Networking Glossary: 150+ Words You Should Know

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There are a lot of terms used in this book that many of our readers may not be familiar with. To help get you started, we are offering definitions of about 150 networking terms that you should be familiar with.

10base-2
The version of Ethernet that uses thin coaxial cable. The name is derived from the speed of the network (10Mbps), the signaling type (baseband), and the maximum cable length (almost 200 meters).

10base-T
The version of Ethernet that uses twisted-pair cabling. The name is derived from the speed of the network (10Mbps), the signaling type (baseband), and the cable type (twisted pair).

100base-T
An extension to the 10base-T standard describing twisted-pair networks that operate at 100Mbps.

802.3
The IEEE standard that describes the CSMA/CD medium access method used in Ethernet networks.

802.5
The IEEE standard that describes the medium access method used in Token Ring networks.

ADSI (Analog Display Services Interface)
A service allowing voice mail to be viewed on your PC screen. Instead of pressing number keys on the telephone to access voice mail functions, you can use your PC to view and control incoming voice mail. A special communications server on the network handles the incoming voice mail.

ADSL (Asymmetrical Digital Subscriber Line)
A high-speed modem technology that provides data services, such as Internet access, over existing telephone lines. ADSL has a downstream (to the subscriber) data transfer rate of at least 1.5Mbps. Subscribers located within two miles of the telephone office can attain downstream speeds as high as 6.2Mbps. Upstream data rates vary from 16Kbps to 640Kbps, depending on line distance. See also asymmetrical transmission.

ANSI (American National Standards Institute)
A private organization involved with setting US standards, often referred to as ANSI standards.

anonymous FTP (Anonymous File Transfer Protocol)
A protocol that allows users to transfer files between TCP/IP-connected computers. A user will log in to an FTP server using anonymous as the user ID and guest as the password. This process gets a user into a special, usually restricted, area of the FTP server.

AppleTalk
A seven-layer protocol stack designed by Apple Computers that allows the sharing of files and printers and the sending of traffic between computers. Its primary design goal was to give the AppleTalk user a simple plug-and-play environment in which the user does not need to be concerned with the details of network configuration.

application layer

Layer 7 of the seven-layer OSI model. The application layer is responsible for interfacing with the user and directing input from the user to the lower OSI layers. It is the part of the OSI model the user interacts with directly.

ARP (Address Resolution Protocol)

A protocol, described in RFC 826, used to determine the hardware address of another computer on a network. ARP is used when a computer may know the destination computer's IP address, but does not know the destination computer's hardware address. The sender broadcasts an ARP packet and the device that recognizes its own IP address responds with the unknown hardware address.

ASCII (American Standard Code for Information Interchange)

A character set in which each letter, number, or control character is made up of a 7-bit sequence. The term ASCII is sometimes erroneously used when referring to Extended ASCII, an 8-bit character set.

asymmetrical transmission

A transmission method developed to overcome the high cost of high-speed full-duplex transmission. In essence, a line's bandwidth is broken up into two subchannels: the main channel and the secondary channel. The main channel contains the majority of the line's bandwidth, the secondary channel contains only a small portion. The unequal division of bandwidth results in an unequal data transfer rate, but allows service providers to overcome signal-coupling problems in large telephone cable plants.

asynchronous communications

A type of data transmission in which each character transmitted (8 bits) is framed by a start and stop bit. These two control bits delineate the beginning and end of a character. Though there is more flexibility with asynchronous transmission, it is much less efficient because the addition of the control bits increases the packet size by 25percent.

AT command set

The modem command set developed by Hayes, Inc. that has become the de facto standard for programming modems.

ATM (Asynchronous Transfer Mode)

A high-speed connection-oriented switching technology that uses 53-byte cells (packets) to simultaneously transmit different types of data, including video and voice. ATM is an attractive technology because it provides dedicated bandwidth at speeds ranging from 25Mbps to 655Mbps.

AUI (Attachment Unit Interface)

The cable that attaches from a MAU or transceiver to a computer. The AUI cable consists of 15-pin D-shell type connectors, female on the computer end and male on the transceiver end.

authentication

The computer security process of verifying a user's identity or the user's eligibility to access network resources. See also public key encryption.

autonomous system

A group of routers or networks that fall under one network administrative organization. Autonomous systems usually run on a single routing protocol.

B-channel

A 64Kbps ISDN channel used to transmit voice or data. The standard BRI connection contains two B-channels, for a total uncompressed capacity of 128Kbps.

backbone

A network that interconnects individual LANs and that typically has a higher capacity than the LANs being connected. One exception is a T-1 backbone connecting a WAN connecting two 100Mbps Ethernet LANs at either end of the backbone. In this case, the LANs have a much higher capacity than the backbone.

backoff

From CSMA/CD, when a collision occurs on a network, the computer sensing the collision calculates a time delay before trying to transmit again. This time delay is referred to as backoff.

balun

An impedance-matching device used when connecting different types of cable to each other. For example, a balun is required to connect twisted pair cable to coaxial cable on an Ethernet network.

bandwidth

The width of the passband or the difference between the highest and lowest frequencies in a given range. For example, the human voice has a passband of approximately 50Hz to -15,000Hz, which translates to a bandwidth of 14,950Hz.

baseband

A type of transmission that uses digital signals to move data. Because the signal is digital, the entire bandwidth of the cable is used.

BER (Bit Error Rate)

The ratio of received bits that are in error. Diagnostic cable-checking tools sense BER by transmitting a stream of data on one end of a cable and reading the output from the other end.

best-effort delivery

A network function where an attempt is made at delivering data; however, if an error such as line failure occurs, it does not attempt recovery. There is no mechanism in best-effort delivery to buffer data then retransmit it once the failure has been resolved.

BISDN (Broadband ISDN)

The next generation of ISDN service. BISDN is a fiber-optic-based service using asynchronous transfer mode (ATM) over SONET-based transmission circuits. The service is designed to handle high-bandwidth applications, such as video, at rates of 155Mbps, 622Mbps, and higher.

BONDING (Bandwidth ON Demand INteroperability Group)

An ISDN consortium name and the technique of inverse multiplexing they developed. Data is broken up into a stream of frames, each stream using a portion of the total available bandwidth. If your ISDN configuration has two B-channels, each with 64Kbps, your equipment will allow a data rate of 128Kbps by splitting the data.

BOOTP (BOOTstrap Protocol)

A protocol designed to allow diskless workstations to boot onto an IP network. A single BOOTP message contains many pieces of information needed by a workstation at startup, such as an IP address, the address of a gateway, and the address of a server. A workstation that boots up requests this information from a BOOTP server.

BRI (Basic Rate Interface)

The ISDN interface often comprised of two B-channels and one D-channel for circuit-switched communications of voice, data, and video. Depending on connection requirements and the local telephone company, it is possible to purchase just one B-channel.

bridge

A device that interconnects two or more LANs. A bridge is often used to segment a LAN to increase bandwidth on the new segments. Although the segments operate logically as one LAN, the repartitioning prevents data from being broadcast indiscriminately across the entire network.

broadband

A type of transmission using coaxial cable and analog or radio-frequency signals. Broadband uses a frequency band that is divided into several narrower bands, so different kinds of transmission (data, voice, and video) can be transmitted at the same time.

brouter

This term has various definitions, but it usually refers to a device that performs the functions of both a bridge and a multiprotocol router. The term is often misused to describe a bridge with more than two LAN connections.

buffer

A location in memory set aside to temporarily hold data. It is often used to compensate for a difference in data flow rates between devices or skews in event timings; many network devices such as network interface cards (NIC) and routers have integrated buffer storage.

cable modem

A specialized, currently experimental modem service offered by cable companies that provides Internet access at speeds of 10Mbps downstream (to the subscriber) and 768Kbps upstream. The cabling infrastructure is already in place, but the service requires the cable company to replace existing equipment with expensive two-way transmission hardware.

capacity planning

The process of determining the future requirements of a network. An important process, if a network is to function properly and at peak performance, especially when users or equipment is added to the network.

category cable

Cable that complies with standard network cable specifications and is rated category 1 through 5. The higher the number, the higher the speed capability of the cable. The wire may be shielded or unshielded and always has an impedance of 100 ohms.

CAT-5 (Category 5)

A cabling standard for use on networks at speeds of up to 100 Mbits, including FDDI and 100base-T. The 5 refers to the number of turns per inch with which the cable is constructed. See also category cable.

CERT (Computer Emergency Response Team)

Formed in 1988 by the Defense Advanced Research Projects Agency (DARPA) to help facilitate and resolve Internet security issues. CERT was formed in response to the Internet worm written by Robert Morris, Jr., which infected thousands of Internet computers in 1988.

circuit switching

A method of transmission in which a fixed path is established between the nodes communicating. This fixed path permits exclusive use of the circuit between the nodes until the connection is dropped. The public telephone network uses circuit switching.

client/server model

A common way to describe the rules and concepts behind many network protocols. The client, usually a user's computer and its software, makes requests for information or programs from a server located somewhere on the network.

collision

The result of two or more computers trying to access the network medium at the same time. Ethernet uses CSMA/CD to handle collisions and to coordinate retransmission.

community string

A password used by the Simple Network Management Protocol (SNMP) that allows an SNMP manager station access to an agent's Management Information Base (MIB) database.

configuration management

The process of retrieving data from network devices and using the information to manage the setup of the devices. For example, SNMP has the ability to automatically or manually retrieve data from SNMP-enabled network devices. Based on this data, a network manager can decide whether configuration changes are necessary to maintain network performance.

connection-oriented communications

The transmission of data across a path that stays established until one of the nodes drops the connection. This type of logical connection guarantees that all blocks of data will be delivered reliably. Telnet is an example of connection-oriented communications.

connectionless communications

The transmission of data across a network in which each packet is individually routed to its destination, based on information contained in the packet header. The path the data takes is generally unknown because there is no established connection between the computers that are communicating. Connectionless services can drop packets or deliver them out of sequence if each of the packets gets routed differently.

cookie

A piece of information sent by content providers on the Internet that gets written to the user's local disk. The content providers often use this information to track where visitors link to on their Web site. Most browsers can be configured to disallow the writing of such data to user's disks.

CSMA/CD (Carrier Sense, Multiple Access with Collision Detection)

The medium access method used in Ethernet to avoid having more than one host transmitting on a LAN segment at a time. The transmitting host first listens for traffic on the cable and then transmits, if no traffic is detected. If two hosts transmit at the same time, a collision occurs. Each host then waits for a random length of time before listening and transmitting again.

CSU (Channel Service Unit)

The hardware interface to a Digital Data Service, for example, a T-1 line. The CSU provides line termination, signal amplification, and has the diagnostic ability to loop a signal back to its source. See also DSU (Data Service Unit).

datagram

A method of sending data in which some parts of the message are sent in random order. The destination computer has the task of reassembling the parts in the correct sequence. The datagram is a connectionless, single packet message used by the Internet Protocol (IP). A datagram is comprised of a source network address, a destination network address, and information.

D-channel

The ISDN channel used to deliver network control information; often referred to as out-of-band signaling. Because many telephone companies are not configured for out-of-band signaling, they combine the D-channel information with a B-channel. The result of this

combination is lower data rates, 56Kbps and 112Kbps, because of the overhead added to the B-channel.

data link layer

Layer 2 of the seven-layer OSI model. The data link layer is concerned with managing network access, for example, performing collision sensing and network control. Also, if the data link layer detects an error, it arranges to have the sending computer resend the corrupt packet.

DDS (Digital Data Service)

A leased digital transmission line offering speeds ranging from switched 56Kbps, to T-1 (1.544Mbps), or to T-3 service operating at 44.736Mbps. When DDS is employed, special digital modems called CSUs and DSUs are used to interface between the DDS line and the LAN.

DES (Data Encryption Standard)

An encryption algorithm based on a 64-bit key. DES is considered the most secure encryption algorithm available, but not the easiest to implement and maintain.

digital ID

An emerging technology using public-key cryptography to make Internet and intranet transactions secure.

DLCI (Data Link Connection Identifier)

A Frame Relay term describing the identifier given to each connection point. The DLCI is used so a node can communicate with the first Frame Relay machine. Then that machine maps the data to another DLCI it uses for its link with the next Frame Relay machine, and so on, until the destination node is reached.

DN (Directory Number)

The directory number is the address for the ISDN line assigned by the telephone company. The type of equipment the telephone company uses at its central office determines whether each of the two B-channels will be assigned their own directory numbers.

DNS (Domain Name Server)

A computer used to map IP addresses to computer system names. A network administrator creates a list on the domain name server where each line contains a specific computer's IP address and a name associated with that computer. When someone wants to access another computer, either the IP address or the name of the computer is used. Using names is easier than remembering scores of IP addresses.

domain

Part of the naming hierarchy used on the Internet and syntactically represented by a series of names separated by dots. Take, for example, the domain name CATJO.BONZO.BOBO.COM. Read right-to-left, the address provides the path to a company (COM) named BOBO, to a company network named BONZO, and finally to the destination computer named CATJO.

DS 1-4 (Digital Services 1-4)

The connection services offered by the telephone companies through T-carriers, more commonly known as T-1, T-2, T-3, and T-4.

Service	*T-Carrier*	*Voice Channels*	*Rate (Mbps)*
DS-1	T-1	24	1.544
DS-2	T-2	96	6.312
DS-3	T-3	672	44.736

DSL (Digital Subscriber Line)

Modems on either end of a single twisted-pair wire that deliver ISDN Basic Rate Access. A DSL transmits duplex data at 160Kbps over 24-gauge copper lines at distances up to 18,000 feet. The multiplexing and de-multiplexing of this data stream creates two B-channels (64Kbps each), a D-channel (16Kbps), and some overhead that takes place for attached terminal equipment. DSL employs echo cancellation to separate the transmit signal and the receive signal at both ends.

DSS1 (Digital Subscriber Signaling System No. 1)

A set of protocols in ISDN designed so your equipment can ask for specific services across the network. Directed at the carrier's switching equipment, DSS1 sends message types that provide the specific control (for example, connect, hold, and restart) to be taken.

DSU (Data Service Unit)

A DSU provides the interface between the Data Terminal Equipment (DTE) and the Channel Service Unit (CSU) when a network is connected to a Digital Data Service (DDS). The DSU's primary functions are to properly convert a DTE's output signals to the format required by the DDS and to provide control signaling.

DVMRP (Distance Vector Multicast Routing)

A protocol used to support IP Multicast. As users join or leave multicast groups, data is broadcast to each router in the internetwork. The routers prune out the users who do not want further transmissions.

encapsulation

A method of wrapping data in a particular protocol header. For example, Ethernet data is wrapped in a special Ethernet header before transmission. Encapsulation is also used when sending data across dissimilar networks. When a frame arrives at the router, it is encapsulated with the header used by the link-layer protocol of the receiving network before it is transmitted.

encryption

A technique of altering data so it becomes incomprehensible to unintended recipients. Encryption algorithms can be simple (for example, associate each letter in the alphabet to a number) or extremely complex (for example, public-key encryption).

Ethernet

The most widely used type of LAN environment, with common operating speeds of 10Mbps and 100Mbps. Ethernet uses the Carrier Sense, Multiple Access with Collision Detection (CSMA/CD) discipline.

Ethernet switch

A hub-like device that reads the destination address in the header of an Ethernet packet and redirects the packet to the proper destination port. By sending the packets only to the destination port and not all other ports, an Ethernet switch increases the amount of data that can be transmitted on the network at one time. Contrast a switch with a standard repeating hub, which takes incoming traffic and repeats it across all ports regardless of the intended destination.

fast-Ethernet switch

An Ethernet switch that operates on a 100Mbps LAN.

fault tolerance

The ability of a network to function even after some hardware or software components have failed and are not available to the user. Fault-tolerant networks attempt to maintain availability by using component redundancy (hardware and/or software) and the concept of atomicity (that is, either all parts of a transaction occur or none at all).

FDDI (Fiber Distributed Data Interface)

A 100Mbps fiber-optic LAN standard that operates on Token Ring mechanics and is usually installed as a backbone. A full duplex (send and receive simultaneously) configuration is possible, which doubles the transmission throughput to 200Mbps.

file server

A computer attached to a network that provides mass disk storage and file services to users. Most often a file server is setup so that only select users or groups of users can access the resource.

firewall

A hardware and software device that protects and controls the connection of one network to other networks. The firewall prevents unwanted or unauthorized traffic from entering a network and also allows only selected traffic to leave a network.

fractional T-1

A full T-1 line consists of 24 64Kbps channels. It is possible to purchase only a portion of a T-1 line, depending on resource needs; hence the term fractional T-1.

fragment

Part of a data packet. If a router sends data to a network that has a maximum packet size smaller than the packet itself, the router is forced to break up the packet into smaller fragments.

Frame Relay

A technique using virtual connections to transport data between networks attached to a WAN. Packets are routed to their destination based on the DLCI number assigned to each of the nodes that are members of the Frame Relay cloud. The cloud is the part of the network the telephone company handles. To the user, it's unknown what happens inside the cloud; data goes in the cloud, then comes out and arrives at the correct destination.

frequency division multiplexing (FDM)

The technique of dividing a specific frequency range into smaller parts, with each part maintaining enough bandwidth to carry one channel.

fubar or foobar

Fouled Up Beyond All Repair. There are also other more colorful versions of this slang term.

full-duplex

The capability of having two-way data transmission in both directions (send and receive) simultaneously. Contrast to half-duplex.

gateway

A network device that performs protocol conversion between dissimilar networks. A gateway is typically used to provide access to wide area networks over asynchronous links from a LAN environment.

half-duplex

A method of two-way transmission, but data can only travel in one direction at a time. Contrast to full-duplex.

hardware address

Also called the physical address, it is a data link address associated with a particular network device.

HDLC (High-Level Data Link Control)

The most widely used synchronous data link protocol in existence. It supports both half-duplex and full-duplex transmission, point-to-point configurations, and switched or non-switched channels.

HDSL (High data rate Digital Subscribe Line)

Modems on either end of one or more twisted-pair wires that deliver T-1 or E-1 transmission speeds. Presently, T-1 service requires two lines and E-1 requires three.

HIPPI (High Performance Parallel Interface)

A standard that extends a computer bus over short distances at speeds of 800 to 1600Mbps. HIPPI is often associated with supercomputers.

hop

A routing term that refers to the number of times data travels through a router before reaching its destination.

hub

A device that connects to several other devices, usually in a star topology. For example, a 12-port hub attached to a 100base-T LAN backbone allows 12 devices or segments to connect to the LAN. There are two type of hubs: Dumb hubs simply act as repeaters and smart hubs have sophisticated features such as SNMP support or built-in bridging or routing functions.

ICMP (Internet Control Message Protocol)

The protocol that handles errors and control messages at the Internet Protocol (IP) layer. For example, when a data packet is transmitted with incorrect destination information, the router attached to the network responds with an ICMP message indicating an error occurred within the transmission.

IGRP (Interior Gateway Routing Protocol)

A protocol developed by Cisco Systems that is used on networks that are under common administration. This protocol was designed to operate on large, complex topology networks with segments that have different bandwidth and delay characteristics. As with other routing protocols, IGRP determines where to send data packets that have destination addresses outside the local network.

interoperability

The ability of applications and hardware combinations on two or more computer systems to communicate successfully with each other. Standards set by groups such as the IEEE are the reason why devices from different vendors operating across multiple platforms are capable of working with each other.

intranet

A term that describes a spin on Web technology that uses servers and browsers to set up a private Internet.

IP (Internet Protocol)

A network layer protocol that contains addressing information and some control information so packets can be routed across an internetwork. The ICMP control and message protocol are integrated within IP, also.

IP Multicast

A method of sending data simultaneously to a selected group of recipients. Multicast makes efficient use of bandwidth because it unicasts to all intended recipients and avoids broadcasting to unnecessary destinations.

Ipng or IPv6

The next generation (ng) of Internet addressing. The current 32-bit Internet addressing scheme (IPv4) is severely strained by current Internet growth. IPv6 (64-bit) is one proposed next generation method of increasing the number of available Internet addresses while also providing additional functionality.

IP switching

An ATM switch capable of routing IP. Standard ATM switches cannot accommodate IP without complicated and difficult-to-manage software translation. By implementing the IP protocol stack on ATM hardware, full compatibility with existing IP networks is maintained while reaping the benefits of the high-speed throughputs associated with ATM.

IPX (Internetwork Packet Exchange)

A protocol suite developed by Novell, Inc. and used by computer systems attached to a network running the NetWare operating system. IPX provides a best-effort delivery service and is equivalent to the IP of TCP/IP.

ISDN (Integrated Services Digital Network)

A type of network provided by the telephone companies that allows both voice and digital services to be combined over a single medium. ISDN services are delivered over standard POTS lines at a speed of 128Kbps.

isochronous service

A transmission service in which the data channel has a guaranteed bandwidth. Bandwidth on an isochronous service is preallocated and stays fixed, whether the bandwidth is used or not, guaranteeing that the required bandwidth is available when it is needed. FDDI and ATM, handling audio and video data, are examples of technologies that support isochronous service.

ISP (Internet service provider)

A company that provides direct access to the Internet as opposed to an online service (for example, America Online or CompuServe) that provides Internet access through a gateway. ISPs usually offer a large range of services, such as Gopher, Archie, Telnet, FTP, or WWW.

jabber

Continuously sent random or garbage data.

jam signal

In Ethernet, a signal generated by a network interface to let other devices know that a collision has occurred.

keep alive

A message sent over an idle network link. The message tells a remote computer that the local computer remains operational and is waiting.

Kerberos

An authentication system used for open systems and networks. Developed at MIT, Kerberos can be added onto any existing protocol. The system uses an adaptation of DES (Data Encryption Standard) and tickets to protect messages sent on a network by a user and by the system. Kerberos never transmits passwords over the network. Contrast Kerberos to public key encryption.

LATA (Local Access Transport Area)

Telephone companies operate within specific geographical regions divided into areas called LATAs. A connection made between two points within the same LATA implies that a connection is local. A connection outside the LATA requires the use of an Interexchange Carrier or long-distance company.

LDAP (Lightweight Directory Access Protocol)

A new protocol, also known as X.500 Lite, that simplifies the complex structure of Internet directories (databases) that handle client information about users and e-mail addresses.

leased line

A permanent circuit provided by the telephone company. Communications on a leased line are not established by dialing and are usually configured as a direct point-to-point connection. A T-1 connection is an example of a leased line.

local loop

The copper twisted-pair cable from the telephone company's central office to an end user's location. The local loop is the determining factor in the data rate associated with your use of the telephone system.

MAC (Media Access Control)

The lower portion of the data link layer responsible for control of access to the physical medium.

MAN (Metropolitan Area Network)

A data network intended to serve an area approximating that of a large city.

managed object

Devices on a network such as workstations, hubs, servers, and routers that are all monitored via SNMP. Each device contains hardware or software that allows it to communicate with the SNMP manager station responsible for tracking all the managed network components.

MAU (Media Attachment Unit)

A device that physically attaches to a LAN and allows the connection of computers or additional LAN segments. A MAU is often referred to as a transceiver and attaches to a computer through an AUI cable.

MIB (Management Information Base)

In SNMP, the MIB is the database where information about the managed objects is stored. The structure of an MIB is complex and can contain information about many aspects of the device being managed.

MIME (Multipurpose Internet Mail Extensions)

A standard set of definitions designed to handle non-ASCII e-mail. MIME specifies how binary data, such as graphical images, can be attached to Internet e-mail. The process of attaching binary data to e-mail requires encoding between two types of data formats. It is MIME's responsibility to handle the encoding and the decoding at the destination.

modem (modulator-demodulator)

A communication device that performs conversion of digital signals into analog signals (transmission) and analog signals into digital signals (receiving). This conversion is necessary if communication over standard POTS is attempted.

multicast

The process of sending messages to a defined set of destinations. Unlike a broadcast, which is read by all destinations that receive them, a multicast is received only by those destinations that are part of a predefined group configured to receive multicast messages.

multicast multimedia transmission

A multicast transmission of video. Rather than sending individual streams of video to each user (unicast), multicast multimedia transmission sends a stream of video that is shared among users assuming the user is configured to receive such transmissions. See also multicast.

multimode fiber

A type of fiber-optic cable. The word mode is synonymous with ray; you can think of multimode fiber as transmitting multiple rays. Multimode fiber typically has a core diameter of 62.5 microns and is usually selected for short haul networks (less than 2km).

multiplexer

A device used to combine data transmitted from many low-to-medium speed devices onto one or more high-speed paths for retransmission. There are various techniques for achieving this, such as time division, frequency division, statistical time division, and wavelength division multiplexing. A multiplexer is sometimes called a concen- trator.

multiport repeater

A type of hub used to join multiple LAN segments. When a segment exceeds its maximum allowable nodes, a repeater is often used to expand the network. See also segmentation.

NetBIOS (Network Binary Input Output System)

Software developed by IBM that extends the interface between the PC operating system and the PC I/O bus to include attachment to a network. Since its design, NetBIOS has become a de facto standard, providing the basic framework for PCs to operate on a LAN.

network layer

Layer 3 of the seven-layer OSI model. The network layer plans the routing of packets and is responsible for addressing and delivering messages from the sender to the final destination. A simple network comprised of a few LANs linked by bridges would not need a Layer 3 at all, because there is no routing involved.

network management

The job of controlling a network so it can be used in an efficient manner. Network management is divided into five management categories: performance, fault, accounting, security, and configuration.

NNTP (Network News Transport Protocol)

A protocol that allows Internet users to access Usenet groups.

OC-1 to 48 (Optical Carrier 1-48)

The high-speed optical carrier networks used by the telephone companies. OC services provide much higher speeds than T-carrier services such as T-1 or T-2.

OC Service	*Data Rate*
OC-1	51.84Mbps
OC-12	622.08Mbps
OC-24	1244.16Mbps

OPR (Optical Packet Router)

A device demonstrated by British Telecom that is capable of routing data on fiber-optic cable at 100Gbps. The router works by reading the destination address of the encoded pulses of light and switching the data to the appropriate output path toward the destination. Because the data rates are about 100 times faster than current non-optical routers, this technology has significant implications for high-speed networks in the future.

optical matrix switch

A device that simply cross-connects one or more fiber-optic cables. This type of switch allows a network to be reconfigured quickly and easily to accommodate specific requirements or workgroup moves. For example, an ATM LAN could be connected to other multiple protocol networks within a building by optical switches, if needed.

OSI model

A concept developed by ISO and CCITT used to develop standards for data networking that promote multivendor equipment interoperability. The OSI model is separated into seven layers that relate to the interconnection of computer systems. See also application layer, presentation layer, session layer, transport layer, network layer, data link layer, and physical layer.

OSPF (Open Shortest Path First)

A protocol that routers use to communicate between themselves. OSPF has the ability to configure topologies and adapt to changes in the Internet. It can also balance traffic loads by determining which routes offer the best service.

OTDR (Optical Time Domain Reflectometer)

Diagnostic equipment used to calculate the length and attenuation of a fiber-optic cable. By sending a short duration laser pulse into one end of the fiber, the fiber's length is calculated by measuring the amount of time it takes for a reflection to return from the other end.

packet

A group of bits comprised of address, data, and control information that is combined and transmitted as one unit. The terms frame and packet are often used synonymously.

packet-switched network

A networking technique where data is broken into small packets and then transmitted to other networks over a WAN to computers configured as packet switches where the data is then reassembled. The packets get routed and rerouted, depending on the size of the network or the distance the packets travel to their destination.

passband

The range of frequencies a data line is capable of handling. Passband is often confused with bandwidth, the width of a channel contained within the passband.

peer-to-peer

Communication between computers in which neither computer has control over the other.

performance management

The process of analyzing the characteristics of a network to monitor and increase its efficiency. For example, a network manager may monitor a network using a Sniffer and develop statistics from that data in hopes of finding ways to increase available bandwidth on a crowded network.

physical layer

Layer 1 of the seven-layer OSI model, which specifies the physical medium of a network. It is the wire on which data is transmitted and it is the connectors, hubs, and repeaters that comprise the network. Some refer to the physical layer as the hardware layer.

Ping (Packet Internet Groper)

A utility program used to determine whether a remote computer is reachable by sending it multiple ICMP echo requests and then waiting for a response.

POP (Point Of Presence)

The connection site where entry to a WAN or the public switched network occurs. The term is most often heard when referring to Internet service providers (ISPs) and their dial-up access locations.

POTS (Plain Old Telephone Service)

Single line twisted-pair residential telephone service.

PPP (Point-to-Point Protocol)

A point-to-point circuit is a network configuration where a connection exists only between two points. PPP is the protocol for transmitting routing information over synchronous or asynchronous point-to-point circuits. The routing information allows different vendor's equipment to interoperate over point-to-point circuits.

PPTP (Point-to-Point Tunneling Protocol)

A secure remote access protocol, developed by Ascend Communications, Inc. and touted by Microsoft Corp. for their Windows platforms, that allows remote users to access their corporate network(s) via the Internet. PPTP makes use of encryption to secure the virtual private connection between the user and the corporate network. The tunneling nature of PPTP allows users to piggyback IPX and NetBEUI on IP packets.

presentation layer

Layer 6 of the seven-layer OSI model. The presentation layer makes sure that data sent to the application layer is in the correct format. If some conversion were required between different data types, it would take place at this layer. Translation and byte reordering is sometimes necessary when different computers (for example, IBM, Apple, NeXT) want to share information.

PRI (Primary Rate Interface)

An ISDN interface consisting of 23 B-channels, operating at 64Kbps each, and one 64Kbps D-channel. Companies installing multiple ISDN lines often use PRI to provide sufficient bandwidth for their network(s). PRI service is referred to as 23B+D.

protocol

A set of rules governing how information flows within a network. Protocols control format, timing, and error correction. They are essential for a device to be able to interpret incoming information. Suites of protocols are often used in networks, with each protocol responsible for one part of a communications function.

protocol emulator

A computer that generates the protocols required by another computer. The term, protocol converter, is often used in place of protocol emulator. A converter is slightly different in that it translates data between two dissimilar protocols so that different systems can communicate with each other.

proxy agent

In SNMP, a device that gathers information about other SNMP-enabled devices on the network. At some predetermined time, the proxy agent will relay the stored information to the SNMP management station for analysis.

public key encryption

A form of asymmetric encryption in which encryption and decryption are performed using two separate keys. One key is referred to as the public key, the other as the private key. The public key is made available to everyone and is used to encrypt a message. The owner of the public key receives a message encrypted with his public key and then decrypts the message with his private key, the only key that can decrypt the message.

punch down block

A wire termination device in which wire is placed across a Y-shaped connector and then connected or punched down using a special tool. The connections made on a punch down block are very reliable.

PVC (Permanent Virtual Circuit)

A circuit that is permanently dedicated, such as a leased line. The virtual aspect of PVC is that a user does not know what path the data took to get to its destination after the data has entered the circuits of the telephone company's central office.

RARP (Reverse Address Resolution Protocol)

The logical reverse of ARP. RARP is used to determine the IP address of a computer on a TCP/IP network when only the hardware address is known.

repeater

A device used to increase the length of a LAN or to increase the distance between devices attached to the LAN. The span can be increased because a repeater regenerates the signals before retransmitting them.

RFC (Request For Comments)

Documents outlining standards and procedures for the Internet. These numbered documents are controlled by the Internet Activities Board (IAB) and are available in hard-copy from the Defense Data Network, Network Information Center, (DDN/NIC) or electronically over the Internet.

RG58

50 ohm coaxial cable used in 10base-2 Ethernet networks. Often referred to as ThinNet or CheapNet.

RJ45

A standard 8-pin conductor modular plug. The RJ45 connector is replacing the RJ11 (6-pin) connector for use in 10base-T networks. RJ45 connectors look very similar to the old RJ11 modular jack used on telephones.

RMON MIB (Remote Network Monitoring Management Information Base)

The standard that defines the information sent to and from devices within a network using SNMP. To ease the difficulties in managing networks spanning large geographical areas, remote management devices or probes are placed on remote segments to act as the eyes and ears of the network management system. RMON MIB defines what data passes between the remote devices and the SNMP manager.

router

In general terms, a router makes decisions about which of several possible network paths data will follow. In a TCP/IP network, a router reads IP destination addresses to determine routes.

routing table

A directory contained in a router's memory that contains the addresses of other networks or devices and how to reach them.

RPC (Remote Procedure Call)

A complex facility that allows a local process or program to invoke a remote process.

SCSI (small computer systems interface)

A high-performance bus for connecting peripherals to a computer. The SCSI interface, or host card, allows multiple SCSI-compatible devices to attach to the bus. SCSI's design intent is two-fold: increase throughput speed and decrease the number of problems associated with hardware compatibility.

SDSL (Single line Digital Subscriber Line)

HDSL over a single telephone line. This name has not been set by any standards group, and may not stick. SDSL operates over POTS and would be suitable for symmetric services to the premises of individual customers.

segment

A bus LAN term meaning an electrically continuous piece of the bus. Segments can be joined together using repeaters or bridges.

segmentation

The process of splitting a network into multiple segments. A multiport repeater is one device often used to segment LANs. In diagnostic terms, segmenting a network minimizes the difficulty of analyzing network faults. Rather than the whole network being inoperable, only the segment with the fault ceases to function.

serial link

A connection where the data bits are transmitted sequentially over a single channel.

session layer

Layer 5 of the seven-layer OSI model. The session layer defines the session type between two computers and controls the dialogue between the applications on those two computers. For example, when a user accesses another computer, a session that allows computer applications to inform each other of any problems is created and controlled by Layer 5.

singlemode fiber

A type of fiber-optic cable. Singlemode fiber typically has a core diameter of 8 microns and is usually selected for high bandwidth, long haul networks (greater than 2 km). It is also the most difficult optical cable to splice and terminate because of its small core diameter.

SLIP (Serial Line Internet Protocol)

An Internet protocol used to run IP over serial lines, such as telephone circuits, and connecting two computers. Though similar to PPP, SLIP supports only IP and is not as efficient as PPP.

SMDS (Switched Multimegabit Data Service)

Pronounced "smuds," SMDS is a high-speed, datagram-based, public data network. SMDS currently allows several remotely located LANs to communicate with each other at 45Mbps (T-3) speeds.

SMTP (Simple Mail Transfer Protocol)

The TCP/IP standard protocol used to transfer e-mail from one computer to another. SMTP manages mail functions such as establishing a sender's credentials and ensuring a recipient's mailbox is correct.

Sniffer

Originally the name for the protocol analyzer from Network General, but now incorrectly used to describe protocol analyzers in general. A Sniffer decodes and interprets frames on LANs with more than one protocol. A user programs the Sniffer with search criteria and starts the packet capture process. When the capture is complete, the results are displayed on the screen.

SNMP (Simple Network Management Protocol)

A network system framework designed to collect report information, configuration information, and performance data with the use of SNMP managers and agents. An agent

is a device such as a hub, a router, or even a computer that has the capability to store SNMP data, such as information about whether the device is functioning properly. A manager is the device that retrieves SNMP data from the agent devices installed on the network.

SONET (Synchronous Optical NETwork)

A high-speed fiber-optic network used to interconnect high-speed networks. SONET can carry data 50 times faster than T-3 rates while providing higher-quality signals. SONET operates by multiplexing low-speed lines onto high-speed trunk lines.

spanning tree

An algorithm used by bridges to automatically develop routing tables, a list of possible data paths, and update that table anytime the network topology changes. Spanning tree is used to avoid network loops by ensuring there is only one route between any two LANs in the bridged network.

SPID (Service Profile IDentifier)

A number used to identify the ISDN device to the telephone network, much as an Ethernet address uniquely identifies a network interface card. A SPID is assigned to each channel of an ISDN line.

spooling

The process of controlling data, usually to a printer. Spooling uses buffer storage to reduce processing delays when transferring large amounts of data between printers and computers. The term is derived from the expression simultaneous peripheral operation Online.

SS7 (Signaling System 7)

A transmission system based on the use of a dumb switch and a smart database. By using this database and switch combination, the number of network features is significantly increased. Another advantage of SS7 is that networks can be easily customized because more knowledge can be contained in the database than can be embedded cost effectively in hardware.

subnet mask

A 32-bit mask used to interpret the network address from the host addresses in an IP address.

subscriber loop

The connection between the user's equipment and a telephone company's central office.

switched virtual circuit (SVC)

In packet switching, SVC gives the user the appearance of an actual connection. An SVC is dynamically established when needed.

synchronous transmission

A method of data transfer in which characters are blocked together for transmission as a group. Special synchronization characters are placed at the beginning and end of each block to delineate the start and end of the block. Contrast with asynchronous transmission.

T-1

A T-carrier that operates at 1.544Mbps. See also DS1-4.

T-3

A T-carrier that operates at 44.736Mbps. See also DS1-4.

T-Carrier

The U.S. standard for digital transmission lines. The line types are of the form T-n, as in T-1 or T-3, and the corresponding line signal standards of the form DS-n, as in DS-1 or DS-4.

TA (Terminal Adapter)

The terminal adapter's function is to adapt non-ISDN equipment to ISDN. For example, you will often see a terminal adapter marked with an R interface that is a connection point typically for an analog phone, a modem, or other devices that are not ISDN compliant.

Tap

The connecting device on cable-based LANs, such as Ethernet, linking to the main transmission medium. For example, taps are used to connect multiport repeaters to 10base-5 coaxial cabling.

TCP/IP (Transmission Control Protocol/Internet Protocol)

The two best-known Internet protocols that are often mistaken as a single protocol. TCP corresponds to the transport layer (Layer 4 of the OSI model) and is responsible for the reliable transmission of data. IP corresponds to the network layer (Layer 3) and provides for the connectionless service of data transmission.

terminal server

A device that connects terminals and modems to a network. Terminal server is synonymous with access server.

TFTP (Trivial File Transport Protocol)

A simplified version of FTP that transfers files from one computer to another without the need for authentication. TFTP is sometimes used to help boot diskless workstations by retrieving boot images from a remote server.

Token Ring

A popular LAN type in which access to the network is controlled by use of a token. A computer can transmit only if it has possession of the token. Data is attached to the token and the token is passed to the next computer in the sequence. Token Ring network topology is typically star-shaped but, because of the sequential nature of token passing, the network operates logically as a ring.

topology

The physical structure and organization of a network. The most common topologies are bus, tree, ring, and star.

transport layer

Layer 4 of the seven-layer OSI model. The transport layer is responsible for ensuring that data is delivered reliably between nodes. Also, if more than one packet is in process at any one time, the transport layer sequences the packets to ensure the packets get rebuilt in the correct order.

tunneling

A method of encapsulating data so it can be transmitted across a network that operates with a different protocol.

twisted pair

A transmission media consisting of two shielded or unshielded copper wires that are arranged in a precise spiral pattern. The spiral pattern is an important aspect of twisted-pair cables in order to minimize crosstalk or interference between adjoining wires. See also CAT-5.

UDP (User Datagram Protocol)

A connectionless transport protocol used by IP networks that allows an application program on one computer to send a datagram or packet to an application program on another computer. Unlike IP packets, UDP packets include a checksum (error- checking data) with the data being sent.

Usenet

The large group of computers set up to exchange information in the form of newsgroups. Any user that connects to the Internet and has the proper software can access Usenet. It is not controlled by any person or organization, so the content of each newsgroup is determined by its users.

virtual channel

A channel that appears to the user to be a simple, direct connection, but in fact is implemented in a more complex manner.

WDM (Wavelength Division Multiplexing)

A technique using an optical multiplexer to combine light sources of different wavelengths onto a fiber-optic cable. When the light reaches the end of the cable, an optical demultiplexer separates the original signals by wavelength and passes them to detector circuits for conversion back into electrical signals.

wide area network (WAN)

A data communications network designed to work over a large geographical area. Corporate WANs can connect employees across many branch offices by using various telecommunication link technologies.

wiring closet

A room that often serves as the central location for network devices. For example, a wiring closet could be located in the middle of a small building. All the network wiring would originate from this room and all the connections to the routers, hubs, and other network devices are easily accessed in one location.

worm

A program that copies itself from one computer to another, usually over a network. Like viruses, worms may damage data or degrade performance by overloading system resources. One famous worm in the late 1980s virtually brought down the global WAN of a large computer company by tying up network resources each time unwitting users opened their e-mail.

"High Performance Networking Unleashed"- Sportack & Johnson- Edit. Macmillan Computer Publishing.