G L O S S A R Y

Numerics

2B1Q
2 binary 1 quaternary. An encoding scheme that provides a 2 bits per baud, 80k baud per second, 160kbps transfer rate. The most common signaling method on ISDN U interfaces.

4xflexi
quad-port flexi ATU-C line card. Supports four ADSL modem connections and CAP, DMT, and G.lite line encoding. For chassis compatibility, refer to the *Cisco DSLAM Compatibility Notes* or the appropriate hardware installation guide.

4xSDSL
quad-port STU-C line card. Supports four SDSL modem connections and 2B1Q line encoding. For chassis compatibility, refer to the *Cisco DSLAM Compatibility Notes* or the appropriate hardware installation guide.

8xDMT
octal-port DMT ATU-C line card. Supports eight ADSL modem connections and DMT line encoding. For chassis compatibility, refer to the *Cisco DSLAM Compatibility Notes* or the appropriate hardware installation guide.

8xG.SHDSL
octal-port SHTU-C line card. Supports eight G.SHDSL modem connections and TC-PAM line encoding. For chassis compatibility, refer to the *Cisco DSLAM Compatibility Notes* or the appropriate hardware installation guide.

8xIDSL
octal-port ITU-C line card. Supports eight IDSL modem connections, or four connections when the chassis limits the number of tip and ring connectors. Supports 2B1Q line encoding. For chassis compatibility, refer to the *Cisco DSLAM Compatibility Notes* or the appropriate hardware installation guide.

A

AAL
ATM adaptation layer. AAL is an adaptation layer within the data link layer of the OSI model. AAL is divided into a segmentation and reassembly sublayer (SAR) and a convergence sublayer. The SAR divides the application datastream into transmit cells and then reassembles the received cells into a datastream that is compatible with the related application. The convergence sublayer specifies the requirements for the various types of applications that run over ATM. AAL is defined in terms of types, 1 to 5, specified by the type of traffic that it supports. Each type offers an appropriate QoS.

ABR
available bit rate. A QoS class defined by the ATM Forum for ATM networks. ABR is used for connections that do not require timing relationships between source and destination. ABR provides no guarantees in terms of cell loss or delay, providing only best-effort service. Traffic sources adjust their transmission rate in response to information they receive describing the status of the network and its capability to successfully deliver data. Compare with *CBR*, *UBR*, and *VBR*.

accounting management	One of five categories of network management defined by ISO for the management of ISO networks. Accounting management subsystems are responsible for collecting network data that relates to resource usage. See also *configuration management*, *fault management*, *performance management*, and *security management*.
address	Data structure or logical convention used to identify a unique entity, such as a particular process or network device.
ADSL	asymmetric digital subscriber line. An *x*DSL technology in which more bandwidth is delivered downstream (from the CO to the customer site) than upstream over a single copper twisted pair. Compare with *IDSL*, *SDSL*, and *SHDSL*. See also *DSL*.
alarm	A notification that a traffic signal has degraded or failed or that equipment is malfunctioning. See also *event* and *trap*.
AM	amplitude modulation. A modulation technique by which information is conveyed through the amplitude of the carrier signal. Compare with *FM* and *PAM*. See also *modulation*.
American National Standards Institute	See *ANSI*.
American Wire Gauge	See *AWG*.
amplitude modulation	See *AM*.
ANSI	American National Standards Institute. An organization that coordinates, develops, and approves international and U.S. standards for, among other things, communications and networking. ANSI is a member of ISO. See also *ISO*.
APS	automatic protection switching. A method that allows transmission equipment to recover automatically from failures, such as a cut cable.
asymmetric digital subscriber line	See *ADSL*.
asynchronous communications	A method of transmitting data in which individual characters are encapsulated in control bits (called start and stop bits) that designate the beginning and end of each character. Asynchronous transmission allows communication without precise clocking.
Asynchronous Transfer Mode	See *ATM*.
ATM	Asynchronous Transfer Mode. The international standard for cell relay in which multiple service types (voice, video, or data, for example) are transmitted in fixed-length (53-byte) cells. ATM offers fast packet technology, and real-time, demand-led switching for efficient use of network resources.
ATM adaptation layer	See *AAL*.
ATU-C	See *xTU-C*.
ATU-R	See *xTU-R*.

authentication	In security, the verification of the identity of a person or a process.
autodiscovery	The process by which a network device automatically searches through a range of network addresses and discovers the known types of devices that are present. Also see *subrack discovery*.
automatic protection switching	See *APS*.
available bit rate	See *ABR*.
AWG	American Wire Gauge. The standard gauge for measurement of thickness of a wire in the United States.

B

backplane	The physical connection between an interface processor or card and the data buses and the power distribution buses inside a DSLAM.
bandwidth	The difference between the highest and lowest frequencies available for network signals. The term also is used to describe the rated throughput capacity of a given network medium or protocol. For a digital channel, this is defined in bits. For an analog channel, it depends on the type and method of modulation used to encode the data.
bandwidth on demand	The ability of a user to dynamically set upstream and downstream line speeds to a particular rate of speed.
BITS	building integrated timing supply. A clock in a CO that supplies DS1 or composite clock timing references to all synchronous network elements in that office.
bits per second	See *bps*.
bootflash	Separate Flash memory device used primarily to store the Cisco IOS boot image, operational Cisco IOS images, and system configuration information.
BOOTP	Bootstrap Protocol. The protocol used by a network node to determine the IP address of its Ethernet interfaces to affect network booting.
Bootstrap Protocol	See *BOOTP*.
bps	bits per second. A standard measurement of digital transmission speeds.
bridge	A device that connects two or more physical networks and forwards packets between them. Bridges can usually be made to filter packets, that is, to forward only certain traffic. See *switch* and *router*.
broadband	In telecommunications, any channel having a bandwidth greater than a voice-grade channel (4 kHz).
broadband remote access server	Device that terminates remote users at the corporate network or Internet users at the internet service provider (ISP) network that provides firewall, authentication, and routing services for remote users.
broadcast	Data packet that are sent to all nodes on a network. Broadcasts are identified by a broadcast address. Compare with *multicast* and *unicast*.

building integrated timing supply   See *BITS*.

bus topology   A linear method of connecting devices so that transmissions from network stations propagate the length of the medium and are received by all other stations. Compare with *daisy-chain topology*, *ring topology*, *star topology*, and *tree topology*.

C

CAP   Carrierless Amplitude and Phase Modulation. A bandwidth efficient transmission technology for implementing DSL. The transmit and receive signals are modulated into two wide-frequency bands using passband modulation techniques. CAP supports ADSL and RADSL line coding.

Carrierless Amplitude and Phase Modulation   See *CAP*.

CBOS   Cisco Broadband Operating System. The operating system that users access to configure and operate the Cisco 600 Series DSL CPE products.

CBR   constant bit rate. A QoS class defined by the ATM Forum for ATM networks. CBR is used for connections that depend on precise clocking to ensure undistorted delivery. Compare with *ABR*, *UBR*, and *VBR*.

CDM   Cisco DSL Manager. An SNMP-based element management system with fault, configuration, and performance reporting capabilities. CDM runs within the Cisco EMF and manages DSLAMs through a GUI.

central office   See *CO*.

chassis   The cage or housing into which cards or modules are installed. See also *DSLAM* and *multiplexer*.

child   See *subtended node chassis*.

Cisco Broadband Operating System   See *CBOS*.

Cisco DSL Manager   See *CDM*.

Cisco Element Management Framework   See *Cisco EMF*.

Cisco EMF   Cisco Element Management Framework. The element management layer of the system. Cisco EMF provides the framework to support carrier-class element managers across Cisco service provider product lines.

Cisco IOS   Cisco system software that provides common functionality, scalability, and security for all products under the CiscoFusion architecture. Cisco IOS is a CLI that allows centralized, integrated, and automated installation and management of internetworks while ensuring support for a wide variety of protocols, media, services, and platforms.

Cisco Service Management	See *CSM*.
CLEI	common language equipment identifier. The standard code used by suppliers to identify equipment parts and system configurations. CLEI is a registered trademark of Bellcore (now Telcordia).
CLI	command line interface. An interface that allows the user to interact with the operating system by entering commands and optional arguments.
client	Node or software program (front-end device) that requests services from a server.
CO	central office. A local telephone company office at all local loops in a given area connect and where the circuit switching of subscriber lines occurs.
command line interface	See *CLI*.
common language equipment identifier	See *CLEI*.
community string	Text string that acts as a password used with SNMP protocol. The password is used to authenticate messages and can be read-only or have read/write privileges; setting it to read-only is private and setting it to read-write is public. A community string is case sensitive.
configuration management	One of five categories of network management defined by ISO for the management of OSI networks. Configuration management subsystems are responsible for detecting and determining the state of a network. See also *accounting management*, *fault management*, *performance management*, and *security management*.
configuration register	In Cisco DSLAMs, a 16-bit, user-configurable value that determines how the DSLAM functions during initialization. The configuration register can be stored in hardware or software. In hardware, the bit position is set using a jumper. In software, the bit position is set by specifying a hexadecimal value using configuration commands.
connectionless network	A type of communications network in which no logical connection (for example, no leased line or dialed-up channel) is required between sending and receiving stations. Compare with *connection-oriented network*.
connection-oriented network	A type of communications network in which data transfer requires the establishment of a virtual circuit. Compare with *connectionless network*.
constant bit rate	See *CBR*.
CPE	customer premises equipment. Terminating equipment, such as terminals, telephones, and modems, supplied by the telephone company. The equipment is installed at customer sites and connected to the telephone company network.
CSM	Cisco Service Management system of OAM&P and management tools for service providers and large enterprise networks.
customer premises equipment	See *CPE*.

D

daemon
A program that is not invoked explicitly but lies dormant waiting for some condition(s) to occur.

daisy-chain topology
A method of connecting devices in a series so that signals are passed through the chain from one device to the next. Unlike a ring topology, the last device in the series is not connected to the first. Compare with *bus topology*, *ring topology*, *star topology*, and *tree topology*.

data circuit-terminating equipment
See *DCE*.

data storage backup
Process of making a copy of the data that resides on a server.

data terminal equipment
See *DTE*.

DCE
Data circuit-terminating equipment (ITU-T expansion). Devices and connections of a communications network that comprise the network end of the user-to-network interface. The DCE provides a physical connection to the network, forwards traffic, and provides a clocking signal used to synchronize data transmissions between DCE and DTE devices. Modems and interface cards are examples of DCE. Compare with *DTE*.

DDTS
Distributed Defect Tracking System. Cisco tracks bugs in a variety of products, including router software, communication server software, and network management software, using a system called DDTS. DDTS is also used for bugs in some hardware and microcode products, and for bugs in some internal tools, including the automated test software and various Software Tools.

destination address
Address of a network device that is receiving data. See also *source address*.

DHCP
Dynamic Host Configuration Protocol. Provides a mechanism to allocate IP addresses dynamically so that addresses can be reused when hosts no longer need them. Defined in RFC 2131.

digital signal level 3
See *DS3*.

digital subscriber line
See *DSL*.

digital subscriber line access multiplexer
See *DSLAM*.

Discrete Multitone
See *DMT*.

Distributed Defect Tracking System
See *DDTS*.

distributed server
Server that supports a specific group of users on the network. Also referred to as local or workgroup server.

DMT
Discrete Multitone. A technology that uses digital signal processors to transmit more than 6 Mbps of video, data, image, and voice signals over existing one pair copper wiring. DMT supports ADSL line coding.

downstream	Data that is coming from the NI-2 card to the subscriber lines. See also *upstream*.
DS3	digital signal level 3. A framing specification used for transmitting digital signals at 44.736 Mbps on a T3 facility. See also *E3*.
DSL	digital subscriber line. Public network technology that delivers high bandwidth over conventional copper wiring at limited distances. There are several types of DSL: ADSL, IDSL, SDSL, and SHDSL, to name a few. All are provisioned via modem pairs, with one modem located at a CO and the other at the customer site. Because most DSL technologies do not use the whole bandwidth of the twisted pair, there is room remaining for a voice channel. See also *ADSL*, *IDSL*, *SDSL*, and *SHDSL*.
DSL Forum	An organization of competing companies that sponsors an Internet Web site (http://www.adsl.com) containing information about the applications, technology, systems, market, trials, and tariffs related to DSL technology.
DSLAM	digital subscriber line access multiplexer. A device that connects many digital subscriber lines to a network by multiplexing the DSL traffic onto one or more network trunk lines. The Cisco DSLAMs include the Cisco 6015, Cisco 6100, Cisco 6130, Cisco 6160, and Cisco 6260. See also *chassis* and *multiplexer*.
DTE	data terminal equipment. Device at the user end of a user-network interface that serves as a data source, destination, or both. DTE connects to a data network through a DCE device (for example, a modem) and typically uses clocking signals generated by the DCE. DTE includes such devices as computers, protocol translators, and multiplexers. Compare with *DCE*.
Dynamic Host Configuration Protocol	See *DHCP*.

E

E1	Wide-area digital transmission scheme used predominantly in Europe that carries data at a rate of 2.048 Mbps. See also *T1*.
E3	Wide-area digital transmission scheme used predominantly in Europe that carries data at a rate of 34.368 Mbps. See also *DS3* and *T3*.
EFCI	explicit forward congestion indication. In ATM, one of the congestion feedback modes allowed by ABR service. EFCI is set by a network element to notify the destination end-system of congestion or impending congestion in the network.
EIA	Electronic Industries Alliance. A standards organization made up of electronics industry organizations. EIA is responsible for the RS-232C and RS-422 standards.
Electronic Industries Alliance	See *EIA*.
electrostatic discharge	See *ESD*.

encapsulation	The wrapping of data in a particular protocol header. For example, Ethernet data is wrapped in a specific Ethernet header before network transit. Also, when bridging a dissimilar network, the entire frame from one network is placed in the header used by the data link layer protocol of the other network.
EPROM	Erasable programmable read-only memory. Nonvolatile memory chips that are programmed after they are manufactured, and, if necessary, can be erased by some means and reprogrammed.
erasable programmable read-only memory	See *EPROM*.
error detection	A process used during file transfer to discover discrepancies between transmitted and received data. Some file transfer programs only detect errors; others detect errors and attempt to fix them (called error correction).
ESD	electrostatic discharge. Discharge of stored static electricity that can damage electronic equipment and impair electrical circuitry, resulting in complete or intermittent failures.
ESF	Extended Superframe. A framing type that is used on T1 circuits that consists of 24 frames of 192 bits each, with the 193rd bit providing timing and other functions.
Ethernet	One of the most common LAN wiring schemes, Ethernet has a transmission rate of 10 Mbps; a newer standard called Fast Ethernet has a rate of 100 Mbps.
ETSI	European Telecommunications Standards Institute. ETSI is a non-profit organization producing voluntary telecommunications standards used throughout Europe, some of which have been adopted by the european community as the technical base for Directives or Regulations.
European Telecommunications Standards Institute	See *ETSI*.
event	Network message indicating operational irregularities in physical elements of a network or a response to the occurrence of a significant task, typically the completion of a request for information. See also *alarm* and *trap*.
explicit forward congestion indication	See *EFCI*.
Extended Superframe	See *ESF*.

F

fault management	One of five categories of network management defined by ISO for management of OSI networks. Fault management attempts to ensure that network faults are detected and controlled. See also *accounting management*, *configuration management*, *performance management*, and *security management*.

FCC	Federal Communications Commission. A U.S. government agency that regulates interstate and foreign communications. The FCC sets rates for communication services, determines standards for equipment, and controls broadcast licensing.
Federal Communications Commission	See *FCC*.
ferrite	Use on coaxial cables to reduce the radiation/EMI susceptibility to high frequency noise.
field replaceable unit	See *FRU*.
File Transfer Protocol	See *FTP*.
firmware	Software instructions set permanently or semi-permanently in ROM.
flash memory	A special type of EPROM that can be used and reprogrammed in blocks instead of one byte at a time.
FM	frequency modulation. Modulation technique in which signals of different frequencies represent different data values. Compare with *AM* and *PAM*. See also *modulation*.
frame	A packet as it is transmitted over a serial line. The term derives from character-oriented protocols that involved the addition of special start-of-frame and end-of-frame characters for packet transmission.
frequency modulation	See *FM*.
FRU	field replaceable unit. Hardware component that can be removed and replaced on-site. Typical FRUs include cards, modules, PEMs, and some chassis components. When FRUs are removed from the chassis, service is interrupted for some or all of the system.
FTP	File Transfer Protocol. The application protocol used to transfer files between network nodes.

G

G.992.1	Also known as *G.dmt*.
G.992.2	The ITU standard for line coding and framing for splitterless, reduced spectrum ADSL. Also known as *G.lite*.
G.994.1	The ITU standard for signaling, identification, and negotiation between broadband systems; an integral part of G.dmt and G.lite. Also known as *G.hs*.
G.997.1	The ITU standard for performance monitoring on DMT access technologies.
G.dmt	Pseudonym for G.992.1.
G.hs	Pseudonym for G.994.1.
G.lite	Pseudonym for G.992.2.

G.SHDSL   See *SHDSL*.

graphical user   See *GUI*.
interface

GUI   graphical user interface. A user environment that uses pictorial as well as textual representations of
                     the input and the output of applications and the hierarchical or other data structure in which
                     information is stored.

H

handshake   See *hs*.

HDLC   High-Level Data Link Control. Bit-oriented synchronous data link layer protocol developed by ISO.
                     Derived from Synchronous Data Link Control (SDLC), HDLC specifies a data encapsulation method
                     on synchronous serial links using frame characters and checksums.

header   (1) The protocol control information that is located at the beginning of a protocol data unit. (2) The
                     portion of a message that contains information to guide the message to the correct destination and
                     contains, for example, sender and receiver addresses and routing instructions.

High-Level Data See *HDLC*.
Link Control

host   Computer system on a network. Similar to the term node, except that host usually implies a computer
                     system; node generally applies to any networked system, including access servers and routers. See
                     also *node*.

hot swapping   Feature that permits the addition, replacement, or removal of cards or modules without interrupting
                     the system power, entering console commands, or causing other software or interfaces to shut down.
                     Sometimes called "online insertion and removal" or "power-on servicing." Removal of some cards
                     causes interruption to some or all of the system.

hs   handshake. Sequence of messages that are exchanged between two or more network devices to ensure
                     transmission synchronization.

I

I/O card or   input/output card or module.
I/O module

ICP cell   IMA control protocol cell. IMA control protocol cell used for aligning the cells in multiple links.

IDSL   ISDN digital subscriber line. An *x*DSL technology that uses ISDN technology to deliver data at speeds
                     of 128 Kbps over copper loops as long as 18,000 feet. IDSL is reserved for data communications only.
                     Compare with *ADSL*, *SDSL*, and *SHDSL*. See also *DSL*.

IEEE   Institute of Electrical and Electronics Engineers. A U.S. publishing and standards organization
                     responsible for many LAN standards.

IMA	inverse multiplexing over ATM. A standard protocol defined by the ATM Forum in 1997.
IMA control protocol cell	See *ICP cell*.
IMA group	Physical links grouped to form a higher-bandwidth logical link the rate of which is approximately the sum of the individual link rates.
industrial temperature	See *ITEMP*.
Institute of Electrical and Electronics Engineers	See *IEEE*.
Integrated Services Digital Network	See *ISDN*.
intermixing	Installation of line cards with different modulation types into a single DSLAM. Intermixing rules are determined by spectral frequency overlap considerations, chassis type, and line card modulation type.
International Organization for Standardization	See *ISO*.
International Telecommunication Union Telecommunication Standardization Sector	See *ITU-T*.
inverse multiplexing	Process whereby physical links are grouped to form a higher-bandwidth logical link whose rate is approximately the sum of the individual link rates.
inverse mutliplexing over ATM	See *IMA*.
ISDN	Integrated Services Digital Network. Communication protocol offered by telephone companies that permits telephone networks to carry data, voice, and other source traffic.
ISDN digital subscriber line	See *IDSL*.
ISO	International Organization for Standardization. A voluntary, nontreaty organization founded in 1946 that is responsible for creating international standards in many areas, including computers and communications.
ITEMP	industrial temperature.
ITU-C	See *xTU-C*.

ITU-R   See *xTU-R*.

ITU-T   International Telecommunication Union Telecommunication Standardization Sector. ITU-T is the telecommunication standardization sector of ITU and is responsible for making technical recommendations about telephone and data (including fax) communications systems for service providers and suppliers.

J

jitter   In telecommunications, analog communication line distortion caused by the variation of a signal from its reference timing positions. Jitter can cause data loss, particularly at high speeds.

L

LAN   local-area network. High-speed, low-error data network covering a relatively small geographic area (up to a few thousand meters). LANs connect workstations, peripherals, terminals, and other devices in a single building or other geographically limited area. LAN standards specify cabling and signaling at the physical and data link layers of the OSI model. Ethernet, FDDI, and Token Ring are widely used LAN technologies. Compare with *WAN*.

laser   light amplification by stimulated emission of radiation. Analog transmission device in which a suitable active material is excited by an external stimulus to produce a narrow beam of coherent light that can be modulated into pulses to carry data. Networks based on laser technology are sometimes run over SONET.

LED   light emitting diode. The lights indicate status or activity of electronic equipment.

light emitting diode   See *LED*.

line rate   The speed at which data is transferred over a particular line type, expressed in bps.

link   Network communications channel that consists of a circuit or transmission path and all related equipment between a sender and a receiver. In a transmission network, a link is a point-to-point connection between adjacent nodes.

local-area network   See *LAN*.

logical port   A logical entry to a server machine. Logical ports are mostly invisible to the user, though you may occasionally see a URL with a port number included in it. These ports do not refer to physical locations; they are set up by server administrators for network trafficking.

loopback   A diagnostic test that returns the transmitted signal to the sending device after the signal has passed through a network or across a particular link. The returned signal can then be compared to the transmitted one and the discrepancies between the two can be used to trace the fault. When you are trying to locate a faulty piece of equipment, you can repeat loopbacks, eliminating satisfactory machines, until the problem is found.

M

managed object In network management, a network device that can be managed by a network management protocol.

Management Information Base See *MIB*.

maximum rate Maximum total data throughput allowed on a given virtual circuit. The maximum rate, which cannot exceed the media rate, represents the highest data throughput the virtual circuit will ever deliver, measured in bps or cells per second.

MIB Management Information Base. A collection of objects that can be accessed through a network management protocol, such as SNMP or Common Management Information Protocol (CMIP).

MMF multimode fiber. Optical fiber that supports the propagation of multiple frequencies of light. See also *SMF.*

modulation Process by which the characteristics of electric signals are transformed to represent information. Types of modulation include AM, FM, and PAM. See also *AM*, *FM*, and *PAM*.

multicast Single packets copied by the network and sent to a specific subset of network addresses. Compare with *broadcast* and *unicast*.

multimode fiber See *MMF*.

multiplexer Equipment that enables several data streams to be sent over a single physical line. A device for combining several channels to be carried by one line or fiber. See also *chassis* and *DSLAM*.

N

NAT Network Address Translation. Mechanism for reducing the need for globally unique IP addresses. NAT allows an organization with addresses that are not globally unique to connect to the Internet by translating those addresses into globally routable address space.

NEBS Network Equipment Building Systems. An extensive set of performance, quality, environmental and safety requirements developed by Bellcore (now Telcordia).

network Collection of computers, printers, routers, switches, and other devices that can communicate with each other over some transmission medium.

Network Address Translation See *NAT*.

network element A network element is generally a combination hardware and software system that is designed primarily to perform a telecommunications service function.

Network Equipment Building Systems See *NEBS*.

network management Generic term used to describe systems or actions that help maintain, characterize, or troubleshoot a network.

network management system	See *NMS*.
network timing reference	See *NTR*.
NI-2 card	A second generation network interface card for Cisco DSLAMs. Board that works with the network software and operating systems to transmit and receive messages on a network.
NMS	network management system. A system responsible for managing at least part of a network. An NMS communicates with agents to help keep track of network statistics and resources.
node	Endpoint of a network connection or a junction common to two or more lines in a network. Nodes can be processors, controllers, or workstations. Nodes can be interconnected by links and serve as control points in the network. Node sometimes is used generically to refer to any entity that can access a network, and frequently is used interchangeably with device. See also *host*.
node system save file	See *NSS file*.
noise margin	Noise margin is the margin between the signal and noise in decibels (dB). The recommended minimum noise margin is typically 6dB. The 6dB noise margin was specified based on empirical research and the resulting algorithms to allow the best performance (line rate and reach) while maintaining the 10-7 bit-error rate. When RADSL is enabled for a DSL DMT application, the modem will train to 1) the specified rate or 2) the highest rate possible given the line conditions while maintaining a 6dB margin.
nonvolatile random-access memory	See *NVRAM*.
NSS file	node system save file. The file that is saved during the Save Configuration procedure or during a software download. This file is required for the Restore Configurations procedure.
NTR	Network timing reference. In DSL, NTR enables the DSLAM to provide clocking for network devices that reside beyond the CPE. The CPE must support NTR to enable this feature.
NVRAM	nonvolatile random-access memory. RAM that retains its contents when a unit is powered off.

O

OAM&P	operations, administration, management, and provisioning. Provides the facilities and the personnel required to manage a network.
OC	Optical Carrier. Series of physical protocols (OC-1, OC-2, OC-3, and so on) defined for SONET optical signal transmissions. OC signal levels put STS frames onto multimode fiber-optic line at a variety of speeds. The base rate is 51.84 Mbps (OC-1); each signal level thereafter operates at a speed divisible by that number (thus, OC-3 runs at 155.52 Mbps). See also *SONET* and *STS-3c*.
OC-*n*	SONET optical carrier, Level *n* (such as *n* equals 3, 12, 48, 192).

Open System Interconnection	See *OSI*.
operations, administration, management, and provisioning	See *OAM&P*.
Operations Support System	See *OSS*.
octal-port DMT ATU-C line card	See *8xDMT*.
octal-port ITU-C line card	See *8xIDSL*.
octal-port SHTU-C line card	See *8xG.SHDSL*.
Optical Carrier	See *OC*.
optical fiber	See *MMF* and *SMF*.
OSI	Open System Interconnection. An international standardization program created by ISO and ITU-T to develop standards for data networking that facilitate multivendor equipment interoperability. See also *ISO*.
OSS	Operations Support System. Network management system supporting a specific management function, such as alarm surveillance and provisioning, in a carrier network.

P

PAM	pulse amplitude modulation. Modulation scheme where a continuous analog signal is represented with a series of discrete analog samples, which are then recreated as a complete signal. Sampling allows several signals to be combined on a channel that would otherwise carry only one signal. Compare with *AM* and *FM*. See also *modulation*.
parent	See *subtending host chassis*.
PEM	power entry module. A hardware module that distributes power throughout a DSLAM.
performance management	One of five categories of network management defined by ISO for the management of ISO networks. Performance management subsystems are responsible for analyzing and controlling network performance, including network throughput and error rates. See also *accounting management*, *configuration management*, *fault management*, and *security management*.
permanent virtual circuit	See *PVC*.
permanent virtual connection	See *PVC*.

permanent virtual path	See *PVP*.
physical port	A physical connection to a computer through which data flows. An Ethernet port, for example, is the point at which the Ethernet network cabling plugs into a computer.
plain old telephone service	See *POTS*.
Point-to-Point Protocol	See *PPP*.
port	An interface on an internetworking device (such as a DSLAM).
POTS	plain old telephone service. General term referring to the variety of telephone networks and services in place worldwide.
POTS splitter	A device that enables both a DSL data device and a standard analog device to share the same ADSL or IDSL line.
power entry module	See *PEM*.
PPP	Point-to-Point Protocol. The successor to SLIP that provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits. See *SLIP*.
protocol	A formal description of messages to be exchanged and rules to be followed so that two or more systems can exchange information.
pulse amplitude modulation	See *PAM*.
PVC	permanent virtual circuit (or connection). A virtual circuit that is permanently established. PVCs save bandwidth associated with circuit establishment and tear down in situations where certain virtual circuits must exist all the time. Compare with SVC. See also *virtual circuit*.
PVP	permanent virtual path. A virtual path that consists of PVCs. See also *PVC* and *virtual path*.

Q

QoS	quality of service. A measure of performance for a transmission system that reflects its transmission quality and service availability.
quad-port flexi ATU-C line card	See *4xflexi*.
quad-port STU-C line card	See *4xSDSL*.
quality of service	See *QoS*.

R

RADIUS Remote Authentication Dial-In User Service. A client/server security protocol created by Livingston Enterprises. Security information is stored in a central location, known as the RADIUS server.

RADSL rate adaptive digital subscriber line. A transmission technology that supports adaptive transmission rates through the use of intelligent DSL modems, which negotiate the line rate according to line conditions and profile specifications. Once the line rate is negotiated, the rate is locked when the line trains. RADSL supports both asymmetric and symmetric applications on a single twisted pair telephone line. See *ADSL*.

RAM random-access memory. Volatile memory that can be read and written by a microprocessor.

random-access memory See *RAM*.

Rate Adaptive Digital Subscriber Line See *RADSL*.

read-only memory See *ROM*.

redundancy In internetworking, the duplication of devices, services, or connections so that, in the event of failure, the redundant devices, services, or connections can perform the work of those that failed.

remote address The IP address of a remote server.

Remote Authentication Dial-In User Service See *RADIUS*.

remote monitoring See *RMON*.

remote server A network computer that allows a user to log on to the network from a distant location.

Request for Comments See *RFC*.

RFC Request for Comments. The document series, begun in 1969, which describes the Internet suite of protocols and related experiments. Not all RFCs describe Internet standards, but all Internet standards are written up as RFCs.

ring topology A method of connecting devices so that a series of repeaters is connected to one another by unidirectional transmission links to form a single closed loop. Each station on the network connects to the network at a repeater. Compare with *bus topology*, *daisy-chain topology*, *star topology*, and *tree topology*.

RMON remote monitoring. MIB agent specification described in RFC 1271 that defines functions for the remote monitoring of networked devices. The RMON specification provides numerous monitoring, problem detection, and reporting capabilities.

ROM read-only memory. Nonvolatile memory that can be read, but not written, by the microprocessor.

router
A system responsible for making decisions about which of several paths network (or Internet) traffic will follow. The router uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics." See also *bridge* and *switch.*

routing table
A table that is stored in a router or some other internetworking device that keeps tracks of routes to particular network destinations, and, in some cases, metrics associated with those routes. A routing table is used to select the most appropriate route to forward information.

S

scalability
Capacity of a network to keep pace with changes and growth.

SDSL
symmetrical digital subscriber line. An *x*DSL technology that can delivers 1.168 Mbps downstream and upstream over a single copper twisted pair. The use of a single twisted pair limits the operating range of SDSL to 10,000 feet (3048.8 meters). Compare with *ADSL*, *IDSL*, and *SHDSL*. See also *DSL*.

security management
One of five categories of network management defined by ISO for the management of ISO networks. Security management subsystems are responsible for controlling access to network resources. See also *accounting management*, *configuration management*, *fault management*, and *performance management*.

Serial Line Internet Protocol
See *SLIP.*

server
Node or software program that provides services to clients.

SHDSL
single-pair high-speed digital subscriber line, also known as symmetric high bit rate digital subscriber loop. A version of *x*DSL that includes advanced Trellis line code, a precoding mechanism, spectral shaping, equalization circuits, and forward error correction. SHDSL can deliver 2.312 Mbps of bandwidth downstream and upstream over a single copper twisted pair. Compare with *ADSL*, *IDSL*, and *SDSL*. See also *DSL*.

shielded twisted pair
A pair of insulated wires which are twisted together in a spiral manner. In addition, the pair is wrapped with metallic foil or braid, designed to insulate the pair from electromagnetic interference. Sometimes referred to as STP. See also *twisted pair* and *unshielded twisted pair.*

SHTU-C
See *xTU-C.*

SHTU-R
See *xTU-R.*

signal-to-noise ratio
See *SNR.*

Simple Network Management Protocol
See *SNMP.*

single-mode fiber
See *SMF.*

single-pair high-speed digital subscriber line
See *SHDSL.*

SLIP	Serial Line Internet Protocol. A standard protocols for point-to-point serial connections using a variation of TCP/IP. This protocol is the predecessor of PPP. See *PPP* and *TCP*.
slot	A numbered location within a chassis, which is capable of housing a card or module.
SMF	single-mode fiber. Fiber-optic cabling with a narrow core that allows light to enter only at a single angle. Such cabling has higher bandwidth than multimode fiber, but requires a light source with a narrow spectral width (for example, a laser). See also *MMF*.
SNMP	Simple Network Management Protocol. The network management protocol of choice for TCP/IP-based internets. SNMP provides a means to monitor and control network devices, and to manage configurations, statistics collection, performance, and security.
SNR	signal-to-noise ratio. The usable signal being transmitted divided by the noise or undesired signal. SNR is a measure of transmission quality.
SONET	Synchronous Optical Network. A standard format for transporting a wide range of digital communications services over optical fiber. SONET is characterized by standard line rates, optical interfaces, and signal formats.
source address	Address of a network device that sends data. See also *destination address*.
star topology	A method of connecting devices in which end points on a network are connected to a common central switch by point-to-point links. Compare with *bus topology*, *daisy-chain topology*, *ring topology*, and *tree topology*.
STM-1	Synchronous Transfer Module 1. Synchronous Digital Hierarchy standard for transmission over OC-3c optical fiber at 155.52 Mbps.
STS-3c	Synchronous Transport Signal level 3, concatenated. SONET format that specifies the frame structure for the 155.52 Mbps-lines used to carry ATM cells. See also *SONET*.
STU-C	See *xTU-C*.
STU-R	See *xTU-R*.
subinterface	One of a number of virtual interfaces on a single physical interface.
subnet	For routing purposes, IP networks can be divided into logical subnets by means of a subnet mask. Values below those of the mask are valid addresses on the subnet.
subnet address	Portion of an IP address that is specified as the subnetwork by the subnet mask.
subnet mask	The 32-bit address mask used in IP to indicate the bits of an IP address that are being used for the subnet address.
subrack discovery	The process by which a DSLAM node automatically searches through the interfaces and ports within that DSLAM and discovers the components that are present within that DSLAM.
subscriber	A logical entity with attributes identifying the customer that is receiving service on a particular port.
subtended configuration	Services and aggregates the data from one or more chassis into a subtending host chassis requiring only one connection to the outside network. This reduces the number of ATM edge-switch ports necessary to terminate multiple chassis.

subtended node chassis	Downstream chassis in a subtended network configuration. Also known as the *child*.
subtending	See *subtended configuration*.
subtending host chassis	Provides the data network interface for the subtended node chassis and connects to the ATM backbone. Also known as the *parent*.
SVC	switched virtual circuit (or connection). A virtual circuit that is dynamically established on demand and is torn down when transmission is complete. SVCs are used in situations where data transmission is sporadic. Compare with *PVC*. See also *virtual circuit*.
switch	Network device that filters, forwards, and floods frames based on the destination address of each frame. The switch operates at the data link layer of the OSI model. See also *bridge* and *router*.
switched virtual circuit	See *SVC*.
symmetric high bit rate digital subscriber loop	See *SHDSL*.
symmetrical digital subscriber line	See *SDSL*.
synchronous communications	Data is not sent in individual bytes, but as frames of large data blocks.
Synchronous Optical Network	See *SONET*.
Synchronous Transfer Module 1	See *STM-1*.
Synchronous Transport Signal level 3, concatenated	See *STS-3c*.
SYSLOG	SYSLOG allows you to log significant system information to a remote server.

T

T1	A digital carrier that is used to transmit a DS1 formatted digital signal at 1.544 Mbps through the telephone-switching network. See also *E1*.
T1.413	The ANSI standard for line coding and framing for full rate ADSL.
T3	A digital carrier that is used to transmit a DS3 formatted digital signal at 45 Mbps through the telephone-switching network. Compare with *E3*. See also *DS3*.

TC-PAM	trellis coded pulse amplitude modulation. Trellis coding provides forward error correction, while pulse amplitude modulation is a modulation scheme where a continuous analog signal is represented with a series of discrete analog samples.
TCP	Transmission Control Protocol. The major transport protocol in the Internet suite of protocols providing reliable, connection-oriented, full-duplex streams. See *SLIP*.
Telnet	The virtual terminal protocol in the Internet suite of protocols. It allows users of one host to log in to a remote host and use resources as if they were connected to a local system.
TFTP	Trivial File Transfer Protocol. A simple file transfer protocol (a simplified version of FTP) that allows files to be transferred from one computer to another over a network. TFTP does not offer password security.
tip and ring	A pair of wires that provide the electrical connection between a telephone set and the local CO. The more electrically positive side of a POTS telephone line (0 V) is the tip. Its counterpart is the ring, which is the more negative side, 52 v).
topology	Physical arrangement of network nodes and media within a networking structure.
trailer	A block of information that is transmitted at the end of a message to trace error impacts and missing blocks.
training	The handshake procedure that initiates and establishes an end-to-end *x*DSL connection
training mode	The mode, either standard or quick, that a DSLAM port employs when it is training to a CPE. The training mode uses RADSL technology to adjust line speed according to noise conditions on the transmission line.
Transmission Control Protocol	See *TCP*.
trap	Message sent by SNMP agent to an NMS, a console, or a terminal to indicate the occurrence of a significant event, such as a specifically defined condition or a threshold that was reached. See also *alarm* and *event*.
tree topology	A method of connecting devices that is similar to a bus topology, except that tree networks can contain branches with multiple nodes. Transmissions from a station propagate the length of the medium and are received by all other stations. Compare with *bus topology*, *daisy-chain topology*, *ring topology*, and *star topology*.
trellis coded pulse amplitude modulation	See *TC-PAM*.
trellis encoding	A channel coding technique which provides forward error correction capability.
Trivial File Transfer Protocol	See *TFTP*.
twisted pair	Two insulated copper wires twisted together with the twists or lays varied in length to reduce potential signal interference between the pairs.

U

UBR
unspecified bit rate. A QoS class defined by the ATM Forum for ATM networks. UBR allows any amount of data up to a specified maximum to be sent across the network but there are no guarantees in terms of cell loss rate and delay. Compare with *ABR*, *CBR*, and *VBR*.

UDP
User Datagram Protocol. A connectionless transport protocol that runs on top of the TCP/IP. UDP, like TCP, uses IP for delivery; however, unlike TCP, UDP provides for exchange of datagrams without acknowledgments or guaranteed delivery. This protocol is the best suited for small, independent requests, such as requesting a MIB value from an SNMP agent, in which setting up a connection would take more time than sending the data.

UL
Underwriters Laboratories. A private organization that tests and certifies electrical components and devices against rigorous safety standards. A UL Listing Mark on a product means that representative samples of the product have been tested and evaluated against nationally recognized safety standards with regard to fire, electric shock, and other related safety hazards, and have met the standards.

Underwriters Laboratories
See *UL*.

UNI
User-Network Interface.

UNI signaling
User-Network Interface signaling for ATM communications.

unicast
Message sent to a single network destination. Compare with *broadcast* and *multicast*.

unshielded twisted pair
Four-pair wire medium used in a variety of networks. Sometimes referred to as UTP. See also *shielded twisted pair* and *twisted pair*.

unspecified bit rate
See *UBR*.

upstream
Data that is coming from the subscriber lines to the NI-2 card. See also downstream.

User-Network Interface
See *UNI*.

User Datagram Protocol
See *UDP*.

V

variable bit rate
See *VBR*.

VBR
variable bit rate. A QoS defined by the ATM Forum for ATM networks. VBR is subdivided into a real time (rt) class and non-real time (nrt) class. VBR-rt is used for connections in which there is a fixed timing relationship between samples. VBR-nrt is used for connections in which there is no fixed timing relationship between samples but that still need a guaranteed QoS. Compare with *ABR*, *CBR*, and *UBR*.

VCC
virtual channel connection. A logical circuit, made up of links, that carries data between two endpoints in an ATM network. It is sometimes called a virtual circuit connection. See also *VCI* and *VPI*.

VCI	virtual channel identifier. A 16-bit field in the header of an ATM cell. The VCI, together with the VPI, is used to identify the next destination of a cell as it passes through to the ATM switch. It is sometimes called virtual circuit identifier. See also *VPI*.
virtual channel connection	See *VCC*.
virtual channel identifier	See *VCI*.
virtual circuit	A logical circuit created to ensure reliable communication between two network devices. A virtual circuit is defined by a VPI/VCI pair and can be either PVC or SVC. In ATM, a virtual circuit is called a virtual channel. See also PVC, SVC, VCI, and VPI.
virtual circuit connection	See *VCC*.
virtual circuit identifier	See *VCI*.
virtual connection	In ATM, a connection between end users that has a defined route and endpoints. See also *PVC* and *SVC*.
virtual path	A logical grouping of virtual circuits that connect two sites. One of two types of ATM circuits identified by a VPI. A virtual path is a bundle of virtual circuits, all of which are switched across a network based on a common VPI. See also *VPI*.
virtual path identifier	See *VPI*.
VPI	virtual path identifier. An 8-bit field in the header of an ATM cell. The VPI, together with the VCI, is used to identify the next destination of a cell as it passes through the network. See also *VCI*.

W

WAN	wide-area network. A data communications network that serves users across a broad geographic area and often uses transmission devices provided by common carriers. Compare with *LAN*.
WAN Interface Card	See *WIC*.
WIC	WAN Interface Card. A WIC card plugs into the card slot of a router and allows DSL use on routers. Each WIC acts as a CPE and can handle the amount of data available depending on the line conditions and the DSL profile assigned to the port.
wide-area network	See *WAN*.

X

xDSL Generic term used to refer to digital subscriber line equipment and services, including ADSL, IDSL, SDSL, and SHDSL. All are digital technologies that provide high bandwidth over existing copper infrastructure provided by the telephone companies.

xDSL Transmission Unit—central office See xTU-C.

xDSL Transmission Unit—remote See xTU-R.

xTU-C xDSL Transmission Unit—central office. A hardware device that supports xDSL communication and that is placed in the CO. The xTU-C has a matching unit on the subscriber premise in the form of an xTU-R. The two units, in combination, support a high data rate over UTP copper cable local loops. Examples of xTU-Cs are ATU-C, ITU-C, STU-C, and SHTU-C.

xTU-R xDSL Transmission Unit—remote. A hardware device that supports xDSL communication and that is placed in the customer's premise. The xTU-R has a matching unit in the carrier's CO in the form of an xTU-C. The two units, in combination, support a high data rate over UTP copper cable local loops. Examples of xTU-Rs are ATU-R, ITU-R, STU-R, and SHTU-R.