

I

i750 chipset A chipset initially developed by Intel for the compression and delivery of DVI (Digital Video Interactive) video. The ActionMedia capture and playback boards for DVI video were based on the i750 chipset. Nowadays it is used to playback Intel Indeo video at high speed using such expansion cards as the ActionMedia II.

(See MMX Technology and MPEG.)*

IAP (Internet Access Provider) A company that provides users with access to the Internet; an alternative name for ISP.

(See ISP.)

IBM (International Business Machine) A major manufacturer of business computer systems and software products, including OS/2. Launched the IBM PC in early 1980s, which was to become an industry standard. Its successor, the PC AT, was downwardly compatible, and it too became an industry standard. Introduced the Personal System/2 (PS/2) in mid-1987, incorporating the Micro-channel Architecture (MCA) bus for the first time.

IBM ViaVoice *(See ViaVoice.)*

ICMP (Internet Control Message Protocol) A protocol used between an Internet gateway and hosts. It returns error messages and reports, including:

- Unreachable destination
- Echo
- Echo reply
- Parameter problem
- Redirect
- Time exceeded

Icon

- Timestamp
- Timestamp reply.

(See *TCP/IP*.)

Icon A graphical representation of an option, application or feature on screen. Selected by pointing and clicking with a mouse, or through other means of user interaction including voice commands.

IconAuthor A popular multimedia authoring environment; it competes with such packages as Macromedia Authorware and Asymetrix ToolBook. (See *Authorware*, *Lingo*, *OpenScript* and *ToolBook*.)

IDA (Integrated Digital Access) A digital network pilot scheme which was introduced in 1988 by British Telecom. It was operated in Manchester and London.

IDC 1. Internet Database Connector: a Microsoft server extension, which interacts with 32 bit ODBC-compliant databases such as:

- Microsoft Access
- Microsoft SQL Server
- Microsoft FoxPro
- Oracle
- Sybase.

The IDC:

- is a DLL, and receives database requests via the Web server from the user's browser
- interacts with the database, and submits SQL queries
- receives resulting data from the database
- passes the data to the user's browser via the Web server.

IDC files may be created using Microsoft's FrontPage Database Connection Wizard. (See *FrontPage*, *Web** and *Web server*) 2. A firm of analysts specialising in IT.

IDE (Integrated Disk Electronics) A disk controller used widely on PCs, often integrated with the motherboard. In its standard form, at least two hard disks and two floppy disk drives are supported. IDE CD-ROM controllers are also widespread.

IEEE Multimedia An arm of the Institute of Electrical and Electronics Engineers, focusing on multimedia.

IEEE1394 (See *Firewire*.)

IIS (Internet Information Server) A Microsoft Web server, which forms part of the Windows NT 4.0 Server default installation. Including FTP, HTTP and Gopher services, the IIS may be implemented to perform the standard and specialised functions of:

- downloading HTML pages to browsers
- downloading streaming audio
- downloading streaming video
- downloading streaming multimedia
- downloading files using FTP
- uploading files using FTP.

The IIS provides a migration path for the renovation of legacy systems, supporting CGI components.

(See ASP, CGI, FTP, HTTP, ISAPI and Web server.)

IMA (Interactive Multimedia Association) An organisation that provides considerable information resources and support for multimedia professionals.

Image compression A means by which pixel data can be compressed. The compression process may be lossless or lossy. Discrete Cosine Transform (DCT) features strongly in image compression. This has been adopted by numerous manufacturers and is the mainstay of the JPEG algorithm.

(See DCT, JPEG and MPEG-1/2.)

Image format Numerous image file formats exist for storing digital images, including PIC, TIFF, IMG, EPS and GIF.

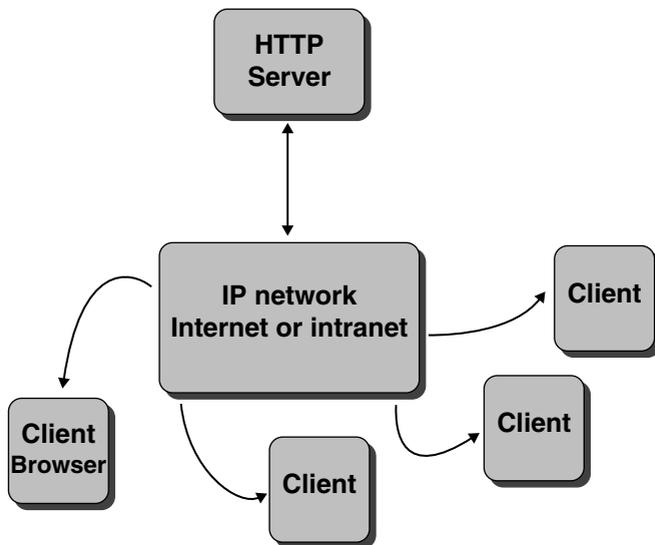
Image processor A processor specifically designed for image compression purposes. Unlike a conventional processor, it is usually designed to carry out specific matrix transformations at high speed.

Immersive VR Full immersion VR places the user in a virtual world, which can be navigated and interacted with to varying degrees. Users can interact with other users. Achieving a virtual world requires the user to wear a head mount display (HMD) which normally contains miniaturised LCD screens.

(See VR.)

Inactive Web Architecture An architecture where an HTTP server is connected to HTML clients (with browsers). The connection is provided by an IP network such as the Internet or an intranet. The client functionality is restricted to information browsing and the reception of HTML documents.

Include <file>



Inactive Web

The information flow is unidirectional, and the client cannot edit or enter data into HTML documents. The Inactive Web model is rarely used, other than when an intranet is required for information distribution and browsing. (See *Active Web Architecture and Web*.)

include <file> A C++ command which is implemented by the pre-processor and causes the contents of a named file to be read. Its precise syntax conforms to:

```
#include <filename>
```

(See C++.)

Information browsing A process of searching for and retrieving information which might be on the Internet or on a single CD-ROM or network. CD-ROM-based titles embody a retrieval engine, which is a piece of software that will accept search strings and logic operators, as well as permitting hypertext-style navigation and browsing. More modern navigation and browsing tools include Microsoft Internet Explorer, Netscape Navigator and HotJava. These may be used to tour the World Wide Web (WWW or W3) using the hypertext-style model for information storage and retrieval.

(See *Browser*.)

Inheritance An OOP methodology where a defined type inherits the characteristics of an existing type. The new type is a subclass or derived type.

(See C++, Java and OOP.)*

Inmos A chip manufacturer responsible for the innovative Transputer, a milestone in parallel processing history, and numerous other components including image compression processors and graphics chips. Once British-owned, it was bought by the European Consortium SGS-Thompson in the late 1980s.

(See Occam, MMP, NUMA and SMP.)

Inprise A software company that began life as Borland, which was founded by Philippe Kahn in order to market and sell Turbo Pascal for the PC environment. Inprise is best known for programming tools such as Delphi Turbo C++, as well as business applications. Its headquarters are in Scotts Valley, CA. Its lesser known products include the Sprint word processor. The company was founded by Philippe Kahn, and its initial rapid growth can be attributed largely to its PC programming tools, which include Turbo Pascal. Inprise (UK) International is headquartered in Twyford, and its European headquarters are in Amsterdam.

(See C++.)

Input 1. An input device provides a means for user interaction. A keyboard is an input device, as is a mouse or remote control device. Touchscreens, track balls, joy sticks and control dials are also input devices. These were referred to as user communication devices in earlier days. 2. The process of entering data into an application. Using early versions of BASIC, such as BBC BASIC, you would enter data using a statement such as:

```
200 INPUT A$
210 REM * Assign the entered keyboard characters to
    the string variable A$
```

Similarly, keyboard entries could be placed in an array using BBC BASIC with a simple loop:

```
10 DIM A$(2,10)
20 REM Create an array
30 REM
40 FOR X%=1 to 10
50 INPUT A$(1, X%)
60 NEXT X%
70 REM
```

Input device

Input device A device used to input data to and interact with an application or environment. Typical examples include a mouse, touchpad and touch screen.

InstallShield A tool used widely in the creation of installation programs. (See *www.installshield.com*.)

Instance 1. A unit object defined by a class. It may have many running copies or instances in an OO implementation, which may contain one or more programs in the form of executables and DLLs. (See *DLL*.) 2. An instance variable is the container portion of an object. This container may be used to store data. 3. A single running copy of an application. It is possible to run multiple instances of many Windows applications.

Intel A chip manufacturer founded by Gordon Moore. The world's largest manufacturer of PC processors, it makes the fifth generation Pentium and sixth generation Pentium Pro series of processors. Pentium processors are also available with MMX Technology, which is designed to accelerate multimedia performance. A modern fully specified PC should be considered as comprising a minimum of a Pentium-class processor. (See *MMX Technology*.)

Intel Indeo Video A video compression standard. The resultant video can be played using software decompression or hardware decompression. (See *AVI, MPEG* and Video**.)

Interchangeability A generic term used to describe a peripheral device or storage medium able to exist within more than one system type or operating system environment.

Interface device A means of connecting peripheral devices to a computer system, consisting of hardware and software.

Interframe compression A video stream that is composed of intermittent full frames (or intraframes) that are interwoven with partial frames. The frequency of intraframes determines the frequency of random access points for non-linear playback or editing. The partial frames sandwiched between intraframes generally contain frame information that is different from that of the intraframes. MPEG is the best known intraframe compression variant that uses what were specified as Intraframes or I frames. In MPEG compressed video streams partial frames can exist as Predicted frames or Bi-directional frames. A principal disadvantage of interframe compression

is that it does not lend itself to non-linear editing. It also results in higher compression ratios than can be achieved using intraframe compression.

(See *MPEG**.)

Interlaced A mode of operation in which the image on a monitor screen is generated by scanning even and odd numbered lines using two separate fields. This technique was introduced in television broadcasting specifically to optimise transmission bandwidth and reduce screen flicker. However, it can generally be assumed that a monitor operating in interlaced mode presents an image that flickers considerably more than a non-interlaced monitor.

(See *CRT and Monitor*.)

Internet A technical definition might be: a global network of computer networks. Conceptually, however, the Internet is much more, and it has become a universal publishing, distribution, real-time communications and broadcasting medium. It can also be used to gather information from users. The World Wide Web (or Web) is seen as a mainstay of the Internet, and it presents users with a hypertext navigation scheme. This now offers streaming multimedia playback, and may include streaming video, streaming WAV audio, graphics, photographic quality images and text. The growing number of day-to-day Internet applications include:

- e-mail
- information browsing
- downloading and uploading files to and from FTP (File Transfer Protocol) sites
- e-commerce
- distance learning
- low-cost Internet telephony
- publishing information through personal home pages
- videoconferencing
- radio broadcasting
- Web TV (television broadcasting).

Access technologies include:

- POTS
- ISDN
- Cable
- GSM.

Cyberspace is another term for the Internet. The Internet is a fast-evolving multimedia medium that is able to combine increasingly sophisticated still images, audio and video. Moreover, the Internet is cultivating an improved

Internet 2

real-time identity. This provides a gateway to numerous applications including telephony, videotelephony, videoconferencing, and radio and television broadcasting. Continuing evolution of the Internet will see:

- increasingly sophisticated still images, audio and video
- a growing number of Web sites used to deploy information and services, along with qualitative improvements
- improving search engine architectures that users access in order to find and retrieve Web pages
- faster access technologies. These include cable, ISDN and the increasing speed of conventional modems that offer 56.6 Kbps speeds
- improved software interfaces with the Web through better browser designs, which are programs that permit users to interact with Internet
- faster client systems such as PCs.

(See Web.)

Internet 2 A high-performance Internet implementation, which is currently the preserve of US academic establishments.

Internet 3 A high-performance Internet implementation which is currently under construction in the USA.

Internet Engineering Task Force (IETF) A publisher, originator and certifier of specifications of Internet protocols such as TCP/IP. Further information can be obtained at www.ietf.cnri.reston.va.us.

Internet Explorer A market-leading Web browser from Microsoft, which supports:

- ActiveX
- VBScript
- JScript
- Just-in-Time compiler for Java Applets
- SSL 2.0/3.0
- PCT 1.0

and runs on Windows 3.x/95/98/NT and Macintosh. Explorer records visited pages using a cache called the History folder. This optimises performance, as the cache is checked prior to connecting to remote Web sites. The period of time that Explorer maintains the pages within the History folder can be defined.

(See ActiveX, Browser, JScript, PCT, SSL and VBScript.)*

Internet Information Server (IIS) *(See IIS.)*

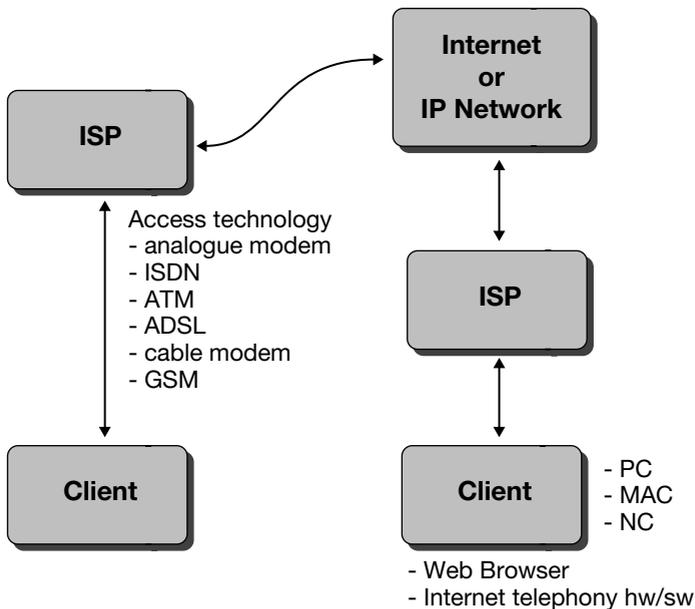
Internet Locator A Windows NT-based server which is part of the MCIS. It permits users to search a database of current visitors to a Web site, and to chat with them using Microsoft NetMeeting.

(See *Chat, IRC and MCIS.*)

Internet relay chat (See *IRC.*)

Internet Society A publisher of Internet statistics and market research.

Internet telephony A method of making telephone calls using packet-switched IP networks. In 1997 low-cost Internet telephony began to change the face of telcos, Internet Service Providers (ISPs) and corporations; the largely unregulated Internet became interwoven with telephony. For the first time ISPs could mine revenue-rich long-distance and international call businesses, which were once the preserve of telcos like BT and Mercury. Corporations and government departments may also 'toll bypass' the telcos by using Internet telephony over their own networks such as intranets, and significantly reduce their operating costs in the process. Similarly, since VocalTec launched the Internet Phone in 1995, growing numbers of ISP subscribers have been making long-distance and international calls for the cost of a local phone call. Internet telephony theoretically means that an ISP could become an international telco. The domestic long-distance call business presents ISPs with one opportunity to compete with telcos, as does



Internet telephony

Interpreted

the international call business. The technology is also being embedded into the existing switched network, where it will become transparent to the user. The successful proliferation of Internet telephony also hinges on emerging internationally agreed standards, such as H.232, which collectively will unify ISP services globally. The corporate sector will also be affected by Internet telephony, with companies like Lucent technologies and Bay Networks providing turnkey solutions that integrate into existing networks. According to an IDC report, 35 per cent of medium to large companies today already have an intranet. By 1998 that is going to increase by a further 25 per cent, and by the year 2000, 80 per cent of all companies are expected to be using an intranet. With *tour de force* Internet telephony products, Lucent Technologies is already working with numerous corporations and an undisclosed ISP in Australia. Its products are currently used by five of the seven largest banks in Australia, and the telcos MCI, GTE and France Telecom continue to evaluate its technology. One school of thought indicates that telcos have large margins in international traffic while ISPs have small margins. It follows, then, that when Internet telephony reaches critical mass, telcos will react strongly, with falling international call prices. (See Web.)

Interpreted A computer language in which object code is generated from source code each time a program is run. Almost all inexpensive micro-computers of the 1980s included BASIC interpreters. Even the first IBM PC XT included a basic interpreter, which was stored as a firmware package. The error message 'Missing Basic Interpreter', occasionally seen on later PCs, was a legacy of its earlier inclusion.

Interpreter A program which interprets a language. (See *Interpreted*.)

Intraframe A key or reference frame in an MPEG video sequence. It is a full frame and does not depend upon other frames for its data. An MPEG sequence composed entirely of intraframes is termed editable MPEG because it provides random access points. Intraframes are compressed in a similar way to JPEG images, and a comparable compression ratio is achieved. (See *MPEG**.)

Intraframe compression A video stream that can be assumed to be composed of full frames. M-JPEG is an example of intraframe compression. Its main advantage is that the resultant video files lend themselves to non-linear editing. It can also result in higher video quality than interframe compression, but compression ratios are a great deal less. (See *MPEG**.)

Intranet An IP (Internet Protocol) network based on Internet technology which is confined to selected users. Firewalls serve to partition intranets and networks from the wider Internet. Initially intranets were used for publishing internal documents in large organisations. Increasingly they are being used for transaction processing, and are displacing, and coexisting with, traditional client/server and mainframe (or legacy) systems. Intranets are based on Internet technologies, including the same protocols, client devices, server-side components etc.

(See Firewall, Security and Web.)

IP (Internet Protocol) 1. A collection of standard protocols used on the Internet and compliant networks. The standard IP protocols include:

TCP (Transmission Control Protocol).

ICMP (Internet Control Message Protocol).

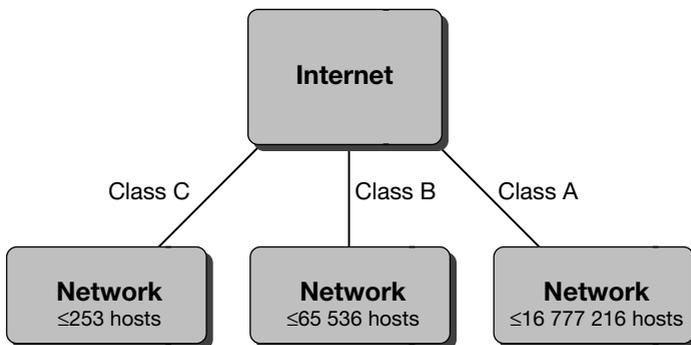
UDP (User Datagram Protocol).

(See TCP/IP.) 2. A standard protocol initially developed to transmit TCP (Transmission Control Protocol) segments between different networks.

(See ARPANET.)

IP address A physical IP address consisting of 32 bits, which identifies a network and its connected computers. The syntax for such addresses consists of four bytes, each written in decimal form and separated by a full stop:

118.234.98.87



Class A, B and C addresses

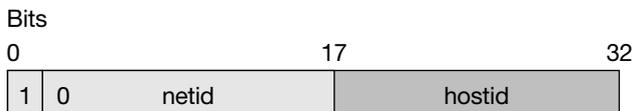
IP address class A A networks may have between 2^{16} (65 536) and 2^{24} (16.7 million) hosts.



Class A address format

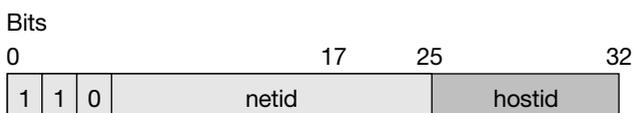
IP multicast

IP address class B B networks may have between 2^8 (256) and 2^{16} (65 536) hosts.



Class B address format

IP address class C C networks may have up to 253 hosts, and not 255 because two values are reserved.



Class C address format

The addresses consist of a network address (netID) and a host address (hostID). The leftmost digits represent the netID address. This is set to zero when addressing hosts within the network.

(See Subnet.)

IP multicast An IP addressing system, which is known as class D and was developed at Xerox PARC. A multicast packet addresses a multicast group of nodes or hosts. The first multicast tunnel was implemented at Stanford University in 1988.

(See Mbone.)

IPv6 (Internet Protocol) An advancement of the IP protocol which introduces 128 bit addressing and other improvements. The scaling of IPv4 32 bit addressing to 128 bit is intended to accommodate the future growth of the Internet in terms of the growing number of network addresses. IPv6 is also called IPng (IP Next Generation), and is specified by the Internet Engineering Task Force (IETF). IPv6 supports addressing of the types:

- multicast, which connects a host to multiple addressed hosts
- unicast, which connects a host to a single other addressed host
- anycast, which connects a host to the nearest of multiple hosts.

(See IP address.)

IRC (Internet Relay Chat) A means of communicating using text in real time across the Internet. The emergence of Internet Relay Chat or IRC in the late 1980s started a quiet revolution in the way people communicated

globally. Allowing users to chat in real time using text, it surfaced as an ideal tool for spreading news updates, particularly those about regions of war or unrest, of which the Persian Gulf is remembered as one of the first. Typical users see IRC as a way of talking to people irrespective of their geographical location, or of joining debates with IRC users that might be in different parts of the world. The debates take place in one of a number of channels, which you can change on the fly using an IRC client program. IRC clients include mIRC, TeleCafe, Mirc, PIRCH, Visual IRC96, Secure Communicator, WinTalk and NetPopup. Most popular IRC client programs are shareware or freeware, and can be downloaded from various FTP and Web sites. Modern IRC clients like mIRC offer the user easy methods of navigating through channels, connecting with selected IRC servers and talking with people in general. The many networks of IRC servers include EFnet (Eris Free net), UnderNet, DalNet, ChatNet, NewNet and IRCNet. Once connected to one of the IRC networks, you can communicate with its users through the many channels it provides. EFnet, IRCNet, UnderNet and DalNet have a global presence, and you will find their servers in many major cities. When using most IRC clients the user is required to provide a nickname, the IRC server to which to connect, an IP address, a local host name and an e-mail address if the user wishes to be contacted. An alternative nickname may also be provided, and it is used should the first nickname choice be in use on the connected network. Commercial IRC servers are rarely password protected. Many users advise reading the message of the day (MOTD), which might provide useful updates about the server. Having joined a channel, you might like to read the text messages for a while just to get the feel of things. If someone asks a question and you want to answer it, simply enter a reply and do not forget to include the person's nickname. Alternatively, you can ask a question yourself, or simply say 'hello all' or something similar, in which case you might begin talking with an IRC user that is known to you. If this leads to a one-to-one conversation, using mIRC you can double-click the person's nickname to produce a private window in which only your text appears. It is possible to set up multiple conversations like this, which is quite a good idea when you consider the lags in getting responses from users and the times when users simply stop talking to you. In regard to IRC etiquette, if you decide to be offensive in any way, and you are caught by the operator or reported by other users, the operator may eject you instantly from the channel. The channel operators' nicknames have @ signs as prefixes. Serious offences will lead to you being banned from an IRC server. When connected to IRC networks, you can use IRC commands to perform various tasks, such as joining, leaving and even creating channels. You do not have to know IRC commands, because most modern IRC clients provide such functionality through a single click. If you want to get the most out of IRC, however, it helps to be familiar

with the more common IRC commands. Equally, if you are a budding programmer and you want to write an IRC client program of your own, you will certainly need to know IRC commands. IRC commands begin with a forward slash / and range from the simple, such as `/help`, which is used to get basic help information, to the `/list #channel` command, which shows the topic and the number of users, but does not show hidden and private channels. To join a listed channel you would type `/join #channel_name`, and to leave it you would type `/part #channel_name`. The `/join` command can also be used to create your own channel by specifying a new channel name. If you create your own channel, it is a good idea to use the `/topic` command to indicate what the channel is about; you might type `/topic #genealogy`, for instance. The topic will be shown when someone lists your channel, and will help you get the channel participants you want. The `/invite` command allows you to ask specified users to join you in conversation. For example, you would type `/invite edwinstreet #hottub` if you wanted to talk to `edwinstreet` in the `hottub` channel. You can also send private messages to other such IRC users by typing `/m nickname`. To speak privately with another user, simply type `/query nickname`, following which only the named user will see what you type. The e-mail addresses of channel participants can be obtained using the `/whois` and `/whowas` commands, provided the users' e-mail addresses have been included in their IRC client program. The command `/whois #instant` will list the e-mail addresses of users on channel `#instant`, while `/who` shows the e-mail addresses of all those connected to the IRC server. You can also gain the e-mail address of a specific user with the `/whois nickname` statement, or the e-mail addresses of all users using the `/whois*` command. The `/whowas` command is used in a similar way to `/whois`, but produces the e-mail addresses of users that have recently signed off IRC.

IrDA (Infrared Data Association) A wireless interface technology, which is able to drive compatible peripheral devices such as printers. It is supported by Windows 98, and is integrated in numerous notebook systems designs. Typically, it may offer data transfer rates of up to 115.2 Kbps.

ISA (Industry Standard Architecture) A standard 16 bit expansion bus developed and introduced by IBM in the early 1980s as an integral part of its PC AT (Advanced Technology) design. Its profile is diminishing as more and more systems feature 32 bit buses and local bus slots. 32 bit buses include EISA (Extended Industry Standard Architecture) and MCA (Micro-channel Architecture). Standard local bus slots include VLB (Vesa Local Bus) and PCI (Peripheral Component Interconnect). Local bus slots

can be assumed to allow expansion cards to run at considerably higher clock speeds than those of ISA cards.

ISAPI (Internet Server Application Program Interface) An API used to create filters, which may replace CGI scripts. ISAPI filters are DLLs. They may be driven by HTTP events, and might perform such functions as data encryption. ISAPI filters improve the efficiency of server-side resources, when compared to CGI scripts, because these require separate processes. ISAPI filters require adequate testing, because their failure can render the Web server inoperable. ISAPI technology can be used for database access using the Internet Database Connector (IDC).

(See CGI.)

ISDN (Integrated Services Digital Network) An access technology that uses existing telephone lines to deliver a wider bandwidth. Introduced by the CCITT, it is able to support reasonably sophisticated video-conferencing and high-speed access to the Internet and other networks. A BRI (Basic Rate Interface) ISDN line can have two 64 Kbps B-channels that can carry video, voice or data. ISDN uses PCM for encoding data in digital form for transmission. Used in the Integrated Services Digital Network (ISDN) standard, PCM involves creating a data stream consisting of 8 bit PCM blocks. The blocks are created every 125 microseconds. By interleaving the blocks with those from other encoders, the result is time division multiplexing (TDM). In North America ISDN typically interleaves data from 24 64 Kbps sources or channels. This results in connections that provide 1.536 Mbps, although in actual fact the connection has a bandwidth of 1.544 Mbps, because each channel's frame has a marker bit 'F', adding 8 Kbyte/s. European ISDN typically interleaves 30 64 Kbps channels, giving 2048 Mbps. This and the 1.544 Mbps connection are known as primary rate multiplexes. Further interleaving of primary rate multiplexes sees:

- 6, 45, 274 Mbps in North America
- 8, 34, 139, and 560 Mbps in Europe.

(See Access technology.)

ISO (International Organization for Standardization) An organisation actively engaged in establishing standards in optics, image processing and video. It sponsors both JPEG and MPEG.

(See MPEG.)*

ISO 9660 A standard for storing data on CD-ROM. So successful was High Sierra that it was built upon by the International Organization for

ISO CD11172

Standardization, officially calling it ISO 9660. The ISO 9660 standard acted as a catalyst for CD-ROM drive manufacture.

(See CD-ROM and DVD.)

ISO CD11172 An ISO (International Organization for Standardization) official specification for the MPEG-1 algorithm, which is observed in the Video CD format.

ISP (Internet Service Provider) A company that is able to provide users with access to the Internet. Compuserve, for instance, is an ISP. Typically an ISP may offer a number of access technology options, including:

- POTS (Plain Old Telephone System), with modem access speeds of 28.8 Kbps, 33.6 Kbps or 56.6 Kbps
- Cable, providing high-speed access via cable modems
- ISDN (Integrated Services Digital Network), providing speeds of 64 Kbps or 128 Kbps, or multiples of the same.

ISPs may offer a host of other services, including virtual second lines and even Internet Telephony.

(See Access technology, Cable modem, Internet telephony, ISDN and Modem.)