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SAA (Systems Application Architecture) A strategy initiated by IBM for enterprise computing, which defines the three layers:

- Common User Access
- Common Programming Interface
- Common Communications Support.

Sample A digital value derived from an analogue source.

(See ADC and ISDN.)

Sampling rate (or frequency) The frequency at which an incoming analogue signal is digitised. The sampling rate of an ADC influences the effectiveness of conversion.

SAP R/3 A client/server development environment, which is the successor to SAP R/2. The transition was a response to the shift from the two-tier client/server model to the three-tier client/server model. The product is used globally, and came to prominence through its application in German industry, notably the automotive sector.

(See Client/server, Three-tier client/server and Two-tier client/server.)

Satellite system A medium or communications technique which uses orbiting satellites fitted with microwave antennas. These provide line-of sight communications with microwave antennas at earth stations. Applications are used extensively in telecommunications and in television broadcasting. Geostationary satellites orbit above the equator, revolving in unison with the earth; hence they are stationary relative to the earth's rotation. The concept was originated by science-fiction writer Arthur C. Clark.

Scanner A device used to digitise printed material such as photographs. With optical character recognition (OCR) software, a scanner can be used

Screened subnets

to convert text into machine-readable form. Types of scanner include the following.

- Hand-held scanners typically offer a scanning width of around 10 cm. Operation involves passing the scanner over images to be digitised.
- Flat-bed scanners are the most popular. Paper handling is comparable to that of a photocopier. Flat-bed variants can allow complete A4 or A3 pages to be scanned, and are ideal for digitising manuscripts, together with illustrations. If digitisation of a significant amount of material forms part of the development process, then a flat-bed scanner is essential. Conversion of text into a computer-readable format requires optical character recognition (OCR) software.
- Sheet-fed scanners are easier to use than hand-held scanners. Paper handling approximates that of a fax machine, where motorised rollers simply pass sheets over the scanning array. A principal disadvantage is that bound publication pages have to be removed before they may be scanned.
- Drum scanners are very highly specified and tend to be used by commercial printers and bureaux. They offer very high resolutions that provide true photographic quality images.
- Slide scanners enable the production of images using 35 mm slides alone.

Scanners may be greyscale or colour. The simplest greyscale variants will produce 8 bit images, so generating images with 256 (2^8) shades of grey. More sophisticated colour versions may generate colour images using 24 bits per pixel, so producing 16.7 million (2^{24}) colours. Image depths of 30 bits, 32 bits or 36 bits may also be supported. Most scanners come complete with scanning software, picture editing programs and OCR (Optical Character Recognition) software. Such software can be essential in the production stage of multimedia, and also in electronic publishing when transcribing older texts into digital form. Drivers supplied with a scanner do much for compatibility with various software packages. For example, a standard Twain driver will allow the scanner to be used with Twain-compliant programs like HiJaak Pro. Equally, HP Scanjet drivers allow the device to understand HP protocols.

Screened subnets A subnet which restricts TCP/IP traffic from entering a secured network. The screening function may be implemented by screening routers.

(See Firewall, Screening router and Security gateway.)

Screening router A router variant able to screen packets which match pre-defined criteria, including the:

- source address
- destination address
- protocol type.

(See *Firewall, Packet filtering and Security.*)

Screen refresh rate (See *Refresh rate.*)

Screen scraper A client/server software component or function, which removes or ‘scrapes’ display information from requested data and formats it so that it may be displayed by the client system. It may also do the same for outgoing traffic from the terminal or client system.

(See *Client/server.*)

Script A series of instructions that can be interpreted by a program, sometimes referred to as macros. Scripts can sometimes be generated through menu selections or by writing code.

(See *Perl and VBScript.*)

Script-based authoring tool A multimedia authoring system/environment which requires coded program sequences or scripts. They are generally difficult to use for non-programmers.

Scripting A scripting language such as VBScript or JScript may also be perceived as a glue, as may HTML.

(See *VBScript.*)

Scroll bar A user interface component that is used to scroll an image of item of text that is too large to be shown in the display area. Horizontal and vertical scroll bars are available.

SCSI (Small Computer System Interface) A universal and internationally agreed interface standard backed by ANSI (American National Standards Institute), intended to provide interchangeability between peripherals and computer systems from different manufacturers. Apple Computer has long realised the importance of SCSI, fitting Macintosh machines with appropriate controllers. The SCSI continuum approximates:

- SCSI-1
- SCSI-2
- Wide SCSI
- Fast Wide SCSI
- Ultra SCSI.

(See *Firewire.*)

SDK

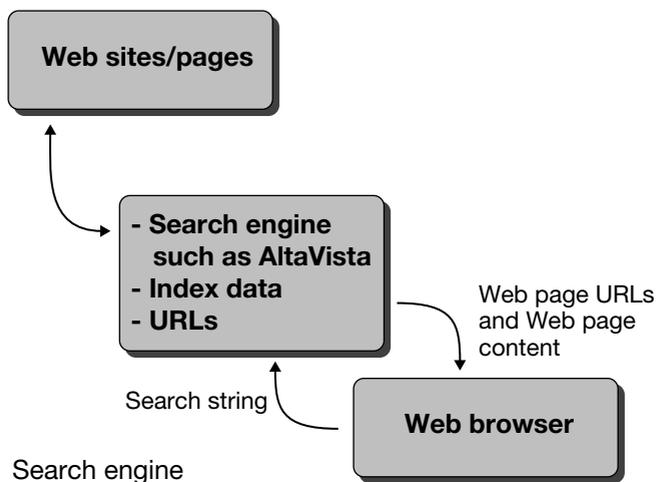
SDK (Software Development Kit) A library of functions that may be used to implement specific solutions. Microsoft SDKs are numerous, and include those associated with:

- ActiveX
- Java
- NetMeeting
- Design-Time Control
- Active Template Library
- OLE DB.

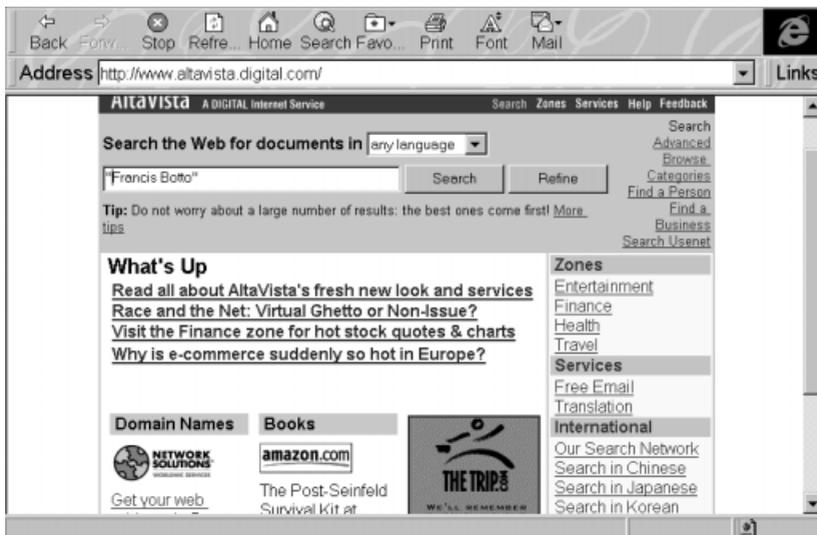
SDRAM (Static Dynamic RAM) A type of random access memory (RAM) which offers a comparatively short access time. Such access time is measured in nanoseconds (nS), or billionths of a second.

(See *EDO*.)

Search engine A program used to search indexed words and phrases that exist in documents on the Internet. The search engine retrieves the documents in which specified words or phrases are found. Popular search engines include AltaVista (at www.altavista.digital.com) and HotBot (at www.hotbot.com). Crawler programs may be deployed to gather metadata (such as indexes) from Web sites.



Search string A single word, phrase or sentence (or a number of words, phrases or sentences) for which a document or number of documents are searched. A search engine or retrieval system retrieves documents (or document details) based on the search string. Search engines and retrieval



systems support wildcards and logical operators. For instance, if it were necessary to find documents containing the name Van Gogh along with the city Amsterdam, using logical operators you would use the phrase Van Gogh AND Amsterdam.

(See *Search engine*.)

SECAM (Système Electronique Couleur Avec Mémoire) A broadcast television standard developed in France, and used in many parts of Eastern Europe. Like PAL, it runs at 25 frames/50 fields per second.

Second-generation language A programming language where instructions are represented by concise mnemonics. Such ‘assembly languages’ are indigenous to processors. Often the terms *assembly language* and *machine code* are used interchangeably.

Secret key (See *Cryptography*.)

Security A method of restricting access to applications, data and systems to their intended users. The term may include automated virus checks on incoming documents and on executable code such as Java applets and ActiveX controls using security gateways. (See *Security gateway*.) Firewall technology is vital to Web security, as are data encryption and password protection. Security is paramount to organisations deploying corporate data, and for companies running e-commerce Web sites (such as Amazon,

Security boundary

for example). Security standards include those developed by the United States Department of Defense, and named the Trusted Computer Standards Evaluation Criteria, which are otherwise known as the Orange Book. This was introduced in 1985, and was originally aimed at mainframe and mini-computers for many years. It is also applicable to databases and to networks, through the Trusted Database Interpretation and the Trusted Network Interpretation. The Orange Book is a multi-tier set of guidelines, including:

- Level D1, which is the lowest level of security, rendering the system untrusted.
- Level C1, which is a discretionary security protection system, requiring a login name and password, and in which access rights are allocated.
- Level C2, which includes Level D1 and Level C1 security and integrates additional security features. For instance, this level requires that the system's relevant events be audited.
- Level B1, or Labelled Security Protection, which provides tiered security. Compliance sees object permissions that may not be changed by file owners.
- Level B2, or Structured Protection, requires the labelling of all objects.
- Level B3, or Security Domains level, which requires terminal connections via a trusted path.
- Level A, or Verified Design level, is the highest Orange Book security level.

(See Encryption, Firewall, Packet filtering, Risk exposure, Screening router, Security gateway, SET and Web security.)

Security boundary Also known as security perimeters, such boundaries encapsulate systems, software, objects etc. They may be implemented in software, in hardware using firewalls, in passwords, by encryption or by the assignment of dongles to users. Boundaries exist at a number of different levels, including:

- Physical, which covers tangible resources such as systems
- Application, which covers access rights to applications
- Data, which covers access and editing rights to data
- System, which dictates who may log on to a network or system.

(See Firewall.)

Security gateway A security layer which fortifies a network against hostile virus attacks by screening incoming executables and data. The executables might be Java applets, ActiveX controls or plug-ins. Each of these represents a potential threat, not just in terms of viruses but in terms of what they may do to client-side documents, files and even system files, such as those

concerned with the initialisation of Windows variants. For instance, an ActiveX control might take control of a client's Word documents, performing operations on them, such as converting them to HTML, and then possibly abstracting them, for display or even processing on a remote Web site. For many security managers, this is unacceptable behaviour. Additionally, the unregulated Internet means that virtually anyone can deploy applications, which may potentially damage clients. It is desirable, therefore, to attempt to check and possibly screen such inbound traffic. Such a comparative centralisation of the anti-virus security layer makes redundant the need for standalone variants on clients, though these may still be employed, particularly if removable media are being used for file transfer. Such a security gateway may:

- provide multiple OS support, such as Windows, DOS or NetWare, though many are confined to Windows NT
- support ActiveX, Java, cookies, plug-ins, JavaScript, JScript, VBScript and various executables
- check all Java classes on downloaded applets
- provide intelligent filtering features.

(See Firewall, Security and Solomon, Alan.)

Security proxy A Web proxy that integrates security features, which are used to authenticate connections to servers.

(See Firewall, Security and Web proxy.)

Sega A manufacturer of games consoles and their accompanying software titles.

Semaphore A communications method involving physical signalling which was invented by the French in 1792. Even today the semaphore principle is applied in programming, where flags may be used to relay certain states and events. In computer terms, semaphore may be applied to coordinate processes.

Sequential prose A continuous stream of linear text.

(See Hypertext and Nelson, Ted.)

Serial port An input/output port through which data is transmitted and received sequentially. RS232 is a standard serial port used to transmit serial digital information over modest distances so as to connect communication devices and other serial peripherals to computers. The PC COM (COMMunications) ports are serial ports.

(See Firewire and USB.)

Server

Server 1. A transaction server is allocated the task of transaction processing (TP), and it often invokes the application logic necessary to perform database interactions and manipulations. The process(es) invoked directly or indirectly by the client are collectively referred to as the transaction. Transaction servers may include UI logic, driving the client UI, relegating the client device to little more than a dumb terminal. Typically, mainframe-based transaction systems might adhere to this model. Alternatively, the UI logic or presentation may be distributed to the client. The server consists of a TP monitor, which performs transaction management and resource management. Transaction management ensures the so-called ACID properties of transactions. These include *Atomicity*, *Consistency*, *Isolation* and *Durability*. ACID property compliance is achieved through the two-phase commit protocol. (*See ACID and Two-phase commit.*) Resource management is intended to optimise the use of resources, which include memory, mass storage and processing. It may also be involved with load-balancing between resources and between the software processes, which may be threads. (*See MPP.*) 2. An entity that serves clients. The services provided might include the implementation of processes and the distribution of data, and may be categorised as follows.

- Fax, where the server provides fax reception and transmission facilities for connected client systems.
- Database, in the client/server configuration, in which SQL requests from the clients perform the necessary data requests.
- Communications, which enable client systems to make remote connections to external networks and servers.
- Print, where the server is dedicated to printing locally or remotely.
- File, where a centralised server, perhaps connected to RAID storage devices, is utilised by clients to provide high-volume data storage and high-performance disk access and data transfer rates.
- Transaction, where the server updates data, which may form part of simple client/server two-dimensional database or warehouse data that may be multidimensional (in data cubes) or even hypercubes. (*See Data warehouse and entries listed below.*) 3. A Web server is the hardware platform that supports one or Web sites. Traditionally Web servers have been based on the Unix or Windows NT OSes. 4. A Web server may also be considered as the software implementation which serves HTML pages etc. (*See Web.*) 5. An intranet server may be considered in the same terms as a Web server, but with a security perimeter to prevent public access. 6. A peer-to-peer server is a system on a network in which the resources of any connected system may be shared. While any system on a peer-to-peer network might be a server, typically the most highly specified system performs as a server. 7. A file server provides centralised

resources for network users. 8. A database server provides centralised data storage. 9. An object or application that serves an application or object with embedded or linked data. The server might be OLE 2.0-compliant, or may conform to another component architecture. (*See ActiveX, Object* and OLE.*) 10. A CD-ROM server dynamically distributes requested information from CD-ROM drives to LAN users. If the maximum number of drives per server is exceeded, additional servers are added. The incorporation of additional servers, prior to reaching the network maximum of drives per server, leads to a better service for users. There are several commercially available CD-ROM network packages, many of which are software orientated. 11. A video server is a hardware solution which provides the basis for a video on demand (VoD) service. It may be implemented using MPP. The advantage of such parallel processing systems is scalability, where, for example, growing numbers of subscribers to a VoD service may be accommodated through additional processors and even complete servers. (*See MPP.*) 12. A video, audio or multimedia server which serves client systems with streaming media.

(*See ASF and Streaming*.*)

SET (Secure Electronic Transaction) An internationally agreed standard for securing electronic funds transactions using e-commerce on the Web/Internet. Encryption is a key technology of SET.

(*See Encryption, Firewall, RSA and SSL.*)

Set-top box A television decoder that permits the reception of an encoded analogue or digital signal. It may also provide a means of interaction. MPEG-2 decoders permit the reception of high-quality digital video/television broadcasts. MPEG-2 was initially aimed at digital video distribution via networks, satellite, wireless and digital storage media that could sustain an average data transfer rate of up to 10 Mbps.

SGML (Standard Generalized Markup Language) An internationally agreed language intended for the implantation of formatting information in documents.

(*See HTML.*)

Shannon's theorem A theorem that may be applied to give the maximum data transfer limit over a given medium such as an access technology:

$$I = F \log_2 (1 + S/N)$$

F=bandwidth,

S/N=signal-to-noise ratio.

(*See 56 600, Access technology and Modem.*)

Shareware

Shareware A method of distributing software, which allows the user to try it without paying a fee to the software's legal owner. If the user continues to use the software, he/she is required to register it for a fee. In some instances a registered copy may include additional features, along with technical support and documentation.

Shell 1. A means of entering commands using Unix and other similar operating systems. A Unix shell can be considered as performing a similar task to the command line interpreter associated with DOS. 2. A term used to describe the framework of an expert system. The shell is occupied by a knowledge base that consists of IF ... THEN rules that are used to solve entered problems. The knowledge (or rule) base is interpreted by an inference engine.

Shockwave A streaming multimedia technology which uses AfterBurner compression. Its producers, Macromedia, also produce the popular Director and Authorware programs. Essentially, the technology is used to deploy Director movies over the Web, and can also be applied to the same to applications that depend on the Lingo multimedia authoring language. Web browsers may be enabled using a Shockwave plug-in.

(See Lingo and Streaming.)*

S-HTTP A means of seamlessly integrating encryption into HTTP. It was developed by Enterprise Integration Technologies and supports RSA, DES, triple DES and DESX.

(See Encryption.)

SIF (Source Input Format) An MPEG-1 frame resolution of 352×288 pixels. This resolution equates to the MPEG Source Input File (SIF), which is achieved by omitting odd or even lines from a standard interlaced PAL (Phase Alternating Line) signal. This is an exceptionally 'lossy' procedure, omitting a great deal of picture information and losing video quality. It is this single operation that limits the quality of video that can be achieved using MPEG-1, though it has to be implemented in order to confine the video stream to the narrow bandwidth of about 1.5 Mbps. The MPEG claim that this is VHS quality is an area of debate.

(See MPEG.)*

SIMM (Single In-line Memory Module) A standard electronic assembly used to accommodate electronic memory in the form of RAM. Standard SIMM sizes include 4 Mbyte, 8 Mbyte, 16 Mbyte and 32 Mbyte. SIMMs may include parity checking (*See Parity bit*). EDO (Enhanced Data Out) offers improved performance.

SIMNET A US network used to distribute military simulations. Financed by ARPA it was originated and developed in the Institute of Simulation and Training, University of Central Florida. It is used for training US army personnel. Its existence came to prominence when it was revealed that it had been used to train foot soldiers for Operation Desert Storm (the Gulf War). Satellite information can be used to generate complex landscapes bearing important military installations, communication installations and the distribution of enemy forces to varying degrees of accuracy. Effective military simulations require a near real-time link between gathered satellite information and the simulated environment to achieve real-time imaging.

Simulation An interactive environment that duplicates a real-world operation such as flying a passenger aircraft or driving a car. Simulators are used widely in the military sector. Displays that may be used in simulators include conventional CRT, projected images, LCD projected images and HMDs (Head Mount Displays).

Sinclair, Sir Clive An English technologist and entrepreneur. Notable Sinclair products include the first commercial pocket calculator and the first pocket television. Unlike the LED-based pocket TV from Citizen, Sinclair's was CRT-based and was bulky and heavy. Sinclair's work on miniature CRT manufacture was valid, with such assemblies used in many highly specified HMDs (Head Mount Displays) today. Currently their specification in terms of speed and resolution outperforms comparable LED technology. Sinclair also introduced a range of home computers in the late 1970s and early 1980s. The earliest computer was the ZX80 which was available ready-built or in kit form. His most successful computer was the Spectrum. Later Sinclair computers include the QL (Quantum Leap), which was not a success. Other Sinclair interests include chip manufacture (wafer-scale technology) and transport, through the C5 electric car and the electric bicycle called the Zyke.

Site Server A Microsoft solution for enhancing, deploying and managing e-commerce Web sites.

SK8 (Skate) A multimedia authoring tool/environment developed by Apple Computer.

SLIP (Serial Line Internet Protocol) A protocol often used for serial data transmission over media which include access technologies such as POTs.

(See PPP.)

Smalltalk An OO programming language.

(See OOP.)

SMIL

SMIL (Synchronised Multimedia Integration Language) A language intended for the deployment of interactive multimedia applications over the World Wide Web, and over networks that offer a comparable narrow-bandwidth. Pronounced ‘smile’, it is similar to HTML, but is designed specifically for multimedia, which includes text, audio, video, animations, graphics and interactivity. It may be perceived as a glue which enables the developer to choreograph multimedia elements. Offering the timeline metaphor, SMIL permits the coordination of multiple streaming multimedia entities, which combine to form an application. SMIL does not require the merging of media streams into container files; rather, users may simply edit the listing to alter the coordination of such multimedia elements. SMIL is an open standard and supports among other things:

- AVI
- ASF container format
- RealMedia
- QuickTime
- AAF
- WAV
- MOV
- MIDI
- Shockwave Flash.

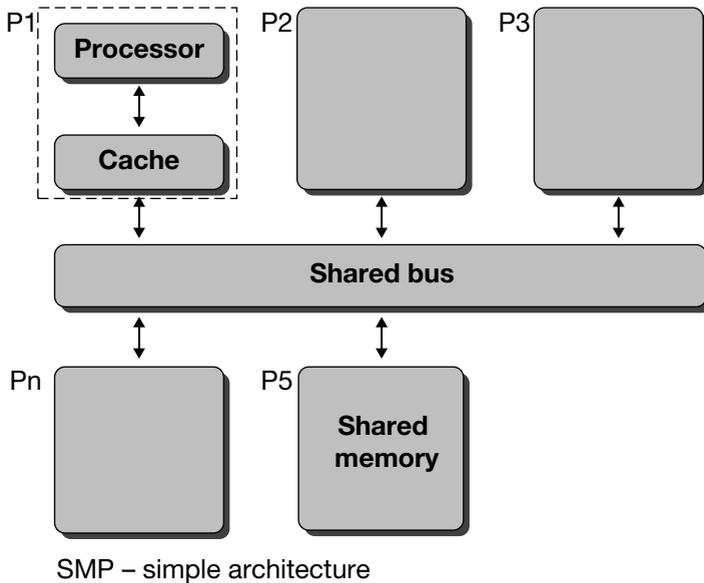
The World Wide Web Consortium (W3C) is responsible for the SMIL specification, and participants in the SMIL Working Group include:

- Microsoft
- Philips
- Netscape
- Digital Equipment
- Lucent
- RealNetworks.

(See ActiveX, ASF, DHTML, HTML and XML.)*

SMP (Symmetric Multiprocessing) A system that has two or more processors which do not operate independently with their own connected memory and I/O capabilities. Systems find application as servers, and such processor designs as the Intel Pentium Pro were optimised for SMP. SMP systems offer processor scalability, but not in the precise processing increments associated with MPP systems. Unlike MPP systems, limitless scalability is prohibited by the interconnecting bus bandwidth, which is shared.

(See MPP and NUMA.)



SMTP (Simple Mail Transport Protocol) A protocol used to transmit e-mail messages over the Internet and across other compatible IP networks. (See *TCP/IP*.)

Sniffing A term used to describe the use of a *sniffer* program to monitor data traffic to a network or server in order to gain access information. For instance, it may be applied to gather illegal passwords and IDs for ISP accounts, passwords to mail accounts and passwords to remote systems. (See *Firewall*.)

SOCKS A security-related technology which may be used to allow hosts within a firewall perimeter to access the Internet. The hosts do not require IP addresses; rather they use an intermediate server. This server acts as a bridge or interface which offers a connection between the firewall's hosts and external Internet sites. It was designed for multi-homed firewalls. (See *Firewall and Security*.)

Software distribution A method of delivering software to users. Software distribution may be by downloading from the Internet. Other distribution media include floppy disk, CD-ROM and DVD-ROM. The first commercial CD-ROM software distribution disc from a major producer was Microsoft Office. Farallon Computing released lesser known programs on

Software key

CD-ROM prior to this, as did Microsoft itself. PC Sig released the world's first shareware compilation on CD-ROM in the USA. Used as a distribution medium, DVD-ROM presents vendors with new opportunities; spare storage space may be used for program demonstrations, program documentation, training material and advertising using DVD (MPEG-2) video. Currently most leading software producers distribute their programs on CD-ROM, but a swing to DVD-ROM is imminent.

(See CD-ROM and DVD.)

Software key A method for unlocking encrypted data. It allows the customer to unlock the products purchased contained on a CD-ROM.

Software training A process through which users are trained to use software applications. The continual introduction of Information Technology, and its pace of change, have given rise to a thriving software training industry. This bears testimony to the fact that current commercial software and computers are simply too difficult to use. Evidence of this is seen when a new program is introduced into an office environment: the need for training or retraining emerges instantly. Equally, new employees often have to be trained to use word processors, databases, spreadsheets, integrated packages and so forth.

Solomon, Alan The founder of Dr Solomon's anti-virus software: computer programmer, entrepreneur and accomplished writer. His anti-virus products have won him deserved fame and wealth.

SoundBlaster A range of sound cards produced by Creative Labs.

Sound card A plug-in card which permits wave audio recording, multi-voice sound synthesis and speech synthesis. Questions that should be asked about sound cards include the following.

- Is it SoundBlaster-compliant?
- Is it an 8 bit or 16 bit variant? A 16 bit card will normally offer CD-quality sound.
- Does it use wave table synthesis? MPC-3 compliant cards support wave table sound. They include sampled sounds that make MIDI file playback more authentic. Commercial examples include the Creative Labs SoundBlaster AWE.
- If the sound card does not include a wave table, can it be upgraded to include one? The SoundBlaster 16 ADSP can be upgraded to include the WaveBlaster daughter board.
- What CD-ROM interface does it have? If it has a proprietary interface you must naturally ensure that it is compatible with your CD-ROM

drive, or the CD-ROM drive you intend buying. Ideally you should look for a sound card with a SCSI-2 controller which will give greater flexibility in terms of CD-ROM drives and peripherals that can be controlled.

- Does it come with business audio software? Text-to-speech converters such as Monologue for Windows and ProofReader (supplied with Windows Sound System 2.0) can prove useful. Programs that permit you to control Windows and Windows applications using voice commands are also useful. Examples include Creative Voice Assist and Microsoft Voice Pilot.
- Does it come with useful Windows applets? The card should include a decent wave audio recorder and editor, mixer and MIDI sequencer.
- What wave audio compression schemes does it use? These can result in greatly reduced wave audio file sizes. Compression schemes to look for include IMA ADPCM for recording music, True Speech for recording dialogue, CCITT A-Law and u-Law.

With suitable software, sound cards can be used for such purposes as sampling, playing synthesised polyphonic sequences, speech synthesis and MIDIs (Musical Instrument Digital Interfaces). The latter application, however, often requires additional hardware which can usually be assumed to be a MIDI connector box or similar, to which MIDI keyboards and other compatible devices can then be connected. Most sound cards also operate in full stereo, and on more expensive variants you can expect features such as reverb, thus giving multimedia developers the ability to emulate various acoustic conditions. Sampling permits you to digitise and store, in memory or on disk, live sounds from an analogue source. For example, it is possible to sample a short sequence from a CD player using a microphone or the direct output from a player's headphone socket or that which is connected to an amplifier. The duration of sequences is often restricted by memory capacity, and the overall sound quality of different cards varies according to individual specification. Occasionally, sampled sequences can be compressed by a modest degree, thus saving disk space. Popular low-cost 8 bit sound cards include Ad Lib and SoundBlaster Pro (from Creative Technology).

(See Wave audio.)

Sound Recorder A Windows recording, playing and editing tool for waveform audio files (.WAV). It is not the most sophisticated .WAV file recorder, and it is almost certain that you will have a better one already bundled with your sound card. SoundBlaster 16 ASP, for example, comes with WaveStudio, and the Microsoft Windows Sound System has Quick Recorder. Sound Recorder has standard controls that include Rewind, Fast

Sound rendering

Forward, Play, Stop and Record. Like almost all other such programs it illustrates the wave shape of loaded .WAV files. It has an Effects menu that can be used to increase and decrease the volume of recorded .WAV files. The same menu has options to alter the speed of a .WAV file, to add echo, and to reverse the recording. Accompanying its effects features is an Edit menu. This allows you to delete the start and end sections of WAV files. More interesting items on the Edit menu include Insert File and Mix with File. The former allows you to insert a .WAV file at a specific point in a loaded .WAV file. You can define the exact point at which the file is inserted using the horizontal bar. The latter lets you blend one .WAV file with another. For instance, a chime sound can be blended with a bell.

Sound rendering An audio reproduction technique which indicates the position of moving or stationary sound sources. A 3-D sound rendering system emulates the complexity of the sensation of sound in three-dimensional space. For example, if you approached a person playing a guitar the volume of the guitar would increase.

(See VR.)

Spam 1. A form of unsolicited e-mail; the Internet equivalent of junk mail. The originators of such e-mail are termed spammers, and messages from known spammers may be filtered using appropriate software. 2. The practice of posting the same message simultaneously to a large number of USENET newsgroups.

Speech recognition A technique by which a computer is able to recognise speech and perform tasks. Modestly specified speech recognition programs recognise a modest number of words. Commercial examples include Creative VoiceAssist and Microsoft VoicePilot (included in Microsoft Windows Sound System), both of which provide a means for operating Windows and Windows applications using voice commands. More advanced speech recognition systems are voice-independent dictation systems, such as IBM ViaVoice and competing products from Dragon Systems.

(See ViaVoice.)

Speech synthesis The process of generating recognisable speech using digital data. Currently most speech synthesis programs operate by combining a predefined set of phonemes. Such programs are sometimes called text-to-speech convertors. Commercial examples include Creative Text-Assist, which reads text, and ProofReader (supplied with Microsoft Windows Sound System) that read monetary and numeric data. TextAssist

is useful for proofreading long documents in Windows applications. ProofReader is aimed at reading data entered in real-time. Both tools serve to increase productivity. Other commercial speech synthesis programs include Text-to-Speech, which can be embedded into documents as an OLE object. Occasionally the vocabulary of speech synthesis programs can be increased using a predefined set of phonemes, or sometimes it is necessary to add wave audio files.

Sprite A screen image confined to a limited number of pixels, often used as a 'character' in computer games and a pointer in GUIs. Highly mobile, they may be defined by hardware or software.

SPX/IPX A network protocol.

SQL (Structured Query Language) A non-procedural language that is used to manipulate data stored in a relational DBMS. Like other procedural languages, including Prolog, it does not have a rigidly defined series of operations to perform a function. Some thirty commands are included in the SQL specification, of which a recent version is SQL-92. However, third parties have extended it to semi-proprietary variants. The language permits:

- the creation of table structures
- the entry, correction and deletion of data
- databases to be queried, to satisfy perhaps data requests.

The SQL syntax is easily learnt and understood, as it depends heavily on English words and phrases. For example, creating a database requires the statement:

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CREATE DATABASE datawarehouse
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See: Date, C. J., *A Guide to the SQL Standard*, Addison-Wesley, 1987. This text describes the original SQL standard.

(See C++, Data warehouse, Dylan, Java and OOP.)

SRAM (Static Random Access Memory) A volatile form of electronic memory which is not constantly refreshed. It therefore consumes less power.

SSL A means of encrypting data transparently when sent using TCP/IP. A security protocol, it was developed by Netscape and uses the RSA public key encryption technique.

(See Encryption.)

Stack A contiguous series of memory locations utilised as a storage area. It is a LIFO (last in, first out) system, in that the order in which items are

Stacker

dispensed opposes that in which they were deposited. A stack is sometimes called a push-down store. It can be used to store the return addresses from subroutines.

Stacker A real-time disk compression utility. It increases the data capacities of hard disks and of removable magnetic media by around two-fold. Produced by Stac Electronics, it is available as a hardware or software product. Its makers won global fame, and media exposure, when they served Microsoft with a \$100 000 000 lawsuit for patent infringements and duly won. The compression ratio attained using Stacker is a variable, and:

- increases with data files that are largely uncompressed, such as BMP and text files
- diminishes with pre-compressed files, such as JPEG and ZIP.

Start button A button that provides single-click access to the main menu system in Windows 95/98/NT. By default it appears at the bottom left of the screen and is anchored to the Taskbar which underlines all applications. The menus that result from the Start button can be navigated by moving the mouse, and highlighted menu items can be run by clicking them once. The Start button and Taskbar were introduced into the Windows 95 design in order to replace the Program Manager of Windows 3.x.

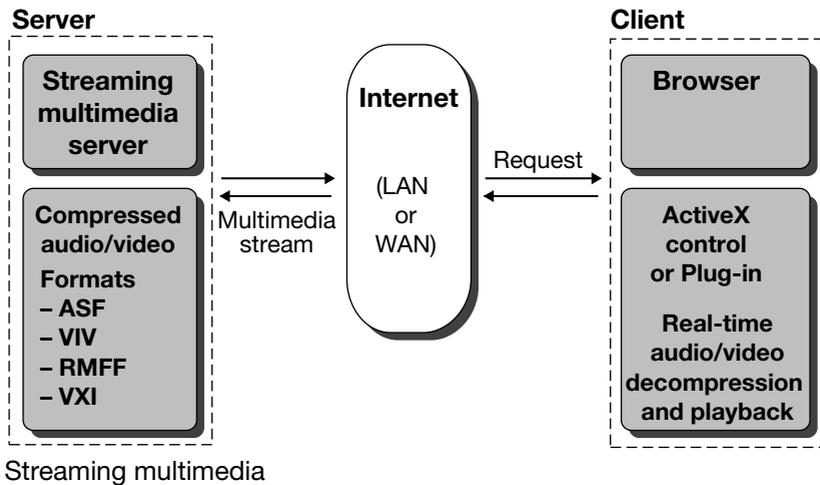
Static processor A processor that requires a lower level of cyclic electrical refreshment than most widely used designs. Such devices consume less power than dynamic designs such as the Intel Pentium. Commercial examples of static designs include Intel processors with the SL suffix.

Stereoscopic A term used to describe the process of communicating the depth of an image by stimulating each eye with a slightly different image. The earliest device used to communicate such images was the stereoscopic viewer, a hand-held device that provided a stereo view of normal photographs. In 3-D computer graphics a transformation matrix is used to present a stereographic view of images stored using the homogeneous vector representation of 3-D coordinates.

Still video camera (*See SVC.*)

Streaming audio A method of playing audio while the audio stream is being downloaded. Streaming audio plug-ins are available for popular browsers such as Netscape Navigator. Such plug-ins are useful for tuning into radio broadcasting services on the Web.

Streaming video A method of playing video while the video stream is being downloaded. Streaming video plug-ins are available for Netscape



Navigator, while equivalent ActiveX controls operate with Microsoft Internet Explorer.

(See *ASF and Microsoft NetShow.*)

Structured programming A programming model which consists of procedures or subroutines and has no GOTO commands in order to direct program execution unconditionally. All modern high-level languages can be assumed to comply with structured programming. One of the first implementations was structured BASIC, which was launched in 1982 by Acorn Computer. It was integrated into its Acorn BBC microcomputer design in the form of a ROM-based BASIC interpreter. One of the earliest structured programming languages was Algol, which was evolved into Pascal.

(See *BBC BASIC.*)

Stylus A pen input device used to interact with, and write to, a computer or appliance. The first stylus was the light pen, which was yielded by the US Defense SAGE project, an early warning radar system based upon digital graphics technology. A stylus might be used as a pen with a graphics tablet or bit pad. The stylus is used widely in pen computing with everything from notebook computers to PDAs. In pen computing the user simply writes directly on the screen, and data entry using normal longhand is valid.

Subnet A method of using an IP address so that a greater number of networks may be addressed. IP addresses are designed to accommodate networks which may have between 253 and several million hosts. In many

Subnotebook

instances, organisations wish to address a number of networks using a class C address. By creating subnets using their IP address, they may link the separate networks using a router. Subnets are created by dividing the last octet of an IP address. The division involves reserving the most significant bits of the octet so as to provide addressing information for subnets. This may yield one of the following configurations:

- 2 subnets, each with 62 hosts
- 6 subnets, each with 30 hosts
- 14 subnets, each with 14 hosts
- 30 subnets, each with 6 hosts
- 62 subnets, each with 2 hosts.

(See IP address.)

Subnotebook A portable computer that is smaller and lighter than conventional A4 size notebook computers.

(See Notebook.)

Subsystem A physical element of a PC. Subsystems include graphics cards, video capture cards, hard disks and sound cards.

(See Graphics card, Hard disk and Sound card.)

Sun Microelectronics A division of Sun Microsystems, and manufacturer of chips that are optimised for the Java programming language, including:

- the PicoJava chipset, which is used in cellular phones and computer peripherals
- the MicroJava processor, which is used in network devices, telecommunications hardware and consumer games
- UltraJava, which is optimised for use in 3-D graphics and multimedia-related computing, much like Intel's MMX Technology.

(See Java and MMX Technology.)*

Super Beta An enhanced Beta videotape variant, using 1/2" tape.

Superclass A class of objects that has subclasses, which may inherit its attributes and behaviour.

(See Inheritance.)

Supercomputer An MPP architecture that is based on a network of parallel processors.

(See MPP.)

SuperVGA monitor A typical SuperVGA monitor can be driven at resolutions of at least 640×480 pixels. All fully specified PC monitors can be considered as being SuperVGA-compliant. The number of colours produced is a function of the video card you have fitted to your machine. All VGA monitors have analogue inputs and can therefore support an infinite number of colours. The resolution achieved, however, depends upon both the video card and the monitor.

Surf An alternative and popular term for browsing the Internet.

Surround sound A sound reproduction technique where the sounds that emerge from the rear of an auditorium are reproduced using surround speakers placed to the rear of the listener. It was once termed quadraphonic. An accessible worldwide standard is Dolby Pro-Logic. Other more expensive surround sound technologies exist, but are confined mainly to cinemas. The complete Dolby Pro-Logic effect requires stereo speakers either side of the screen and a shielded centre speaker mounted beneath the screen to accompany a pair of surround speakers to the rear. These are becoming increasingly popular under the name 'home movie system'. However, the full Dolby Pro-Logic effect requires a little more than this. In fact, two pairs of speakers are required for the rear surround speakers, including a pair of centre speakers to accompany the front speakers mounted either side of the screen. There are two basic ways of decoding Dolby Pro-Logic sound. The first of these is the use of a dedicated Pro-Logic decoder that plugs into a standard stereo amplifier using its tape loop capability. The other method of decoding is to use a Dolby Pro-Logic receiver, which consists of a decoder and an amplifier. The number of outputs supported is variable, as is its ability to support the full Dolby effect.

Sutherland, Ivan A founding father of a field that has come to be known as virtual reality. In 1968 he built the first Head Mount Display (HMD), providing a means of interfacing a user with what was then described as artificial reality or a synthetic/synthesised environment.

SVC (Still Video Camera) A still video camera may operate by writing images in analogue form to a two inch diameter magnetic (video) floppy disk that can store up to 50 exposures. Using a still video player exposures can be digitised using a frame grabber or video capture board.

SVGA (*See SuperVGA monitor.*)

S-VHS (Super-VHS) An enhanced version of the VHS videotape standard. (*See Video*.*)

Switched network

Switched network A telecommunications network that uses switches to route calls from one telephone to the next. A switch matrix can be used to allow intercommunication between connected terminals.

Symbolic constant A symbolic constant has a name, and is assigned an unchanging value. It can be used just like an integer constant. Symbolic constants improve program maintenance and updating; a single change may be made to a symbolic constant, which might be used throughout a program. A symbolic constant multiplier can be assigned the value 10 using the C++ code:

```
#define multiplier 10  
or  
const unsigned short int multiplier = 10
```