 1934, which granted AT&T the monopoly for telephone service in the United States, to provide telephone service to all who want it at a reasonable price.

Virtual Networks: Virtual networks establish logical, temporary connections as opposed to dedicated ones. From the users perspective they are similar to private networks.

VSATS: Very small aperture terminals, satellite receive dishes, approximately 1.8 to 2.4 meters in diameter, that are capable of sending and receiving voice, data, and/or video signals. VSATS can transmit over wide areas by relaying to satellites in geosynchronous orbit.

Wide Area Networks (WANs): Data communication networks that provide long-haul connectivity among separate networks located in different geographic areas. WANs make use of a variety of transmission media, which can be provided on a leased or dial-up basis. WANs can also be privately owned.

SOURCES: Jack L. Dempsey, *Telecom Basics* (Chicago, IL: Telephony division, Intertec Publishing, 1988); Jack L. Dempsey, *Transmission Basics* (Chicago, IL: Telephony division, Intertec Publishing, 1989); Jack L. Dempsey, *Datacom Basics* (Chicago, IL: Telephony division, Intertec Publishing, 1990); Graham Langley, *Telephony's Dictionary: Second Edition* (Chicago, IL: Telephony Publishing Corp., 1986); Raymond Lawton, *Factors Affecting the Definition of the Local Calling Area: An Assessment of Trends* (Columbus, OH: National Regulatory Research Institute) February, 1990; Office of Technology Assessment, *Linking for Learning: A New Course for Education, OTA-SET-430* (Washington, DC: U.S. Government Printing Office, November, 1989); and Office of Technology Assessment, 1991.