
D

D1 (*See CCIR 601.*)

Daemons A program or process dedicated to perform what is usually a singular given task, such as sending mail. TCP/IP daemons include those added by third parties that include SCO.

(*See TCP/IP.*)

Daisychain A method of uniting a number of CD-ROM drives or other connected devices.

DARPA (*See ARPANET.*)

DAT (Digital Audio Tape) A worldwide standard for digital audio tape recording, covering physical attributes and encoding. DAT cassettes offer two hours of continuous digital audio playback. Standard compact cassettes are encoded horizontally using a fixed magnetic head. The head current induces an analogue magnetic signal on tape, via a head gap. DAT cassettes are encoded diagonally using a twin rotary head. Like CD-DA, CIRC error correction ensures high sound quality and long life.

(*See Wave audio.*)

Database An electronic information system offering data storage and retrieval. A generic term that describes the storage of information on a record by record basis. Records are divided into fields of different types including text, numeric, date, graphic and even BLOB (Binary Large Object). The records are stored in tables or files. Database types include flat file and relational. The flat file database model embodies no links between different files or tables. A relational database is quite different in that records from one file can be linked to records stored in a separate file or table. Codd's standard text about relational databases published in the 1960s specified different types of relational links. Types of link include one-to-one,

Database middleware

one-to-many and many-to-many. There are many commercial examples of the relational database that base their design on the original writings of Codd. Relational databases are formally referred to as RDBMSes (Relational Database Management Systems) and flat-file databases are termed simply DBMSes (Database Management Systems). Commercial examples of software products that permit the development of RDBMSes include Paradox for Windows, dBase, Microsoft Access, Oracle and Ingres. Relational databases are used to store tabular information in the form of records, and useful versions are able to generate graphs. Popular PC relational databases include Microsoft Access, Borland Paradox, dBase, Q&A and DataEase. Because they are relational, an invoice can extract information from a number of different tables or files. Flat-file databases are used to store isolated records, and cannot be used to link files or tables. They are used for simple applications such as card files. Text databases are used to store documents such as articles and even complete books. Documents can be indexed, where the user interface simply allows users to search for documents which contain target words, phrases or sentences.

(See Data warehouse, DBMS, DSS and RDBMS.)

Database middleware *(See Glue and Middleware.)*

Database server *(See Server.)*

Data capacity A measure of how much data may be stored using DSM (Digital Storage Media). The device might be electronic (such as RAM), magnetic (such as data cartridge), optical (such as CD-ROM) magneto-optical, or even molecular or organic. The physical length of CD-ROM tracks and data block size in terms of user data provide a means of calculating disc capacity. It can be assumed that a standard CD-ROM can store around 660 Mbyte. The new generation of DVD discs have data capacities in the Gbyte range (1 Gbyte = 1024 Mbyte). Hard disk data capacities tend to range from around 100 Mbyte up to several Gbyte. The length of a CD-ROM in minutes and data block size in terms of user data provide a means of calculating disc capacity with pinpoint accuracy. For example, consider the following simple formula:

$$\text{User data capacity} = \text{disc length (seconds)} * \text{blocks read per second} * \text{usable block data}$$

Or, using CD-I discs:

$$\text{User data capacity} = \text{disc length (seconds)} * \text{sectors read per second} * \text{usable sector data}$$

Applying this formula to calculate the precise data capacity of a 65 mins 12 s Mode 1 or CD-I Form 1 disc gives:

User data capacity = $3912 * 75 * 2048$ bytes
= 600 883 000 bytes
= 573 Mbyte

The capacity of a 65 mins 12 s Mode 2 CD-ROM disc is:

User data capacity = $3912 * 75 * 2336$ bytes
= 685 382 000 bytes
= 653.6 Mbyte

The data capacity of a 65 mins 12 s CD-I Form 2 disc is:

User data capacity = $3912 * 75 * 2324$ bytes
= 681 861 000 bytes
= 650.2 Mbyte
= 650.2 Mbyte

(See CD-I, CD-ROM and DVD.)

Data compression *(See Compression.)*

Data cube An information storage model. In the context of a data warehouse, data cubes are evolved as a result of extractions from operational data. They can be assumed to be static entities, which do not change and may not be altered or even built from query data. A cube cache is used to store them in memory. If grown beyond three dimensions, the cube becomes a hypercube.

(See Data warehouse.)

Data dictionary A type of metadata which defines stored data along with its relationships. Typically the database dictionary is dynamic, updating its contents as data structural changes occur.

(See Data warehouse and DBMS.)

Data extraction A process that abstracts data from one or more sources in order to build a static database of unchanging data.

(See Data warehouse.)

Data hiding A means of making the underlying workings of types or classes transparent to the programmer. The programmer merely has to understand the behaviour and functionality of the class.

(See C++, Java and OOP.)

Data link A direct serial connection between two nodes or devices; it is devoid of intermediate switches or devices.

(See MPP.)

Data mart

Data mart A single-subject (and generally small-scale) data warehouse which provides DSS for a limited number of users.

(See *Data warehouse*.)

Data partitioning A method of segregating data so that it is distributed across different systems. It may serve to store selected records in more secure (and often expensive) mass storage (such as SRAM or an appropriate level of RAID), while storing less important data on conventional storage media, namely hard disks.

(See *RAID*.)

Data replication A dynamic and changeable verbatim copy of data. A multiplicity of such replicas may exist.

Data schema A term which describes a database structure, such as the entity relationship (E-R) diagram of an RDBMS. The E-R diagram shows the links that unite the database tables.

(See *Database, Data warehouse and RDBMS*.)

Data sonification A general term used to describe the process of enhancing data through the addition of audio.

Data transfer rate (Average user data transfer rate) 1. The rate at which data is transferred from a CD-ROM, hard disk or DVD-ROM drive. Typically, it is standardised on old-fashioned single-speed drives at either 150 Kbyte/s or circa 171 Kbyte/s. The approximate average user data transfer rate can be calculated using the following simple formula:

$$\text{Average user data transfer rate} = \text{blocks/s} * \text{user data/block}$$

In Mode 1:

$$\begin{aligned} \text{Average user data} \\ \text{transfer rate} &= 75 * 2048 \\ &= 153\,600 \text{ byte/s} \\ &= 150 \text{ Kbyte/s} \end{aligned}$$

Turning to Mode 2 discs, a noticeable improvement is brought about through increased user block data:

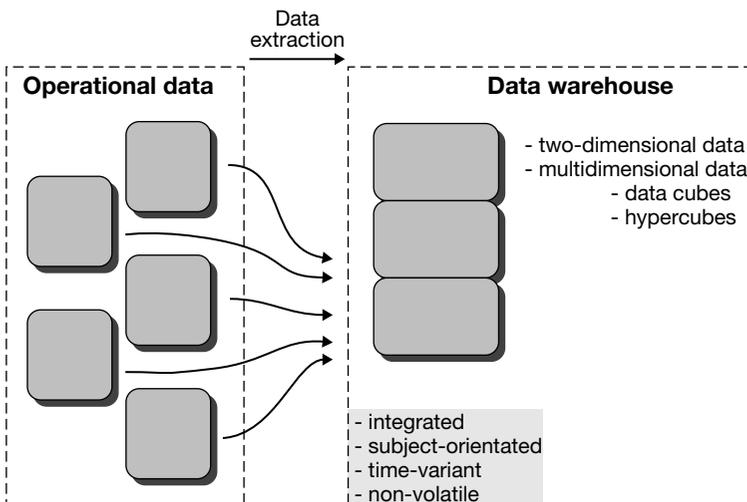
$$\begin{aligned} \text{Average user data} \\ \text{transfer rate} &= 75 * 2336 \\ &= 175\,200 \text{ byte/s} \\ &= 171 \text{ Kbyte/s} \end{aligned}$$

(See *CD-ROM and DVD*.) 2. The rate at which data is transferred from a mass storage device, such as a hard disk, removable media or RAID.

(See *Hard disk and RAID*.)

Data type A classification for data. Modern relational databases commonly store the following different data types, including currency, numeric, date, alphanumeric, Boolean, graphical and BLOB (Binary Large Object). (See *Data warehouse, BLOB, Boolean and OODBMS.*)

Data warehouse ‘An integrated, subject-oriented, time-variant, non-volatile database that provides support for decision making.’ (Bill Inman). A unified data repository extracted from multiple data storage structures that may emanate from various data sources. It provides a single interface with relational and/or multi-dimensional data. It is the rebirth of what IBM termed the *Information Warehouse* in the 1980s. Data warehouses form the information storage methodology in modern decision support systems (DSS). Collectively these systems provide a means of querying data that emanates from disparate information storage models. On-Line Analytical Processing (OLAP) is a crucial facet of the data warehouse architecture, providing a means of abstracting and analysing data in a manner which makes transparent the multiple data sources and data storage models used. The data mining system (DMS) is also a key DSS component. Data mining is an attempt to embed intelligence into the interrogation of stored data, and may automate the querying of data, provide user access to new data structures whose information is in close proximity in terms of related subject matter, and assist in solving defined problems. The underlying storage metaphors of a data warehouse may be:



Data warehouse overview

DBMS

- two-dimensional, where values are stored using the table metaphor, adhering to the established formal RDBMS model for information storage
- multi-dimensional, where data is perceived as a three-dimensional cube or a data cube, where values have x , y and z coordinates.

Data cubes are evolved as a result of extractions from operational data. They can be assumed to be static entities, which do not change and may not be altered or even built from query data. A cube cache is used to store them in memory. If grown beyond three dimensions, the cube becomes a hypercube. According to Inman's definition, a data warehouse is characterised as:

- *integrated*, providing a unified interface to multiple data sources that may use disparate information storage models
- *subject-orientated*, revealing data which is in close proximity in terms of subject matter, providing related information that may be dedicated to specific analysis.
- *time-variant*, permitting data retrieval and analysis using the dimension of time.
- *non-volatile*, making the collective data entities static in definition, except during the periodic instances where updates are driven through the data by the integrated operational systems. On-line updates are impermissible, and the data warehouse can be considered as being read-only.

See: Inman, Bill and Kelley, Chuck, *The 12 Rules Of Data Warehouse For A Client/Server World*, Data Management Review, Vol. 4, May 1994, pp. 6–16.

(See *Database, DBMS and DSS.*)

DBMS (Database Management System) A system that provides the operations necessary to manage stored data, which may be two-dimensional or multi-dimensional. A DBMS:

- requires a data dictionary, which defines stored data along with relationships. The database dictionary is dynamic, updating its contents as data structural changes occur.
- ensures that entered data undergoes pre-defined validity checks.
- transforms entered data so that it may be stored by the underlying data structure.
- provides storage for data, its relationships, forms, reports, queries and miscellaneous files.
- includes security features, such as the password protection of files and allocated user access rights, and prohibits certain users from accessing certain files and from making data changes.
- may maintain data integrity in a multi-user environment.

- may provide a database communications interface, which might permit users to submit forms-based queries through Web browsers or publish reports and data using various media, which include the Web, e-mail and Lotus Notes.
- provides features pertaining to backup and recovery.
- provides access to data using a query language (such as SQL or a variant thereof), or a querying mechanism which might involve the completion of tables using defined query statements (such as the Borland Query By Example (QBE) technique.)

(See Data warehouse.)

DBS (Direct Broadcast Satellite) A communication and broadcasting technology where information is transmitted (from a geostationary satellite) and received by a satellite dish, which is typically 18 in to 3 ft in diameter. It can also be applied as an access technology which offers downstream bandwidths of perhaps 400 Kbps. Hughes Network Systems (USA) offer such service and implementation. Up to 200 television channels may be chosen using many DBS or Direct To Home (DTH) services. MPEG-2 encoding is used for many DBS services.

(See MPEG-2 and Satellite system.)

DCC (Digital Compact Cassette) An audio distribution medium developed by Philips and launched in 1991. Players able to play both DCC and conventional compact cassettes are commercially available. This dual compatibility is regarded as a significant advantage.

DCE (Data Communications Equipment) A term sometimes applied to a modem.

DCE-DTE (Data Communications Equipment – Data Terminal Equipment) speed The rate at which data is transferred between computer and modem. Synonyms: communications rate and modem-to-computer speed.

D channel (Delta channel) A 16 Kbps signalling channel which supports two 64 Kbps data channels according to the ISDN standard.

(See ISDN standard.)

DCOM (Distributed Component Object Model) A Microsoft technology or protocol which permits interaction between objects or ActiveX components over a network. An open standard, DCOM is operable with standard Internet protocols, including HTTP and TCP/IP.

(See COM and Glue.)

DCT (Discrete Cosine Transform) A widely used mathematical technique for image compression. It provides the basis for lossy image compression where redundant image data is omitted. It is part of the JPEG algorithm, and is also used in videotex. (See *JPEG and Videotex*.) The DCT process operates by converting image data from the *spatial* to the *transform* domain. The complex underlying mathematics are transcribed to matrix manipulations. The resulting intensive arithmetic operations are best implemented using dedicated image processors or general purpose processors that have multimedia capabilities, such as those integrated into Intel MMX. Image energy in the spatial domain is defined as the square of the pixel values. This energy is spread evenly over pixel blocks and the resulting coefficients. Following the transformation, the energy is confined to fewer coefficients. The process involves dividing the image data into 8×8 pixel blocks and performing a forward DCT:

$$F = [T] [P] [T]$$

where $[T]$ is

0.3536	-0.3536	-0.3536	-0.3536	-0.3536	-0.3536	-0.3536	-0.3536
0.4904	0.4157	0.2778	0.0975	-0.0975	-0.2778	-0.4157	-0.4904
0.4616	0.1913	-0.1913	-0.4619	-0.4619	-0.1913	0.1913	0.4619
0.4517	-0.0975	-0.4904	-0.2778	0.2778	0.4904	0.0975	-0.4157
0.3536	-0.3536	-0.3536	0.3536	0.3536	-0.3536	-0.3536	0.3536
0.2778	-0.4904	-0.0975	0.4157	-0.4157	-0.0975	0.4904	-0.2778
0.1913	-0.4619	-0.4619	-0.1913	-0.0193	0.4619	-0.4619	0.1913
0.0975	-0.2778	-0.4157	-0.4904	0.4904	-0.4157	0.2778	-0.0975

(See *JPEG and MPEG**.)

DDE (Dynamic Data Exchange) A standard technique by which data can be exchanged between running Windows applications. For example, a database tool might have a DDE interaction with a spreadsheet in order to draw graphs based on spreadsheet data. A DDE interaction is occasionally called a conversation. Nowadays most Windows users harness OLE (Object Linking and Embedding) rather than DDE. OLE 2.0 compatible applications can be assumed to be considerably less difficult to link.

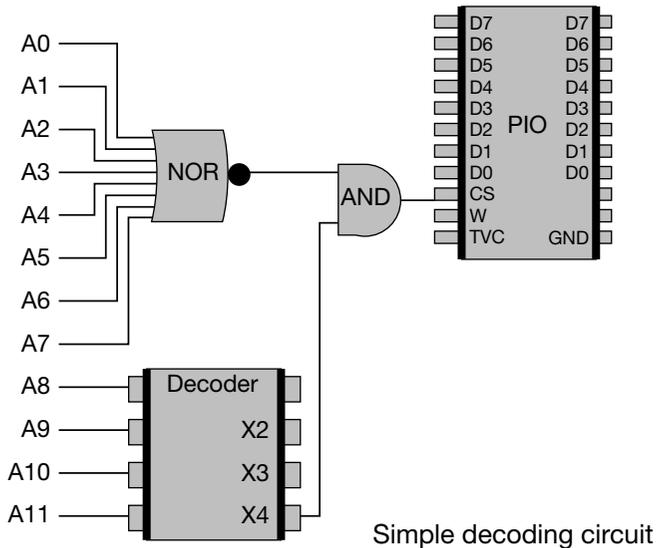
(See *ActiveX* and OLE*.)

Debugger A program or feature which permits program code to be corrected or debugged. It assists the process through appropriate prompts and indications as to where the bugs exist in the source code listing.

Decode A process by which encoded data, which may be compressed, is interpreted and delivered to the receiving system or device. For example, the process may involve the decoding of MPEG video.

(See *MPEG**.)

Decoder 1. A device which is able to interpret and encode a signal. An MPEG decoder is able to uncompress digital video, as is an MPEG-2 STB. (See *DCT and MPEG**.) 2. An electronic device which is able to decode digital addresses. A simple two-input device may set up to four digital outputs. Such devices may form part of the address decoding between the processor and connected electronic devices.



Decryption A process by which encrypted data is unlocked to become readable.

(See *Encryption*.)

Defragmentation program A program used to defragment a hard disk. It ensures that used data blocks are arranged in a contiguous stream.

Delta channel (See *D channel and ISDN*.)

Density A measure of how densely packed data bits are on a storage medium.

Depth cue A method where distant objects are dimmed or toned down to assist in the achievement of an authentic perspective view.

DES (Data Encryption Standard) An encryption technique; a symmetric cryptosystem. Both senders and receivers use a common 56 bit key to

Desktop publishing

encrypt and decrypt messages and data. The US government backed DES in 1977, and has since recertified every five years.

(See Cryptography and Encryption.)

Desktop publishing *(See DTP.)*

DESX A version of DES encryption.

Dextrous master An input device used to communicate physical movements usually to a remote robot. This activity is termed telerobotics.

Dhrystone A unit of measurement that provides a guide to the raw processing power of a computer system. Performing such a test does not require a specialised laboratory testbed but a commercially available diagnostics program. One such program is CheckIt (TouchStone Software Corporation, Seal Beach, CA). More sophisticated programs include PC Bench (Ziff-Davis). To determine the practical performance of a machine, comparative tests running everyday programs are often more desirable.

DHTML (Dynamic HyperText Markup Language) A version of HTML where changes may be made to running HTML objects. It was released jointly by Microsoft and the World Wide Web Consortium (W3C).

(See Dylan, HTML and OODL.)

Dialog box A box that establishes communication between an application or environment and the user. In the context of Windows, typical examples include the Open dialog box, which permits a file to be saved. A dialog box might be referred to as a Windows component.

Dialog box control A window contained by a dialog box.

Dialog box editor A tool that can be used to create dialog boxes, commonly integrated into visual programming packages.

Dial-up password file A file used to store passwords, authenticating access to networks via dial-up links.

(See TCP/IP.)

DIB (Device-Independent Bitmap) A bitmap format that provides a device-independent means for storing bitmaps. DIB files can be used to stored intraframe video sequences. Such DIB sequences can be played using Windows Media Player and VidEdit.

Digital A term describing devices such as a computer that process and store data in the form of ones and zeros. In a positive logic representation, 'one' might be +5 volts and zero 0 volts. This lowest of levels at which computers operate is known as machine code. Binary arithmetic and Boolean algebra (named after Irish mathematician George Boole) permit mathematical representation. Boolean algebra and Karnaugh maps are used widely for minimisation of logic algebraic expressions. Though digital signals exist at two levels (one or zero), an indeterminate state is possible.

Digital audio An audio signal recorded in digital form. The most common standard digital format is that defined in the CD-DA specification. Digital audio is used widely in modern multimedia through wave audio files. Audio may be digitised using either video capture boards or sound cards. Audio sources can take the form of a microphone, CD player, audio tape, audio cassette and even electronic musical instruments. Audio cards can be regarded as analogue to digital convertors (ADCs) where the accuracy of digitisation and the subsequent quality achieved largely depend upon the sample rate and number of bits used per sample. The audio quality required can also be preset from within many authoring programs. The memory capacity consumed by a sequence is a function of quality. If it is necessary to calculate the exact memory/data capacity consumed, then the following simple formula can be applied:

$$\text{Memory capacity required (bits)} = \text{Sequence duration (secs)} * \text{Sampling rate (Hz)} * \text{bits per sample}$$

For example, if an 8 bit sound digitiser with a sample rate of 11 kHz were used to digitise a 15 second sequence, then:

$$\begin{aligned} \text{Data capacity required (bits)} &= 15 * 11\ 000 * 8 \\ &= 1\ 320\ 000 \text{ bits} \\ &= 165\ 000 \text{ bytes} \\ &= 161.13 \text{ Kbyte} \end{aligned}$$

The memory or disk data capacity required naturally increases linearly with increased sample rates.

(See Wave audio.)

Digital camera A camera able to store pictures in digital form. A popular range of digital cameras is the Kodak DC series.

Digital signature A unique digital code which is attached to a document. It is created using cryptography software such as PGP (Pretty Good Privacy) or Sleet. Digital signatures are created using private keys, which may also be used to unlock the resulting secured documents.

(See Cryptography.)

Digital video

Digital video A video sequence that is stored and played in digital form. Digital motion video is the most animating feature of modern multimedia. Using videodisc players it has been possible to incorporate colour full-motion, full-screen video (FMFSV) in a computer environment for some time. Because multimedia is a blend of concurrent processes, its storage on a single optical disc requires various elements to be interleaved on the same track. Before this concept could be addressed, the inability of conventional (serial) desktop computers to play motion video stored on CD-ROM represented a significant hurdle. Reasons as to why this is not possible lie in the inadequate rate at which data is transferred from CD-ROM to computer, and in inadequate data storage capacity. A blanket solution to both problems lies in image-compression. For example, if frames of video are compressed significantly, then the need for large data storage capacity and, more importantly, high rates of data transfer is reduced. Intel refined such a technology that it acquired from General Electric in October 1988. Called Digital Video Interactive (DVI), its home was the Intel Princeton Operation, which is part of the Microcomputer Components Group. It originally began in the David Sarnoff Research Centre, New Jersey, the once RCA laboratories. Using DVI, up to 72 minutes of FMFSV (at 30 fps) can be stored on a single 12 cm diameter CD-ROM.

(See DI, M-JPEG, MPEG, Streaming video and Video*.)*

Direct Broadcast Satellite *(See DBS and Satellite system.)*

Direct connection A modem connection without error connection, compression and overflow control. It can be assumed that in such a situation the modem rate equates precisely to the connection rate.

Direct Cosine Transfer (DCT) *(See DCT.)*

Director *(See Macromedia Director.)*

Direct X *(See Microsoft DirectX and SDK.)*

Disc replication A process of manufacturing CD-ROM or DVD discs. With disc data built and stored, a replication company can be employed to create a CD master disc and so produce a specified quantity of discs. However, where a low volume of discs is required, the possibility of using CD-R replication might be considered. If uncertain about data format and submission medium requirements, advice should be sought from the replication company. Mastering involves the physical creation of a glass disc mirroring exactly the CD-ROM disc to be produced. In clean room con-

ditions an electroforming process ensures that the glass master is transcribed onto metal stampers, the output from which is tested electronically as well as mechanically. By injection moulding, clear polycarbonate pressings are produced, to which a metallic disc (holding encoded data) is bonded. Finally, the assembly is coated with a protective lacquer. At advanced manufacturing facilities the complete manufacturing and quality control process is highly automated, where the highest level of personnel interaction will be through the operation of semi-automatic systems and quality control. Quality control normally consists of data verification, manual or automatic inspection, and microscope analysis of pit geometry (for quality analysis).

(See CD-ROM and DVD.)

Disintermediation A term used to describe the Web in its direct selling and information access guise. In essence it refers to the effects of the Web in terms of providing users with direct access to information sources, services and commerce.

(See SET and Web.)

Display *(See Monitor.)*

Dissolve A cut from one image or video sequence to another. More precisely, it is the fading of an image into a background colour or image, or the fading of one image while another image is faded up.

Distributed computing A computing environment where processing, applications and resources are spread across different platforms. It is typically a client/server environment, and may be heterogeneous where disparate operating systems are integrated.

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

Distributed debugging A methodology for debugging client/server applications where the collective distributed system is perceived as a single system.

(See Distributed computing.)

Distributed glue A name given to the collective entities which bind together (dynamically) running components that are on the client and on the server. As is the case with local glues, standard OO component architectures use different distributed glues.

(See ActiveX, Glue, JavaBeans, OLE and OpenDoc.)*

Dithering

Dithering A process by which the image depth of a graphic is altered. Programs such as PaintShop Pro are able to dither images, which can be useful for:

- targeting a system which may be limited to simple 8 bit graphics
- improving the quality of displayed graphics (particularly where a machine will attempt to display 24 bit images at 16 bit image depth)
- reducing the size of image files, so improving the response of a Web application.

DLL (Dynamic Link Library) A file that contains a number of functions that may be called by different applications. The Windows architecture is itself based on DLLs. A DLL may be:

- *dynamic*, where programs interact with it at run-time
- *static*, where the DLL is embedded into the application when compiled.

Static libraries tend to make applications *fat*, requiring more memory than their dynamic counterparts. A DLL has:

- a file which contains its source code and entry and exit functions.
- a module definition file
- a resource definition file.

Typically DLLs offer:

- effective program investment through improved reusability
- better code compatibility
- easier migration paths
- cost-effective system renovations
- better program performance
- improved memory management.

(See *C++ and Java*.)

DMA (Direct Memory Access) A channel used to move data, with minimal use of the processor. For instance, it speeds up the rate at which an expansion card can communicate with a computer's memory. It also allows separate devices using different DMA channels to operate concurrently. Computers based on the 80386 processor (or higher) support eight DMA channels, though some channels are reserved for certain housekeeping tasks. Many sound cards require exclusive use of a DMA channel, while some can share a DMA with another expansion card.

DNS (Domain Name Service) A server that converts domain names (such as *www.digital.com*) into IP addresses.

(See *TCP/IP*.)

DNS negotiation A process by which the DNS address is determined by the PPP server and passed to the PPP client.

(See TCP/IP.)

Domain category A collection of servers on the Internet that share the same suffix in their URLs. For example, <http://www.cia.com.au> is in the domain [com.au](http://www.cia.com.au) (which is a mnemonic for a commercial site in Australia). Other domains include [.edu](http://www.cia.com.au) (educational), [.gov](http://www.cia.com.au) (government), [.mil](http://www.cia.com.au) (military) and [.net](http://www.cia.com.au) (network).

(See Domain name, E-mail, TCP/IP and URL.)

Domain name The name of a domain. For example, in the URL www.microsoft.com, [microsoft](http://www.microsoft.com) is a domain name.

(See E-mail, TCP/IP and URL.)

DOS *(See MS-DOS.)*

Dot pitch A measurement of the distance between addressable pixels on a monitor screen, indicating the clarity of picture and maximum resolution supported.

Double-click A method of selecting options or icons using a mouse. It involves positioning the screen pointer above the icon and pressing the left button twice in succession. When the cursor is transformed into an hourglass (or something similar), you have successfully selected a program icon, for example. Using Windows the interval between the consecutive clicks can be altered using the Mouse icon in the Control Panel window.

Double double An item of data that consists of 64 contiguous bits. It is twice as long as a double word.

(See C++.)

DoubleSpace A real-time disk compression program built into MS-DOS 6.0 to MS-DOS 6.2. Depending upon the file types stored on a hard disk it theoretically doubles disk data capacity. There are numerous other so-called on-the-fly data compression programs on the market for both the PC and Apple Macintosh. Foremost among these is Stacker from Stac Electronics.

(See Compression, DriveSpace and Stacker.)

Double word

Double word An item of data that contains 32 contiguous bits. It is twice as long as a 16 bit word.

(See C++.)

Downloading The process of copying files from a remote server to a local computer. The reverse process is called uploading.

(See Browser and FTP.)

Downsizing The process of reducing the complexity of software so that it can be ported to a less powerful system. For instance, a client/server database application could be simplified to run on a PC-based LAN. Equally, an operating system originally developed for a mainframe or workstation can be downsized to run on a PC.

Drag-and-drop The drag-and-drop feature permits the user to move objects on screen simply by dragging them to required locations using a mouse.

DR-DOS (Digital Research Disc Operating System) An operating system, based upon Digital Research CPM (Control Program for Microcomputers), which has minor deviations from MS-DOS. DR-DOS 5.0, for example, is slightly incompatible with MS-DOS 4.01 and MS-DOS 5.0. DR-DOS 6.0 is the most recent version (1993).

DriveSpace A Microsoft real-time disk compression utility which is integrated in Windows 98. It increases the data capacity of a hard disk and of removable magnetic media by around two-fold. The compression ratio attained 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 WinZip.

(See Compression, DoubleSpace and Stacker.)

Drop-down list box A Windows component that provides the user with a means of selecting a file or option. Its physical appearance is that of a box with an arrow pointing downwards on its right-hand side. Clicking the arrow produces a list of selectable items.

Dropped A frame in a video source recording which does not appear in a captured digital video file is said to be dropped.

(See Video capture.)

Dropped packet A packet which does not arrive at its intended destination. In certain instances, such as streaming audio and video, such dropped packets are acceptable. In error-sensitive applications, such as program file transfers, dropped packets are unacceptable.

Drum scanner (*See Scanner.*)

DSA An encryption technique.
(*See Cryptography and Encryption.*)

DSM (Digital Storage Medium/Media) A medium used to store digital data. Commercial examples include audio CD, CD-ROM, CD-ROM XA, CD-I, Digital Versatile Disc (DVD), floppy disk, Sony Mini disc, Philips DCC (Digital Compact Cassette) and DAT (Digital Audio Tape).
(*See CD-ROM and DVD.*)

DSN (Data Source Name) A means of identifying, and connecting to, a database. A DSN is required for many Web applications that interact with and query databases, which are typically ODBC-compliant.
(*See IDC and ODBC.*)

DSS (Decision Support System) (*See Data warehouse.*)

DTE (Data terminal equipment) A term rarely used to describe a computer connected to a network.

DTP (Desktop publishing) A term used to describe the use of a desktop computer to design and produce documents of the sort distributed by the publishing sector. Fully specified DTP packages provide the user with a choice of fonts, formatting tools, page make-up features, drawing tools and a means to import pictures into documents. Professional DTP packages include QuarkXPress, PageMaker and Ventura.

Dual-homed host (*See Firewall.*)

Dumb terminal A client device which is restricted to the presentation element of the application. It has no more application logic than that required to send requests and receive visual information. Physically it consists of a keyboard, display and network interface.
(*See Client/server.*)

DUN (Dial-Up Networking) A technique by which a system/client may be connected with a remote system or network. It is the chosen connection method integrated in Windows 95/98/NT.

Duplex A channel that can be used to transmit data in two directions simultaneously. Where data is unidirectional at any point in time, the channel is termed half-duplex.

DVD An optical disc technology that provides a sufficiently wide bandwidth to play MPEG-2 video. DVD was once an acronym for Digital Video Disc and Digital Versatile Disc. It offers maximum data capacities of 4.7 Gbyte, 8.5 Gbyte and 17 Gbyte, and exists in four forms:

- DVD-ROM, which provides the same functionality as CD-ROM but with a wider bandwidth and considerably more data capacity
- DVD, which is aimed at the consumer market as a replacement for VideoCD and VHS video
- DVD-RAM, which is a rewritable format able to support a data capacity of 2.6 Gbyte
- DVD+RW, which is a rewritable format offering a data capacity of 3.0 Gbyte.

The general DVD specification includes a:

- 1.2 mm thick, 120 mm diameter disc
- 4.7 Gbyte for a single-layered, single-sided disk
- track pitch of 0.74 micrometres
- 650/635 nanometre laser
- RS-PC (Reed Solomon Product Code) error correction scheme
- variable data transfer rate yielding an average of 4.69 Mbps.

DVD-ROM drives offer backward compatibility with CD-ROM, and the important factors that apply to the performance of a dedicated CD-ROM drive are applicable. Features which drive the DVD-ROM specification include the:

- supported data capacities, i.e. 4.7 Gbyte, 8.5 Gbyte and 17 Gbyte
- interface type
- ability to record CD-R discs
- burst transfer rate
- MTBF (mean time between failures)
- DVD disc average access time
- CD-ROM disc average access time
- average CD-ROM data transfer rate, i.e. 16 speed, 24 speed, 32 speed etc.

- CD-ROM burst transfer rate
- disc spin modes, which may be either CAV or CLV
- meeting of MPC3 requirements
- installation which may be vertical or horizontal.

(See CAV, CD-ROM, CLV, LED and MPC.)

DVD-ROM *(See DVD.)*

DVD video An alternative term for MPEG-2 video stored on DVD.

(See MPEG.)*

DVHS (Digital Video Home System) A digital video cassette format developed by JVC.

DVI (Digital Video Interactive) A largely obsolete, but nonetheless pioneering, video compression and decompression technology for the AT and MCA bus, thus aimed at PC ATs and PS/2 systems (beginning with the PS/2 Model 50). Intel Indeo superseded DVI. It is specified as being able to generate full-colour full-motion, full-screen video (FMFSV). The original specification embodied 8 bit digital video. The MPEG were presented with the DVI compression algorithm, but it was rejected. However, the compression techniques used in DVI were influential in the development of the MPEG compression schemes. Digital Video Interactive (DVI) was demonstrated at the second Microsoft CD-ROM conference of 1987. An image compression technology, DVI permits FMFSV in the PC environment. DVI offers full-colour FMFSV at 10 to 30 fps and a frame size of 512×480 pixels resolution.

(See MPEG and MMX Technology.)

Dylan An object-oriented dynamic language (OODL) developed by Apple Computer. Popular Dylan development environments include Apple Dylan Technology Release and Early Dylan, which runs on top of Apple Common Lisp. Key Apple Dylan features include:

- automatic memory management
- a system for organising code in a meaningful manner
- an IDE that has incremental compiler, which allows programmers to change the code of a running programs
- a totally object-oriented structure
- an application framework tailored for building Macintosh applications

Dynamic Data Exchange

- the ability to deploy standalone applications that don't require the Dylan environment
- Cross-language support for C code and APIs.

Dylan was developed by the Apple Advanced Technology Group (ATG) in the late 1980s, and was moved from its Cambridge office to Cupertino in the late 1990s. The ATG set about combining the qualities of dynamic languages such as Smalltalk with static languages like C++ and Pascal. Other Dylan implementations include:

- The Marlais (freeware) interpreter for Macintosh, Windows and Unix
- Carnegie Mellon University's Dylan for Unix
- Harlequin's Windows version
- The Mindy bytecode compiler for the Macintosh and Unix environments.

See: *Dylan Reference Manual*, Apple Computer, 1995.

(See C++, DHTML, Java, OODL and Parallel programming.)

Dynamic Data Exchange (See DDE.)

Dynamic HTML (See DHTML.)

Dynamic language A programming language that supports an incremental compiler where code changes can be made to running programs. For other important characteristics, see Dylan and OODL.

(See Dylan.)

Dynamic Link Library (See DLL.)

Dynamic load balancing (See MPP.)

Dynamic processor A processor that has to be constantly refreshed electronically. Such processors are commonly used in desktop systems, and include Pentium processors. They tend to consume a comparatively large amount of current when placed in the perspective of the static processor designs used in some notebook computers.

(See Pentium* and PowerPC.)

DYUV (Differential or Delta YUV) An image compression technique used in CD-I. In the context of CD-I it yields a compression ratio of 3:1 and is used for still near-photographic quality images. It operates in the confines

of conventional television broadcast signals, where the Y component represents luminance and U and V chrominance. Refinement and comparatively large data storage requirements make Delta YUV images uneconomic for cartoon-like images. DYUV operates by storing the differences between absolute YU or YV pixel information, rather than the absolute pixel data.