

Computer Desktop Encyclopedia

Ninth Edition

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client (1) A workstation or personal computer in a client/server environment. See *client/server* and *fat client*.

(2) One end of the spectrum in a request/supply relationship between programs. See *X Window* and *OLE*.

client application An application running in a workstation or personal computer on a network. See also *OLE*.

client based Refers to hardware or software that runs in the user's machine (client). Contrast with *server based*.

client machine A user's workstation that is attached to a network. The term can also refer to a portable computer that is plugged into the network. See *client* and *client/server*.

client program Software that runs in the user's PC or workstation. Contrast with *server program*, which resides in a server in the network.

client/server An architecture in which the user's PC (the client) is the requesting machine and the server is the supplying machine, both of which are connected via a local area network (LAN) or wide area network (WAN). Throughout the late 1980s and early 1990s, client/server was the hot buzzword as applications were migrated from centralized minicomputers and mainframes to networks of personal computers.

In client/server, the client processes the user interface (Windows, Mac, etc.) and can perform some or all of the application processing. Servers range in capacity from high-end PCs to mainframes. A database server maintains the databases and processes requests from the client to extract data from or to update the database. An application server provides additional business processing for the clients. See *client/server development system*.

Client/server Versus the Web Because of the Internet, terms such as "Web based" and "Web enabled" have replaced the client/server buzzword, yet the client/server architecture is conceptually the same. Users' PCs are still clients, and there are tens of thousands of Web servers throughout the Internet delivering Web pages. Nevertheless, client/server is mostly used to refer to "legacy," non-Web based systems.

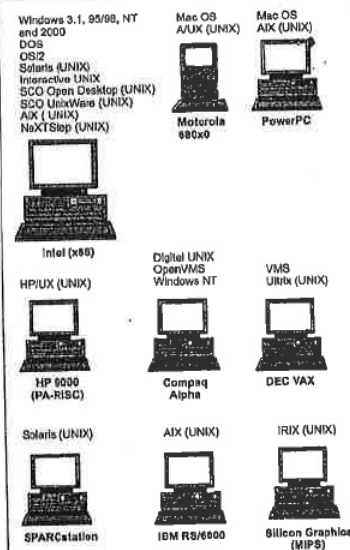
On the Web, the client runs the browser and just like legacy client/server can perform little or a lot of processing: simple displaying of HTML pages, more processing with embedded scripts or considerable processing with Java applets. A myriad of browser plug-ins provide all sorts of client processing.

The server side of the Web is a multi-tier server architecture with interlinked Web servers, application servers, database servers and caching servers. See *application server*.

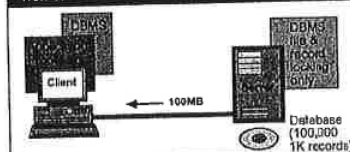
client/server analyst A person responsible for performing analysis and design of a client/server system. A knowledge of two-tier and three-tier client/server architectures is required. See *systems analyst* and *client/server*.

client/server architecture An environment in which the application processing is divided between client workstations and servers. It implies the use of desktop computers interacting with servers in a network, in contrast to processing everything in a large centralized mainframe. See *client/server*.

CLIENT PLATFORMS (CPU & OS)



Non-Client/Server



Non-Client/Server

Although there are clients and servers in this scenario, this is not "true" client/server, because the server is nothing more than a remote disk drive, and the client does all the processing. Lengthy searches can bog down the network, because each client has to read the entire database. At 1,000 bytes per record, a database with 100,000 records sends 100MB over the LAN.

PATROL An application management suite from BMC that uses agents to report on software activities on all the servers within the enterprise. Using the information in "knowledge modules" (KMs) about each system component, agents detect events, collect information and notify system and network administrators to take corrective action.

PAX (1) (Private Automatic Exchange) An inhouse intercom system.

(2) (Parallel Architecture Extended) A parallel processing environment standard based on Intel's i860 RISC chip, UNIX System V and Alliant Computer's parallel and 3-D graphics technologies.

payload The data-carrying capacity of some structure. It typically refers to a part of a packet or frame in a communications system that holds the message data in contrast to the headers, which are considered overhead.

payment service See *Web payment service*.

payware Software distributed for money. Contrast with *freeware*.

PB See *PowerBuilder*.

PBX (Private Branch eXchange) An inhouse telephone switching system that interconnects telephone extensions to each other, as well as to the outside telephone network. It may include functions such as least cost routing for outside calls, call forwarding, conference calling and call accounting. Modern PBXs use all-digital methods for switching and may support both digital terminals and telephones along with analog telephones. See *WPBX*.

PC (3) (Printed Circuit) See *printed circuit board*.

(2) (Personal Computer) Any laptop or desktop computer such as Windows machine or a Macintosh.

(1) (Personal Computer) A stand-alone laptop or desktop computer running Windows (or DOS for earlier applications). PC hardware and operating systems are primarily governed by Intel and Microsoft respectively. The PC is the world's largest computer base.

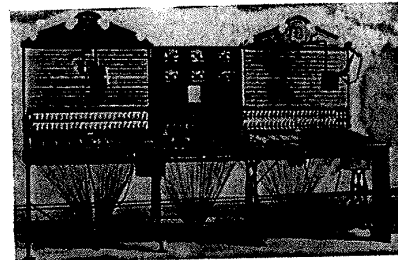
PCs are also widely used as clients and servers in a local area network (LAN). PC clients predominantly run under Windows, but PC servers (x86-based servers) run under Windows, NetWare or a variation of UNIX such as Linux or UnixWare. PC servers may use Windows 95/98, but Windows NT and 2000 are more likely choices.

Although there are literally thousands of PC vendors, from mom and pop shops to large mail order houses (Dell, Gateway, etc.) to the major computer companies (Compaq, HP, etc.), and of course IBM, still one of the world's largest PC makers, all PCs use an Intel x86 or compatible CPU.

After IBM introduced the PC in 1981, the first attempts at cloning it were mostly unsuccessful. Except for Compaq's first PC, from 1982 to 1985, there were a lot of "almost compatible" PCs. However, as soon as the part of the operating system known as the BIOS was successfully cloned and made commercially available, true compatibles appeared in abundance.

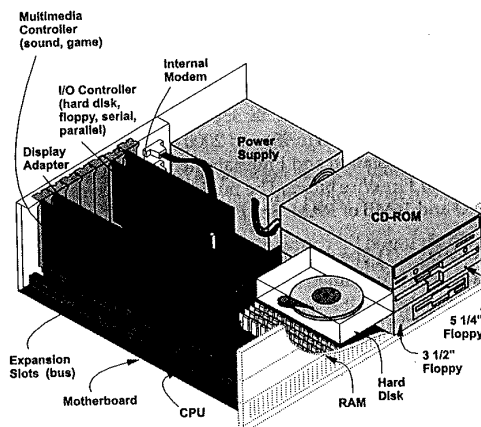
Before Windows 95, adding another peripheral device to a PC was often an exercise in trial and error. Modifying DOS's infamous configuration files (AUTOEXEC.BAT and CONFIG.SYS) caused many a user to give up. Windows 95, 98 and 2000 added Plug and Play, which means for the most part, you can replace hard disks and display adapters, as well as add a scanner, CD-ROM or other device without difficulty.

The PC has become a commodity item, winding its way onto the shelves of retail outlets worldwide. This is a testimonial to the power of a computer standard, even one fraught with loopholes and inconsistencies.



An Early PBX

This PBX began operation in Bangor, Maine in 1883. (Image courtesy of AT&T.)



What's Inside a PC?

Perl (Practical Extraction Report Language) A programming language written by Larry Wall that combines syntax from several UNIX utilities and languages. Introduced in 1987, Perl is designed to handle a variety of system administrator functions and provides comprehensive string handling functions. It is widely used to write Web server programs for such tasks as automatically updating user accounts and newsgroup postings, processing removal requests, synchronizing databases and generating reports. Perl has also been adapted to non-UNIX platforms. See also *PURL*.

permanent font (1) A soft font that is kept in the printer's memory until the printer is turned off.
(2) Same as *internal font*.

permanent memory Same as *non-volatile memory*.

permutation One possible combination of items out of a larger set of items. For example, with the set of numbers 1, 2 and 3, there are six possible permutations: 12, 21, 13, 31, 23 and 32.

perpendicular recording See *vertical recording*.

per seat By workstation. See *per seat licensing*.

per seat licensing Software licensing based on a per user basis. For example, a 100-user license means that up to 100 specifically-named users have access to the program. Per seat licensing is administered by providing user-level security to the directory containing the program. Contrast with *concurrent licensing*.

persistence (1) In a CRT, the time a phosphor dot remains illuminated after being energized. Long-persistence phosphors reduce flicker, but generate ghost-like images that linger on screen for a fraction of a second.
(2) In object technology, the storage of an object on a disk or other permanent storage device.

persistent data Data that exists from session to session. Persistent data is stored in a database on disk or tape. Contrast with *transient data*.

persistent link See *hot link*.

persistent object An object that continues to exist after the program that created it has been unloaded. An object's class and current state must be saved for use in subsequent sessions. In object technology, persistence means storing the object for later use.

personal agent See *agent*.

personal communicator See *PDA*.

personal computer Synonymous with "microcomputer," "desktop computer," and "laptop computer," it is a computer that serves one user in the office or home. A complete personal computer system with printer can cost as little as \$1,000 or as much as \$8,000 or more. Size is based on memory and disk capacity. Speed is based on the CPU that runs it, and output quality is based on the type and resolution of its monitor and printer.

Major Suppliers of Personal Computers The personal computer world is dominated by Windows-based PCs. There are thousands of vendors that make them, from mom and pop shops to huge companies such as Compaq, HP and IBM. The alternate personal computer standard is Apple's Macintosh, which is only made by Apple. Atari and Commodore once carved out their respective niches, but Atari returned to its gaming roots and Commodore has since closed its doors.

The History of Personal Computers The industry began in 1977, when Apple, Radio Shack and Commodore introduced the first off-the-shelf computers as consumer products. The first machines used an 8-bit microprocessor with a maximum of 64K of memory and floppy disks for storage. The Apple II, Atari 500, and Commodore 64 became popular home computers, and Apple was successful in companies after the VisiCalc spreadsheet was introduced. However, the business world was soon dominated by the Z80 processor and CP/M operating system, used by

protocol stack The hierarchy of protocols used in a communications network. Network architectures designed in layers, such as TCP/IP, OSI and SNA, are referred to as stacks. See *OSI*.

protocol suite Same as *protocol stack*.

prototyping (1) Creating a demo of a new system. Prototyping is essential for clarifying information requirements. The design of a system (functional specs) must be finalized before the system can be built. While analytically-oriented people may have a clear picture of requirements, others may not.

Using fourth-generation languages, systems analysts and users can develop the new system together. Databases can be created and manipulated while the user monitors the progress. Once users see tangible output on screen or paper, they can figure out what's missing or what the next question might be if this were a production system. If prototyping is carefully done, the end result can be a working system.

Even if the final system is reprogrammed in other languages for standardization or machine efficiency, prototyping has served to provide specifications for a working system rather than a theoretical one.

(2) See *function prototyping*.

provisioned Set up for a particular type of telecommunications service. See *provisioning*.

provisioning Setting up a telecommunications service for a particular customer. Common carriers provision circuits by programming their computers to switch customer lines into the appropriate networks.

proxy See *proxy server*.

proxy cache A facility in a proxy server that caches incoming Web pages on the hard disk. If the next page requested by a browser is already in the proxy cache, the page is retrieved locally instead of from the Internet. With proxy caches, the browsers must be configured to use the proxy server. See *proxy server*, *reverse proxy cache*, *transparent cache* and *Web cache*.

proxy server Also called a "proxy" or "application level gateway," it is an application that breaks the connection between sender and receiver. All input is forwarded out a different port, closing a straight path between two networks and preventing a hacker from obtaining internal addresses and details of a private network.

Proxy servers are available for common Internet services; for example, an HTTP proxy is used for Web access, and an SMTP proxy is used for e-mail. Proxies generally employ network address translation (NAT), which presents one organization-wide IP address to the Internet. It funnels all user requests to the Internet and fans responses back out to the appropriate users. Proxies may also cache Web pages, so that the next request can be obtained locally. Proxies are only one tool that can be used to build a firewall. See *LAN*, *firewall*, *proxy cache* and *SOCKS server*.

PR/SM (Processor Resource/Systems Manager) Hardware circuits and microcode built into IBM System/390 mainframes that support logical partitions (LPARs). LPARs allow the running of multiple system images on a single processor complex. Each such image has a full complement of CPUs (dedicated or shared), central storage, expanded storage and channels. ESCON and FICON channels may be shared across images using the MIF feature. Pronounced "prism," PR/SM was derived from VM, the IBM operating system that provides multiple system images in software. See *LPAR*, *MIF* and *VM*.

PRT SC See *print screen*.

ps (1) (PicoSecond) See *space/time*.

(2) (PS—Personal Services) IBM office automation software for PCs, minis and mainframes, which includes word processing, electronic mail and library services.

(3) (PostScript) See *PostScript*.

PS/1 An early IBM home computer series introduced in 1990. The original models featured an integrated monitor and easy-to-open case. The first PS/1 was a 286 with an ISA bus. See *PC*.

TSOP (Thin Small Outline Package) A very-thin, plastic, rectangular surface mount chip package with gull-wing pins on its two short sides. TSOPs are about a third as thick as SOJ chips. See *gull-wing lead*, *SOP*, *SOJ* and *chip package*.

T-span A 24-channel group, which makes up one T1 line. See *T1*.

TSR (Terminate and Stay Resident) Refers to a program that remains in memory when the user exits it in order that it be immediately available at the press of a hotkey. TSRs were popular under DOS to quickly pop up a calendar, calculator or other utility, because DOS did not have built-in task switching. Standards for writing TSRs were not codified early on, and TSRs often conflicted with each other and regular applications. After Windows 3.0, TSRs became moot, since any DOS or Windows application could be conveniently task switched in a separate window.

TSS See *ITU*.

TTCN (Tree and Tabular Combined Notation) A programming language endorsed by ISO that is used to write test suites for telecommunications systems. TTCN is used for "black box testing," which means that all interaction to the system is via messages, rather than by a user with a mouse. Test suites are built in a hierarchical and modular manner, allowing many programmers to be involved in the project. Numerous telecom vendors use TTCN for their products, and organizations such as the ITU, ATM Forum and ETSI, provide TTCN conformance tests for new standards.

TTFN Digispeak for goodbye ("ta ta for now").

TT font See *TrueType*.

TTL (1) (Transistor Transistor Logic) A digital circuit composed of bipolar transistors wired in a certain manner. TTL logic has been widely used since the early days of digital circuitry. TTL designations may appear on input or output ports of various devices, which indicates a digital circuit in contrast to an analog circuit.

(2) (Time To Live) A set maximum amount of time a packet is allowed to propagate through the network before it is discarded.

(3) (Through The Lens) Refers to a single-lens reflex camera that lets the photographer view the scene through the same lens that captures the image.

T.TUD See *T.120*.

TTY protocol (TeleTYpewriter protocol) A low-speed asynchronous communications protocol with limited or no error checking. See *teletypewriter*.

tube See *CRT* and *vacuum tube*.

tunable laser A laser that can change its frequency over a given range. In time, tunable lasers are expected to be capable of switching frequencies on a packet-by-packet basis.

tuner An electronic part of a radio or TV that locks on to a selected carrier frequency (station, channel) and filters out the audio and video signals for amplification and display.

tunneling *Transmitting data structured in one protocol format within the format of another protocol.* Tunneling allows other types of transmission streams to be carried within the prevailing protocol. See *IP tunneling* and *L2TP*.

tuple In relational database management, a record, or row. See *relational database*.

Turbo C A C compiler from Borland used to create a wide variety of commercial products. It is known for its well-designed debugger. Borland's object-oriented versions of C are Turbo C++ and Borland C++.

The DOS version of this database is written in Turbo C. The Windows version is written in Microsoft C.

turbo code A type of channel coding that uses a convolutional code and a type of Viterbi decoder that outputs a continuous value rather than a 0 or 1. See *convolutional code* and *Viterbi decoder*.

voxel (VOLUME piXEL) A three-dimensional pixel. A voxel represents a quantity of 3-D data just as a pixel represents a point or cluster of points in 2-D data. It is used in scientific and medical applications that process 3-D images.

Voyetra (Voyetra Turtle Beach, Inc., Yonkers, NY, www.tbeach.com) A manufacturer of sound cards and music software that is a result of a late-1996 merger of Voyetra Technologies and Turtle Beach Systems. Voyetra was founded in 1975 as Octave Electronics, a synthesizer and repair facility in southern New York state. It introduced the Voyetra synthesizer and later moved into software for MIDI sequencer and music-related applications. Voyetra utilities are bundled with numerous sound cards.

Turtle Beach was founded in 1985 in York, PA, and became known for its award-winning Multisound line of high-end sound cards. Its consumer brands are also popular and are named after beaches from around the world such as Malibu, Montego and Daytona.

VPC (Virtual Processor Complex) An IBM mainframe multiprocessing that uses several computers under tight central control.

VPN (Virtual Private Network) A private network that is configured within a public network. For years, common carriers have built VPNs that appear as private national or international networks to the customer, but physically share backbone trunks with other customers. VPNs enjoy the security of a private network via access control and encryption, while taking advantage of the economies of scale and built-in management facilities of large public networks. VPNs have been built over X.25, Switched 56, frame relay and ATM technologies. Today, there is tremendous interest in VPNs over the Internet, especially due to the constant threat of hacker attacks. The VPN adds that extra layer of security, and a huge growth in VPN use is expected. See *PPTP, L2F, L2TP, IPsec, PVC, security and transparent LAN service*.

VP ratio (Virtual Processor ratio) The number of virtual processors that a physical processor is simulating.

VPS (Vectors Per Second) The measurement of the speed of a vector or array processor.

VR See *virtual reality*.

VRAM See *video RAM*.

VRC (Vertical Redundancy Check) An error checking method that generates and tests a parity bit for each byte of data that is moved or transmitted.

VRML (Virtual Reality Modeling Language) A 3-D graphics language used on the Web. After downloading a VRML page, its contents can be viewed, rotated and manipulated. Simulated rooms can be "walked into." The VRML viewer is launched from within the Web browser.

The first VRML viewer was WebSpace from SGI, whose Open Inventor graphics library was the basis for developing VRML. WebFX, WorldView and Fountain are other Windows viewers, and Whirlwind and Voyager are Mac viewers.

VS (1) (Virtual Storage) Same as *virtual memory*.

(2) (Virtual Storage) A family of minicomputers from Wang introduced in 1977, which use virtual memory techniques.

VSAM (Virtual Storage Access Method) An IBM access method for storing data, widely used in IBM mainframes. It uses the B+tree method for organizing data.

VSAT (Very Small Aperture satellite Terminal) A small earth station for satellite transmission that handles up to 56 Kbits/sec of digital transmission. VSATs that handle the T1 data rate (up to 1.544 Mbits/sec) are called "TSATs."

VSB (1) (VME Subsystem Bus) An auxiliary "backdoor" protocol on the VME bus that allows high-speed transfer between devices. It was faster than the main bus before the 64-bit implementation arrived.

(2) (Vestigial SideBand) A digital modulation method developed by Zenith for cable modems and terrestrial transmission for DTV. See *8-VSB*.

VSE See *DOS/VSE*.

bottom of the in basket. Automating workflow sets timers that ensure that documents move along at a prescribed pace and that the appropriate person processes them in the correct order.

Integrating workflow into existing software applications may require extensive reprogramming, because although independent workflow software can launch a whole application, a workflow system must be able to invoke individual routines within the application. As a result, vendors of application software have teamed up with workflow vendors to provide the appropriate interfaces and/or they have developed their own workflow capability. Workflow standards developed by the Workflow Management Coalition (WFMC) are expected to provide interoperability between workflow software and the applications as well as between different workflow systems.

Workflow software is not the same as workgroup software, otherwise known as *groupware*. Workflow deals with the step-by-step processes, whereas workgroup systems are concerned with information sharing and threaded discussions among users.

For an excellent book on the subject of workflow written by the guru in this field, read *The Workflow Imperative* by Thomas M. Koulopoulos, published by Van Nostrand Reinhold, ISBN 0-442-01975-0.

work function The amount of photon energy required to cause an electron to be emitted from a material.

workgroup Two or more individuals that share files and databases. LANs designed around workgroups provide electronic sharing of required data. In general, products designed for workgroups support up to 50 people, whereas departmental devices support several hundred, and enterprise devices serve several thousand. See *groupware* and *workflow*.

workgroup switch A network switch designed for LAN traffic within an enterprise. Contrast with *carrier-class switch*.

working directory See *current directory*.

Workplace Shell The user interface in OS/2 introduced with Version 2.0. The Workplace Shell is extensible and application developers can use Workplace Shell library functions when developing programs.

worksheet Same as *spreadsheet*.

worksheet compiler Same as *spreadsheet compiler*.

workstation (1) A high-performance, single-user computer used for graphics, CAD, CAE, simulation and scientific applications. It is typically a RISC-based computer that runs under some variation of UNIX. The major vendors of workstations are Sun, HP, IBM, Compaq and SGI. High-end Pentium PCs increasingly provide workstation performance.

(2) A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine). Contrast with *server* and *host*.

(3) In the telecom industry, a combined telephone and computer.

WorldCom (WorldCom, Inc., Jackson, MS, www.wcom.com) A major, international telecommunications carrier founded in 1983 as Long Distance Discount Service (LDDS), a reseller of AT&T WATS lines to small businesses. It grew by acquiring many small, and eventually, large long distance and networking organizations, including IDB WorldCom, a leading international carrier, WITel, a major telecom carrier, and MFS Communications, an international phone company and recent parent of UUNET, a prominent Internet provider.

In 1997, the network operations of America Online and CompuServe became part of WorldCom. It also merged with Brooks Fiber and then acquired MCI in 1998 to become the MCI WorldCom powerhouse. While WorldCom may have been a pretentious name for rather modest beginnings, it was very prophetic, because the MCI name was later dropped, leaving WorldCom as the name of the company.

World Wide Wait What many have called the Web while waiting patiently for the next page to download. The World Wide Wait is caused by any combination of a slow modem, overloaded Web server at the site you are accessing or any clog in one of the routers or switches at a national, regional or local ISP. See *Internet service provider*.

World Wide Web An Internet facility that links documents locally and remotely. The Web document, or Web page, contains text, graphics, animations and videos as well as hypertext links. The links in the page let users jump