VMS Glossary

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This document contains definitions for commonly used terms in documentation of the VMS operating system.

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Preface

Intended Audience

This document is intended for all users of VMS documentation.

Document Structure

The definitions are presented in alphabetical order. They have not been grouped into categories.

glossary

"a" character: The subset of ASCII characters that are allowed in the labels of ANSI-labeled magnetic tape.

abort: An exception occurring in the middle of an instruction that sometimes leaves the registers and memory in an indeterminate state such that the instruction cannot necessarily be restarted.

absolute indexed mode: An indexed addressing mode in which the base operand specifier is addressed in absolute mode. See also *indexed addressing mode* and *absolute mode.*

absolute mode: A mode of address in which the program counter (PC) is used as the register in autoincrement deferred mode. The PC contains the address of the location containing the actual operand.

absolute time: A value expressing a specific date (month, day, and year) and time of day. Absolute time values are always expressed in the system as positive numbers.

access control: Validating requests for connection, login, or file-access to determine whether or not they can be accepted. User name and password provide the most common means of access control.

access control list (ACL): A list that defines the kinds of access to be granted or denied to users of an object. Access control lists can be created for objects such as files, devices, and mailboxes. Each access control list consists of one or more entries known as access control list entries.

access control list entry (ACE): An entry in an access control list. Access control list entries may specify identifiers and the access rights to be granted or denied the holders of the identifiers, default protection for directories, or security alarm details. Access control lists for each object can hold numerous entries, limited only by overall space and performance considerations.

access mode: A processing mode that determines which instructions a processor can execute and which locations in memory it can read and write. The four processor access modes are, in order from most to least privileged and protected, kernel (mode 0), executive (mode 1), supervisor (mode 2), and user (mode 3). When the processor is in kernel mode, the executing software has complete control of, and responsibility for, the system. The processor status longword contains the current access mode field. The operating system uses access modes to define protection levels for software executing in the context of a process. For example, the executive and most system services run in kernel mode and are most protected. VMS Record Management Services (RMS) and some system services run in executive mode. The command interpreter is less protected and runs in supervisor mode. The debugger runs in user mode with the same privileges and protection as normal user programs. See also *record access mode.*

access type: (1) The way the processor interprets instruction operands. Access types are read, write, modify, address, and branch. (2) The way a procedure accesses its arguments. See also *record access type.*

access violation: An exception that takes place on an attempt to reference an address that is either not mapped into virtual memory or not accessible by the current access mode.

account: A character-string name or number that identifies an individual user when the user logs in. That name or number tells the system where the user's files are and the type of access to other files the user has.

User accounts are either privileged or nonprivileged. Privileged users have access to privileged system commands. Nonprivileged users are limited to everyday operations that do not threaten the integrity of the operating system.

accounting manager: A function in the job controller system process that writes accounting records to a system accounting log file to track job activity for user process termination, printer and batch jobs, and so on.

account name: A string that identifies a particular account used to accumulate data on a job's resource use. This name is the user's accounting charge number, not the user identification code (UIC).

ACE: See *access control list entry.*

ACL: See *access control list.*

ACP: See *ancillary control process.*

active component: A network component whose operational state is other than OFF. The ACTIVE keyword can be used with the Network Control Program (NCP) commands SHOW or LIST to display information about active lines, circuits, nodes, and logging.

active set: In a VMS symmetric multiprocessing system, those processors that have been bootstrapped into the system, have undergone initialization, and are capable of scheduling and executing processes. Together, the primary processor and all secondary processors make up a system's active set. Compare with *available set.*

adapter control block (ADP): A structure in the I/O database that describes an adapter or device. VMS creates an ADP for each UNIBUS or MASSBUS adapter, each UNIBUS or MASSBUS device, and each device on a VAXBI bus.

address: A number used by the operating system and user software to identify a storage location in memory. See also *virtual address* and *physical address.*

address access type: A type of access in which the specified operand of an instruction is not accessed directly by the instruction. The address of the specified operand is the actual instruction operand, and the context of the address calculation is determined by the data type of the operand.

address space: The set of all possible addresses available to a process. Virtual address space refers to the set of all possible virtual addresses. Physical address space refers to the set of all possible physical addresses transmitted on the backplane interconnect.

addressing mode: The way in which an operand is specified; for example, the way in which the effective address of an instruction operand is calculated using the general registers. The seven general-register addressing modes are register, register deferred, autoincrement, autoincrement deferred, autodecrement, displacement, and displacement deferred. In addition, there are six indexed addressing modes using two general registers and literal mode addressing. The three program counter (PC) addressing modes are referred to as immediate (for register deferred mode using the PC), absolute (for autoincrement deferred mode using the PC), and branch.

adjacent node: A network node connected to the local node by a single physical line.

ADP: See *adapter control block.*

affinity: In a VMS symmetric multiprocessing system, a close association of a device or a process with a specific processor or set of processors in the system. See *device affinity* and *process affinity.*

alarm: See *security alarm.*

allocating: Reserving a particular device unit for exclusive use. A user process can allocate a device only when that device is not allocated by any other process.

allocation class: A unique number between 0 and 255 that the system manager assigns to a pair of hosts and to the dual-pathed devices that the hosts make available to other nodes in the VAXcluster configuration. (Allocation class 0 is used to denote that the node is not a member of any allocation class.) The allocation class provides a way for users to access dual-pathed devices through either of the hosts. In this way, if one host of an allocation class set is not available, the user can gain access to a device specified by that allocation class through the other host of the allocation class.

alphanumeric character: An uppercase or lowercase letter, a dollar sign, an underscore, or a decimal digit.

alphanumeric UIC: A format of user identification code (UIC) that specifies the user's group (optional) and member in alphanumeric form rather than numeric form.

alternate key: An optional key within the data records in an indexed file; used by VMS Record Management Services (RMS) to build an alternate index. See *key (indexed files)* and *primary key.*

American Standard Code for Information Interchange (ASCII): A set of 8-bit binary numbers representing the alphabet, punctuation, numerals, and other special symbols used in text representation and communications protocol.

ancillary control process (ACP): A process that acts as an interface between user software and an I/O driver. An ACP provides functions supplemental to those performed in the driver, such as file and directory management. Two examples of ACPs are the magnetic tape ACP and the network ACP.

AP: See *argument pointer.*

application: A set of tasks related by the business activity they support and controlled as a single unit. See also *transaction processing.*

area: (1) A region of an indexed file maintained by VMS Record Management Services (RMS) that allows a user to specify placement or specific bucket sizes or both for particular portions of a file. An area consists of any number of buckets; there may be from 1 to 255 areas in a file. (2) A group of nodes in a network that can run independently as a subnetwork.

area router: See *level 2 router.*

area routing: A technique for grouping the nodes in a network into areas for routing purposes. Routing in a multiple-area network is on two levels, with one level of routing within an area (called level 1 routing) and a second, higher level of routing between areas (called level 2 routing). Area routing permits a DECnet network to support the configuration of very large networks.

argument pointer (AP): General register 12 (R12). By convention, AP contains the address of the base of the argument list for procedures initiated using CALL instructions.

ASCII: See *American Standard Code for Information Interchange.*

ASMP: See *asymmetric multiprocessing.*

asymmetric multiprocessing (ASMP): A multiprocessing configuration in which the processors are not equal in their ability to execute operating system code. In general, a single processor is designated as the primary, or master, processor; other processors are the slaves. The slave processors are limited to performing certain tasks, whereas the master processor can perform all system tasks. Contrast with *symmetric multiprocessing.*

assembler: A language processor that translates a source program containing assembly language directives and machine instructions into an object module.

assembly language: A machine-oriented programming language. VAX MACRO is the assembly language for the VAX computer. See *binary machine code.*

assigning a channel: Establishing the necessary software link between a user process and a device unit that allows a user process to communicate with the device.

assignment statement: In DCL, the association of a symbol name to use with a character string or numeric value. Symbols can define synonyms for system commands or can be used for variables in command procedures.

AST: See *asynchronous system trap.*

ASTLVL: See *asynchronous system trap level.*

asynchronous record operation: A mode of record processing in which a user program can continue to execute after issuing a record retrieval or storage request without having to wait for the request to be fulfilled.

asynchronous system trap (AST): A software-simulated interrupt to a user-defined service routine. ASTs enable a user process to be notified asynchronously, with respect to that process, of the occurrence of a specific event. If a user process has defined an AST routine for an event, the system interrupts the process and executes the AST routine when that event occurs. When the AST routine exits, the system resumes execution of the process at the point where it was interrupted.

asynchronous system trap level (ASTLVL): A value kept in an internal processor register that is the most privileged access mode for which an AST is pending. The AST does not occur until the current access mode drops in privilege (rises in numeric value) to a value greater than or equal to ASTLVL. Thus, an AST for an access mode is not serviced while the processor is executing in a more privileged access mode.

attached processor: See *secondary processor.*

attribute: In the security context, an attribute is a field of information maintained in the rights database that identifies a characteristic that may be accorded to a holder of the identifier. For example, if the holder and the identifier possess the resource attribute, the holder of that identifier can charge resources, such as disk quota, to that identifier.

auditing: See *security auditing.*

authentication: The act of establishing the identity of users when they start to use the system. VMS (and most other commercial operating systems) uses passwords as the primary authentication mechanism.

authorization file: See *user authorization file.*

autodecrement indexed mode: An indexed addressing mode in which the base operand specifier uses autodecrement mode addressing. See also *indexed addressing mode* and *autodecrement mode.*

autodecrement mode: An addressing mode in which the contents of the selected register are decremented, and the result is used as the address of the actual operand for the instruction. The contents of the register are decremented according to the size of the operand. See also *addressing mode.*

autoincrement deferred indexed mode: An indexed addressing mode in which the base operand specifier uses autoincrement deferred mode addressing. See also *indexed addressing mode* and *autoincrement deferred mode.*

autoincrement deferred mode: An addressing mode in which the specified register contains the address of a longword that contains the address of the actual operand. The contents of the register are incremented by 4 (the number of bytes in a longword). If the program counter (PC) is used as the register, this mode is called absolute mode. See also *addressing mode.*

autoincrement indexed mode: An indexed addressing mode in which the base operand specifier uses autoincrement mode addressing. See also *indexed addressing mode* and *autoincrement mode.*

autoincrement mode: An addressing mode in which the contents of the specified register are used as the address of the operand; the contents of the register are then incremented by the size of the operand: 1 for byte, 2 for word, 4 for longword and floating, 8 for quadword and double floating. See also *addressing mode.*

automatic record locking: A VMS Record Management Services (RMS) capability that allows a user to lock only one record in a specific shared file at any given time. The lock occurs on every execution of a $FIND or $GET macroinstruction (unless the NLK bit is set in the record processing field). The lock is released when the next record is accessed, when the current record is updated or deleted, when the record stream is disconnected, or when the file is closed. VMS Record Management Services (RMS) maintains locks on modified records during a recovery unit.

available set: In a VMS symmetric multiprocessing system, those processors that have passed the system's power-on hardware diagnostics and may or may not be actively involved in the system. The available set includes the active set. Compare with *active set.*

backplane interconnect: An internal processor bus that allows I/O device controllers to communicate with main memory and the central processor. These I/O controllers may reside on the same bus as memory and the central processor (for instance, in VAX 8200/8250/8300/8350 systems), or they may be on a separate bus entirely (for instance, in a VAX–11/780 or VAX 8600/8650/8670 system). In the latter case, an I/O adapter enables and controls the communications between the I/O bus and the processor and memory.

The backplane interconnect is called the synchronous backplane interconnect (SBI) in the VAX–11/780 and VAX 8600 family of systems, the CPU-to-memory interconnect (CMI) on the VAX–11/750 processor, and the VAXBI in the VAX 8530/8550/8700 /8800 and VAX 8200/8250/8300/8350 family of systems. The MicroVAX 3000 series, MicroVAX II and MicroVAX I processors use the Q22 bus as a backplane.

balance set: The collection of all process working sets currently resident in physical memory. The balance set is maintained by the system's swapper process.

bandwidth: The range of frequencies assigned to a channel or system; that is, the difference expressed in Hertz between the highest and lowest frequencies of a band.

base operand address: The address of the base of a table or array referenced by index mode addressing.

base operand specifier: The register used to calculate the base operand address of a table or array referenced by index mode addressing.

base priority: The priority that the system assigns to a process when it is created. A base priority generally comes from the authorization file. The scheduler never schedules a process below its base priority. The base priority can be modified only by the system manager or the process itself. The base priority of a running process can be altered by any user with ALTPRI privilege.

base register: A general register used to contain the address of the first entry in a list, table, array, or other data structure.

batch job: A noninteractive process.

batch processing: A mode of processing in which all commands to be executed by the operating system (and, optionally, data to be used as input to the commands) are placed in a file or punched onto cards and submitted to the system for execution as a single unit. Compare with *command procedure.*

BCUG: See *bilateral closed user group.*

bilateral closed user group (BCUG): An optional packet switching data network facility that restricts a pair of DTEs (data terminal equipment) to communicating with each other.

binary machine code: The internal instruction format used by the computer. It is called binary because only two characters—0 and 1—are used in this code. Programmers use languages, compilers, and the assembler to generate the binary code.

binding: See *linking.*

bit string: See *variable-length bit field.*

bits per inch (bpi): The recording density of a magnetic tape; indicating how much data can fit on one inch of the recording surface. See *density.*

block: (1) The smallest logically addressable unit of data that a specified device can transfer in an I/O operation (512 contiguous bytes for most disk devices). (2) An arbitrary number of contiguous bytes used to store logically related status, control, or other processing information.

block I/O: A data-accessing technique in which the program manipulates the blocks (physical records) that make up a file, instead of its logical records; allows for the direct access to the blocks in a file without regard for the file organization or record format.

blocking AST: An AST that can be requested by a process using the lock management system services. A blocking AST is delivered to the requesting process when it is preventing another process from accessing a resource.

boot: Short for bootstrap. A bootstrap is a technique or device by which the system brings itself into a desired state by means of its own action, such as a routine whose first few instructions are sufficient to bring the rest of the routine into memory from an input device. Bringing a fresh operating system into memory is called booting.

boot name: The abbreviated name of the device being used to boot software. For example, DU0 is the boot name for device DUA0.

bootstrap block: A block in the index file of a system disk. It can contain a program that loads the operating system into memory.

bpi: See *bits per inch.*

branch access type: An instruction attribute that indicates the processor does not reference an operand address; rather, the operand is a branch displacement. The size of the branch displacement is given by the data type of the operand.

branch mode: An addressing mode in which the instruction operand specifier is a signed byte or word displacement. The displacement is added to the contents of the updated program counter (PC), which is the address of the first byte beyond the displacement, and the result is the branch address.

breach: A break in the system security that results in admittance of a person or program to an object.

breakin attempt: An effort made by an unauthorized source to gain access to the system. Since the first system access is achieved through logging in, breakin attempts primarily refer to attempts to log in illegally. These attempts focus on supplying passwords for users known to have accounts on the system through informed guesses or other trial-and-error methods.

broadcast addressing: In an Ethernet network, a special type of multicast addressing in which all nodes are to receive a message.

broadcast circuit: A circuit having multiple nodes connected to it and having a method for transmitting a message that will be received by multiple receivers.

bucket: A storage structure of 1 to 32 blocks used for building and processing files of relative and indexed organization. A bucket contains one or more records or record cells. Buckets are the unit of contiguous transfer between VMS Record Management Services (RMS) buffers and the disk.

bucket locking: A facility that prevents access to any record in a bucket by more than one user until that user releases the bucket.

bucket split: The result of inserting records into a full bucket. To minimize bucket splits, VMS Record Management Services (RMS) attempts to keep half of the records in the original bucket and transfers the remaining records to a newly created bucket.

buffer: An internal memory area used for temporary storage of data records during input or output operations.

buffered data path: A UNIBUS adapter data path that transfers 32 or 64 bits of data in a single synchronous backplane interconnect (SBI) transfer.

buffered I/O: An I/O operation, such as terminal or mailbox I/O, in which an intermediate buffer from the system buffer pool is used instead of a process-specified buffer. Contrast with *direct I/O*.

bugcheck: The operating system's internal diagnostic check. The system logs the failure and, if the bugcheck is fatal, the system ceases to function.

busywait: See *spin wait*.

byte: Eight contiguous bits starting on any addressable boundary. Bits are numbered 0 to 7 from right to left. Bit 0 is the low-order bit. When interpreted arithmetically, a byte is a two's complement integer with significance increasing from bits 0 through 6. Bit 7 is the sign bit. The value of the signed integer is in the range –128 to +127 decimal. When interpreted as an unsigned integer, significance increases from bits 0 through 7 and the value of the unsigned integer is in the range 0 to 255 decimal. A byte can be used to store one ASCII character.

cache memory: A small, high-speed memory placed between slower main memory and the processor. A cache increases effective memory transfer rates and processor speed. It contains copies of data recently used by the processor and fetches several bytes of data from memory in anticipation that the processor will access the next sequential series of bytes.

call: To transfer control to a specified routine.

call frame: See *stack frame*.

call instructions: The processor instructions CALLG (call procedure with general argument list) and CALLS (call procedure with stack argument list).

call stack: The stack and the conventional stack structure used during a procedure call. Each access mode of each process context has one call stack, and the interrupt service context has one call stack.

capability: In a VMS symmetric multiprocessing environment, an attribute of a single processor or set of processors. The capabilities required by a given process determine the set of processors on which it can be scheduled. For instance, the VMS routine that maintains the system time can execute only on the processor that has the timekeeper capability.

captive account: A type of VMS account that limits the activities of the user. Typically, the user is restricted to using certain command procedures and commands. For example, the user may not be allowed to use the CTRL/Y key. This type of account is synonymous with a turnkey or tied account.

carrier sense: A signal provided by the Physical layer of the DECnet architecture to indicate that one or more stations (nodes) are currently transmitting on the Ethernet channel.

Carrier Sense, Multiple Access with Collision Detect (CSMA/CD): A link management procedure used by the Ethernet. Allows multiple stations to access the broadcast channel at will, avoids contention by means of carrier sense and deference, and resolves contention by means of collision detection and retransmission.

CCB: See *channel control block.*

CCITT: Comité Consultatif International Télégraphique et Téléphonique. An international consultative committee that sets international communications usage standards.

central processing unit (CPU): The hardware that handles all calculating and routing of input and output as well as executing programs. In short, the CPU is the part of the computer that actually computes.

CF: Current frame pointer. See *frame pointer.*

channel: (1) A logical path connecting a user process to a physical device unit. A user process requests the operating system to assign a channel to a device so the process can communicate with that device. Contrast with *controller data channel.* (2) A means of transmission over a packet switching data network. For VAX Packetnet System Interface (PSI), a logical path between a DTE (data terminal equipment) and a DCE (data circuit-terminating equipment) over which data is transmitted. Each channel is identified by a unique reference number called a logical channel number (LCN).

channel control block (CCB): A structure in the I/O database created by the Assign I/O Channel system service to describe the device unit to which a channel is assigned.

channel request block (CRB): A structure in the I/O database that describes the activity on a particular controller. The channel request block for a controller contains pointers to the wait queue of drivers ready to access a device through the controller.

character: A symbol represented by an ASCII code. See also *alphanumeric character.*

character buffer: A temporary storage area used to store the last character deleted by an EDT delete character operation.

character string: A contiguous set of bytes. A character string is identified by two attributes: an address and a length. Its address is the address of the byte containing the first character of the string. Subsequent characters are stored in bytes of increasing addresses. The length is the number of characters in the string.

character string descriptor: A quadword data structure used for passing character data (strings). The first word of the quadword contains the length of the character string. The second word can contain type information. The remaining longword contains the address of the string.

characteristics: A display type for the Network Control Program (NCP) commands SHOW and LIST. It refers to static information about a component that is kept in either the volatile or permanent database. Such information may include parameters defined for that component by either the SET or DEFINE command.

CI: See *computer interconnect.*

CI-only VAXcluster configuration: A type of VAXcluster configuration in which the computer interconnect (CI) device is used for most interprocessor communication. In these configurations, a cluster node may be a VAX processor or a Hierarchical Storage Controller (HSC)

circuit: Virtual communication paths between nodes or data terminal equipment (DTE). Circuits operate over physical lines and are the media on which all I/O occurs. X.25 circuits are virtual circuits.

closed user group (CUG): An optional packet switching data network facility that restricts two or more DTEs (data terminal equipment) in the same group to communicating with each other. The basic CUG also prevents these DTEs from accessing or being accessed by other DTEs outside the group. Additions to the basic CUG facility allow one or more DTEs to access or be accessed by DTEs outside the group.

cluster: (1) A set of contiguous blocks that is the basic unit of space allocation on a Files–11 disk volume. (2) A set of pages brought into memory in one paging operation (page fault cluster). (3) An event flag cluster. (4) A configuration of VAX processors (VAXcluster configuration). See also *VAXcluster configuration.*

CMI: See *computer memory interconnect.*

CMP: See *compatibility mode bit.*

collating sequence: An order assigned to the characters of a character set (for example, ASCII, multinational, and EBCDIC) used for sequencing purposes.

collision: Multiple network transmissions overlapping in the physical channel, resulting in garbled data and necessitating retransmission.

collision detect: A signal provided by the Physical layer of the DECnet architecture to its Data Link layer to indicate that one or more stations (nodes) are contending with the local station's transmission.

command: In DIGITAL Command Language (DCL), an instruction, generally an English word, entered by the user at a terminal or included in a command procedure. A command requests the software monitoring a terminal or reading a command procedure to perform some well-defined activity. For example, entering the COPY command requests the system to copy the contents of one file into another file.

command file: See *command procedure.*

command interpreter: A procedure-based system code that executes in supervisor mode in the context of a process to receive, to check the syntax of, and to parse commands entered by the user at a terminal or submitted in a command file.

command language interpreter: See *command interpreter.*

command level: Input stream for the command interpreter. The initial input stream is always command level 0. An interactive command procedure begins executing at command level 1. A batch job command procedure begins executing at command level 0. You can use the execute procedure (@) command or the CALL command in a command procedure to create up to 32 nested command levels.

command node: The node from which a Network Control Program (NCP) command is issued.

command parameter: The positional operand of a command delimited by spaces, such as a file specification, option, or constant.

command procedure: A file containing commands and data that the command interpreter can accept in lieu of the user's entering the commands individually on a terminal. Thus, command procedures provide a means of automatically passing commands to the operating system. In addition, they permit users to employ such programming techniques as loops, counters, labels, and symbol substitution to set up elaborate command sequences that can be altered through user interaction. Command procedures can also be submitted to the system for processing as batch jobs.

command string: A line (or set of continued lines) containing a command and, optionally, information modifying the command. A complete command string consists of a command, its qualifiers, if any, and its parameters (file specifications, for example), if any, and their qualifiers, if any. A command string is normally terminated by pressing the RETURN key.

common: A FORTRAN term for a program section that contains only data.

common event flag cluster: A set of 32 event flags that enables cooperating processes to post event notification to each other. Common event flag clusters are created as they are needed. A process can associate with up to two common event flag clusters.

compatibility mode: A mode of execution that enables the central processor to execute nonprivileged PDP–11 instructions. The operating system supports compatibility mode execution by providing an RSX–11M execution environment for an RSX–11M task image. The operating system compatibility mode procedures intercept calls to the RSX–11M executive and convert them to the appropriate operating system functions. Note that a layered product (VAX RSX) is required for the RSX–11M environment.

compatibility mode bit (CMP): The compatibility mode bit in the hardware processor status longword.

compiler: A system component that translates a program written in a high-level language into an object module in binary machine code.

complete crash dump: A crash dump that contains the complete contents of all of physical memory.

component: An element in a network that can be controlled and monitored. Components include lines, circuits, nodes, modules, logging, and objects. Components form part of the Network Control Program (NCP) command syntax.

computer interconnect (CI): A high-speed, fault-tolerant, dual-path bus, which has a bandwidth of 70 megabits per second. With the CI, any combination of processor nodes and intelligent I/O subsystem nodes — up to 16 in number — can be loosely coupled in a computer-room environment.

computer memory interconnect (CMI): The part of the VAX–11/750 hardware that connects the processor, memory controllers, MASSBUS adapters, and the UNIBUS interconnect.

concealed device: An I/O device that has a logical name associated with it; users thus see the logical name, rather than the device name, displayed in most system responses.

condition: An error state that exists when an exception occurs. See *exception* and *condition handler.*

condition codes: The 4 bits in the processor status word that indicate the results of previously executed instructions.

condition handler: A procedure that the system executes when a process exception occurs. When an exception occurs, the operating system searches for a condition handler and, if found, initiates the handler immediately. The condition handler may perform some action to change the situation that caused the exception and continue execution for the process that incurred the exception. Condition handlers execute in the context of the process at the access mode of the code that incurred the exception.

condition value: A 32-bit value that uniquely identifies the exception that caused the condition.

configuration database: A database containing files that provide information about network components. Specifically, the files contain information about the local node, and all nodes, modules, circuits, lines, logging, and objects in the network. See also *permanent database* and *volatile database.*

configuration register: A control and status register (CSR) for an adapter, for example, a UNIBUS adapter. It resides in the adapter's I/O space.

congestion loss: A condition in which data packets transmitted over a network are lost when the DECnet–VAX Routing layer is unable to buffer them.

connect-to-interrupt: A function by which a process connects to a device interrupt vector. To perform a connect-to-interrupt, the process must map to the program I/O space containing the vector. See also *page frame number mapping.*

connector node: A node that serves as an X.25 gateway to permit VMS host nodes to access a packet switching data network.

console: The manual control unit integrated into the central processor. The console enables the operator to start and stop the system, monitor system operation, and run diagnostics.

console terminal: The video or hard-copy terminal connected to the central processor console.

context: See *process context.*

context indexing: The ability to index through a data structure automatically because the size of the data type is known and used to determine the offset factor.

context switching: Interrupting the activity in progress and switching to another activity. Context switching occurs as one process after another is scheduled for execution. The operating system saves the hardware context of the interrupted process in its hardware process control block (PCB) using the Save Process Context instruction, and loads the hardware PCB of another process into the hardware context using the Load Process Context instruction, thus scheduling that process for execution.

contiguous area: A group of physically adjacent blocks on a device or in memory.

continuation character: A hyphen placed at the end of a command line, which allows the user to continue the command string on the next line after the RETURN key is pressed.

control key: The keyboard character that causes a control action. A control key is usually the combination of the CTRL key and an alphabetic key, for example, CTRL/Y.

control region: The highest-addressed half of per-process space (the P1 region). Control region virtual addresses refer to the process-related information used by the system to control the process, such as the kernel, executive, and supervisor stacks; the permanent I/O channels; exception vectors; and dynamically used system procedures (such as the command interpreter). The user stack is also normally found in the control region.

control region base register (P1BR): The processor register, or its equivalent in a hardware process control block, that contains the base virtual address of a process control region page table.

control region length register (P1LR): The processor register, or its equivalent in a hardware process control block, that contains the number of nonexistent page table entries for virtual pages in a process control region.

control region page table (P1PT): The page table that maps the control region of virtual address space.

control station: The network node at the controlling end of a multipoint circuit. The control station controls the tributaries for that circuit.

control and status register (CSR): A device or controller register residing in the processor's I/O space. The CSR initiates device activity and records its status.

controller data channel: A logical path to which a driver for a device on a multidevice controller must be granted access before it can activate a device.

cooperating tasks: Two tasks that communicate with each other in a task-to-task communication environment. In particular, cooperating tasks must agree on optional user data to be passed, how they will send and receive messages to ensure that there is one transmit for each receive, and which task will disconnect the link.

copy-on-reference: A method used in memory management for sharing data until a process accesses it, in which case it is copied and made private before the access. Copy-on-reference allows sharing of the initial values of a global section whose pages have read/write access but contain preinitialized data available to many processes.

cost: An numeric value assigned to a circuit that exists between two adjacent nodes. In the DECnet network, data packets are routed on paths with the lowest cost.

counted string: A character-string data structure consisting of a byte-sized length followed by the string. Although a counted string is not used as a procedure argument, it is a convenient representation in memory.

counters: Performance and error statistics kept for a network component, such as lines or nodes.

CPU: See *central processing unit.*

crash: The system's response to an unstable condition, particularly if the system is corrupted. Rather than continuing to operate and possibly damaging itself, the system stops functioning. If the system has crashed, users will be unable to use their terminals. See also *hanging.*

crash dump: The action the operating system takes, when it crashes, to preserve information for future analyis. See also *complete crash dump* and *selective crash dump.*

CRB: See *channel request block.*

CRC: See *cyclic redundancy check.*

CRT: Cathode ray tube. See also *terminal.*

CSMA/CD: See *Carrier Sense, Multiple Access with Collision Detect.*

CSR: See *control and status register.*

CUG: See *closed user group.*

current access mode: The processor access mode of the currently executing software indicated in the current mode field of the processor status longword.

cursor: An indicator used on a video terminal to point to the screen position where the next character will appear.

cyclic redundancy check (CRC): An error detection scheme in which the receiver checks each block of data for errors. The check character is generated by taking the remainder after dividing all the serialized bits in a block of data by a predetermined binary number. The check character is compared with the transmitter-generated check character. If the check characters do not match, retransmission of the block of data is requested.

cylinder: The tracks at the same radius on all recording surfaces of a disk.

data: A general term referring to any representation of facts, concepts, or instructions in a form suitable for communication, interpretation, or processing.

data check: An operation that consists of first performing the derived physical, logical, or mutual read or write function successfully and then comparing the data in memory with the data on disk to make sure they match.

data circuit-terminating equipment (DCE): A CCITT X.25 term referring to the network equipment that establishes, maintains, and terminates a connection and handles the signal conversion and coding between the data terminal equipment and the network. The switching exchange of the network to which DTEs (data terminal equipment) are connected. In non-X.25 usage, the term is synonymous with "modem."

data link mapping (DLM): Capability of using an X.25 virtual circuit as a DECnet data link.

data terminal equipment (DTE): An X.25 term referring to the user's equipment (computer or terminal) connected to a DCE (data circuit-terminating equipment) on a packet switching data network (PSDN) for the purpose of sending and receiving data.

data structure: Any table, list, array, queue, or tree whose format and access conventions are well defined for reference by one or more images.

data type: In general, the way in which bits are grouped and interpreted. In reference to the processor instructions, the data type of an operand identifies the size of the operand and the significance of the bits in the operand. Operand data types include byte, word, longword, and quadword integer; floating and double-floating character string; packed decimal string; and variable-length bit field.

database: (1) All the occurrences of data described by a database management system. (2) A collection of related data structures.

datagram: A unit of data sent over the network that is handled independently of all other units of data so far as the network is concerned. When a route header is added, a datagram becomes a packet.

DCE: See *data circuit-terminating equipment.*

DCL: See *DIGITAL Command Language.*

DDB: See *device data block.*

DDT: See *driver dispatch table.*

debug symbol table: The portion of the symbol table that is created by the compiler or assembler.

debugger: A program that aids a programmer in finding errors in other programs.

decryption: The process that restores encrypted information to its original unencoded form.

dedicated resource: A system resource — an I/O device, image, or the entire system — that is assigned to a single application or purpose.

default: A value or operation that is automatically included in a command, unless the user specifies otherwise. In most cases, default settings will be what is "normal" or "expected."

deferred echo: Refers to the fact that terminal echoing does not occur until a process is ready to accept input entered by type-ahead.

delimiter: A character that separates, terminates, or organizes elements of a character string, statement, or program.

delta time: A time value expressing an offset from the current date and time. Delta times are always expressed in the system as negative numbers whose absolute value is used as an offset from the current time.

demand zero page: A page, typically of an image stack or buffer area, that is initialized to contain all zeros when dynamically created in memory as a result of a page fault. This feature eliminates the waste of disk space that would otherwise be required to store blocks (pages) that contain only zeros.

density: The number of bits per inch (bpi) of magnetic tape. Typical values are 800 bpi and 1600 bpi. See *bits per inch*.

descriptor: A data structure used in calling sequences for passing argument types, addresses, and other optional information. See *character string descriptor*.

designated router: A routing node on the Ethernet selected to perform routing services on behalf of end nodes.

detached process: A process that has no owner. The job controller creates a detached process when a user logs in to the system. It also creates a detached process each time it initiates a batch job or services a request for a logical link connect. Because the job controller does not own the processes it creates, these processes are referred to as detached. The DCL command RUN/UIC and the Create Process system service (specifying a UIC) allow a suitably privileged process to request creation of a detached process.

device: The general name for any peripheral connected to the processor that is capable of receiving, storing, or transmitting data. Card readers, line printers, and terminals are examples of record-oriented devices. Magnetic tape devices and disk devices are examples of mass storage devices. Terminal line interfaces and interprocessor links are examples of communications devices. Devices are not necessarily hardware (see also *pseudodevice*).

device affinity: In a VMS symmetric multiprocessing system, a close association of a device with a specific processor or set of processors in the system. There are three dimensions to device affinity in a VMS system. First, physical connectivity describes those devices that are directly accessible only to the primary processor or to all processors. Secondly, affinity is a software mechanism that defines those processors that can initiate an I/O operation on the device. Finally, interruptibility describes the set of processors that can receive interrupts from a device.

device allocation: See *allocate*.

device controller: The electronic circuits associated with each physical device in the system that serve as the interface between the processor and the device hardware.

device data block (DDB): A structure in the I/O database that identifies the generic device or controller name and driver name for a set of devices attached to the same controller.

device driver: The software associated with each physical device in the system that serves as the interface between the operating system and the device controller.

Device driver code is divided into two sections: device-dependent logic that drives a particular kind of device unit, and device-independent support routines that perform functions common to all devices. Each unit of a particular type has a driver process, but there is only one set of driver code.

device interrupt: An interrupt received on interrupt priority levels (IPLs) 20 through 23. Device interrupts can be requested only by devices, controllers, and memories.

device lock: In a VMS symmetric multiprocessing system, a dynamic spin lock, the ownership of which synchronizes device specific code that executes at device interrupt priority level (IPL). A device lock is associated with each adapter or controller in the system. See *spin lock.*

device name: The field in a file specification that identifies the device unit on which a file is stored. Device names also include the mnemonics that identify an I/O peripheral device in a data transfer request. A device name consists of a mnemonic followed by a controller identification letter (if applicable), followed by a unit number (if applicable), and ends with a colon.

device queue: See *spool queue.*

device register: A location in device controller logic used to request device functions (such as I/O transfers) or report status.

device unit: An I/O device and its controlling logic; for example, a disk drive or terminal. Some controllers can have several device units connected to a single controller; for example, mass storage controllers.

D_floating point data: See *double floating data.*

diagnostic: A program that tests hardware, firmware, peripheral operation, logic, or memory and reports any faults it detects.

DIGITAL Command Language (DCL): A command interpreter in a VMS system. It provides a means of communication between the user and the operating system. Contrast with *monitor console routine.*

DIGITAL Network Architecture (DNA): A set of protocols (rules) governing the format, control, and sequencing of message-exchange for all DIGITAL network implementations. The protocols are layered, and they define rules for data exchange from the physical link level up through the user interface level. DNA controls all data that travels throughout a DIGITAL network. DNA also defines standard network management and network generation procedures.

direct data path: A UNIBUS adapter data path that transfers 16 bits of data in a single synchronous backplane interconnect (SBI) transfer.

direct I/O: An I/O operation in which the system locks the pages containing the associated buffer in physical memory for the duration of the I/O operation. The I/O transfer takes place directly from the process buffer. Contrast with *buffered I/O.*

direct mapping cache: A cache organization in which only one address comparison is needed to locate any data in the cache because any block of main memory data can be placed in only one possible position in the cache. Contrast with *fully associative cache.*

direct memory access: The method by which a device driver transfers a large amount of data without requesting an interrupt after transferring each of the smaller amounts.

directory: A file that briefly catalogs a set of files stored on disk or tape. The directory includes the name, type, and version number of each file in the set, as well as a unique number that identifies the file's actual location and points to a list of its attributes. See also *master file directory* and *subdirectory*.

directory name: The field in a file specification that identifies the directory in which a file is listed. The directory name begins with a left bracket ([or <) and ends with a right bracket (] or >).

disconnect abort: A form of disconnection by which nontransparent tasks can deaccess a logical link without deassigning the channel. A disconnect abort indicates that not all messages sent have necessarily been received.

discretionary controls: Security controls that are applied at the user's option; that is, they are not required. Access control lists are typical of such optional security features.

disk scavenging: Any method of obtaining information from a disk that the owner intended to discard. The information, although no longer accessible by normal means, retains a sufficient amount of its original magnetic encoding so that it can be retrieved and used by one of the scavenging methods.

displacement deferred indexed mode: An indexed addressing mode in which the base operand specified uses displacement deferred mode addressing. See also *indexed addressing mode* and *displacement deferred mode*.

displacement deferred mode: An addressing mode in which the specifier extension is a byte, word, or longword displacement. The displacement is sign-extended to 32 bits and added to a base address obtained from the specified register. The result is the address of a longword that contains the address of the actual operand. If the PC is used as the register, the updated contents of the PC are used as the base address. The updated contents of the PC is the address of the first byte beyond the specifier extension.

displacement indexed mode: An indexed addressing mode in which the base operand specifier uses displacement mode addressing. See also *indexed addressing mode* and *displacement mode*.

displacement mode: An addressing mode in which the specifier extension is a byte, word, or longword displacement. The displacement is sign extended to 32 bits and added to a base address obtained from the specified register. The result is the address of the actual operand. If the PC is used as the register, the updated contents of the PC are used as the base address. The updated contents of the PC is the address of the first byte beyond the specifier extension.

distributed transaction processing: The processing of transactions on remote nodes. A user logged in to a transaction processing system on one node can select tasks in an application on a transaction processing system on another node.

DLM: See *data link mapping*.

DMA: See *direct memory access*.

DNA: See *DIGITAL Network Architecture.*

double floating data: A double precision floating-point number, eight bytes long, having a range of $+/- 2.9 * 10^{-37}$ to $+/- 1.7 * 10^{38}$ and a precision of approximately sixteen decimal digits. See also *D_floating data* and *G_floating data.*

downline system load: A DECnet–VAX function that allows an unattended target node to receive an operating system file image or terminal server image from another node.

downline task load: A DECnet–VAX function that allows a remote target node to receive an RSX–11S task from another node.

DPT: See *driver prolog table.*

drive: The electromechanical unit of a mass storage device system on which a recording media (disk cartridge, disk pack, or magnetic tape reel) is mounted.

driver: See *device driver.*

driver code: See *device driver.*

driver dispatch table (DDT): A table in a driver that lists the entry point addresses of standard driver routines and the sizes or diagnostic and error logging buffers for the device type.

driver fork level: The interrupt priority levels (IPLs) at which a driver fork processes executes, that is, IPLs 8 through 11. Every unit control block indicates the address of a fork lock that synchronizes driver resources. The fork lock structure indicates the fork level or driver.

driver prolog table (DPT): A table in the driver that describes the driver and the device type to the VMS procedure that loads drivers into the system.

driver start I/O routine: See *start I/O routine.*

DST: See *debug symbol table.*

DTE: See *data terminal equipment.*

DV: The bit in the processor status word that indicates that decimal overflow traps are enabled.

dynamic access: A technique in which a program switches from one record access mode to another while processing a file.

dynamic load balancing: A method of work distribution in which the operating system ensures that the system work load is evenly distributed among the processors. Dynamic load balancing in a VMS symmetric multiprocessing system is a direct effect of the implementation of the scheduler. In a VMS multiprocessing system, processors independently and continually look for processes to execute from a common pool of processes.

ECB: See *exit control block.*

EBCDIC: See *Extended Binary Coded Decimal Interchange Code.*

ECC: See *error correction code.*

echo: A terminal handling characteristic in which the characters typed by the user on the terminal keyboard are also displayed on the screen or printer.

editor: A system image used for creating and altering text files.

effective address: The address obtained after deferred or indexing modifications are calculated.

encryption: A process of encoding information so that its content is no longer immediately obvious to anyone who obtains a copy of it.

end node: A node that can receive packets addressed to it and send packets to other nodes, but cannot route packets through from other nodes. Also called a nonrouting node.

entry mask: A word whose bits represent the registers to be saved when a procedure is called with a CALLS or CALLG instruction and restored when the procedure executes a RET instruction.

entry point: A location that can be specified as the object of a call. It is identified by a symbolic name and contains a mask known as the register save mask that determines which registers are saved before the procedure is called and can enable DV or IV arithmetic traps.

equivalence name: The string associated with a logical name in a logical name table. An equivalence name can be, for example, a device name, another logical name, or a logical name concatenated with a portion of a file specification. See also *search list.*

erase-on-allocate: A technique that applies an erasure pattern whenever a new area is allocated for a file's extent. The new area is erased with the erasure pattern so that subsequent attempts to read the area can only yield the erasure pattern and not some valuable remaining data. This technique is used to discourage disk scavenging.

erase-on-delete: A technique that applies an erasure pattern whenever a file is deleted or purged. This technique is used to discourage disk scavenging.

erasure pattern: A character string that can be used to overwrite magnetic media for the purpose of erasing the information that was previously stored in that area.

error correction code (ECC): Code that carries out automatic error correction by performing an exclusive OR operation on the transferred data and applying a correction mask.

error logger: A system process that empties the error log buffers and writes the error messages into the error file. Errors logged by the system include memory system errors, device errors and timeouts, and interrupts with invalid vector addresses.

escape sequence: An escape is a transition from the normal mode of operation to a mode outside the normal mode. An ASCII escape character is the code that indicates the transition from normal to escape mode. An escape sequence refers to the set of character combinations starting with an escape character that the terminal transmits without interpretation to the software set up to handle escape sequences.

ESP: See *executive mode stack pointer.*

ESR: See *exception service routine.*

Ethernet: A communications concept for local communication networks that employs coaxial cable as a passive communications media to interconnect different kinds of computers, information processing products, and office equipment at a local business site. Ethernet does not require switching logic or control by a central computer.

evasive action: A responsive behavior by VMS to discourage breakin attempts whenever they seem to be in progress. VMS has a set of criteria it uses to detect the fact that breakin attempts may be underway. Typically, once VMS suspects that an unauthorized user is attempting to log in, the evasive action consists of locking out all login attempts by the offender for a limited period of time.

event: (1) A change in process status or an indication of the occurrence of some activity that concerns an individual process or cooperating processes; an incident reported to the scheduler that affects a process's ability to execute. Events can be synchronous with the process's execution (a wait request), or they can be asynchronous (I/O completion). Some other events include swapping, wake request, and page fault. (2) A network or system-specific occurrence for which the logging component maintains a record. (3) An exception or interrupt.

event class: A particular classification of events. Generally, this classification follows the DIGITAL Network Architecture (DNA) architectural layers; some layers may contain more than one class. Class also includes the identification of system-specific events.

event flag: A bit in an event-flag cluster that can be set or cleared to indicate the occurrence of the event associated with that flag. Event flags are used to synchronize activities in a process or among many processes.

event-flag cluster: A set of 32 event flags used for event posting. Four clusters are defined for each process: two process-local clusters and two common event flag clusters. Of the process-local flags, eight are reserved for system use.

event type: A particular form of event that is unique within an event class.

exception: An event detected by the hardware or software (other than an interrupt or jump, branch, case, or call instruction) that changes the normal flow of instruction execution. An exception is always caused by the execution of an instruction or set of instructions (whereas an interrupt is caused by an activity in the system independent of the current instruction). There are three types of hardware exceptions: traps, faults, and aborts. Examples are attempts to execute a privileged or reserved instruction, trace traps, compatibility mode faults, breakpoint instruction execution, and arithmetic traps such as overflow, underflow, and division by zero.

exception dispatcher: An operating system procedure that searches for a condition handler when an exception condition occurs. If no exception handler is found for the exception or condition, the image that incurred the exception is terminated.

exception enables: See *trap enables.*

exception vector: See *vector.*

exception service routine: The routine by which VAX hardware initially passes control to service an exception. An exception service routine passes control to a general exception dispatcher that attempts to locate a condition handler to further service the exception.

executable image: An image that can be run in a process. When run, an executable image is read from a file for execution in a process.

executive: The generic name for the collection of procedures included in the operating system software that provides the operating system's basic control and monitoring functions.

executive mode: The second most privileged processor access mode (mode 1). The VMS Record Management Services and many of the operating system's system service procedures execute in executive mode.

executive mode stack pointer: The process context stack pointer for executive mode.

executor node: The node at which a network control program (NCP) command actually executes.

exit: An image rundown activity that occurs when image execution terminates either normally or abnormally. Image rundown activities include deassigning I/O channels and disassociating common event flag clusters. Any user- or system-specified exit handlers are called.

exit control block: A data structure that describes an exit handling routine declared by the Declare Exit Handler system service, $DCLEXH.

exit handler: A procedure executed when an image exits. An exit handler enables a procedure that is not on the call stack to gain control and clean up procedure-owned databases before the actual image exit occurs.

extended attribute block (XAB): A VMS Record Management Services (RMS) user data structure that contains additional file attributes beyond those expressed in the file access block (FAB), such as boundary types (aligned on cylinder, logical block number, virtual block number) and file protection information.

Extended Binary Coded Decimal Interchange Code (EBCDIC): A set of 8-bit characters used for representing data. See also *ASCII*.

extended QIO processor (XQP): A facility that supplements the QIO driver's functions when performing virtual I/O operations on file-structured devices (Files–11 On-Disk Structure Level 2). The XQP executes in kernel mode in the context of the process of its caller.

extension: The amount of space allocated at the end of a file each time a sequential write exceeds the allocated length of the file.

extent: The contiguous area on a disk containing a file or a portion of a file. An extent consists of one or more clusters.

F11ACP: See *Files–11 ancillary control process*.

FAB: See *file access block*.

failure exception mode: A mode of execution selected by a process that instructs the system to declare an exception condition if an error occurs as the result of a system service call. The normal mode is for the system service to return a status code for which the process must test.

fallback: A function that the Terminal Fallback Facility (TFF) performs when an application program sends a charater that a terminal cannot display. In this case, TFF replaces the character with the closest possible visual character that the terminal can display.

fault: A hardware exception condition that occurs in the middle of an instruction and leaves the registers and memory in a consistent state so that eliminating the fault and restarting the instruction gives correct results.

FCB: See *file control block.*

FCS: See *file control system.*

FDL: See *file definition language.*

FDT: See *function decision table.*

FDT routine: A driver routine called by the Queue I/O Request system service to perform device-dependent preprocessing of an I/O request.

F_floating-point data: See *floating (point) data.*

FID: See *file identifier.*

field: A set of contiguous bytes in a logical record. See also *variable-length bit field.*

FIFO: First-in/first-out; the order in which processing is performed. For example, processing on a FIFO queue would be on a first-come, first-served basis. See also *LIFO.*

file: A set of data elements arranged in a structure significant to the user. A file is any named, stored program or data, or both, to which the system has access. Access can by of two types: read-only, meaning the file is not to be altered, and read-write, meaning the contents of the file can be altered. See also *volume.*

file access block (FAB): A VMS Record Management Services (RMS) user data structure that describes a particular file and contains file-related information needed for data operations, such as OPEN, CLOSE, or CREATE.

file control block (FCB): A memory-resident structure used by the operating system to coordinate access to a file that is opened by an active task.

file control system (FCS): A generic term for the file control services that control the file services for disks and tapes. These services include adding, opening, closing, and renaming files.

file definition language (FDL): A special-purpose language used to write specifications for data files. These specifications are written in text files called FDL files; they are then used by VMS Record Management Services (RMS) utilities and library routines to create the actual data files.

file header: A block in the index file describing a file on a Files–11 disk structure. The file header contains information needed by the file system to find and use the file. Some of this information is displayed when the DCL command DIRECTORY is entered. There is at least one file header for every file on the disk.

file identifier (FID): A 6-byte value used to uniquely identify a file on a Files–11 disk volume. The file number, file sequence number, and relative volume number are contained in the file identifier.

file name: The field containing a 1- to 39-character name for a file that precedes a file type in a file specification.

file name extension: See *file type*.

file organization: The particular file structure used as the physical arrangement of the data comprising a file on a mass storage media. The VMS Record Management Services (RMS) file organizations are sequential, relative, and indexed.

file section: The part of a file that contains the user data and that is delimited by the header and trailer labels. Only one section of a given file can be written on any one volume. Multiple sections of a file or other file sections cannot be interspersed within a file section.

file sharing: The capability of a particular relative or indexed file to allow access to more than one process.

file specification: A unique name for a file on mass storage media. It identifies the node, the device, the directory name, the file name, the file type, and the version number under which a file is stored.

file structure: The way in which the blocks forming a file are distributed on a disk or magnetic tape.

file system: A method of recording, cataloging, and accessing files on a volume.

file type: The field in a file specification that consists of a period followed by a 0- to 39-character identification. By convention, this field identifies a generic class of files that have the same use or characteristics, such as compiler and assembler listing files, binary object files, and so on.

Files–11: The name of the disk structure used by the RSX–11, IAS, and VMS operating systems. Refer also to Files–11 Structure Level 1 and Files–11 Structure Level 2.

Files–11 ancillary control process (Files–11 ACP): The interface process that is the files manager for the Files–11 on-disk structure.

Files 11 Structure Level 1: The original Files–11 structure used by IAS, RSX–11M, and RSX–11D for disk volumes. VMS supports structure level 1 to ensure compatibility among systems.

Files–11 Structure Level 2: The second generation disk file structure supported by VMS.

first part of an instruction done (FPD): A bit in the processor status longword. If the FPD is set, when the processor returns from an exception or interrupt, it resumes the interrupted operation where it left off, rather than restarting the instruction.

fixed-length control area : An area, prefixed to a variable-length record, containing additional information about the record that may have no bearing on the other contents of the record. The fixed-length control area may be used, for example, to contain line numbering or carriage control information.

fixed-length record format: A file format in which all records have the same length.

fixed line number: A number fixed to a line of text in a file. The EDT text editor maintains a record of line numbers during the editing sessions in which the files are used; they are copied to the file when the editing session ends.

flag: A bit that can be set to invoke the execution of a particular sequence of instructions; frequently, an indicator used to tell some later part of a program that a certain condition occurred earlier.

floating (point) data: A single precision floating-point number, 4 bytes long, having a range of $+/- 2.9 * 10^{-37}$ to $+/- 1.7 * 10^{38}$ and a precision of approximately seven decimal digits.

floating underflow (FU): A trap enable bit in the processor status word (PSW).

foreign volume: Any volume other than a Files–11 formatted volume. A foreign volume may or may not be file-structured.

fork block: The portion of a unit control block that contains a driver's context while the driver is waiting for a resource, or the portion of another structure used as a fork block to enable the driver to synchronize events at a lower interrupt priority level (IPL). A driver awaiting a processor or adapter resource has its fork block linked into a fork queue.

fork dispatcher: A VMS interrupt service routine that is activated by a software interrupt at a fork interrupt priority level (IPL). Once activated, it dispatches driver fork processes from a processor-specific fork queue until no processes remain in the queue for that IPL.

fork lock: In a VMS symmetric multiprocessing system, a static spin lock, the ownership of which synchronizes the right of a driver's fork process to execute at its associated fork interrupt priority level (IPL). See also *spin lock*.

fork process: A minimal context process that executes code under a series of constraints: it executes at raised interrupt priority levels; it uses R0 through R5 only (other registers must be saved and restored); it executes in system virtual address space; it is only allowed to refer to and modify static storage that is never modified by higher interrupt priority level code. The VMS operating system uses software interrupts and fork processes to synchronize executive operations.

fork queue: A processor-specific queue of driver fork blocks that is awaiting activation, at a particular interrupt priority level, by the VMS fork dispatcher.

form feed: The movement of the cursor position to the start of a new page.

FP: See *frame pointer*.

FPD: See *first part (of an instruction) done*.

frame: A unit, which is delimited by flags and includes a header, used by the link level to exchange data packets as well as control and error information between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) on a packet switching data network. See also *stack frame*.

frame pointer (FP): General register 13 (R13). By convention, it contains the base address of the most recent call frame on the stack.

FU: See *floating underflow*.

fully associative cache: A cache organization in which any block of data from main memory can be placed anywhere in the cache. Address comparison must take place against each block in the cache to find any particular block. Contrast with *direct mapping cache*.

function code: See *I/O function code*.

function decision table (FDT): A table in a device driver that lists all valid function codes for the device and the addresses of I/O preprocessing routines associated with each valid function.

function modifier: See *I/O function modifier*.

general identifier: One of three possible types of identifiers that specify one or more groups of users. The general identifier is alphanumeric and typically is a convenient term that symbolizes the nature of the group of users. For example, a typical general identifier might be PAYROLL for all users allowed to run payroll applications.

general register: Any of the sixteen 32-bit registers used as the primary operands of the native-mode instructions. The general registers include 12 general purpose registers, which can be used as accumulators, as counters, and as pointers to locations in main memory, and the FP, AP, SP, and PC.

generic device name: A device name that identifies the type of device but not a particular unit; a device name in which the specific controller or unit number is omitted.

G_floating data: An extended-range floating-point number, 8 bytes long, having a range of $+/- 0.56 * 10^{-308}$ to $+/- 0.9 * 10^{308}$ and a precision of approximately 15 decimal digits.

global: Affecting the entire file, the entire system, or the entire image, depending on context. A global substitution in a text file would be the change all instances of a particular string to something else, for example, changing "fall" to "autumn."

global page table: The page table containing the master page table entries for global sections.

global section: A data structure (for example, FORTRAN global common) or shareable image section potentially available to all processes in the system. Access is protected by privilege or group number of the user identification code (UIC), access control list (ACL), or both.

global symbol: (1) A symbol defined in a module of a program that is potentially available for reference by another module. The linker resolves (matches references with definitions) global symbols. Contrast with *local symbol*. (2) A command language symbol accessible at all command levels.

global symbol table (GST): In a library, an index of strongly defined global symbols used to access the modules defining the global symbols. The linker also puts global symbol tables into an image. For example, the linker appends a global symbol table to executable images that are intended to run under the symbolic debugger, and it appends a global symbol table to all shareable images.

gold key: The upper-left key on the VT100 series terminal keypad, which enables alternate keypad functions.

GROUP: (1) In the context SYSTEM/OWNER/GROUP/WORLD, a set of users who have special access privileges to each other's directories and files within those directories (unless protected otherwise). GROUP refers to all accounts having the same group number as a particular owner. (2) A set of jobs (processes and their subprocesses) with access to a group's common event flags and logical name tables.

group number: The first number or its alphanumeric equivalent in a user identification code.

GST: See *global symbol table.*

handshaking sequence: The exchange of logical link connection information between two tasks. This exchange takes place to enable the successful completion of a logical link connection.

hanging: The extremely slow response of the system. During an interactive session, when the terminal fails to respond, it is said to be hanging. When the system hangs, users might think that it has crashed.

hard-copy terminal: Terminals that print output on paper. See also *terminal.*

hardware address: For an Ethernet device, the unique Ethernet physical address associated with a particular Ethernet communications controller (usually in read-only memory) by the manufacturer.

hardware context: The values contained in the following registers while a process is executing:

- The program counter (PC)
- The processor status longword (PSL)
- The 14 general registers (R0 through R13)
- The four processor registers (P0BR, P0LR, P1BR and P1LR) that describe the process's virtual address space
- The stack pointer (SP) for the access mode in which the processor is executing
- The contents to be loaded in the SP for every access mode other than the current access mode

When a process is executing, its hardware context is continually being updated by the processor. When a process is not executing, its hardware context is stored in its hardware process control block (PCB).

hardware process control block (hardware PCB): A data structure known to the processor that contains the saved hardware context when a process is not executing. A process's hardware PCB resides in its process header.

hibernation: A state in which a process is inactive, but known to the system. A hibernating process becomes active again when a wake request is issued. It can schedule a wake request before hibernating, or another process can issue its wake request. A hibernating process can also become active long enough to service any AST it may receive while it is hibernating. Contrast with *suspension.*

Hierarchical Storage Controller (HSC): A self-contained, intelligent, mass-storage controller that communicates with VAX processors.

high-level language: A language for specifying computing procedures or organization of data within a digital computer. High-level languages are distinguished from assembly and machine languages by the omission of machine specific details required for direct execution on a given computer.

highwater marking: A technique for discouraging disk scavenging. The system tracks the furthest extent that the owner of a file has written into the file's allocated area. It then prohibits any attempts at reading beyond the written area on the premise that any information that exists beyond the currently written limit is information some user had intended to discard. The VMS operating system accomplishes the goals of highwater marking with its erase-on-allocate strategy.

H_floating data: An extended range floating-point number, 16 bytes long, having a range of $+/- 0.84 * 10^{-4932}$ to $+/- 0.59 * 10^{4932}$ and a precision of approximately 33 decimal digits.

holder: A user who possesses a particular identifier. The user is said to be the holder of an identifier if he or she possesses that identifier. The rights database is the place where the system associates users and the identifiers they hold.

home block: A block in the index file that contains the volume identification, such as volume label and protection.

hop: The logical distance between two nodes. One hop is the distance from one node to an adjacent node.

host node: (1) For a DECnet network, a node that provides services for another node (for example, the host node supplies program image files for a downline load). For VAX Packetnet System Interface (PSI), a node that accesses a packet switching data network by means of an X.25 multihost connector node. (2) The node that makes a device available to other nodes in a VAXcluster configuration. A host node can be either a VAX processor that adds the device to the Mass Storage Control Protocol (MSCP)-server database or a Hierarchical Storage Controller (HSC) server.

HSC: See *Hierarchical Storage Controller.*

IDB: See *interrupt dispatch block.*

identifier: A notation that represents a user or group of users to the system. There are three types of identifiers: user identification code (UIC) identifiers, system-defined identifiers, and general identifiers. Identifiers are stored in the rights database.

image: Procedures and data bound together by the linker to form an executable program. This executable program is executed by the process. There are three types of images: executable, shareable, and system.

image activator: A set of system procedures that prepares an image for execution. The image activator establishes the memory management data structures required both to map the image's virtual pages to physical pages and to perform paging.

image exit: See *exit.*

image I/O segment: That portion of the control region that contains the VMS Record Management Services (RMS) internal file access blocks (IFAB) and I/O buffers for the image currently being executed by a process.

image name: The name of the file in which an image is stored.

image privileges: The privileges assigned to an image when it is installed. See also *process privileges.*

image section (ISECT): A group of program sections (PSECTs) with the same attributes (such as read-only access, read/write access, absolute, relocatable, and so on) that is the unit of virtual memory allocation for an image.

immediate mode: An addressing mode in which the program counter (PC) is used as the register in autoincrement mode addressing.

inbound connection: Logical link connection requests that a task receives.

increment: (1) To add one quantity to another. (2) The quantity added.

index: The structure that allows retrieval of records in an indexed file by key value. See *key (indexed files).*

index file: The file on a Files–11 volume that contains the access information for all files on the volume and enables the operating system to identify and access the volume.

index file bit map: A table in the index file of a Files–11 volume that indicates which file headers are in use.

index register: A register used to contain an address offset.

indexed addressing mode: An addressing mode in which two registers are used to determine the actual instruction operand: an index register and a base operand specifier. The contents of the index register are used as an index (offset) into a table or array. The base operand specifier supplies the base address of the array (the base operand address or BOA). The address of the actual operand is calculated by multiplying the contents of the index register by the size (in bytes) of the actual operand and adding the result to the base operand address. The addressing modes resulting from index mode addressing are formed by adding the suffix "indexed" to the addressing mode of the base operand specifier: register deferred indexed, autoincrement indexed, autoincrement deferred indexed (or absolute indexed), autodecrement indexed, displacement indexed, and displacement deferred indexed.

indexed file organization: A file organization in which a file contains records and a primary key index (and optionally one or more alternate key indexes) used to process the records sequentially by index or randomly by index.

indirect command file: See *command procedure.*

input stream: The source of commands and data — the user's terminal, the batch stream, or a command procedure.

instruction buffer: An 8-byte buffer in the processor used to contain bytes of the instruction currently being decoded and to prefetch instructions in the instruction stream. The control logic continuously fetches data from memory to keep the 8-byte buffer full.

interactive system: A computer system in which the user and the operating system communicate directly by means of a terminal. The operating system immediately acknowledges and acts upon requests entered by the user at the terminal.

interleaving: Assigning consecutive physical memory addresses alternately between two memory controllers.

interprocess communication facility: A common event flag cluster, mailbox, or global section used to pass information between two or more processes.

interrecord gap (IRG): A blank space deliberately placed between data records on the recording surface of a magnetic tape.

interrupt: (1) An event other than an exception or a branch, jump, case, or call instruction that changes the normal flow of instruction execution. Interrupts are generally external to the process executing when the interrupt occurs. See also *device interrupt, software interrupt,* and *urgent interrupt.* (2) A packet, sent through a packet switching data network, that bypasses normal flow control procedures used by data packets.

interrupt dispatch block (IDB): A structure in the I/O database that describes the characteristics of a particular controller and points to devices attached to that controller.

interrupt message: A user-generated message sent outside the normal exchange of data messages during nontransparent DECnet task-to-task communication. This use of the term interrupt is contrary to the normal usage, which means to designate a software or hardware interrupt mechanism.

interrupt priority level (IPL): The interrupt level at which a software or hardware interrupt is generated. There are 31 possible interrupt priority levels: IPL 1 is lowest, 31 is highest. The levels arbitrate contention for processor service. For example, a device cannot interrupt a processor if the processor is currently executing at an interrupt priority level equal to or greater than the interrupt priority level of the device's interrupt service routine.

interrupt service routine (ISR): The routine executed when an interrupt occurs.

interrupt stack (IS): The processor-specific stack used when executing in interrupt service context. At any time, the processor is either in a process context executing in user, supervisor, executive, or kernel mode, or in interrupt service context operating in kernel mode, as indicated by the interrupt stack and current mode bits in the processor status longword. The context of the interrupt stack is not switched.

interrupt stack pointer (ISP): The stack pointer for the system-wide interrupt stack.

interrupt vector: See *vector.*

I/O database: A collection of data structures that describes I/O requests, controllers, device units, volumes, and device drivers in a VMS system. Examples are the driver dispatch table, driver prolog table, device data table, unit control block, channel request block, I/O request packet, and interrupt dispatch block.

I/O driver: See *device driver.*

I/O function: An I/O operation interpreted by the operating system and typically resulting in one or more physical I/O operations.

I/O function code: A 6-bit value specified in a Queue I/O Request system service that describes the particular I/O operation to be performed (for example, read, write, rewind).

I/O function modifier: A 10-bit value specified in a Queue I/O Request system service that modifies an I/O function code (for example, read terminal input no echo).

I/O lockdown: The state of a page when it cannot be paged or swapped out of memory.

I/O request packet (IRP): A structure in the I/O database that describes an individual I/O request. The Queue I/O Request system service creates an I/O request packet for each I/O request. The VMS operating system and the driver of the target device use information in the I/O request packet to process the request.

I/O rundown: An operating system function in which the system cleans up any I/O in progress when an image exits.

I/O space: The region of physical address space that contains the configuration registers, and device control and status and data registers. These regions are not physically contiguous.

I/O status block (IOSB): A data structure associated with the Queue I/O Request system service. This service optionally returns a status code, number of bytes transferred, and device- and function-dependent information in an IOSB. An IOSB is not returned from the service call, but filled in when the I/O request completes.

IPL: See *interrupt priority level.*

IRG: See *interrecord gap.*

IRP: See *I/O request packet.*

IS: See *interrupt stack.*

ISECT: See *image section.*

ISP: See *interrupt stack pointer.*

ISR: See *interrupt service routine.*

IV: Integer overflow trap enable bit in the processor status word.

job: The accounting unit equivalent to a process and its subprocesses, if any, and all subprocesses that they create. Jobs are classified as batch and interactive. For example, the job controller creates an interactive job to handle a user's requests when the user logs onto the system, and it creates a batch job when the symbiont manager passes a command input file to it.

job controller: The system process that establishes a job's process context, starts a process running the LOGIN image for the job, maintains the accounting record for the job, manages symbionts, and terminates a process and its subprocesses.

job information block (JIB): A data structure associated with a job that contains the quotas pooled by all processes in the job.

journal file: A file containing the data input to the terminal for one editing session.

journaling: The recording of input during an editing session.

K: A unit for measuring the size of memory or similar resources. K is short for kilo and is used to mean roughly 1000, although K is equal to 2^{10}, or 1024.

kernel mode: The most privileged processor access mode (mode 0). The operating system's most privileged services, such as I/O drivers and the pager, run in kernel mode.

kernel mode stack pointer (KSP): The process context stack pointer for kernel mode.

key: (1) In indexed files, a character string, a packed decimal number, a 2- or 4-byte unsigned binary number, or a 2- or 4-byte signed integer within each data record in an indexed file. The user defines the length and location within the records; VMS Record Management Services (RMS) uses the key to build an index. See *primary key, alternate key,* and *random access by key value.* (2) In relative files, the relative record number of each data record in a data file; VMS Record Management Services (RMS) uses the relative record numbers to identify and access data records in a relative file in random access mode. See *relative record number.* (3) In the Sort Utility, the data field in a record that contains the information by which the user wants to sort the records.

keypad: The small set of keys next to the main keyboard on a terminal.

keyword: A word reserved for use in certain specified syntax formats, usually in a command string or a statement.

known component: The classification for one or more of the same DECnet components. This classification includes all active and inactive occurrences of the component type. For example, known nodes include all active and inactive nodes in the network.

KSP: See *kernel mode stack pointer.*

label: A record that identifies and delimits a magnetic tape volume or file section.

label group: A collection of one or more contiguous label sets.

label identifier: The first three characters of a label name, which identify one or more labels within a label set. These characters will always be the same; for example, a file identifier of HDR will always be used to identify header labels within a header label set.

label number: A number that indicates the position of a label within a label set. For ANSI labels, label number 1 is always present if the label set exists.

label set: One or more contiguous labels on a magnetic tape volume or file section with the same label identifier.

LAT: See *Local Area Transport.*

LAP: See *link access protocol.*

LBN: See *logical block number.*

LCN: See *logical channel number.*

level 1 router: A DECnet node that can send and receive packets, and route packets from one node to another node within a single area.

level 2 router: A DECnet node that can send and receive packets, and route packets from one node to another within its own area and between areas. Also known as an *area router.*

lexical function: A command language construct that the DIGITAL Command Language (DCL) command interpreter evaluates and substitutes before it parses a command string. Lexical functions return information about the current process (the user identification code [UIC] or default directory, for example) and about character strings, (their length or the location of substrings, for example).

librarian: A program that allows the user to create, update, modify, list, and maintain object library, help library, text library, and assembler macro library files.

library file: A direct access file containing one or more modules of the same module type.

LIFO: Last-in/first-out; the order in which processing is performed. For example, a LIFO queue would process data on a last-come, first-served basis. See also *FIFO.*

limit: The size or number of given items requiring system resources (such as mailboxes, locked pages, I/O requests, open files, and so on) that a job is allowed to have at any one time during execution, as specified by the system manager in the user authorization file. See also *quota.*

line: The network management component that provides a distinct physical data path.

line buffer: A storage area used to store the last line deleted by an EDT delete line operation.

line feed: The ASCII command character that moves the cursor position down one line.

line number: A number used to identify a line of text in a file processed by a text editor.

line printer: An output device that prints files one line at a time. It is used for printing large amounts of output that would otherwise tie up a slower device. Almost every system has a device designated as the line printer. In some cases, the "line printer" is actually a high-speed terminal.

link access protocol (LAP): A set of procedures used for link control on a packet switching data network. X.25 defines two sets of procedures:

- LAP — The data terminal equipment/data circuit-terminating equipment (DTE /DCE) interface is defined as operating in two-way simultaneous asynchronous response mode (ARM) with the DTE and DCE containing a primary and secondary function.
- LAPB — The DTE/DCE interface is defined as operating in two-way asynchronous balanced mode (ABM).

linker: A system program that creates an executable program, called an image, from one or more object modules produced by a language compiler or assembler. Programs must be linked before they can be executed.

linking: The resolution of external references between the object modules used to create an image; the acquisition of referenced library routines, service entry points, and data for the image; and the assignment of virtual addresses to components of an image.

literal mode: An addressing mode in which the instruction operand is a constant value expressed in a 6-bit field of the instruction. If the operand data type is byte, word, longword, or quadword, the operand is zero-extended and can express values in the range 0 through 63 (decimal). If the operand data type is floating or double floating, the 6-bit field is composed of two 3-bit fields, one for the exponent and the other for the fraction. The operand is extended to floating or double floating format.

LMB: See *logical memory block.*

load assist agent: An image that provides additional data required to perform a downline system load to a node in a local area VAXcluster configuration.

load balancing: A function of the operating system by which work is distributed equally among all processors in a system. For more information, see *static load balancing* and *dynamic load balancing.*

load device: The drive that holds the distribution media during software installation.

Local Area Transport (LAT): A communications protocol that the VMS operating system uses within a local area network to communicate with terminal servers.

Local Area VAXcluster configuration: A type of VAXcluster configuration in which cluster communication is carried out over the Ethernet by software that emulates certain computer interconnect (CI) port functions. A VAXcluster node can be a VAX or a MicroVAX II class processor; HSCs are not used.

local disk: A disk drive in a computer interconnect (CI) environment that is independent of the Hierarchical Storage Controller (HSC).

local node: The network node at which the user is physically located.

local symbol: (1) A symbol meaningful only to the module that defines it. Symbols not identified to a language processor as global symbols are considered to be local symbols. A language processor resolves (matches references with definitions) local symbols. They are not known to the linker and cannot be made available to another object module. They can, however, be passed through the linker to the symbolic debugger. Contrast with *global symbol.* (2) A command language symbol name that is accessible only at the current command level and subsequently invoked levels. It is deleted when the command level at which it is defined exits.

locality: See *program locality.*

locate mode: A VMS Record Management Services (RMS) record access technique in which a program accesses records in a VMS RMS I/O buffer area to reduce overhead. See also *move mode.*

lock: An association between a job and a resource maintained by the VMS Lock Manager. A lock is normally used to synchronize access by multiple processes to shared objects.

lock manager: See *VMS Lock Manager.*

lock mode: A value associated with a request to the lock management system services, indicating the compatibility of the requested lock with other locks.

lock status block: Location containing the lock identification, final completion status, and optionally, a lock value block.

lock value block: An optional block of data associated with a lock-status block. The lock value block can be used to communicate information among processes sharing a resource.

locked password: A password that cannot be changed by the account's owner. Only system managers or users with the SYSPRV privilege can change locked passwords.

locking a page in memory: Making a page in a process ineligible for either paging or swapping. A page stays locked in physical memory until the operating system specifically unlocks it.

locking a page in the working set: Making a page within a process ineligible for paging out of the working set for the process. The page can be swapped when the process is swapped. A page stays locked in a working set until it is specifically unlocked.

log: A record of performance.

logging: The network management component that routes event data to logging sinks such as a console or file.

logging file: The destination to which a machine-readable record of events is sent for later retrieval. The logging file is user-defined.

logging in: The identification of a user to the operating system. When users log in, they type an account name and password in response to the appropriate prompts from the system. If the name and password match an account on the system, the user will be permitted access to that account.

logging console: The destination to which a record of events is sent in a form that is comprehensible to system users. Typically, a logging console is a terminal or a user-specified file.

logging monitor: The destination to which a machine-readable record of events is sent for possible real-time decision making. Typically, the logging monitor is a user-defined program.

logging out: Entering the DIGITAL Command Language (DCL) command LOGOUT, which informs the operating system that the user has finished using a particular terminal.

logical block number (LBN): A volume-relative address of a block on a mass storage device. The blocks that form the volume are labeled sequentially starting with logical block 0. See also *physical block number* and *virtual block number.*

logical channel: A logical link between a data terminal equipment (DTE) and its data circuit-terminating equipment (DCE). The physical communications line between a DTE and DCE is divided into a set of logical channels.

logical channel number (LCN): A unique reference number that identifies a logical channel. Data terminal equipment (DTE) recognizes a virtual circuit by its associated LCN.

logical I/O function: A set of I/O operations (for example, read and write logical block) that allow restricted direct access to device level I/O operations using logical block addresses.

logical link: (1) A communication path between programs on two network nodes. Contrast with *physical link*. (2) A carrier of a single stream of full-duplex traffic between two user-level processes.

logical memory block (LMB): The portion of information written to the dump file during a selective crash dump. Each LMB includes a header block describing the data structure, blocks describing the parts of the address space that could not be dumped, and the dumpable parts of virtual address space.

LMBs exist for system and global page tables, system space, global pages in use by a process or processes, and for individual processes.

logical name: A user-specified name for any portion or all of a file specification. For example, the logical name INPUT can be assigned to a terminal device from which a program reads data entered by a user. Logical name assignments are maintained in logical name tables for each process, each group, and the system. Logical names can be assigned translation attributes, such as terminal and concealed. See also *search list*.

logical name table: A table that contains a set of logical names and their equivalence names for a particular process, a particular group, or the system.

logical record: A group of related fields treated as a unit.

login file: A command procedure that is automatically executed at login and at the beginning of a batch job.

longword: Four contiguous bytes (32 bits) starting on any addressable byte boundary. Bits are numbered from right to left, 0 through 31. The address of the longword is the address of the byte containing bit 0. When interpreted arithmetically, a longword is a two's complement integer with significance increasing from bit 0 to bit 30. When interpreted as a signed integer, bit 31 is the sign bit. The value of the signed integer is in the range –2,147,483,648 to 2,147,483,647. When interpreted as an unsigned integer, significance increases from bit 0 to bit 31. The value of the unsigned integer is in the range 0 to 4,294,967,295.

loop node: A local node associated with a particular line and treated as if it were a remote node. All traffic to the loop node is sent over the associated line.

loosely coupled system: A multiprocessing system configuration consisting of separate operating systems that communicate through some message transfer mechanism. Contrast with *tightly coupled system*.

macro: A statement that requests a language processor to generate a predefined set of instructions.

magnetic tape ancillary control process (MTACP): The internal software process of the operating system that interprets the logical format of VMS ANSI-labeled volumes.

mailbox: A software data structure that is treated as a record-oriented device for general interprocess communication. Communication using a mailbox is similar to other forms of device-independent I/O. Senders write to a mailbox, the receiver reads from that mailbox. Some system-wide mailboxes are defined; the error logger and operator communication manager (OPCOM) read from system-wide mailboxes.

main memory: See *physical memory.*

main text buffer: In a text editor, the default text buffer for keyboard input and for input files, and the source for output files.

manual record unlocking: A VMS Record Management Services (RMS) capability that allows users to lock multiple records in a file simultaneously. The user has explicit control over the unlocking of records. A lock occurs when the RAB$V_ULK bit is set in the record processing options field on the execution of a Get, Find, or Put service. Once a record is locked when record unlocking is enabled, it will remain locked until it is explicitly unlocked by either the Free or Release service, or until the stream terminates.

mapping window: A subset of file retrieval information used to translate virtual block numbers to logical block numbers.

mass storage device: An input/output device on which data and other types of files are stored while they are not being used. Typical mass-storage devices include disks, magnetic tapes, and floppy disks.

Mass Storage Control Protocol (MSCP): A software protocol used to communicate between a VAX processor and a Hierarchical Storage Controller (HSC).

MASSBUS adapter: An interface device between the backplane interconnect and the MASSBUS.

master file directory (MFD): The file directory on a disk volume that contains the name of all user file directories (UFDs) on a disk, including its own.

maximum visits: The maximum number of nodes through which a packet can be routed before reaching its destination.

MBA: See *MASSBUS adapter.*

MBZ: See *must be zero.*

MCR: See *monitor console routine.*

member number: The second number or its alphanumeric equivalent in a user identification code (UIC) that uniquely identifies that code.

memory: A series of physical locations into which data or instructions can be placed in the form of binary words. Each location in memory can be addressed and its contents can be altered. Memory should not be confused with mass-storage devices.

memory management: The operating system functions that include the hardware's page mapping and protection and the operating system's image activator and pager.

memory mapping enable (MME): A bit in a processor register that governs address translation.

MFD: See *master file directory.*

Mixed Interconnect VAXcluster System: A VAXcluster environment in which both the Ethernet and the computer interconnect (CI) are being used as interconnects.

MME: See *memory mapping enable.*

modem: Contraction of modulator/demodulator. A device that modulates signals for sending over communications facilities and demodulates signals being received.

modify access type: A type of access in which the specified operand of an instruction or procedure is read and potentially modified and written during execution.

module: (1) A portion of a program or program library, as in a source module, object module, or image module. (2) A board, usually made of plastic covered with an electrical conductor, on which logic devices (such as transistors, resistors, and memory chips) are mounted, and circuits connecting these devices are etched, as in a logic module. (3) A network management component.

monitor console routine (MCR): The command interpreter in an RSX–11 system; also an optional command interpreter in a VMS system.

mounting a volume: (1) Logically associating a volume with the physical unit on which it is loaded (an activity accomplished by system software at the request of an operator). (2) Loading or placing a magnetic tape or disk pack on a drive and placing the drive on line (an activity accomplished by a system operator).

mount verification: A VMS feature that suspends I/O to and from volumes while they are changing status. Mount verification also ensures that, following a suspension in disk I/O, the volume being accessed is the same as was previously mounted. When volume shadowing is installed, the mount verification feature also maintains and validates shadow set membership for Files–11 shadow sets.

move mode: A VMS Record Management Services (RMS) record I/O access technique in which a program accesses records in its own working storage area. See also *locate mode.*

MTACP: See *magnetic tape ancillary control process.*

MSCP: See *Mass Storage Control Protocol.*

multiaccess channel: A media (for example, Ethernet) on which many transmitters contend for access.

multicast addressing: An Ethernet addressing mode in which a given message packet is targeted to a group of logically related nodes.

multicast group address: An address assigned to a number of nodes on an Ethernet and used to send a message to all nodes in the group in a single transmission.

multinational character set: A set of 8-bit character international alphanumeric characters, including characters with diacritical marks.

multipoint circuit: A circuit connecting two systems, with one of the systems (the control station) controlling the circuit and the other system serving as a tributary.

multiport memory: A memory unit that can be connected to multiple processors and that can contain resources (for example, mailboxes, common event flag clusters, and global sections) for use by processes running on different processors.

multiprocessing system: A system containing two or more general purpose processors. These processors are connected, through hardware, so that they can work on the same application concurrently. See *asymmetric multiprocessing* and *symmetric multiprocessing*.

multiprogramming: A mode of operation in which hardware resources are shared among multiple, independent software processes.

must be zero (MBZ): A field that is reserved and must be supplied as zero. If examined, it must be assumed to be undefined.

mutex: A semaphore used to control exclusive access to a region of code that can share a data structure or other resource. The mutex (mutual exclusion) semaphore ensures that only one process at a time has write access to the region of code.

NAM: See *name block*.

name block (NAM): A VMS Record Management Services (RMS) user data structure that contains supplementary information used in parsing file specifications.

National Replacement Character (NRC): A 7-bit character set that is a country-specific version of ASCII.

native image: An image whose instructions are executed in native mode.

native mode: The processor's primary execution mode, where the programmed instructions are interpreted as byte-aligned, variable-length instructions that operate on four data types: byte, word, longword, and quadword integers; floating and double floating character strings; packed decimals; and variable-length bit fields. The other instruction execution mode is compatibility mode.

NCP: See *Network Control Program*.

NETACP: See *network ancillary control process*.

network: A collection of interconnected individual computer systems.

network ancillary control program (NACP): A VMS ancillary control process that controls all lines and circuits, maintains a picture of the network topology, and creates a process to receive inbound logical link requests.

network connect block (NCB): (1) For a DECnet network, a user-generated data structure used in a nontransparent task to identify a remote task and optionally send user data in calls to request, accept, or reject a logical link connection. (2) For VAX Packetnet System Interface (PSI), a block that contains the information necessary to set up an X.25 virtual circuit or to accept or reject a request to set up an X.25 virtual circuit.

network control program (NCP): An interactive utility program that permits you to control and monitor the network.

network object: Any task with a nonzero object type, for example, those programs such as FAL and NML that provide generic services across a network.

network services protocol (NSP): A formal set of conventions used in a DECnet network to perform network management and to exchange messages over logical links.

network status notification: Information about the state of both logical and physical links over which two tasks communicate. A nontransparent task can use this information to take appropriate action under conditions such as third party disconnections and a partner's exiting before I/O completion.

network task: A nontransparent task that is able to process multiple inbound connection requests; that is, it has declared a network name or object number.

node: (1) An individual computer system in a network that can communicate with other computer systems in the network. (2) A VAXBI interface—such as a central processor, controller, or memory subsystem—that occupies one of 16 logical locations on a VAXBI bus. See also *VAXBI*. (3) A VAX processor or HSC that is recognized by System Communications Services (SCS) software.

node address: The required, unique, numeric identification of a specific node in the network.

node name: An optional alphanumeric identification associated with a node address in a strict one-to-one mapping. A node name must contain at least one alphabetic character.

node specification: The first field in a file specification. This field identifies the location of a computer system in a network.

nonprinting character: A character in the computer code set for which there is no corresponding graphic symbol.

nonprivileged: In DECnet–VAX terminology, this term means no privileges in addition to NETMBX, which is the minimal requirement for any network activity.

nonrouting node: See *end node*.

NRC: See *National Replacement Character*.

NSP: See *network services protocol*.

null: (1) The character with the ASCII code 000. (2) An absence of information.

null string: A string without content or an empty string represented by adjacent quotation marks.

numeric string: A contiguous sequence of bytes representing up to 31 decimal digits (one per byte) and possibly a sign. The numeric string is specified by its lowest addressed location, its length, and its sign representation.

object: (1) A DECnet–VAX process that receives a logical link request. It performs a specific network function or is a user-defined image for a special-purpose application. (2) A VAX Packetnet System Interface (PSI) management component that contains records to specify account information for incoming calls and to specify a command procedure that is initiated when the incoming call arrives. (3) A system resource such as a file, device, or directory.

object module: The binary output of a language processor such as the assembler or a compiler, which is used as input to the linker.

object program: A source program that has been translated into machine language.

object time system: See *Run-Time Procedure Library.*

object type: A discrete identifier for either a task or DECnet service on a remote node. Object type identifiers can either be 0 plus a name (alternatively, TASK=name), or nonzero without a name (for example, 17= or FAL=).

octal number: A number in the base-8 numbering system. Only the numerals 0 through 7 are used in this system. If a number includes an 8 or a 9, it cannot be an octal number. Octal numbering is used in computer systems because it is easy to convert to the binary numbers that are actually used by the computer.

offset: A fixed displacement from the beginning of a data structure. System offsets for items within a data structure normally have an associated symbolic name used instead of the numeric displacement. Where symbols are defined, programmers always reference the symbolic names for items in a data structure instead of using the numeric displacement.

OLTP: See *Online Transaction Processing.*

On-Disk Structure Level1 (ODS-1): See *Files–11 Structure Level 1.*

On-Disk Structure Level2 (ODS-2): See *Files–11 Structure Level 2.*

Online Transaction Processing (OLTP): An environment in which many users are simultaneously reading and writing to a collection of shared data, generally a database. Results are usually expected immediately (real time). In contrast to standard transaction processing, when an OLTP transaction is completed, all data is fully updated during the request and output stages. No files are created for later batch updates of the stored data. See also *transaction processing.*

opcode: The pattern of bits within an instruction that specifies the operation to be performed.

OPCOM: See *operator communication manager.*

open account: An account that does not require a password.

operand specifier: The pattern of bits in an instruction that indicates the addressing mode and register, or a displacement that identifies an instruction operand.

operand specifier type: The access type and data type of an instruction's operand or operands. For example, the test instructions are of read access type because they read only the value of the operand. The operand can be of byte, word, or longword data type, depending on whether the opcode is for the TSTB (test byte), TSTW (test word), or TSTL (test longword) instruction.

operating system: An integrated collection of programs that controls the execution of computer programs and performs system functions.

operator: The person responsible for daily maintenance of the system at a particular installation. The operator does such things as mounting disks and tapes, changing ribbons and paper on line printers, rebooting the system, keeping records, and so forth. In small systems, these duties may be combined with those of the system manager or informally divided among several people.

operator communication manager (OPCOM): A system process that receives input from a process that wants to inform an operator of a particular status or condition, passes a message to the operator, and tracks the message.

operator's console: Any terminal identified as a terminal attended by a system operator.

out-of-order packet caching: The mechanism by which the Network Services Protocol (NSP) maintains a buffer of data packets received out of order so that they can be reassembled in the correct order before being forwarded to the destination node.

outbound connection: A task's request for a logical link connection to another node.

output file: A file that contains the results of a processing operation, for example, a file that has been sorted or edited.

OWNER: In the context SYSTEM/OWNER/GROUP/WORLD, an owner is the particular member (of a GROUP) to which a file, global section, mailbox, or event flag cluster belongs.

owner process: The process or subprocess that created a subprocess.

P0: See *program region.*

P0BR: See *program region base register.*

P0LR: See *program region length register.*

P0PT: See *program region page table.*

P1: See *control region.*

P1 through P8: See *parameter.*

P1BR: See *control region base register.*

P1LR: See *control region length register.*

P1PT: See *control region page table.*

packed decimal: A method of representing a decimal number by storing a pair of decimal digits in 1 byte, taking advantage of the fact that only 4 bits are required to represent the numbers 0 through 9.

packed decimal string: A contiguous sequence of up to 16 bytes interpreted as a string of 4-bit fields. Each field represents a digit except for the low-order four bits of the highest addressed byte, which represent the sign. The packed decimal string is specified by its lowest addressed location and by the number of digits.

packet: A unit of data to be routed from a source node to a destination node; for VAX Packetnet System Interface (PSI), the unit of data switched through a packet switching data network (PSDN). Normally a user data field accompanied by a header carrying destination and other information.

packet assembly/disassembly (PAD) facility: A device at a the packet switching data network (PSDN) that allows access from an asynchronous terminal. The terminal connects to the PAD, and the PAD puts the terminal's input data into packets (assembles) and takes the terminal's output data out of packets (disassembles).

packet switching: A data transmission process, utilizing addressed packets, whereby a channel is occupied only for the duration of transmission of the packet.

Packetnet System Interface (PSI): A software product that allows the VMS user to communicate across packet switching data networks (PSDNs).

PAD: See *packet assembly/disassembly (PAD) facility.*

packet switching data network (PSDN): A set of equipment and interconnecting links that provides a packet switching communications service to subscribers.

page: (1) A set of 512 contiguous byte locations beginning at an even 512-byte boundary used as the unit of memory mapping and protection. (2) The data between the beginning of file and a page marker, between two markers, or between a marker and the end of a file.

page fault: An exception generated by a reference to a page that is not in the working set of the faulting process. Also called *translation-not-valid fault.*

page fault cluster: See *cluster.*

page fault cluster size: The number of pages read into memory on a page fault.

page frame number (PFN): The high-order 21 bits of the physical address of a page in physical memory.

page frame number mapping (PFN mapping): Mapping a section to one or more pages in physical memory or I/O space (as opposed to mapping it to a disk file).

page marker: A character or characters (generally a form feed) that separates pages in a file processed by a text editor.

page table: A memory management data base used to account for virtual pages. See also *system page table, process page table,* and *global page table.*

page table entry (PTE): The data structure that identifies the physical location and status of a page of virtual address space. When a virtual page is in memory, the PTE contains the page frame number needed to map the virtual page to a physical page. When it is not in memory, the page table entry contains the information needed to locate the page on secondary storage (disk).

pager: A set of kernel mode procedures that executes as the result of a page fault. The pager makes the page for which the fault occurred available in physical memory so that the image can continue execution. The pager and the image activator provide the operating system's memory management functions.

paging: The action of bringing pages of an executing process into physical memory when referenced. When a process executes, all of its pages are said to reside in virtual memory. Only the actively used pages, however, need to reside in physical memory. The remaining pages can reside on disk until they are needed in physical memory. On a VMS system, a process is paged either when it references more pages than it is allowed to have in its working set or when it first activates an image in memory. When the process refers to a page not in its working set, a page fault occurs. This faulting causes the operating system's pager to read in the referenced page if it is on disk (and, optionally, other related pages depending on a cluster factor), replacing the least recently faulted pages as needed. The operating system's pager does not read in a referenced page if that page is on the free or modified list.

parallel processing: A method of computing that occurs when a section of an application is divided into multiple tasks, and those multiple tasks are executed simultaneously on multiple processors.

parameter: (1) A value passed to a command procedure equated to a symbol ranging from P1 through P8. See also *command parameter.* (2) An entry in the volatile or permanent database for a network management component.

parsing: (1) Breaking a command string into its elements to interpret it. (2) Interpreting a file specification, as is done by VMS Record Management Services (RMS).

password: A character string that users provide at login time to validate their identity and as a form of proof of their authorization to access the account. There are two kinds of passwords—system passwords and user passwords. User passwords include both primary and secondary passwords.

path: The route a packet takes from source to destination.

path cost: The sum of the circuit costs along a path between two nodes.

path length: The number of hops along a path between two nodes; that is, the number of circuits a packet must travel along to reach its destination.

PC: See *program counter.*

PCB: See *process control block.*

PCBB: See *process control block base register.*

peripheral device: Any unit, distinct from the CPU and physical memory, that can provide the system with input or accept any output from it. Terminals, line printers, and disks are peripheral devices.

permanent database: A file containing information about network management components. See also *volatile database* and *configuration database.*

permanent virtual circuit (PVC): A permanent logical association between two DTEs (data terminal equipment), which is analogous to a leased line. Packets are routed directly by the network from one DTE to the other.

per-process address space: See *process address space.*

PFN: See *page frame number.*

PFN mapping: See *page frame number mapping.*

Phase II VAXcluster configuration: A VAXcluster environment in which both the computer interconnect (CI) and the Ethernet are used for cluster communications.

physical address: (1) The address used by hardware to identify a location in physical memory or on directly addressable secondary storage devices such as disk. A physical memory address consists of a page frame number and the number of a byte within the page. A physical disk block address consists of a cylinder or track and sector number. (2) The unique address value associated with a given system on an Ethernet circuit. An Ethernet physical address is defined to be distinct from all other physical addresses on an Ethernet.

physical address space: The set of all possible physical addresses that can be used to refer to locations in memory (memory space) or device registers (I/O space).

physical block number: The physical address of a block on a mass storage device. Contrast with *logical block number* and *virtual block number.*

physical I/O functions: A set of I/O functions that allows access to all device-level I/O operations except maintenance mode.

physical link: A signal-carrying media that links two nodes in a network. Contrast with *logical link.*

physical memory: The memory modules connected to the backplane interconnect that are used to store both instructions that the processor can directly fetch and execute and any other data that a processor is instructed to manipulate. Also called main memory.

PID: See *process identification.*

point-to-point circuit: A circuit that connects two nodes, operating over a single line.

polling: The activity that the control station performs with a multipoint circuit's tributaries to grant the tributaries permission to transmit.

position-dependent code: Code that can execute properly only in the locations in virtual address space that are assigned to it by the linker.

position-independent code: Code that can execute properly without modification wherever it is located in virtual address space, even if its location is changed after it is linked. Generally, this code uses addressing modes that form an effective address relative to the program counter (PC).

primary key: The mandatory key within the data records of an indexed file; used by VMS Record Management Services (RMS) to determine the placement of records within the file and to build the primary index. See *key (indexed files)* and *alternate key.*

primary password: A type of user password that is the first password requested from the user. Systems may optionally require a secondary password, as well. As a user password, this password must be associated with the user name that is supplied with it.

primary processor: The processor in a VMS symmetric multiprocessing system that is either logically or physically attached to the console device. Only the primary processor performs the initialization activities that define the VMS environment and prepare memory for the entire system. In addition, the primary processor serves as the system timekeeper. Contrast with *secondary processor.*

primary vector: A location that contains the starting address of a condition handler to be executed when an exception condition occurs. If a primary vector is declared, that condition handler is the first handler to be executed.

priority: See *process priority* and *interrupt priority level.*

private section: An image section of a process that is not shareable among processes. See also *global section.*

private volume: A volume that has been allocated by a process for its own exclusive use.

privileged: Generally refers to instructions, images, or accounts intended for use by the operating system, specific system programs, or a subset of the system users.

privileges: A means of protecting the use of certain system functions that can affect system resources and integrity. System managers grant privileges according to user's needs and deny them to users as a means of restricting their access to the system. See also *process privileges, user privileges,* and *image privileges.*

procedure: A routine entered by means of a call instruction. See also *command procedure.*

process: The basic entity scheduled by the system software, a process provides the context in which an image executes. A process consists of an address space and both hardware and software context.

process address space: See *process space.*

process affinity: In a VMS symmetric multiprocessing system, a close association of a process with a specific processor or set of processors in the system. Process affinity can be indicated as either a requirement that a process run only on the processor with a specific CPU identification or on a processor or set of processors that have a needed capability. See *capability.*

process context: The set of data defining the environment, both hardware and software, in which a process executes. See also *hardware context* and *software context.*

process control block (PCB): A data structure used to contain process context. The hardware PCB contains the hardware context. The software PCB contains the software context, which includes a pointer to the hardware PCB.

Process Control Block Base Register: A processor register that contains the physical address of the current process control block (PCB).

process header: A data structure that contains the hardware process control block (PCB), accounting and quota information, process section table, working set list, and the page tables defining the virtual layout of the process.

process header slots: That portion of the system address space in which the system stores the process headers for the processes in the balance set. The number of process header slots in the system determines the number of processes that can be in the balance set at any one time.

process identification (PID): A 32-bit binary value that uniquely identifies a process. Each process has a process identification and a process name.

process I/O channel: See *channel.*

process I/O segment: That portion of a process control region that contains the process permanent VMS Record Management Services (RMS) internal file access block for each open file, and the I/O buffers, including the command interpreter's command buffer and command descriptors.

process name: A 1- to 15-character ASCII string that can be used to identify processes executing under the same group number.

process page tables: The page tables used to describe process virtual memory.

process permanent file: A file that is opened or created through VMS Record Management Services (RMS) by supervisor or executive mode when the process permanent bit is set in the file-processing options field.

process priority: The priority assigned to a process for scheduling purposes. The operating system recognizes 32 levels of process priority, where 0 is low and 31 high. Levels 16 through 31 are used for real-time processes. The system does not modify the priority of a real-time process (although the system manager or the process itself may). Levels 0 through 15 are used for normal processes. The system may temporarily increase the priority of a normal process based on the activity of the process.

process privileges: The privileges granted to a process by the system. These privileges are a combination of user privileges and image privileges. They include, for example, the privilege to affect other processes associated with the same group as the user's group, to affect any process in the system regardless of user identification code (UIC), to set process swap mode, to create permanent event flag clusters, to create another process, to create a mailbox, to perform direct I/O to a file-structured device, and to perform network operations.

process section: See *private section.*

process space: The lowest-addressed half of virtual address space, where process instructions and data reside. Process space is divided into a program region and a control region.

processor register: A part of the processor used by the operating system software to control the execution states of the computer system. Processor registers include, for example, the system base and length registers, the program and control region base and length registers, the system control block base register, and the software interrupt request register.

processor status longword (PSL): A privileged processor register consisting of a word of privileged processor status and the processor status word itself. The privileged processor status information includes the current interrupt priority level, the previous access mode, the current access mode, the interrupt stack bit, the trace trap pending bit, and the compatibility mode bit.

processor status word (PSW): The low-order word of the processor status longword. Processor status information includes the condition codes (carry, overflow, 0, negative), the arithmetic trap enable bits (integer overflow, decimal overflow, floating underflow), and the trace enable bit.

program: A series of instructions aimed at a particular result. Programming languages are a means of describing procedures so that they can be performed by a computer. See also *image*.

program counter (PC): General register 15 (R15). At the beginning of an instruction's execution, the PC normally contains the address of a location in memory from which the processor will fetch the next instruction it will execute.

program locality: A characteristic of a program that indicates how close or far apart the references to locations in virtual memory are over time. A program with a high degree of locality does not refer to many widely scattered virtual addresses in a short period of time.

program region: The lowest-addressed half of process address space (P0 region). The program region contains the image currently being executed by the process and other user code called by the image.

program region base register (P0BR): The processor register, or its equivalent in a hardware process control block, that contains the base virtual address of the page table entry for virtual page number 0 in a process program region.

program region page table (P0PT): The page table that maps the program region of virtual address space.

program region length register (P0LR): The processor register, or its equivalent in a hardware process control block, that contains the number of entries in the page table for a process program region.

program section (PSECT): A portion of a program with a given protection and set of storage management attributes. Program sections that have the same attributes are gathered together by the linker to form an image section.

programmer number: See *member number*.

project number: See *group number* or *account number*.

prompt: A character string appearing on a terminal indicating that the user must provide input.

protection: The attributes of a resource that limit the type of access available to users. Resources include volumes, devices, directories, and files. See also *user identification code* and *access control list*.

protocol: An agreed set of rules governing the operation of a communications link.

proxy login: The procedure that permits a remote user to access a specific account at the local node, without supplying the user name and password.

PSECT: See *program section*.

pseudodevice: An entity treated as an I/O device by the user or system, although it is not any particular physical device. A pseudodevice is a forwarding address through which actual physical devices can always be reached.

PSDN: See *packet switching data network.*

PSI: See *Packetnet System Interface.*

PSL: See *processor status longword.*

PSW: See *processor status word.*

PTE: See *page table entry.*

public volume: A file-structured disk volume that contains public files.

PVC: See *permanent virtual circuit.*

pure code: See *reentrant code.*

QIO: See *Queue I/O Request system service.*

quadword: Four contiguous words (64 bits) starting on any addressable byte boundary. Bits are numbered 0 to 63 from right to left. A quadword is identified by the address of the word containing the low-order bit (bit 0). When interpreted arithmetically, a quadword is a two's complement integer with significance increasing from bit 0 to bit 62. Bit 63 is used as the sign bit. The value of the integer is in the range -2^{63} to $2^{63}-1$.

qualifier: A portion of a command string that modifies a command verb or command parameter by selecting one of several options. A qualifier, if present, follows the command verb or parameter to which it applies and is in the format /qualifier[=option]. For example, in the command string "PRINT filename /COPIES=3," the COPIES qualifier indicates that the user wants three copies of a given file printed.

quantum: The minimum amount of time that a process can remain in memory; also the maximum amount of time that a process can be the executing process. A specified amount is deducted from the quantum whenever a process enters a wait state.

queue: (1) A line of jobs to be processed, for example, a batch job queue or a printer job queue. Processing occurs primarily in first-in/first-out (FIFO) order, but does reflect the priority of the process that submitted the job. See also *state queue* and *system queue.* (2) To make an entry in a list or table, perhaps using the INSQUE instruction.

Queue I/O Request system service: The VMS system service that handles $QIO and $QIOW requests. The QIO prepares an I/O request for processing by the driver and performs device-independent preprocessing of the request. This system service also calls driver function decision table (FDT) routines.

queue priority: The priority assigned to a job placed in a spooler queue or a batch queue.

quota: The total amount of a system resource, such as CPU time, that a job is allowed to use in an accounting period, as specified by the system manager in the user authorization file. See also *limit*.

RAB: See *record access block*.

random access: A method for retrieving or writing data in which the location of the data to be retrieved or written is not dependent on the location of previously retrieved or written data. Random access refers to memory or mass-storage devices on which all information is equally accessible.

random access by key: The retrieval or storage of a record by specifying the key value. This method of record retrieval and storage applies only to indexed files.

random access by record file address (RFA): The retrieval of a record by its unique address, which is provided to the program by VMS Record Management Services (RMS) upon successful $GET or $FIND operations. The record's file address can subsequently be used to randomly access that same record.

random access by relative record number: The retrieval or storage of a record by specifying its position relative to the beginning of the file. This method of record storage and retrieval applies only to sequential files with fixed-length records and relative files.

reachable node: A node to which the local node has a usable communications path.

read: The act or capability of an image to accept data. For example, when a TYPE command is entered, the system reads the designated file from the disk and writes it to the terminal. See also *write*.

read access type: An instruction or procedure operand attribute indicating that the specified operand is only read during instruction or procedure execution.

read miss: An event in which a read operation cannot be serviced by the processor's hardware cache.

real-time process: A process that responds to events in related or controlled processes as they occur, rather than when the computer is ready to respond to them. The results of the computation can thus be used in the processing. A real-time process is assigned to a software priority level between 16 and 31, inclusive. The scheduling priority assigned to a real-time process is never modified by the scheduler, although it can be modified by the system manager or by the process itself.

record: A set of related data that a program treats as a unit.

record access block (RAB): An VMS Record Management Services (RMS) user control block allocated at either assembly or run time to communicate with VMS RMS. The control block describes the records in a particular file and associates with a file access block to form a record access stream. A RAB defines the characteristics needed to perform record-related operations, such as update, delete, or get.

record access mode: The method used in VMS Record Management Services (RMS) for retrieving and storing records in a file. Access is by one of four methods: sequential, random by key, random by record's file address, and random by relative record number.

record access mode switching: Term applied to the switching from one type of record access mode to another while processing a file.

record blocking: The technique of grouping multiple records into a single block. On magnetic tape, an interrecord gap (IRG) is placed after the block rather than after each record. This technique reduces the number of I/O transfers required to read or write the data; and, in addition (for magnetic tape), increases the amount of usable storage area. Record blocking also applies to disk files.

record cell: A fixed-length area in a relative file that is used to contain one record.

record format: The way a record physically appears on the recording surface of the storage media. The record format defines the method for determining record length.

record length: The size of a record in bytes.

record locking: The ability to control operations being performed on relative and indexed files that are being simultaneously accessed by more than one program or more than one record stream. Record locking makes certain that when a program is adding, deleting, or modifying a record on a given stream, another program or stream is not allowed to access the same record or record cell. See also *automatic record locking* and *manual record locking*.

Record Management Services (RMS): A set of operating system procedures that is called by programs to process files and records within files. VMS RMS allows programs to issue GET and PUT requests at the record level (record I/O) as well as read and write blocks (block I/O). VMS RMS is an integral part of the system software; its procedures run in executive mode.

record-oriented device: A device such as a terminal, line printer, or card reader on which the largest unit of data a program can access in one I/O operation is the device's physical record.

record file address (RFA): The unique address of a record in a file, the RFA allows previously accessed records to be accessed randomly at a subsequent time. This access occurs regardless of file organization.

reentrant code: Code that is never modified during execution. It is possible to let many users share the same copy of a procedure or program written as reentrant code.

register: A storage location in hardware logic other than main memory. See also *general register, processor register,* and *device register.*

register deferred indexed mode: An indexed addressing mode in which the base operand specifier uses register deferred mode addressing. See also *indexed addressing mode* and *register deferred mode.*

register deferred mode: An addressing mode in which the contents of the specified register are used as the address of the actual instruction operand. See also *addressing mode.*

register mode: An addressing mode in which the contents of the specified register are used as the actual instruction operand.

relative file organization: The arrangement of records in a file in which each record occupies a cell of equal length within a bucket. Each cell is assigned a successive number, which represents its position relative to the beginning of the file.

relative record number: An identification number used to specify the position of a record cell relative to the beginning of the file. The relative record number is used as the key during random access by key mode to relative files. To randomly access a record in a sequential disk file having 512-byte, fixed length records, a program must provide VMS Record Management Services (RMS) with the relative record number of the cell containing the record.

relative volume number: A volume number that uniquely identifies which volume set contains a file.

remote device: A device that is not directly connected to the local node, but is available through the VAXcluster system.

remote data terminal equipment (DTE): Any DTE in a network other than the one at which the user is located.

remote node: To any one node in the network, this node is any other network node. See also *adjacent node, local node,* and *executor node.*

reorganization: A record-by-record copy of an indexed file to another indexed file with the same key attributes as the input file.

resource: (1) A physical part of the computer system such as a device or memory, or an interlocked data structure such as a mutex. Quotas and limits control the use of physical resources. (2) Any entity to which access is synchronized by means of the lock management system services.

resource wait mode: An execution state in which a process indicates, when it issues a service request requiring a resource, that it will wait until a system resource becomes available. If a process requests notification when a resource is not available, it can disable resource wait mode during program execution.

resume: To activate a suspended process. Contrast with *wake.*

return status code: See *status code.*

reverse video: A feature of a video terminal that reverses the default video contrast. If the default display is black figures on a white background, reverse video displays white figures on a black background.

RFA: See *record file address.*

rights database: The collection of data the system maintains and uses to define identifiers and associate identifiers with the holders of the identifiers.

rights list: The list associated with each process that includes all the identifiers the process holds.

RMS: See *Record Management Services.*

RMS–11: A set of routines that are linked with compatibility mode programs and provide similar functional capabilities to VMS Record Management Services (RMS). The file organizations and record formats used by RMS–11 are very similar to those of VMS RMS.

round robin: A form of time sharing that gives images of equal priority equal access to the CPU. The VMS operating system uses round-robin scheduling for each of the lower sixteen software priority levels. Each process at a given software priority level executes in turn before any other process at that level (a first-in/first-out (FIFO) queue).

router: A node that can send, receive, and route packets from one node to another.

routing: The network function that determines the path along which data travels to its destination.

runaway tape condition: A situation where a tape spins unceasingly on the drive. A runaway tape condition usually occurs because an operation does not incur a timeout condition. The only way to recover from a runaway tape condition is to take the drive off line.

Run-Time Procedure Library: The collection of procedures available to native-mode images at run time. These procedures may be used by all native-mode images, regardless of the language processor used to compile or assemble the program. These procedures also provide support routines for high-level language compilers.

RVN: See *relative volume number.*

RWED: The abbreviation for Read, Write, Execute, Delete, which are types of access to data files, directory files, or volumes.

save set: A file that the Backup Utility creates to save files that it backs up.

SBI: See *synchronous backplane interconnect.*

SBR: See *system base register.*

scatter/gather: The ability to transfer in one I/O operation data from discontiguous pages in memory to contiguous blocks on disk, or data from contiguous blocks on disk to discontiguous pages in memory.

scavenging: See *disk scavenging.*

SCB: See *system control block.*

SCBB: See *system control block base register.*

scheduling priority: See *process priority.*

screen width: The number of character positions that can be displayed on a line.

scrolling: A feature of a video terminal that allows the display of more than one screenful of text by vertical movement. For example, when the TYPE command is entered, new output appears at the bottom of the screen as the oldest output disappears off the top.

SCS: See *System Communications Services.*

search list: A logical name in which the equivalence name has multiple values instead of a single value. A common use of a search list is to examine multiple directories to locate a file.

search string: A group of characters defined in a command as the object of a search operation.

secondary password: A user password that may be required at login time, immediately after the primary password has been correctly submitted. Primary and secondary passwords can be known by separate users, to ensure that more than one user is present at the login. A less common use is to require a secondary password as a means of increasing the password length so that the total number of combinations of characters makes infiltrating a system by password more time consuming.

secondary processor: The processor or processors in a VMS symmetric multiprocessing system that do not have the initialization and timekeeper responsibilities of the primary processor.

secondary storage: Random access mass storage that is implemented on disks.

secondary vector: A location that identifies the starting address of a condition handler to be executed when a condition occurs and when either the primary vector contains 0 or the handler to which the primary vector points chooses not to handle the condition.

section: A portion of process virtual memory that has common memory management attributes (protection, access, cluster factor, and so on). It is created from an image section, a disk file, or as the result of a Create Virtual Address Space system service. See *global section, private section, image section,* and *program section.*

secure terminal server: A piece of VMS software designed to ensure that users can only log in to terminals that are already logged out. When the user presses the BREAK key on a terminal, the secure server (if enabled) responds by first disconnecting any logged in process and then initiating a login. If no process is logged in at the terminal, the login can proceed immediately.

security alarm: A message sent to operator terminals that are enabled as security operators. Security alarms are triggered by the occurrence of an event previously designated as worthy of the alarm because of its security implications.

security operator terminal: A class of terminal that has been enabled to receive messages sent by the operator communication manager (OPCOM) to "security operators." These messages are security alarm messages. Normally such a terminal is a hardcopy terminal in a protected room, so that the output provides a log of security-related events and details that identify the source of the event.

security auditing: The monitoring and recording of specified events occuring on the system. These events include login failures, privileged and unprivileged access to system objects, and changes to the system user authorization file (SYSUAF).

selective crash dump: A crash dump that saves only those portions of physical memory critical to an analysis of system failure.

semaphore: In a DECnet network, a common data structure used to control the exchange of signals between concurrent processes.

sequential access mode: The retrieval or storage of records where a program reads or writes records one after the other in the order in which they appear, starting and ending at any arbitrary point in the file.

sequential file organization: A file organization in which records appear in the order in which they were originally written. The records can be fixed length or variable length. Sequential file organization permits sequential record access and random access by the record's file address. Sequential file organization with fixed length records also permits random access by relative record number.

served device: A device whose local node makes it available to other nodes in the VAXcluster system.

shadow set: One or more compatible physical disk volumes connected together for volume shadowing and represented by a virtual unit. Thus, the term shadow set refers to the physical units *and* the virtual unit.

shadow set member: A physical disk mounted as part of a shadow set. Normally, all shadow set members contain identical data in corresponding logical blocks.

shareable image: An image that has all of its internal references resolved, but must be linked with one or more object modules to produce an executable image. A shareable image cannot be executed. A shareable image file can be used to contain a library of routines. A shareable image can be used to create a global section by the system manager.

shared image: An image that is installed so that multiple users in a system can share the memory pages where the image is loaded.

shared memory: A generic term referring to any memory that can be accessed by two or more concurrent processes. In a VMS symmetric multiprocessing system, a single copy of the VMS operating system resides in memory. Each processor in the system can access this memory, as can any process executing on any processor. See also *multiport memory*.

shell process: A predefined process that the job controller copies to create the minimum context necessary to establish a process.

shrinking the working set: An alternative available to the swapper process to obtain pages in physical memory. The swapper will shrink the size of the working set of selected processes to obtain pages in physical memory. See also *swapping*.

signal: (1) An electrical impulse conveying information. (2) The software mechanism used to indicate that an exception condition was detected.

sink node: A node on which logging sink types, such as a file or console, are actually located.

slave terminal: A terminal that sends and receives I/O from an image and directly from the operating system. It is not possible to enter commands to the command interpreter from a slave terminal.

SLR: See *system length register*.

small process: A system process that has no control region in its virtual address space and has an abbreviated context. Examples are the working set swapper and the null process. A small process is scheduled in the same manner as user processes but must remain resident until it completes execution; that is, it cannot be swapped.

SMP: See *symmetric multiprocessing*.

software context: Information, residing in the control blocks, that describes the software status of a process. Examples of software context are page tables and the user's identification number. See also *software process control block*.

software interrupt: An interrupt generated on interrupt priority levels 1 through 15, which can be requested only by software.

software priority: See *process priority* and *queue priority*.

software process control block (software PCB): The data structure used to contain a process's software context. The operating system defines a software PCB for every process when the process is created. The software PCB includes the following kinds of information about the process: current state, storage address if it is swapped out of memory, unique identification of the process, and address of the process header (which contains the hardware PCB). The software PCB resides in system region virtual address space. It is not swapped with a process.

sorting: The ordering of records in a prescribed sequence.

source file: A text file containing material suitable for translation into an object module by an assembler or compiler. Such files cannot be run or linked.

source program: A program that expresses an algorithm in a programming language such as FORTRAN, COBOL, or assembly language.

source task: The task that initiates a logical link connection request in a task-to-task communication environment.

SP: See *stack pointer*.

spanned record: A record that can cross block boundaries. A spanned record consists of one or more data segments. The position of a segment within the record and the length of the segment is denoted by the segment control word, the first five characters of each segment.

spin lock: In a VMS symmetric multiprocessing system, a semaphore associated with a set of system structures, fields, or registers whose integrity is critical to the performance of a specific operating system task. There are two types of spin lock: static and dynamic. Static spin locks are assembled permanently into the system; the same static spin locks exist in the same memory locations in all VMS multiprocessing systems. A fork lock is a form of static spin lock. Dynamic spin locks are created as required by the I/O configuration of a system; as a result, the set of dynamic spin locks differ from processor to processor. A device lock is a form of dynamic spin lock. See *fork lock* and *device lock*.

spin wait: In a VMS symmetric multiprocessing system, an execution loop performed by a processor attempting to acquire a spin lock already owned by another processor in the system. This activity is also known as a busy wait.

spool queue: The list of files, supplied by processes, that are to be processed by a symbiont. For example, a line printer queue is a list of files to be printed on the line printer.

spooling: The technique of using a high-speed mass storage device to buffer data passing between low-speed I/O devices and high-speed memory. Output spooling is the method by which output to a low-speed peripheral device (such as a line printer) is placed into queues maintained on a high-speed device (such as disk) to await transmission to the low-speed device. Input spooling is the method by which input from a low-speed peripheral (such as the card reader) is placed into queues maintained on a high-speed device (such as disk) to await transmission to a job processing that input.

SPT: See *system page table.*

SSP: See *supervisor mode stack pointer.*

stack: An area of memory set aside for temporary storage or for procedure and interrupt service linkages. A stack uses the last-in/first-out (LIFO) concept. As items are added to ("pushed on") the stack, the stack pointer (SP) decrements. As items are retrieved from ("popped off") the stack, the SP increments.

stack frame: A standard data structure built on the stack during a procedure call, starting from the location addressed by the frame pointer (FP) to lower addresses, and popped off during a return from procedure. Also called call frame.

stack pointer (SP): General register 14 (R14). SP contains the address of the top (lowest address) of the processor-defined stack. Reference to SP accesses one of the five possible stack pointers—kernel, executive, supervisor, user, or interrupt—depending on the value in the current mode and interrupt stack bits in the processor status longword.

start I/O routine: The routine in a device driver that is responsible for obtaining necessary resources (for example, the controller data channel) and activating the device unit.

state: The functions that are currently valid for a given network component. States include line, circuit, local node, module, data terminal equipment (DTE), and logging.

state queue: A list of processes in a particular processing state. The scheduler uses state queues to keep track of processes' eligibility to execute. State queues include processes waiting for a common event flag, suspended processes, and executable processes.

static load balancing: A method of work distribution in which every process in an application is preassigned to a processor during process creation.

status: A display type for the Network Control Program (NCP) commands SHOW and LIST. Status refers to dynamic information about a component that is kept in either the volatile or permanent database.

status code: A longword value that indicates the success or failure of a specific function. For example, system services always return a status code in general register R0 upon completion.

store through: See *write through.*

stream: An access window to a file associated with a record access control block, supporting record operation requests.

stream record format: Property of a file specifying that the data in the file is interpreted as a continuous sequence of bytes, without control information. Stream record format applies to sequential files only.

string: A connected sequence of characters. When a text editor searches for a word or phrase in a text file, it is looking for a string. The character sequence that forms a command is often called a command string.

string search buffer: A storage area used to store a connected sequence of characters being searched for.

strong definition: Definition of a global symbol that is explicitly available for reference by modules linked with the module in which the definition occurs. The linker always lists a global symbol with a strong definition in the symbol portion of the map. The librarian always includes a global symbol with a strong definition in the global symbol table of a library. Contrast with *weak definition.*

strong reference: A reference to a global symbol in an object module that requests the linker to report an error if it does not find a definition for the symbol during linking. If a library contains the definition, the linker incorporates the library module defining the global symbol into the image containing the strong reference.

subdirectory: A directory file, cataloged in a higher-level directory, that lists additional files belonging to the owner of the directory.

subprocess: A subsidiary process created by another process. The process that creates a subprocess is its owner. A process and its subprocesses share a pool of quotas and limits. When an owner process is removed from the system, all its subprocesses (and their subprocesses) are also removed.

subroutine: (1) A subsidiary routine that executes when called by another program. A subroutine is often called repeatedly until a certain condition is met. (2) A routine entered by means of a JSB or BSB instruction. Contrast with *procedure.*

substate: An intermediate circuit state that is displayed for a circuit state display when the Network Control Program (NCP) commands SHOW or LIST are entered.

summary: The default display type for the Network Control Program (NCP) commands SHOW and LIST. A summary includes the most useful information for a component, selected from the status and characteristics information.

supervisor mode: The third most privileged processor access mode (mode 2). The operating system's command interpreter runs in supervisor mode.

supervisor mode stack pointer: The process context stack pointer for supervisor mode.

suspension: A state in which a process is inactive but known to the system. A suspended process becomes active again when another process requests the operating system to resume it. It also becomes active to service executive mode and kernel mode ASTs. Contrast with *hibernation.*

SVA: See *system virtual address.*

swap mode: A process execution state that determines the eligibility of a process to be swapped out of the balance set. If process swap mode is disabled, the process working set is locked in the balance set.

swapper: The process that performs system-wide memory scheduling. The swapper writes modified pages to secondary storage, creates a shell for new processes, shrinks the physical size of inactive processes, removes processes from the balance set, and brings processes waiting for execution into the balance set.

swapping: The method for sharing memory resources among several processes by writing an entire working set to secondary storage (swap out) and reading another working set into memory (swap in). For example, a process's working set can be written to secondary storage while the process is waiting for I/O completion on a slow device. It is brought back into the balance set when I/O completes. Contrast with *paging*.

switch: See *qualifier*.

switched virtual circuit (SVC): A temporary logical association between two DTEs (data terminal equipment) connected to a packet switching data network (PSDN), which is analogous to connection by a dialup line. An SVC is set up only when there is data to transmit and is cleared when the data transfer is complete.

symbiont: A process that transfers record-oriented data to or from a device. For example, an input symbiont transfers data from card readers to disks. An output symbiont transfers data from disks to line printers.

symbiont manager: The function (in the system process called the job controller) that maintains spool queues and dynamically creates symbiont processes to perform the necessary I/O operations.

symbol: An entity that when defined will represent a particular function or entity (for example, a command string, directory name, or file name) in a particular context. See *local symbol, global symbol,* and *universal symbol*.

symbol table: (1) The portion of an executable image that contains the definition of global symbols used by the debugger for images linked with the /DEBUG qualifier. (2) A table in which the DIGITAL Command Language (DCL) places local symbols. DCL maintains a local symbol table for each command level.

symbolic debugger: See *debugger*.

symmetric multiprocessing (SMP): A multiprocessing system configuration in which all processors have equal access to operating system code residing in shared memory and can perform all, or almost all, system tasks.

synchronous backplane interconnect (SBI): The part of the hardware that interconnects the processor, memory controllers, MASSBUS adapters, and the UNIBUS adapter.

synchronous disconnect: The disconnect that occurs when a nontransparent task can issue a call to terminate I/O operations over a logical link without deassigning the channel. Thus, the task can use the channel for subsequent I/O operations with the same or a different remote task.

synchronous record operation: A mode of record processing in which a user program issues a record read or write request and then waits until that request is fulfilled before continuing to execute.

syntax: The particular form of a command, including spelling and the order of qualifiers and parameters. Misspelled words are the most common syntax errors.

SYSTEM: In the context SYSTEM/OWNER/GROUP/WORLD, SYSTEM refers to the group numbers of less than or equal to 10 (octal) that are used by operating system and its controlling users, the system operators, and the system manager.

system address space: See *system space* and *system region.*

system base register (SBR): A processor register containing the physical address of the base of the system page table.

System Communications Services (SCS): A protocol responsible for the formation and breaking of intersystem process connections and for flow control of message traffic over those connections. System services such as the VAXcluster connection manager, and the Mass Storage Control Protocol (MSCP) disk server communicate with this protocol.

system control block (SCB): The data structure in system space that contains all the interrupt and exception vectors known to the system.

system control block base register (SCBB): A processor register containing the base address of the system control block.

system-defined identifier: One of three classes of identifiers. System-defined identifiers are provided by the system to identify groups of users according to their usage of the system. For example, all users who access the system by dialing up receive the DIALUP identifier. See also *identifier.*

system device: The random access mass storage device unit on which the volume containing the operating system software resides.

system dynamic memory: Memory reserved for the operating system to allocate as needed for temporary storage. For example, when an image issues an I/O request, system dynamic memory is used to contain the I/O request packet. Each process has a limit on the amount of system dynamic memory that can be allocated for its use at one time.

system identification register: A processor register that contains the processor type and serial number.

system image: The image that is read into memory from disk when the system is started up.

system length register (SLR): A processor register containing the system page table in longwords.

system manager: The person responsible for the policies, procedures, and the daily operation of a computer system. VMS system management tasks are sometimes performed by more than one person and might include responsibilities for cluster management.

system page table (SPT): The data structure that maps the system region virtual addresses, including the addresses used to refer to the process page tables. The SPT contains one page table entry (PTE) for each page of system region virtual memory. The physical base address of the SPT is contained in the system base register.

system password: A password required by a terminal before login can be initiated at the terminal.

system queue: A queue used and maintained by operating system procedures. See also *state queue*.

system region: The third quarter of virtual address space (the S0 region); the lowest-addressed half of system space. Virtual addresses in the system region are shareable between processes. Some of the data structures mapped by system region virtual addresses are system entry vectors, the system control block (SCB), the system page table (SPT), and process page tables.

system services: A set of routines (part of the VMS operating system and used by images) to control resources, allow process communication, control I/O, and to perform other such operating system functions.

system space: The highest-addressed half of virtual address space. See also *system region*.

system virtual address (SVA): A virtual address identifying a location in system space.

system virtual space: See *system space*.

target node: The node that receives a memory image from another node during a downline load; a node that loops back a test message.

target task: The task that receives and processes a logical link connection request in a task-to-task communication environment.

task: (1) In networking, an image running in the context of a process. (2) In transaction processing, a unit of work that performs a specific function and that a terminal user can select for processing. Tasks implement the business unit of work. For example, a task might book an airline reservation, update a parts inventory, or debit an account.

task specifier: Information provided to DECnet–VAX software that enables it to complete a logical link connection to a remote task. This information includes the name of the remote node on which the target task runs and the name of the task itself.

terminal: The general name for peripheral devices that have keyboards and video screens or printers. Under program control, a terminal enables users to type commands and data on the keyboard and receive messages on the video screen or printer. Examples of terminals are the LA36 DECwriter hard-copy terminal, the VT100 video display terminal, and the VT240 series video terminal.

Terminal Fallback Facility (TFF): A facility that provides table-driven character conversion for terminals.

terminal server: A communications device that connects terminals, modems, or printers to an Ethernet network.

text buffer: A text editor's storage area for text (either terminal input or file input).

TFF: See *Terminal Fallback Facility.*

tied account: See *captive account.*

tightly coupled system: A multiprocessing system configuration consisting of multiple processors sharing a single copy of the operating system. These processors are connected so that they can communicate and share data. Contrast with *loosely coupled system.*

timeout: The expiration of the time limit in which a device is to complete an I/O transfer. The driver's wait for interrupt request specifies the timeout limit.

timer: Two system interrupt service routines: one (the hardware clock) that maintains the time of day and the date and another (the software timer) that scans for device timeouts and performs time-dependent scheduling upon request.

time sharing: A method of allocating computer time in which each process gets use of the CPU in turn. See also *real-time processing.*

TP monitor: See *Transaction Processing Monitor.*

traceback: The system facility that examines and displays the status of the user call stack when an image terminates abnormally.

track: A collection of blocks at a single radius on one recording surface of a disk.

transaction: An exchange of information between a user and a database or file. The operations in a transaction are treated as a group; either all of them are completed at once or none of them is completed. A transaction is a complete process from input to output, regardless of the number of events in between.

transaction processing: A technique for organizing multiple-user, high-volume, on-line applications that provides control over user access and updates of data.

Transaction Processing Monitor (TP monitor): The master control executive for controlling a transaction processing system. The TP monitor includes a collection of software that schedules operations, allocates resources, and controls the operation of user and system programs which perform I/O, and updates files or databases.

A TP monitor is designed to handle medium-to-large scale transaction processing systems that require high levels of availability, performance, and productivity.

transfer address: The address of the location containing a program entry point (the first instruction to execute).

translation buffer: An internal processor cache containing translations for recently used virtual addresses.

translation-not-valid fault: See *page fault.*

transparent: The performance of functions not visible to the user. For example, when a command is entered, the command interpreter parses the command string and invokes the appropriate system software. The user sees only the result of the processing, not the processing itself.

trap: An exception condition that occurs at the end of the instruction that caused the exception. The program counter saved on the stack is the address of the next instruction that would normally have been executed. All software can enable and disable some of the trap conditions with a single instruction.

trap enables: Three bits in the processor status word (PSW) that control the processor's action on certain arithmetic exceptions.

tributary: A physical termination on a multipoint circuit that is not a control station.

tributary address: A numeric address that the control station uses to poll a tributary.

Trojan horse program: A program that gains access to otherwise secured areas through its pretext of serving one purpose when its real intent is far more devious and potentially damaging.

turnkey account: See *captive account.*

two's complement: A binary representation for integers in which a negative number is one greater than the bit complement of the positive number.

two-way associative cache: A cache organization that has two groups of directly mapped blocks. Each group contains several blocks for each index position in the cache. A block of data from main memory can go into any group at its proper index position. A two-way associative cache is a compromise between the extremes of fully associative and direct mapping cache organizations that takes advantage of the features of both.

type-ahead: A terminal handling technique where the user can enter commands and data while the software is processing a previously entered command. The commands typed ahead are not echoed on the terminal until the command processor is ready to process them. They are held in a type-ahead buffer.

UAF: See *user authorization file.*

UBA: See *UNIBUS adapter.*

UBI: See *UNIBUS interconnect.*

UCB: See *unit control block.*

UETP: See *User Environment Test Package.*

UFD: See *user file directory.*

UIC: See *user identification code.*

unblocked record: A record that is contained in a single block. No other records or parts of records are contained in that block.

UNIBUS adapter (UBA): An interface between the backplane interconnect to the VAX-11/780 and the UNIBUS.

UNIBUS interconnect (UBI): An interface between the backplane interconnect to the VAX-11/750 and the UNIBUS.

unit: See *device unit.*

unit control block (UCB): A structure in the I/O database that describes the characteristics of and current activity on a device unit. The unit control block also holds the fork block for its unit's device driver; the fork block is a critical part of a driver fork process. The UCB also provides a dynamic storage area for the driver.

unit initialization routine: The routine that readies controllers and device units for operation. Controllers and device units require initialization after a power failure and during the driver loading procedure.

unit record device: A device such as a card reader or line printer.

universal symbol: A global symbol in a shareable image that can be used by modules linked with that shareable image. Universal symbols are typically a subset of all the global symbols in a shareable image. When creating a shareable image, the linker ensures that universal symbols remain available for reference after symbols have been resolved.

unwind the call stack: To remove call frames from the stack by tracing back through nested procedure calls using the current contents of the frame pointer (FP) register and the FP register contents stored on the stack for each call frame.

upline dump: A DECnet–VAX function that allows an adjacent node to dump its memory to a file on a VMS system.

urgent interrupt: An interrupt received on interrupt priority levels 24 through 31. These can be generated only by the processor for the interval clock (in certain VAX systems), serious errors, and power failure.

user authorization file (UAF): A file containing an entry for every user that the system manager authorizes to gain access to the system. Each entry identifies the user name, password, default account, user identification code (UIC), quotas, limits, and privileges assigned to individuals who use the system.

User Environment Test Package (UETP): A collection of routines that verify that the hardware and software systems are complete, properly installed, and ready to use.

user file directory (UFD): A file that briefly catalogs a set of files stored on disk or tape. The directory includes the name, type, and version number of each file in the set. It also contains a unique number that identifies that file's actual location and points to a list of its file attributes. See also *directory*.

user identification code (UIC): A 32-bit value assigned to users and to files, global sections, common event flag clusters, and mailboxes that specifies the type of access (read and/or write access and, in the case of files, execute and/or delete access) available to the SYSTEM, OWNER, GROUP, and WORLD. A UIC has two formats: numeric and alphanumeric. The numeric UIC consists of a group identifier and a member identifier separated by a comma and enclosed within square brackets. These identifiers may appear as alphanumeric characters. The alphanumeric UIC consists of a member name and, optionally, a group name.

user mode: The least privileged processor access mode (mode 3). User processes and Run-Time Library Procedures run in user mode.

user mode stack pointer: The process context stack pointer for user mode.

user name: The name that a user types on a terminal to log in to the system. See also *password.*

user number: See *member number.*

user password: See *password.*

user privileges: The privileges granted a user by the system manager. See *process privileges.*

USP: See *user mode stack pointer.*

utility: A program that provides a set of related general-purpose functions, such as a program development utility (an editor, a linker), a file management utility (file copy or file format translation program), or operations management utility (disk quotas, diagnostic program).

value return registers: The general registers R0 and R1 used by convention to return function values. These registers are not preserved by any called procedures. They are available as temporary registers to any called procedure. All other registers (R2 through R11, AP, FP, SP, PC) may be preserved across procedure calls.

variable-length bit field (VBF): A set of 0 to 32 contiguous bits located arbitrarily with respect to byte boundaries. A variable bit field is specified by four attributes: the address A of a byte; the bit position P of the starting location of the bit field with respect to bit 0 of the byte at address A; the size, in bits, of the bit field; and an indication whether the field is signed or unsigned.

variable-length record format: A file format in which records may be of different lengths.

variable-length with fixed-length control field (VFC) record format: A file format in which records of variable length contain an additional fixed-length control area. The control area may be used to contain file line numbers and print format controls.

VAXBI: The part of the VAX 8200/8250/8300/8350 hardware that connects I/O adapters with memory controllers and the processor. In a VAX 8530/8550/ 8700 /8800 system, the part of the hardware that connects I/O adapters with the bus that interfaces with the processor and memory.

VAX: Virtual Address Extension.

VAXcluster configuration: A highly integrated organization of VMS systems that communicate over a high-speed communications path. VAXcluster configurations have all the functions of single node systems, plus the ability to share CPU resources, queues, and disk storage. Like a single-node system, the VAXcluster configuration provides a single security and management environment. Member nodes can share the same operating environment or serve specialized needs.

VAXclusters Phase II: See *Phase II VAXcluster configuration.*

VBF: See *variable-length bit field.*

VBN: See *virtual block number.*

VCB: See *volume control block.*

vector: (1) A storage location (known as an interrupt or exception vector) that contains the starting address of a procedure to be executed when a given interrupt or exception occurs. The system defines separate vectors for each interrupting device controller and for classes of exceptions. Each system vector is a longword. (2) For the purposes of exception handling, users can declare up to two software exception vectors (primary and secondary) for each of the four access modes. Each vector contains the address of a condition handler. (3) A one-dimensional array.

version number: (1) The field following the file type in a file specification. It begins with a semicolon or period and is followed by a number which generally identifies it as the latest file created of all files having the identical file specification. (2) The number used to identify the revision level of program.

VFC: See *variable-length with fixed-length control field record format.*

video terminal: A terminal with a video screen for accepting output. See *terminal.*

virtual address: A 32-bit integer identifying a byte location in the process, control, and system regions of virtual memory. The memory management hardware translates a virtual address to a physical address. The term virtual block number (VBN) refers to the address used to identify a virtual block on a mass storage device. See also *virtual address space.*

virtual address space: The set of all possible virtual addresses that an image executing in the context of a process can use to identify the location of an instruction or data. The VMS virtual address space seen by the programmer is a linear array of 4,294,967,296 (2^{32}) byte addresses. The VMS system distinguishes between the physical memory required by a process and the virtual address space that the process defines. A process's virtual address space is the range of memory locations that the process can address.

virtual block number (VBN): The file-relative address of a block on a mass storage device. The first block in a file is always virtual block 1. Contrast with *logical block number* and *physical block number.*

virtual circuit: An association between two DTEs (data terminal equipment) connected to a packet switching data network (PSDN), whereby they are able to interact as if a specific circuit were dedicated to them throughout the transmission. In reality a logical connection is established, the actual physical circuits being allocated according to route availability, overload conditions, and so on.

virtual disk: A dedicated portion of disk space allocated for storing console files when performing save or restore operations on console media. Virtual disks eliminate the need to create a disk or directory for the console media. Also, because the command procedure that handles the task invokes the Exchange Utility, the conversion of the file format from RT11 to Files–11 is done automatically.

virtual I/O functions: A set of I/O functions that must be interpreted by an ancillary control process.

virtual memory: The set of storage locations in physical memory and on disk that is referred to by virtual addresses. From the programmer's viewpoint, the secondary storage locations appear to be locations in physical memory. The size of virtual memory in any system depends on the amount of physical memory available and the amount of disk storage used for nonresident virtual memory.

virtual page number (VPN): The virtual address of a page of virtual memory.

virtual unit: A software-created representation of a group of disks that compose a shadow set. Most users and system resources communicate with the virtual unit as if it were a physical device and disk volume. A Hierarchical Storage Controller (HSC) then manages I/O to the physical disks that are bound together as a shadow set.

VMS: Virtual Memory System.

VMS Lock Manager: A VMS facility that mediates lock requests.

volatile database: A memory image that contains information about network management components.

volume: A mass storage media such as a disk pack or reel of magnetic tape. The volume is the largest logical unit of the file structure.

volume control block (VCB): A data structure that contains the information needed to control access to a volume. It is created when the volume is mounted.

volume set: The file-structured collection of data residing on one or more mass storage media.

volume shadowing: A cooperative effort between the VMS operating system and a Hierarchical Storage Controller (HSC) to record data on more than one volume. This duplication of data provides greater data availability and faster data accessibility.

VPN: See *virtual page number.*

waiting: Becoming inactive. A process enters a process wait state when the process suspends itself, hibernates, or declares that it needs to wait for an event, resource, mutex, and so forth.

wait for interrupt request: A request made by a driver's start I/O routine after it activates a device. The request causes the driver fork process to be suspended until the device requests an interrupt or the device times out.

waking: Activating a hibernating process. A hibernating process can be awakened by a time-scheduled wake-up call.

WCB: See *window control block.*

WCS: See *writeable control store.*

WDCS: See *writeable diagnostic control store.*

weak definition: Definition of a global symbol that is not explicitly available for reference by modules linked with the module in which the definition occurs. The librarian does not include a global symbol with a weak definition in the global symbol table of a library. Weak definitions are often used when creating libraries to identify those global symbols that are needed only if the module containing them is otherwise linked with a program. Contrast with *strong definition.*

weak reference: A reference to a global symbol that requests the linker not to report an error or search the default library's global symbol table to resolve the reference if the definition is not in the modules explicitly supplied to the linker. Weak references are often used when creating object modules to identify those global symbols that may not be needed at run time.

wildcard character: A nonalphanumeric character such as an asterisk or percent sign that is used within, or in place of, a file name, file type, directory name, or version number in a file specification to indicate "all" for the given field.

window: (1) See *mapping window*. (2) A range of packets authorized for transmission across an X.25 data terminal equipment/data circuit-terminating equipment (DTE/DCE) interface. The lowest sequence number in the window is referred to as the lower window edge (0 when the virtual circuit is just established). The packet send sequence number of the first data packet not authorized to cross the interface is the value of the upper window edge (that is, the lower window edge plus the window size).

window control block: A data structure that stores access control information for a file. It is created when a file is accessed on a volume. It is deleted when the file is closed.

word: Two contiguous bytes (16 bits) starting on an addressable byte boundary. Bits are numbered from the right, 0 through 15. A word is identified by the address of the byte containing bit 0. When interpreted arithmetically, a word is a two's complement integer with significance increasing from bit 0 to bit 14. If interpreted as a signed integer, bit 15 is the sign bit. The value of the integer is in the range –32,768 to 32,767. When interpreted as an unsigned integer, significance increases from bit 0 through bit 15 and the value of the unsigned integer is in the range 0 through 65,535.

working set: The set of pages in process space to which an executing process can refer without incurring a page fault. The working set must be resident in memory for the process to execute. The remaining pages of that process, if any, are either in memory and not in the process working set or they are on secondary storage.

working set swapper: See *swapper*.

WORLD: In the context SYSTEM/OWNER/GROUP/WORLD, WORLD refers to all users, including the system operators, the system manager, and users both in an owner's group and in any other group.

writing: The act or capability of an image to send data. For example, when a PRINT command is entered, the specified file is read from wherever it is stored and then written to the line printer.

write access type: The specified operand of an instruction or procedure is only written during that instruction's or procedure's execution.

write allocate: A cache management technique in which cache is allocated on a write miss as well as on the usual read miss.

write back: A cache management technique in which data from a write operation to cache is copied into main memory only when the data in cache must be overwritten. This results in temporary inconsistencies between cache and main memory. Contrast with *write through*.

write miss: An event in which a write operation cannot be serviced by the processor's hardware cache.

writeable control store: A hardware component of certain VAX processors that allows a customer to customize selected machine functions.

writeable diagnostic control store: A hardware component of certain VAX processors that contains basic instruction microcode and diagnostic microcode.

write through: A cache management technique in which data from a write operation is copied in both cache and main memory. Cache and main memory data are always consistent. Contrast with *write back*.

X.3: A CCITT recommendation that specifies the Packet Assembly/Disassembly (PAD) facility in a public data network.

X.25: A CCITT recommendation that specifies the interface between DTEs (data terminal equipment) and DCEs (data circuit-terminating equipment) for equipment operating in the packet mode on public data networks.

X.28: A CCITT recommendation that specifies the data terminal equipment/data circuit-terminating equipment (DTE/DCE) interface for a start-stop mode DTE accessing the Packet Assembly/Disassembly (PAD) facility in a public data network situated in the same country.

X.29: A CCITT recommendation that specifies procedures for the exchange of control information and user data between a packet-mode DTE (data terminal equipment) and a Packet Assembly/Disassembly (PAD) facility.

X.29 terminal: A terminal connected to a Packet Assembly/Disassembly (PAD) facility.

XAB: See *extended attribute block*.

XQP: See *extended QIO processor*.

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