Glossary

AAL ATM Adaptation Layer. A collection of standardised protocols that provide services to higher layers by adapting user traffic to a cell format.
The AAL is divided into the Convergence Sublayer (CS) and the Segmentation and Reassembly (SAR) sublayer.

AAL1 AAL Type 1. Protocol standard used for the transport of Constant Bit Rate (CBR) traffic (for example, audio and video) and for emulating TDM-based circuits (for example, DS1, E1).

AAL2 AAL Type 2. Protocol standard for supporting Variable Bit Rate connections which are time-dependent (VBR-RT). Examples of these are packetised video and audio.

AAL3/4 AAL Type 3 and 4. Protocol standard for supporting both connectionless and connection-oriented Variable Bit Rate (VBR) traffic. Used also to support SMDS.

AAL5 AAL Type 5. Protocol standard for supporting the transport of Lightweight Variable Bit Rate (VBR) traffic and signalling messages. Also used to support Frame Relay services.

ABR Available Bit Rate. One of the two 'best effort' service types (the other one is UBR), where the network gives no absolute guarantee of cell delivery. However the network guarantees a minimum bit rate for user transmission. An effort is also made to keep cell loss as low as possible.

Access Rate The bit per second (bps) rate at which a user can transmit over the network's lines.

ACK Acknowledgement. A message that acknowledges the reception of a transmitted packet. ACKs can be separate packets or piggybacked on reverse traffic packets.

ACR Allowed (or Available) Cell Rate. The available bandwidth, in cells per second for a given QoS class. The available bandwidth is dynamically controlled by the network.

Adapter Card A hardware card that provides the interface between the computer (DTE) and the physical network circuit (see also NIC).

AIR Additive Cell Rate. The cell rate a source can transmit after increasing its rate by the RIF.

AIS Alarm Indication Signal. One of the OAM function types used for fault management (see also CC, RDI).

ANSI American National Standards Institute. A US technology standards organisation.

API Application Programming Interface. A set of functions used by an application program as a means to provide access to a system's (for example, operating, communications) capabilities.

ARP Address Resolution Protocol. A TCP/IP protocol used for resolving local network addresses by mapping a physical address (i.e. a MAC address) to an IP address.

Asynchronous Asynchronous transmission. A method of acquiring synchronisation on a per-byte basis. Start and stop bits are used as delimiters.

Asynchronous transfer An efficient method of transmitting information where time slots are used on a demand basis (ATDM, ATM) rather than on a time basis (TDM, STM).

ATDM Asynchronous Time-Division Multiplexing. An asynchronous and intelligent TDM where time slots are allocated on demand (dynamically) to the users.

ATMMIB ATM MIB. IETF-defined Management Information Base (MIB) for managing VP/ VC links and ATM PVC-supported services and interfaces.

ATM Asynchronous Transfer Mode. A broadband switching and multiplexing, connection-oriented, high-performance and cost-effective integrated technology for supporting B-ISDN services (i.e. multimedia). Since no clock control is necessary it is called asynchronous (see also STM). Information is transmitted at very high rates (up to hundreds of Mbps) in fixed-size packets called cells. Traffic streams are distinguished and supported according to different QoS classes.

ATM CSU/DSU ATM Channel/Data Service Unit. A device that converts information bits (for example, bits transmitted over the telephony network) or frame-based information into (or from) a stream of ATM cells (see CSU, DSU, DXI).

ATM Forum Originally founded by a group of vendors and telecommunication companies, this formal standards body is comprised of various committees responsible for making recommendations and producing implementation specifications.

ATM Layer The second layer of the ATM protocol stack model. This layer constructs and processes the ATM cells. Its functions also include Usage Parameter Control (UPC) and support of QoS classes.

ATM-SAP ATM-Service Access Point. The physical interface at the boundary between the AAL and the ATM layer (see also SAP, PHY-SAP).

Average Cell Rate The mean number of cells that the source can inject into a network over a given virtual connection (VC).

Average Cell Transfer Delay The arithmetic average of a number of cell transfer delays (CTD). See also Mean Cell Transfer Delay.

BASize Buffer Allocation Size. A 1-byte field in the CPCS-PDU header that indicates to the receiving end the buffer space that needs to be reserved for reassembling the CPCS-PDU.

BEC Backward Error Correction. An error-correction scheme where the sender retransmits, on the basis of the feedback from the receiver, any data found to be in error.

Best Effort A QoS class in which no specific traffic parameters and no absolute guarantees are provided. 'Best effort' includes UBR and ABR (see also service types).

B-ICI Broadband Inter-Carrier Interface. An interface that supports service connections (such as CRS, CES, SMDS, FR) across public ATM networks and/ or carriers.

B-ISDN Broadband Integrated Services Digital Network. A protocol platform introduced by the ITU-T to support the integrated, high-speed transmission of data, audio and video in a seamless fashion. ATM emerged as a suitable transport standard for B-ISDN.

BOM Beginning of Message. A PDU that constitutes the beginning of a message.

BRI Basic Rate Interface. An ISDN service specification that provides two 64-kbps data B-channels and one 16-kbps control D-channel, all sharing the same physical medium.

BT Burst Tolerance. Burst tolerance (measured in seconds) is equivalent to MBS (measured in cells). Burst tolerance, which is used only for VBR, is employed as a measure (leaky bucket parameter) for conformance checking of the SCR.

Burstiness A source traffic characteristic that is defined as the ratio of the peak cell rate (PCR) to the average cell rate. It is a measure of the inter-cell spacing (see also MBS).

BUS Broadcast and Unknown Server. A server that forwards multicast, broadcast and unknown-destination address traffic to the attached LECs.

BW Bandwidth. Transmission capacity of a communications medium.

CAC Connection Admission Control. An ATM function which determines whether a virtual circuit (VC) connection request should be accepted or rejected.

CAT-3 Category 3 Unshielded Twisted. A type of UTP commonly used with ATM interfaces for cell transmission at low speeds, 25-50 Mbps and at distances up to 100 meters.

CAT-5 Category 5 Unshielded Twisted Pair. A type of UTP commonly used with ATM interfaces for higher-speed cell transmission (more than 50 Mbps)

CBR Constant (or Continuous) Bit Rate. One of the five ATM classes of service. CBR supports the transmission of a continuous bit-stream of information where traffic, such as voice and video, needs to meet certain QoS requirements (see also QoS Classes).

CC Continuity Cell. A cell used periodically to check whether a connection is idle or has failed (for example, at the cross-connect nodes), in order to guarantee a continuation in the flow of the information cells. Continuity checking is one of the OAM function types used for fault management (see also AIS, RDI).

CCITT Consultative Committee on International Telegraphy and Telephony. A standards and specifications body whose published recommendations cover a wide spectrum of areas which include definition of terms, basic principles and characteristics, protocol design, description of models and other specifications. Currently known as ITU-T.

CCR Current Cell Rate. A field in the RM cell header that indicates the current complying cell rate a user can transmit over a virtual connection (VC).

CDV Cell Delay Variation. A QoS parameter that measures the difference between a single cell's transfer delay (CTD) and the expected transfer delay. It gives a measure of how closely cells are spaced in a Virtual Circuit (VC). CDV can be introduced by ATM multiplexers (MUXs) or by switches.

CDVT Cell Delay Variation Tolerance. Used in CBR traffic. CDVT specifies the acceptable tolerance of the CDV (jitter).

Cell Basic ATM transmission unit. It is a 53-byte packet, consisting of a 5-byte header and a 48-byte payload. User traffic is segmented into cells at the source and reassembled at the destination.

Cell header The 5-byte ATM cell header contains control information regarding the destination path and flow control. More specifically it contains the following fields: GFC, VPI, VCI, PT, CLP and HEC.

Cell Layer Same as ATM Layer.

CER Cell Error Rate. A QoS parameter that measures the fraction of transmitted cells that are erroneous (that have errors when they arrive at the destination).

CES Circuit Emulation Service. An ATM-provided class of service, where TDM-type, constant-bit-rate (CBR) circuits are emulated by the AAL1.

CI Congestion Indication. A bit in the RM cell to indicate congestion (it is set by the destination if the last cell received was marked).

CIF Cell Information Field. The payload (48 bytes) of an ATM cell.

CIR Committed Information Rate. A term used in Frame Relay. CIR defines the information rate the network is committed to providing to the user, under any network conditions.

Circuit emulation A virtual-circuit (VC) service offered to end-users where the characteristics of an actual, digital bit-stream (for example, video traffic) line are emulated (for example, a 2 Mbps or 45 Mbps signal).

Classical IP IETF-defined protocols for developing IP over ATM networks so that common IP applications (for example, FTP, Telnet, SMTP, SNMP) can be supported in an ATM environment. The main issues in the transport of IP over ATM are packet encapsulation and address resolution.

CLP Cell Loss Priority. A 1-bit field in the ATM cell header that corresponds to the loss priority of a cell. Lower priority (CLP = 1) cells can be discarded under congestion situations.

CLR Cell Loss Ratio. A QoS parameter that gives the ratio of the lost cells to the total number of transmitted cells.

CMR Cell Misinsertion Rate. A performance measure that is defined as the number of misinserted cells (those that arrive from the wrong source) per (virtual) connection second.

CMIP Common Management Information Protocol. An ITU-T-defined management interface standard that can support administration, maintenance and operation information functions (see also OAM&P).

CO Central Office. Premises of a carrier service provider where customer lines (i.e. telephone lines) are multiplexed and switched to other COs.

Connection-oriented See Connection-oriented Network.

Connectionless Network Communications service where packets are transferred from source to destination without the need of a pre-established connection. Examples are IP and SMDS (see also datagram).

Connectionoriented Network Communications service where an initial connection between the end points (source and destination) has to be set up. Examples are ATM and Frame Relay (see also virtual circuit VC).

Congestion Control A resource and traffic management mechanism to avoid and/or prevent excessive situations (buffer overflow, insufficient bandwidth) that can cause the network to collapse. There are various congestion control methods (see also flow control).

COM Continuation of Message. A PDU that is part of a message.

COS Class of Service. See QoS Classes.

CPCS Common Part Convergence Sublayer. Part of the AAL convergence sublayer (CS). It has always to be present in the AAL implementation. Its task is to pass primitives to the other AAL sublayers (SAR, SSCS). It supports the functions of the standardised Common Part AALs: AAL1, AAL3/4 and AAL5.

CPE Customer Premises Equipment. Computer and communications equipment (hardware and software) used by a carrier's customer and located at the customer's site (see also DTE).

CPI Common Part Indicator. A one-byte field in the header of the CPCS-PDU in AAL3/4. The CPI indicates the number of bits the BASize field contains.

CRC Cyclic Redundancy Check. A bit-error detection technique that employs a mathematical algorithm, which calculates on the basis of the transmitted bits, a value which it attaches to the information bits in the same packet. The receiver, using the same algorithm, recalculates that value and compares it to the value received. If the two values do not agree the transmitted packet is then considered to be in error.

CRM Cell Rate Margin. A measure of the residual useful bandwidth for a given QoS class, after taking into account the SCR.

CRS Cell Relay Service. A bearer service offered to the end-users by an ATM network that delivers (transports and routes) ATM cells.

CS Convergence Sublayer. The upper half of the AAL. CS is divided into two sublayers, the Common Part (CPCS) and the Service Specific (SSCS). It is service dependent and its functions include manipulation of cell delay variation (CDV), source clock frequency recovery, and forward error correction (FEC). Though each AAL has its own functions, in general the CS defines the services and functions needed for conversion between ATM and non-ATM protocols (see also SAR).

CSF Cell Switch Fabric. See Switch Fabric.

CS-PDU Convergence Sublayer Protocol Data Unit. The PDU used at the CS for passing information between the higher layers and the SAR, where the information is converted into cells.

CSR Cell Missequenced Ratio. A performance measure that is defined as the number of missequenced cells (those that arrive in the wrong order) per (virtual) connection second.

CSU Channel Service Unit. Equipment at the user end that provides an interface between the user and the communications network. CSU can be combined with DSU in the same device (see DCE)

CTD Cell Transfer Delay. A QoS parameter that measures the average time for a cell to be transferred from its source to its destination over a virtual connection (VC). It is the sum of any coding, decoding, segmentation, reassembly, processing and queuing delays.

Datagram A packet transport mode where packets are routed independently and may follow different paths. Thus there is no guarantee of sequence delivery (see also VC)

DCE Data Circuit-terminating Equipment. or Data Communications Equipment. Device at the user end, typically a modem or other communications device. The DCE acts as an access point to the transmission medium.

DQDB Distributed Queue Dual Bus. The IEEE 802.6 standard is a MAN protocol based on 53-byte packets. DQDB can support connectionless and connection-oriented, isochronous integrated services. It is implemented as two unidirectional buses configured in a physical ring topology.

DS-0 Digital Signal 0. Physical interface for digital transmission at the rate of 64 kbps.

DS-1 Digital Signal 1. Physical interface for digital transmission at the rate of 1.544 Mbps. Also known as a T-1 standard, DS-1 can simultaneously support 24 DS-0 circuits.

DS-2 Digital Signal 2. Physical interface for digital transmission at the rate of 6.312 Mbps.

DS-3 Digital Signal 3. Physical interface for digital transmission at the rate of 44.736 Mbps.

DSU Data Service Unit. Equipment at the user end that acts as a telephony-based interface between low-rate (for example, 56 kbps) services and higher rate circuits.

DTE Data Terminal Equipment. The host computer (PC or workstation) that provides the end-user with access to a communications network. The DTE is connected to a DCE which performs signalling (see also CPE).

DXI Data Exchange Interface. A frame-based ATM interface between a DTE (such as a router or a local switch) and a DCE. DXI interfaces to the ATM UNI and has been chosen by the ATM Forum as an affordable solution for providing ATM capabilities over WAN.

E-1 European Digital Signal 1. European standard for digital physical interface at 2.048 Mbps.

E-3 European Digital Signal 3. European standard for digital physical interface at 34.368 Mbps. It can simultaneously support 16 E-1 circuits.

E-4 European Digital Signal 4. European standard for digital physical interface at 139.264 Mbps.

E.164 An 8-byte address format defined by the ITU-T. In ATM E.164 is typically used in public networks and is provided by the telecommunication carriers, while 20-byte NSAP format addresses are used within private networks.

EFCI Explicit Forward Congestion Indication. A 1-bit field in the PTI that indicates whether congestion at an intermediate node has been experienced. The EFCI bit is set when, for example, a buffer threshold has been exceeded.

ELAN Emulated LAN. A LAN, with an ATM backbone, which is running LAN emulation, is known as an emulated LAN. See LAN Emulation.

ENR Enterprise Network Round-table. An ATM Forum-associated group of ATM users to provide feedback on ATM-related issues and also present the users with completed interoperable capabilities and functionality.

ER Explicit Rate. An RM cell header field that specifies the cell rate a user should use for transmission over a virtual connection (VC), as it is dictated by the RM (see also CCR).

ETSI European Telecommunications Standards Institute. European body that corresponds to ANSI. ETSI is involved in providing and adapting standards for European telecommunications.

FDDI Fibre Distributed Data Interface. An ANSI-defined standard for implementing a high-speed (100 Mbps) LAN over fibre.

FDM Frequency-Division Multiplexing. A technique that allows for the channel bandwidth of a circuit to be subdivided into many little channels (one per traffic stream).

FEC Forward Error Correction. An error correction technique where there are no retransmissions and, therefore, the receiver is responsible for correcting any errors in the packets.

Flow Control A method used for congestion avoidance and traffic regulation in networking. There are three techniques: window-based control, where a sliding window is used to determine how many cells can be transmitted during a predefined period; rate-based control, where the rate at which the source can transmit is monitored and controlled; and credit-based control, where a source can transmit a cell if there is a credit available. CAC is also part of the flow control.

Forum In this case it is the ATM Forum.

FR Same as Frame Relay.

Frame Relay A packet-switching technology used to provide very reliable packet delivery over virtual circuits (VC). Some of the concepts used in Frame Relay have been incorporated in ATM networks.

FRM Fast Resource Management. A form of network management for allocating resources (buffers, bandwidth) dynamically.

FTP File Transfer Protocol. A protocol used for transferring files between different machines across a network.

Gbps Gigabits per second. Transmission speed or rate of a thousand million bits per second.

GCRA Generic Cell Rate Algorithm. A reference model proposed by the ATM Forum for defining cell-rate conformance in terms of certain traffic parameters. It is usually referred as the Leaky Bucket algorithm (see also Traffic Shaping).

GFC Generic Flow Control. A 4-bit field in the ATM cell header used to support multiplexing functions. Its default value is '0000' when the GFC protocol is not enforced. The GFC mechanism is intended to support simple flow control in ATM connections.

GFR Guaranteed frame rate (GFR) is a service category. Its aim is to carry entire frames, such as IP or Frame Relay frames, across the ATM network. This is in contrast to other service categories which deliver only a specified cell rate, GFR delivers a specified frame rate.

GUI Graphical User Interface.

HEC Header Error Check or Header Error Control. A 1-byte field in the cell header used for the header error correction and detection. HEC is quite significant because of the information contained in the header.

HOL Head-of-Line. The head position in a buffer (i.e. inside a switch). A blocking phenomenon, associated with the HOL, refers to the fact that cells in the queue have to wait for the HOL cell to be processed first. This could lead to important traffic (e.g. CBR) being queued behind less important traffic (e.g. VBR-NRT).

HSSI High Speed Serial Interface. An interface between CSU/ DSU and DXI.

ICR Initial Cell Rate. The rate that a source is allowed to start up at following an idle period. It is established at connection set-up and is between the MCR and the PCR.

IE Information Element

IEEE Institute of Electrical and Electronic Engineers. A standards and specification organisation with extensive activities in the areas of computers and electronics.

IETF Internet Engineering Task Force. A body which was initially responsible for developing specifications required for the interoperable implementation of IP. One of the issues IETF has been focusing on is the implementation of Classical IP over ATM.

IISP Interim Interswitch Signalling Protocol. A protocol that uses UNI-based signalling for switch-to-switch communication (see also NNI).

ILMI Interim Local Management Interface. An ATM Forum-defined Network Management System (NMS), based on SNMP, that can provide configuration, performance and fault management information concerning virtual circuit (VC) connections available at its UNI (public and private). It operates over AAL3/4 and AAL5 and will be eventually replaced once it has been standardised by ITU-T.

IME The ILMI requires a management entity at each end of the interface. The UNI Management Entity (IME) acts as the server to the network management station client, and performs all necessary communications tasks via AAL5 and ATM cells. The IME also controls access to the MIB.

IP Internet Protocol. A networking protocol that provides a connectionless (datagram) service to the higher transport protocol. IP is responsible for discovering and maintaining topology information and for routing packets across homogeneous or heterogeneous networks. Combined with TCP, it is commonly known as the TCP/IP platform.

IPX A protocol similar to IP that was developed by Novell.

ISDN Integrated Services Digital Network. An early, CCITT-adopted protocol reference model aimed at providing a ubiquitous, end-to-end, interactive, digital service for data, audio and video.

Isochronous Refers to the fact that a time slot can be divided into equal-size mini slots allocated to different channels for synchronous transmission of information (used in DQDB).

ITU-T International Telecommunications Union-Telecommunications Standards Sector. A formal international standards, specifications and recommendations body, formerly known as CCITT. ITU-T is part of the International Telecommunications Union (ITU) founded in 1948 and sponsored by the UN to promote telephone and telegraphy issues.

IXC Inter-Exchange Carrier. A public switching network carrier that provides connectivity across and between LATAs.

Jitter The Cell Delay Variation (CDV).

JPEG Joint Photographic Experts Group. A standard developed for encoding, transmitting and decoding still images.

Kbps Kilobits per second. Transmission speed or rate of one thousand bits per second.

LAN Local Area Network. A high-speed network that interconnects PCs, terminals, workstations, servers, printers and other peripherals over short distances (usually within the same floor or building). Various LAN standards have been developed, with Ethernet as the most widely used.

LANE Same as LAN Emulation.

LAN Emulation A technique that specifies the interfaces and protocols needed for providing LAN-supported functionality and connectivity in an ATM environment, so that legacy protocols can be interoperable with the ATM protocols, interfaces and devices.

LATA Local Access and Transport Area. Geographically defined telecommunication areas, within which a local carrier can provide communications services (see also LEC, IXC).

Leaky Bucket A flow-control algorithm, where cells are monitored to see if they comply with The connection parameters. Non-conforming cells are either tagged (as violators) or dropped from the network. The analogy is taken from a bucket (memory buffer) with a hole in its bottom that allows the fluid (cells) to flow out at a certain rate (see also GCRA, traffic contract, UPC).

LE Same as LAN Emulation.

LE-ARP LAN Emulation ARP. The ARP used in LAN Emulation for binding a requested ATM address to the MAC address.

LEC LAN Emulation Client. The task of a LEC, which is typically located in an ATM end system (for example, ATM host, LAN switch), is to maintain address resolution tables and forward data traffic. It is uniquely associated with an ATM address.

LEC Local Exchange Carrier. An intra-LATA communication services provider.

LES LAN Emulation Server. A server which provides support for the LAN emulation address resolution protocol (LE-ARP). The LECs register their own ATM and MAC addresses with the LES. An LES is uniquely identified by an ATM address.

LAN Emulation Service A technical workgroup appointed by the ATM Forum to address LAN Emulation.

LECS LAN Emulation Configuration Server. A server whose main function is to provide configuration information to an LEC (such as the ELAN it belongs to or its LES).

LENNI LAN Emulation Network Node Interface. Same as LNNI.

LI Length Indicator. A 6-bit field in the AAL3/4 SAR-PDU trailer that indicates the number of bytes in the SAR-PDU that contain CPCS information.

LIS This IP subnet, is termed a logical IP subnet, as the subnet may just be a small part of a much larger ATM network.

LLC Logical Link Control. The upper half of the Data Link Layer in LANs. LLC performs error control, broadcasting, multiplexing and flow control functions (see also MAC).

LMI Local Management Interface. An ITU-T-defined interface that provides an ATM end-system user with network management information (see also ILMI).

LNNI LAN Emulation Network Node Interface. Specifies the NNI operation between the LANE servers (LES, LECS, BUS).

LSP In MPLS, ATM connections, termed Label Switched Paths (LSPs), are set up in response to topology changes. This means that once a Label edge router learns about the existence of a destination, it uses LDP to signal up a connection to that destination.

LUNI LAN Emulation User Network Interface. Specifies the UNI between a LEC and the network providing the LAN Emulation.

MAC Medium Access Control. A set of protocols that make up (the lower) part of the Data Link Layer and form the basis of the IEEE LAN specifications. Generally, MAC determines the way devices can transmit in a broadcast network (see also LLC).

MAN Metropolitan Area Network. A term to describe a network that provides regional connectivity within a metropolitan area (such as a city). Although the terminology varies, MANs typically are larger than LANs and smaller than WANs.

Mbps Megabits per second. Transmission speed or rate of one million bits per second.

MBS Maximum Burst Size. A traffic parameter that specifies the maximum number of cells that can be transmitted at the peak rate (PCR).

MCDV Maximum Cell Delay Variation. As the name suggests, MCDV is the maximum CDV over a given QoS class.

MCLR Maximum Cell Loss Ratio. As the name suggests, MCLR is the maximum CTD over a given QoS class, defined for CBR and VBR traffic and for cells with CLP.

MCR Minimum Cell Rate. A parameter that gives the minimum rate at which cells can be transmitted by a source over a virtual connection (VC).

MCTD Maximum Cell Transfer Delay. As the name suggests, MCTD is the maximum CTD over a given QoS class.

Mean Cell Transfer Delay The average of the processing, queuing and propagation delays.

MIB Management Information Base. A data structure that defines objects for referencing variables such as integers and strings. In general, it contains information regarding a network's management and performance, for example, traffic parameters (see also ILMI, AToMMIB).

MID Multiplex Identification. A 10-bit field in the AAL3/4 SAR-PDU header for identifying the different CPCS-PDUs multiplexed over the same VCC.

MIN Multistage Interconnection Network. A switch fabric built from switching elements organised in series and/or in parallel. MIN provides physical connections between the inputs and the outputs of a switch.

MPEG Motion Picture Experts Group. A video technology standard that specifies the digital encoding, transmission and decoding protocols, capable of presenting VCR quality motion video.

MPLS Multiprotocol label switching is an IETF forwarding standard, which describes a methd of integrating IP and ATM more closely through label swapping. An IP & ATM switch (an MPLS switch) consists of ATM hardware with MPLS software. The software is IP addressing, IP routing and the Label distribution protocol.

MPOA Multiprotocol Over ATM. A set of standards to support (distributed) routing protocols other than IP. Developed on top of LANE and NHRP it will support switches, route servers and hosts all attached to an ATM network.

MR Mean Rate. Same as Average Cell Rate.

Multimedia A means of presenting to the user a combination of different forms of information such as text, data, images, video, audio, graphics (for example, videoconference).

Multiprotocol Encapsulation Multiprotocol Encapsulation over ATM provides for higher protocols, such asIP, to perform bridging and routing functions over an ATM network.

MUX Multiplexer. A networking local device in which multiple streams of information are combined so that they can share a common physical medium.

NDIS Network Driver Interface Specification. Generic name for an NIC device driver, which is independent of any hardware or software implementation.

NHRP Next Hop Resolution Protocol. A protocol proposed for use in ATM address resolution based on Classical IP. If an address request cannot be served by a node, it is forwarded to the next server node on the path to the destination until finally the ATM-IP address mapping can be accomplished. This allows ATM-IP address resolution to be accomplished between logical IP subnets.

NIC Network Interface Card or Controller. The hardware communications interface (circuit board) required for the DTE (workstation, PC) to access the network (same as Adapter Card).

N-ISDN Narrowband Integrated Services Digital Network. Predecessor to the B-ISDN, N-ISDN encompasses the original standards for the ISDN.

NMS Network Management System. Set of OAM&P functions for setting the required hardware and software parameters used in managing a network.

NNI Network Node Interface (or Network-to-Network Interface). ITU-T-specified standard interface between nodes within the same network. The ATM Forum distinguishes between two standards, one for private networks called P-NNI and one for public networks known as public NNI.

NPC Network Parameter Control. Traffic management mechanism exercised (at the NNI) by a network in relation to traffic received by another network.

NSAP Network Services Access Point. In the OSI environment it is the SAP between the network and the transport layers which identifies a DTE by a unique address.

OAM Operations and Maintenance. Set of administrative and supervisory actions regarding network performance monitoring, failure detection and system protection. Special-type cells are used to carry OAM-related information.

OAM&P Operations, Administration, Maintenance and Provisioning. A set of network management functions and services that interact to provide the necessary network management tools and control.

OC-n Optical Carrier-n. ITU-T-specified physical interface used for transmission over optical fibre at n times 51.84 Mbps (for example, OC-3 is at 155.52 Mbps, OC-12 at 622.08 Mbps, OC-48 at 2.488 Mbps).

Octet 8 bits or one byte.

OSI Open Systems Interconnection. The OSI Reference Model introduced by the International Organisation for Standardisation (ISO) consists of 7 layers, each specifying the protocols and functions required for two nodes to communicate using the underlying network infrastructure (physical medium, switches, routers, bridges, multiplexers and intermediate nodes).

OSIRM Open Systems Interconnection Reference Model. See OSI.

Payload Part of the ATM cell, it contains the actual information to be carried. It occupies 48 bytes (see also PTI).

PBX Private Branch Exchange. A circuit switch that connects telephones, terminals or other equipment and provides access to the public telephone system.

PC Priority Control. A congestion-control function that uses the CLP bit to perform priority queuing and scheduling actions.

PCR Peak Cell Rate. A traffic parameter that gives the maximum rate at which cells can be transmitted. It is calculated as the reciprocal of the minimum inter-cell interval (time between two cells) over a given virtual connection (VC). PCR is an RM cell-header field that indicates the maximum acceptable ER.

PDH Plesiochronous Digital Hierarchy. A hierarchy that refers to the DS-0, DS-1, DS-2 and DS-3 interfaces for digital transmission. Originally developed to

efficiently carry digitised voice over twisted pair.

PDU Protocol Data Unit. Term originally used in the OSI model to describe the primitive passed across different layers. The PDU contains header, data and trailer information. Also known as message.

Peak Duration A source traffic characteristic that gives the duration of a transmission at the peak cell rate (PCR). It is equivalent to the burst length (in cells).

PHY Physical Layer. The bottom layer of the ATM protocol reference model. PHY is subdivided into two sublayers, the Transmission Convergence (TC) and the Physical Medium (PM). It provides the ATM cell transmission over the physical interfaces that interconnect the ATM devices.

PHY-SAP Physical Layer Service Access Point. The physical interface at the boundary between the PHY and the ATM layers (see also SAP, ATM-SAP).

PL Physical Layer. See PHY.

PLCP Physical Layer Convergence Protocol. A protocol that specifies a TC mapping of ATM cells to DS-3 frames.

PM Physical Medium. One of the two PHY sublayers. PM provides bit timing and the actual bit transmission over the physical medium.

PMD Physical Medium Dependent. Same as PM.

P-NNI Private Network Node Interface. The NNI used in private networks.

P-UNI Private User Network Interface The UNI used between a user and a private network.

PRI Primary Rate Interface. An ISDN specification that provides twenty-three 64-kbps B-channels and one 64-kbps D-channel intended for use over a single DS1 or an E-1 line.

Private Network A communications network, owned by a private organisation and typically comprised of dedicated circuits between DTEs and other devices (multiplexers, switches, routers), where bandwidth is dedicated (see also PVN, Public Network,).

PT Payload Type. See PTI.

PTI Payload Type Identifier. A 3-bit cell header field for encoding information regarding the AAL and EFCI.

Public Network A communications network where users have shared access to the network resources. Network services are usually provided by common carriers (for example, telephone companies) (see also Private Network).

PVC Permanent (or Provisioned) Virtual Connection. A virtual connection (VPC/ VCC), provisioned by the network management system (NMS), for indefinite use in an ATM network (see also SVC).

Permanent Virtual Circuit A virtual connection, established by network management, between an origin and a destination that can be left up permanently (used in X.25 and FR protocols).

Q.93B Currently called Q.2931.

Q.931 ITU-T Recommendation for specifying the UNI signalling protocol in N-ISDN.

Q.933 ITU-T Recommendation for specifying the UNI signalling protocol in Frame Relay.

Q.2110 ITU-T Recommendation for specifying the UNI SSCOP.

Q.2130 ITU-T Recommendation for specifying the UNI SSCF.

Q.2931 ITU-T Recommendation derived from both Q.931 and Q.933 to provide SVC specifications and standards.

QoS Quality of Service. A term which refers to the set of ATM performance parameters that characterise the traffic over a given virtual connection (VC). These parameters include the CLR, CER, CMR, CDV, CTD and the average cell transfer delay.

QoS Classes Quality of Service Classes. Five service classes are defined by the ATM Forum in terms of the QoS parameters. Class 0 refers to 'best effort' service.
Class 1 specifies the parameters for circuit emulation, CBR (uncompressed) video and VPN. AAL1 supports this kind of connection-oriented service.
Class 2 specifies the parameters for VBR audio and video. AAL2 supports this delay-dependent, connection-oriented class.
Class 3 specifies the parameters for connection-oriented data transfer. AAL3/4 and mostly AAL5 support this delay-independent class of service.
Class 4 specifies the parameters for connectionless data transfer. AAL3/4 or AAL5 can be used to support this class.

RBOC Regional Bell Operating Company. Local service telephone companies that resulted from the break-up of AT&T.

RDI Remote Defect Indication. One of the OAM function types used for fault management (see also AIS, CC).

RDF Rate Decrease Factor. A factor by which a source should decrease its transmission rate if there is congestion (see also RIF).

RFC Request for Comment. Draft documents that contain proposed standards and specifications. RFCs, which contain these proposals, are either approved or just archived as historical

RIF Rate Increase Factor. A factor by which a source can increase its transmission rate if the RM cell indicates that there is no congestion.

RM Resource Management The management of critical network resources, such as bandwidth and buffers, at the node level. A value of 6 is reserved in the PTI to indicate an RM cell.

Routing A network management function responsible for forwarding the packets from the source to their destination. There are numerous algorithms that satisfy various network topologies and requirements.

RSVP ReSerVation Protocol. A protocol developed to support different QoS classes in IP applications (such as videoconferencing and multimedia).

RTT Round-Trip Time. The round-trip time between a source and a device, such as a switch.

SAAL Signalling AAL Service-specific parts of the AAL protocol responsible for signalling. Its specifications, being developed by ITU-T, were adopted from N-ISDN.

SAP Service Access Point. The physical interface between the layers in the OSI model. Lower layers provide services to the higher layers through this interface by sending Product Data Units (PDUs).
Subnetwork Attachment Point. The unique address maintained by a subnetwork for each of the DTEs attached to it.

SAR Segmentation and Reassembly. The lower half of the AAL. SAR inserts the data from the information frames into the cell. It adds any necessary header or trailer bits to the data and passes the 48-octet payload to the ATM layer. Each AAL type has its own SAR format. At the destination, the cell payload is extracted and converted to the appropriate PDU (see also CS) .

SAR-PDU Segmentation and Reassembly Protocol Data Unit. The 48-octet PDU that the SAR sublayer exchanges with the ATM layer. It comprises the SAR-PDU payload and any control information that the SAR sublayer might add.

SCR Sustainable Cell Rate. A traffic parameter that characterises a bursty source and specifies the maximum average rate at which cells can be sent over a given virtual connection (VC). SCR can be defined as the ratio of the MBS to the minimum burst er-arrival time.

SDH Synchronous Digital Hierarchy. A hierarchy that designates signal interfaces for very high-speed digital transmission over optical fibre links (see also SONET).

SEAL Simple Efficient Adaptation Layer. The original name and recommendation for AAL5.

SECBR The Severely Errored Cell Block Ratio (SECBR) is defined as the number of severely errored cell blocks over the total transmitted cell blocks, where a cell block is the number of user cells transmitted between successive O&M cells

Service Types There are four service types: CBR, VBR, UBR and ABR. CBR and VBR are guaranteed services while UBR and ABR are described as 'best effort' services.

SIG SMDS Interest Group. An industry forum active in producing specifications in the area of SMDS. It has also participated in some of the ATM Forum activities.

SIR Sustained Information Rate. A flow control mechanism used in SMDS.

SMDS Switched Multimegabit Digital Service. A connectionless, MAN service, based on 53-byte packets, aimed at the interconnection of different LANs into a switched public network.

SMTP Simple Mail Transfer Protocol. The protocol standard developed to support electronic mail (e-mail) services.

SN Sequence Number. Part of the header of the SAR-PDU (2 bits in AAL1, 4 bits in AAL3/4). SN is used as a sequence counter for detecting lost, out-of-sequence or misinserted SAR-PDUs.

SNA Systems Network Architecture. A host-based network architecture introduced by IBM. In SNA, logical channels are created between end-points.

SNMP Simple Network Management Protocol. An IETF-defined standard for handling management information. It is normally found as an application on top of the user datagram protocol (UDP).

SNP Sequence Number Protection. A 4-bit field in the header of the AAL1 SAR-PDU. This field contains the CRC and the parity bit fields.

SONET Synchronous Optical Network. An ANSI-defined standard for high-speed and high-quality digital optical transmission. It has been recognised as the North American standard for SDH.

SPANS Simple Protocol for ATM Network Signalling. A protocol, supported by FORE Systems switches, that provides SVC tunnelling capability over a PVC network.

SPVC Soft, Switched or Semi-Permanent Virtual Connection. A PVC-type connection where SVCs are used for call set-up and (automatic) rerouting. SPVC is also called smart PVC.

SS7 Signalling System Number 7. A common channel signalling standard developed by CCITT. SS7 was designed to provide the internal control and network intelligence needed in ISDNs.

SRTS Synchronous Residual Time Stamp Clocking (SRTS) is a method of clock information transfer, used to convey information from one end of the connection to the other about the frequency difference between a common reference clock, such as that derived from SDH, and the service clock on the ATM switch interface.

SSCF Service Specific Co-ordination Function. Part of the SSCS portion of the SAAL. Among other functions, SSCF provides a clear interface for relaying user data and providing independence from the underlying sublayers (see also SSCOP).

SSCOP Service Specific Connection-Oriented Protocol. Part of the SSCS portion of the SAAL. SSCOP is an end-to-end protocol that provides error detection and correction by retransmission and status reporting between the sender and the receiver, while it guarantees delivery integrity (see also SSCF).

SSCS Service Specific Convergence Sublayer. One of the two components of the Convergence Sublayer (CS) of the AAL that is particular to the traffic service class to be converted. SSCS has been developed to support certain user applications such as LAN Emulation, transport of high-quality video and database management.

SSM Single Segment Message. A message that constitutes a single PDU.

ST Segment Type. A 2-bit field in the SAR-PDU header that indicates whether the SAR-PDU is a BOM, COM, EOM or SSM.

STDM Statistical Time-Division Multiplexing. Same as ATDM. Synchronous Time-Division Multiplexing. A TDM scheme where the interleaved time slots are preassigned to the users.

STM Synchronous Transfer Mode. A packet switching method where time is divided in time slots assigned to single channels during which users can transmit periodically. Basically, time slots denote allocated (fixed) parts of the total available bandwidth (see also TDM).

STM-1 Synchronous Transport Module-1. An ITU-T-defined SDH physical interface for digital transmission in ATM at the rate of 155.52 Mbps.

STM-n Synchronous Transport Module-n. An ITU-T-defined SDH physical interface for digital transmission in ATM at n times the basic STM-1 rate. There is a direct equivalence between the STM-n and the SONET STS-3n transmission rates.

STP Shielded Twisted Pair. Two insulated copper wires twisted together and wrapped by a protective shield (see also UTP).

STS-1 Synchronous Transport Signal-1. SONET signal standard for optical transmission at 51.84 Mbps (see also OC-1).

STS-n Synchronous Transport Signal-n. SONET signal format for transmission at n times the basic STS-1 signal (for example, STS-3 is at 155.52 Mbps).

SVC Switched Virtual Connection.
A connection that is set up and taken down dynamically through signalling (see also PVC).

Switched Virtual Circuit A connection where control signalling is used to establish and tear it downdynamically. Examples are the telephone system, ISDN, X.25.

Switch, ATM An ATM device responsible for switching the cells. There is a range of ATM switch architectures, which can be classified according to various aspects (for example, buffering, switch matrix, interconnection design, division multiplexing).

Switch Fabric The central functional block of the ATM switch. The switch fabric is responsiblefor buffering and routing the incoming cells to the appropriate output ports.

T1 A TDM digital channel carrier that operates at a rate of 1.544 Mbps. Known also as a repeater system, it is often referred as DS-1.

T3 A TDM digital channel carrier that operates at 44.736 Mbps. It can multiplex 28 T1 signals. The term is often used to refer to DS-3.

TAXI Transparent Asynchronous Transmitter/Receiver Interface. An interface that provides connectivity over multi-mode fibre links at a speed of 100 Mbps.

TC Transmission Convergence. One of the two PHY sublayers that is responsible for adapting the ATM cells into a stream of bits to be carried over the physical medium (see also PM).

TCS Transmission Convergence Sublayer. Same as TC.

TCP Transmission Control Protocol. A standardised transport protocol developed for interconnecting IP-based networks. Operating on top of IP (the combination is known as TCP/IP), it is responsible for multiplexing sessions, error recovery, end-to-end reliable delivery and flow control.

TCP/IP A protocol platform, known also as the Internet protocol suite, that combines both TCP and IP. Widely used applications, such as Telnet, FTP and SMTP interface to TCP/IP.

TDJ Transfer Delay Jitter. See CDV.

TDM Time-Division Multiplexing. A technique for splitting the total bandwidth (link capacity) into several channels to allow bit streams to be combined (multiplexed). The bandwidth allocation is done by dividing the time axis into fixed-length slots; a particular channel can then transmit only during a specific time slot.

Telnet An asynchronous, virtual terminal protocol that allows for remote access.

TM Traffic Management. Means of providing connection admission (CAC), congestion and flow control (for example, UPC, traffic shaping).

Traffic Contract An agreement between the user and the network management agent regarding the expected QoS provided by the network and the user's compliance with the pre-determined traffic parameters (for example, PCR, MBS, burstiness, average cell rate).

Traffic Descriptors A set of parameters that characterise the source traffic. These are the PCR , MBS, CDV and SCR.

Traffic Shaping A method for regulating non-compliant traffic (for example, traffic that violates the traffic parameters, such as PCR, CDV, MBS as specified by the traffic contract) (see also GCRA).

UBR Unspecified Bit Rate. One of the 'best effort' service types (the other one is ABR). Realistically, no traffic parameters are specified by the source, so, no actual quality commitment is made by network management.

UDP User Datagram Protocol. A connectionless transport protocol without any guarantee of packet sequence or delivery. It functions directly on top of IP.

UME UNI Management Entity. Software at the UNIs for providing the ILMI functions.

UNI User-Network Interface. The interface - defined as a set of protocols and traffic characteristics (e.g. cell structure) - between the CPE (user) and the ATM network (ATM switch). The ATM Forum specifications refer to two standards being developed, one between a user and a public ATM network, called public UNI and one between a user and a private ATM network called P-UNI.

UNI 2.0 ATM Forum UNI specification for the physical (PHY) and the ATM layers, the ILMI, OAM (traffic control) and PVC support.

UNI 3.0 An upgrade of UNI 2.0, with additional features such as traffic control for PCR and operation over current transmission systems.

UNI 3.1 A corrected version of UNI 3.0. This specification also includes SSCOP standards.

UNI 4.0 This UNI specification refers to signalling issues in ABR and VP, and QoS negotiation.

UPC Usage Parameter Control. A form of traffic control that checks and enforces user's conformance with the traffic contract and the QoS parameters. Commonly known as traffic policing, it is performed at the UNI level.

UTOPIA Universal Test & Operation Physical Interface. An interface to provide connectivity at the PHY level among ATM entities.

UTP Unshielded Twisted Pair. A twisted pair (copper) wire without any protective sheathing, used for short-distance wiring (for example, in a building). There are two UTP categories specified by the ATM Forum for cell transmission: 3 (CAT-3) and 5 (CAT-5).

VBR-RT Variable Bit Rate - Real Time. One of the service types for transmitting traffic that depends on timing information and control, and which is characterised by the average and peak cell rates. It is suitable for carrying traffic such as packetised (compressed) video and audio.

VBR-NRT Variable Bit Rate - Non-Real Time. One of the service types for transmitting traffic where timing information is not critical and which is characterised by the average and peak cell rates. It is well-suited for long data packet transfers.

Virtual Channel See VC.

VC Virtual Channel. A term to describe unidirectional flow of ATM cells between connecting (switching or end-user) points that share a common identifier number (VCI).

Virtual Connection A connection established between end-users (source and destination), where packets are forwarded along the same path and bandwidth is not permanently allocated until it is used.

Virtual Circuit A connection set up across the network between a source and a destination where a fixed route is chosen for the entire session and bandwidth is dynamically allocated (see also datagram).

VCC Virtual Channel Connection. Defined as a concatenation of virtual channel links.

VCI Virtual Channel Identifier. A 16-bit value in the ATM cell header that provides a unique identifier for the virtual channel (VC) that carries that particular cell.

VF Variance Factor. It is the CRM normalised by the variance of the total cell rate.