

# Networking Glossary & Reference

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Version 4.0



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# Table of Contents

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## Preface 5

Using the Documentation ..... 6

Contacting GN Nettest ..... 6

## Glossary 7

## Reference 77

Standards Organizations ..... 78

What Does 802.x Mean? ..... 79

Open Standards Interconnection (OSI) Reference Model ..... 80

    ATM Protocols and the OSI Model ..... 80

    Summarizing the OSI Layers ..... 81



# Preface

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The GN Nettetst *Networking Glossary and Reference* provides you with a compilation of the technical terms related to network protocols and our products.

References for this glossary include the ATM Forum web site ([www.atmforum.com](http://www.atmforum.com)), Global Knowledge, *Newton's Telecom Dictionary*, as well as other networking web sites and magazine articles.

For more information on GN Nettetst and our products, please visit our web site at <http://www.gnnettetst.com>.

## **Chapter Contents:**

Using the Documentation .....	6
Contacting GN Nettetst .....	6

# Using the Documentation

The GN Nettek *Networking Glossary and Reference* includes the following chapters:

## **Preface**

Introduces you to the document and its conventions.

## **Chapter 1: Glossary**

Contains the GN Nettek networking glossary, which explains common terms related to network protocols and GN Nettek products.

## **Chapter 2: Reference**

Provides information on standards organizations, the 820.x committee and subcommittees, and the Open Standards Interconnection (OSI) Reference Model.

# Contacting GN Nettek

If you have any questions about our products and services, you can contact GN Nettek by doing one of the following:

- contacting your GN Nettek representative directly
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- searching the web site: <http://www.gnnettest.com>
- phoning +1-(905)-948-7842
- calling this toll free number +1-(877)-537-9350 (North America only)
- faxing +1-(905)-475-6524.

# 1 Glossary

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A B C D E F G H I J L M N O P Q R S T U V W

## A

- GPRS** AA  
Anonymous Access. The network does not know the true identity of the mobile. AA is the opposite of non-anonymous access.
- ATM** AAL  
ATM Adaptation Layer. In the OSI Reference Model, the layer that translates services from higher layers into ATM cells. The AAL allows many applications to translate data into and from the format of an ATM cell.
- ATM** AAL Connection  
A connection created by the ATM Adaptation Layer among entities at the next higher layer.
- ATM** AAL-1  
ATM Adaptation Layer – Type 1. AAL functions of this type support constant bit rate, time-dependent traffic (e.g. voice, video).
- ATM** AAL-2  
ATM Adaptation Layer – Type 2. To be defined by the OSI, it will be used for variable bit rate video transmission.
- ATM** AAL-3/4  
ATM Adaptation Layer – Type 3/4. AAL functions to support variable bit rate traffic that tolerates delays and requires some sequencing or error detection. These two AAL types were originally separate.
- ATM** AAL-5  
ATM Adaptation Layer – type 5 function. AAL functions supporting variable bit rate traffic that tolerates delays, is connection oriented, and requires only minimal sequencing or support for error detection.

## GPRS

### Abis

The Abis interface exists within the Base Station System (BSS) and represents the interface between the Base Station Controller (BSC) function and the Base Transceiver Station (BTS). Valid connections between The BSC and BTS include leased lines, radio links and Metropolitan Area Networks (MANs).

The Abis interface has two basic types of channels:

- Traffic Channels: transport user data at 8, 16 or 64 kbits/s.
- Signalling Channels: send signals between the BSC and the BTS at 16, 32, 56 or 64 kbits/s.

Each transceiver requires a signalling channel on the Abis interface.

## Token Ring

### Abort Delimiters

A ring reports an Abort Delimiter Transmitted error after transmitting an abort sequence. An abort sequence consists of a Start Delimiter (SDEL) and End Delimiter (EDEL) field back-to-back, and indicates that the ring station started to transmit, but needed to abort for one of the following reasons:

- The adapter detected a non-fatal error within itself during transmission of a frame that was severe enough to require transmission to abort.
- The host PC instructed the adapter to abort current transmission of frame(s). This request is usually from the upper-layer protocols or the application.

When an adapter transmits an abort sequence, it does not complete the token protocol by transmitting a free token. Instead, it stops, leaving the ring without a token or frame. This situation generates several soft-error reports to the Ring Error Monitor (REM). The Active Monitor purges the ring and then reports a token error for a lost frame/token. The ring station that transmitted the abort sequence reports an Abort Delimiter Transmitted error. After transmitting an abort delimiter, a ring station does not transmit a token. The Active Monitor must then detect the interruption in token protocol and purge the ring. If a ring station consistently reports an Abort Delimiter Transmitted error, its adapter or adapter driver is not working correctly or it has a misbehaving upper-layer protocol or application.

- ATM**     **ABR**  
Available Bit Rate. An ATM layer service category in which the parameters for data transfer can vary in response to changing network conditions. The source adjusts its traffic flow in response to feedback from the network, and as a result, obtains an acceptable amount of the network's available bandwidth. The ABR service category allows telecommunications service providers to maximize the use of a network's available bandwidth. ABR is designed to carry data which is not time-sensitive, but which requires a low cell loss ratio.
- Frame Relay**     **Access Line**  
A circuit connecting DTE (Data Terminal Equipment) to a Frame Relay switch (Data Communications Equipment).
- Frame Relay**     **Access Rate (AR)**  
The maximum data transmission rate supported by the end user's link to the Frame Relay network, which in turn determines the maximum rate at which data can be transmitted or received.
- ATM**     **ACR**  
Allowed Cell Rate. A service parameter of ABR. ACR is the rate of cells per second at which a source is allowed to send.
- ATM**     **ACS**  
ATM Circuit Steering. A method of routing ATM traffic to built-in test facilities in ATM equipment for monitoring and analysis. ACS is needed because switched ATM networks, unlike such shared-access technologies such as Ethernet and token ring, have no point of entry where a monitoring device can be attached. The ATM Forum's Test Working Group, in conjunction with the Network Management Working Group, is defining a standard for all devices that would allow error-free connections between ATM gear and testing or monitoring devices.
- ATM**     **Address Prefix**  
A string that forms the first part of one or more ATM addresses. Address Prefixes range from 0 to 152 bits in length.
- ATM**     **Address Resolution**  
The procedure used by a client to match a LAN destination with the ATM address of either another client or the BUS.

## ADM

Add-Drop Multiplexing (also known as drop-and-insert multiplexing). A way to demultiplex a high-speed traffic stream into its lower-speed components so that an additional low-speed channel can be added. For example, PDH networks cannot identify available low-speed channels within a high-speed bit stream. To add another channel, ADM is needed to demux the high-speed traffic into lower-speed circuits. The traffic, including the newly added low-speed circuit, is then multiplexed again for transmission to the next station.

## ATM

### ADTF

ACR Decrease Time Factor. The time permitted between sending RM cells before the Allowed Cell Rate is decreased to ICR.

## ATM

### AINI

ATM interWATCH-Network Interface. This protocol facilitates interworking of one network running internally with another network running B-ISUP internally. The protocol also supports interworking of two networks running PNNI internally.

## ATM

### AIR

Additive Increase Rate. An ABR service parameter that controls the increase in the cell transmission rate.

### AIS

Alarm Indication Signal. A signal sent downstream to preserve transmission continuity while notifying the rest of the network that there is a priority 1 alarm situation. AIS replaces the normal traffic signal and can be generated at either the ATM or physical layer (PHY). Also called a blue alarm.

## Ethernet

### Alignment Errors

Alignment errors are frames that have a non-integer number of bytes. Alignment errors indicate a serious problem on the network. Typically, an alignment error occurs when a faulty NIC card or driver is unable to properly apply the CSMA/CD MAC technique, and instead transmits data onto the Ethernet regardless of whether another station is currently using the media. This typically overlaps one frame on top of another, producing an error frame that does not fault on an integer byte boundary.

Alignment errors are extremely difficult to troubleshoot. Traditional network troubleshooting techniques use the source address of the error frame to indicate the station that is introducing the error. With an alignment error, the source address of the frame is a station on the network that is behaving "normally." The faulty station is the second station that begins transmitting, and cannot be easily identified.

Traditionally, you troubleshoot alignment errors by physically disconnecting stations from the network until the problem disappears. After you identify the faulty station, replace the NIC card or driver.

American National Standards Institute  
See *ANSI*.

**ATM** ANI  
Automatic Number Identification. A parameter in the Initial Address Message sent to the next carrier in the transmission path, and containing a charge number used for billing.

ANSI  
American National Standards Institute. The national standards organization of the U.S.A. ANSI proposes and administers standards for communications. See also: *Comite Consultatif International Telegraphique et Telephonique (CCITT)*.

**GPRS** AP  
Access Point. An entry point to external network.

**GPRS** APN  
Access Point Name. Logical name of the point of entry to external packet data networks.

Application Layer  
There are two types of application layer:

- Common Application Service Elements (CASE) are generally useful to a variety of application processes.
- Specific Application Service Elements (SASE) satisfy particular needs of application processes.

ARP  
Address Resolution Protocol. In a communications protocol, the procedures and messages that match a physical network address (MAC) to the IP address in the packet.

**ATM** Asynchronous Time Division Multiplexing  
A multiplexing technique that organizes a transmission capability into unassigned time slots, which are assigned to cells in response to the real requirements of each application.

- ATM** ATM  
Asynchronous Transfer Mode. A telecommunications standard in which information is transmitted in high-bandwidth, fixed-size, 53-byte cells. ATM is capable of carrying a variety of data traffic, including voice, video, and text. ATM is termed "asynchronous" because the recurrence of cells containing data from an individual source is not necessarily periodic.
- ATM** ATM Address  
Defined in the UNI Specification as three formats. Each format has a length of 20 bytes, and includes country, area, and end-system identifiers.
- ATM** ATM Layer Link  
Part of an ATM Layer connection, it is located between two contiguous, active ATM Layer entities.
- ATM** ATM Link  
Can be either a virtual path link (VPL) or a virtual channel link (VCL). See *VPL*, *VCL*.
- ATM** ATM Peer-to-Peer Connection  
Can be either a virtual path connection (VPC) or a virtual channel connection (VCC). Both types are unidirectional. See *VPC*, *VCC*.
- ATM** ATM Traffic Descriptor  
A generic set of traffic parameters. An ATM Traffic Descriptor is used to capture basic traffic characteristics of a requested ATM connection.
- ATM** ATM User-User Connection  
A relationship created by the ATM Layer to support communication between two or more ATM entities or next higher layer entities, over which communications can be unidirectional or bidirectional.

#### Attenuation

The phenomenon wherein a signal's power declines as the signal passes through a medium. The effect is normally in proportion to the distance that the signal has travelled. Attenuation sometimes limits the distance that a signal can be transmitted through a particular medium.

## B

- ISDN** B Channel  
A full duplex, 64 Kbps channel for sending data.

- GPRS** BG  
Border Gateway. A logical box that connects two (or more) operators via the interWATCH-PLMN backbone. BG protects operator's intra-PLMN network against intruders.
- ATM** B-ICI  
B-ISDN Inter-Carrier Interface. An interface specification for connecting public ATM networks, allowing them to support services across many public carriers. This specification was defined by the ATM Forum.
- ATM** B-ICI SAAL  
B-ICI Signaling ATM Adaptation Layer. A signaling layer for transferring connection control signaling, B-ICI SAAL guarantees dependable delivery of the protocol message. The SAAL is composed of a Service Specific section and a Common section (AAL5).
- ATM** B-ISDN  
Broadband ISDN. A network standard evolved from Narrowband ISDN. B-ISDN is high speed (above 1.544 Mbps) network that combines existing and new voice, data, and video services in the same network.
- ATM** B-LLI  
Broadband Low Layer Information. A Q.2931 information element that identifies the Layer 2 and Layer 3 protocols used by the application.
- ATM** B-TE  
Broadband Terminal Equipment. An equipment category used in B-ISDN for grouping terminal adapters and terminals.
- Frame Relay** Backward Explicit Congestion Notification (BECN)  
A bit in the frame Address field set by the network to alert the transmitting device that network congestion is present and that the source device should implement congestion avoidance procedures.
- ATM** Backward Explicit Congestion Notification (BECN)  
A Backward Resource Management (BRM) cell, generated by a destination endpoint when the destination detects network congestion, and which the destination sends to the source without waiting for a Forward Resource Management (FRM) cell to arrive.
- Bandwidth**  
The amount of data that can be transmitted on a communications channel in a given period of time, expressed as bits or kilobits per second for digital communications, and in Hertz for analog.

## Token Ring

### Beacon Frames

Ring stations use beacon frames to recover from a hard error. Information provided in the beacon frame indicates the source of the error (fault domain). Beaconing is the final stage of the hard-error recovery process. When a ring starts beconing, it immediately becomes non-functional. If a beconing ring recovers automatically, it means a station has been removed from the ring. After the station is repaired, it can be reinserted into the ring. If the ring does not recover automatically, do the following:

- If the WinPharaoh is not already inserted in the ring, insert it by selecting Utility, Attach to Broken Ring.
- From General Decode, capture one beacon MAC frame. The fault lies between the port of the transmitting station and the port of its upstream neighbor. Idle stations not on the ring at the time may exist physically between them. Note that the beacon process checks the lobe cables of both stations all the way to the connectors at the MAU/LAM (media attachment unit/lobe attachment module).
- To fix the problem, check patch cables and the MAU/LAM. If the stations are in separate closets, check the cabling between the wiring closets.

Since a nonfunctioning ring can be a serious situation, it is recommended that extra hardware is kept in each wiring closet to facilitate the rapid swapping of equipment, as well as a cable scanner to test cabling between wiring stations.

## ATM

### BER

Bit Error Rate. The ratio of error bits to the total number of bits transmitted. BER is usually expressed as a negative exponent.

### BG

Border Gateway. A Logical box that connects two (or more) operators via interWATCH-PLMN backbone. BG protects operator's intra-PLMN network against intruders.

## ATM

### BICI

Broadband Inter Carrier Interface. A carrier-to-carrier interface like PNNI (private network-to-network interface) but lacking some information offered by PNNI. Carriers are not likely to let their switches share routing information or detailed network maps with their competition's equipment.

- ATM**     **BIP**  
Bit Interleaved Parity. A method used on the PHY layer to monitor the error performance of the link. A check bit or word is sent in the link overhead covering the previous block or frame. Bit errors in the payload are detected and may be reported as maintenance information.
- ATM**     **BISUP**  
Broadband ISDN User's Part. An SS7 protocol that defines the signaling messages that control connections and services.
- ATM-  
PNNI**     **Border Node**  
A logical node that belongs to a specific peer group but that has at least one link which crosses the peer group's boundary.
- ISDN**     **BRI**  
Basic Rate Interface: ISDN standards and specifications provision for low-speed ISDN services. Supports two "B" channels of 64 Kbps each and one "D" channel of 16 Kbps on a single wire pair.
- Bridge**  
A bridge is an internetworking device that connects networks at the Data Link Layer (OSI Layer 2). A bridge uses MAC layer addresses (NIC hardware address) contained in frames to determine what to do with a frame. A bridge will either forward or filter a frame based on the destination address of the frame. Some types of bridges are translational bridges, transparent bridges, source route bridges, local bridges and remote bridges.
- ATM**     **BRM**  
Backward Resource Management cell. A Resource Management (RM) cell either turned around when received from the source, or generated by the destination, and sent to the source. A BRM cell informs the source about current connection conditions through a series of RM-cell parameters.
- Broadcast**  
Data transmission to all addresses or functions.
- Broadcast Address**  
An address that is reserved for simultaneous broadcast to all stations.
- Broadcast Domain**  
The set of all devices that receive broadcast frames originating from any device within the set. Broadcast domains are normally bounded by routers.

**BSSAP+**  
Base Station System Application Part+: Protocol between SGSN and MSC/VLR.

**BSSGP**  
Base Station System GPRS Protocol: This layer conveys routing and QoS-related information between BSS and SGSN.

**ATM** **BT**  
Burst Tolerance. The limit parameter of the Generic Cell Rate Algorithm (GCRA), BT applies to ATM connections that support VBR (variable bit rate) services.

**Token Ring** **Burst Errors**  
Ring stations report a burst error when they detect signal loss for at least five half-bit cycle, usually caused by an intermittent hardware error. Next to Token errors, burst errors are probably the most common soft error on a ring. This is because they result from normal Token Ring operation. Every time a station enters or leaves the ring, burst errors will result from the operation of relays in the MAU or LAM. Burst errors are the most useful soft errors for troubleshooting intermittent hardware problems. As a ring station will not propagate a burst error, the error can be isolated between the reporting station and its upstream neighbor.

**ATM** **BUS**  
Broadcast and Unknown Server: This server handles data sent by an LAN Emulation (LE) Client to the broadcast MAC address ('FFFFFFFFFFFF'), all multicast traffic, and initial unicast frames which are sent by a LAN Emulation Client.

## C

**ATM** **CAC**  
Connection Admission Control. CAC is the process by which the network determines:

- whether a connection request should be accepted or rejected during call setup, or
- whether a re-allocation request can be granted during call re-negotiation.

**ATM** **Call**  
An association between two or more users, or between a user and a network element, involving zero or more connections.

- ATM**     CBR  
Constant Bit Rate. An ATM service category designed to transport services such as video or voice. The transfer rate, or dedicated bandwidth, is set at the time of connection, and is continuously available through the life of the connection.
- ATM**     CCR  
Current Cell Rate. An RM cell field which the source sets to its Allowed Cell Rate (ACR) when generating an outgoing FRM (Forward Resource Management) cell. Approximates the rate at which a source is sending information.
- GPRS**     CCU  
Channel Codec Unit. A Functional element in BSS that handles low-level GPRS control in radio.
- ATM**     CDV  
Cell Delay Variation. A component of cell transfer delay, induced by buffering and cell scheduling. Peak-to-peak CDV is a QoS delay parameter associated with CBR (Constant Bit Rate) and VBR (Variable Bit Rate) services. The peak-to-peak CDV is the  $((1-a)$  quantile of the CTD) minus the fixed CTD (Cell Transfer Delay) that could be experienced by any delivered cell on a connection during the entire connection holding time. The parameter "a" is the probability of a cell arriving late. See CDVT.
- ATM**     CDVT  
Cell Delay Variation Tolerance. ATM layer functions may alter the traffic characteristics of ATM connections by introducing Cell Delay Variations. When cells from two or more ATM connections are multiplexed, cells of a given ATM connection may be delayed while cells of another ATM connection are inserted at the output of the multiplexer. Similarly, some cells may be delayed while physical layer overhead or OAM (Operations Administration Maintenance) cells are inserted. Consequently, some randomness may affect the inter-arrival time between consecutive cells of a connection as monitored at the UNI (User-Network Interface). The upper bound on the "clumping" measure is the CDVT.
- ATM**     CE  
Connection Endpoint. A terminator at one end of a layer connection within a SAP (Service Access Point).
- ATM**     CEI  
Connection Endpoint Identifier. The identifier of a CE (Connection Endpoint) that can be used to identify the connection at a SAP (Service Access Point).

- ATM** Cell  
A unit of transmission in ATM. A fixed-size frame consisting of a 5-octet header and a 48-octet payload.
- ATM** Cell Header  
ATM Layer protocol control information.
- Central Office  
Central Office: (1) A local telephone company office which connects to all local loops in a given area and where circuit switching of customer lines occurs. (2) A local telephone company switching system, where Telephone Exchange Service customer station loops are terminated for purposes of interconnection to each other and to trunks.
- ATM** CER  
Cell Error Ratio. The ratio of errored cells to total cells transmitted over a given interval. For relevance and reliability, CER should be measured on a circuit that is in service.
- ATM** CES  
Circuit Emulation Service. An ATM Forum interoperability specification defining support for CBR (Constant Bit Rate) traffic and emulation of existing TDM (Time Division Multiplexing) circuits over ATM networks that comply with ATM Forum interoperability standards.
- Frame Relay** Channel  
The access channel assigned to carry the user's data over a frame relay network. Channels can be *unchannelized*, where an entire physical line operates as one channel; *channelized*, where the physical line is divided into a number of time slots, and the channel is one time slot; or *fractional*, where the physical line is divided into time slots, and the channel assigned consists of one or more of these time slots.
- ATM-PNNI** Child Node  
Any node at the next lower level in the routing hierarchy (a logical group node or a physical node).

<b>ATM-PNNI</b>	<p><b>Child Peer Group</b> Any peer group containing the child node of a logical group node. For example, if peer group P1 includes logical group nodes L01, L02, L03 representing peer groups P01, P02, and P03, respectively, from the next lowest level in the hierarchy, then:</p> <ul style="list-style-type: none"> <li>• P01, P02, and P03 are child peer groups of P1</li> <li>• P01 is the child peer group of L01, P02 is child of L02, and P03 is child of L03.</li> </ul>
<b>ATM</b>	<p><b>CI</b> Congestion Indicator. A field in a Resource Management (RM)-cell which indicates whether network congestion is present. CI is set by a destination in outgoing BRM cells to instruct the source to decrease its ACR (Allowed Cell Rate).</p>
<b>ATM</b>	<p><b>CIF</b> Cells in Frames. A protocol established by the CIF Alliance that specifies how to transport ATM protocol over Ethernet, Token Ring, and other frame protocols. CIF uses software at the workstation instead of a new hardware network interface card to do QoS (Quality of Service) scheduling and ABR (Allowed Bit Rate) flow control.</p>
<b>Frame Relay</b>	<p><b>CIR</b> Committed Information Rate. The average capacity (transfer rate) of a circuit over a time interval Tc. Under frame relay service agreements, CIR indicates the transfer rate that the service provider must deliver under normal network conditions.</p>
<b>GPRS</b>	<p><b>CLNS</b> Connectionless Network Service: Like IP protocol.</p> <p><b>CLEC</b> Competitive Local Exchange Carrier: A company that builds and operates communication networks in metropolitan areas, providing its customers an alternative to the local telephone company.</p>
<b>ATM</b>	<p><b>CLP</b> Cell Loss Priority. A bit in an ATM cell header indicating the cell priority. A value of 0 indicates high priority; a value of 1 indicates low priority. CLP is used to determine which cells can be dropped during periods of network congestion (CLP=1 cells can be dropped in order to maintain the transmission of CLP=0 cells).</p>

- ATM**     **CLR**  
Cell Loss Ratio. The ratio of lost cells (cells sent to the source but not received by the destination) to total cells transmitted. CLR is negotiated between network elements during connection establishment, and a target CLR value is agreed upon, provided the network elements respect other layer transfer characteristics.
- ATM**     **CMR**  
Cell Misinsertion Rate. Of the cells received at an endpoint, the ratio of cells that the source did not originally transmit to the total number of cells that the source transmitted correctly.
- ATM**     **COD**  
Connection Oriented Data. Data which must be transmitted in sequential order so that the related application (voice, video) functions properly.
- Ethernet**     **Collisions**  
Ethernet frames with a length greater than 1518 bytes and invalid frame checksums. (Frame with an illegally short length and a valid Frame Check Sequence are classified as runts.) Ethernet collisions occur when two stations on a local Ethernet segment transmit data at the same time, jamming each other's signal and wasting bandwidth.
- Collisions typically terminate with a hexadecimal pattern and nbsp; AAAAAAAAA or 55555555. Collisions can have many possible causes, but the most likely is an excessive numbers of hosts on the local Ethernet segment. Other possible causes include a malfunctioning NIC card or a bad driver. In some cases, a cable flaw such as a kink or a short might manifest itself as "collisions" on the network.
- Comite Consultatif International Telegraphique et Telephonique (CCITT) International Consultative Committee for Telegraphy and Telephony, a standards organization that devises and proposes recommendations for international communications. See also American National Standards Institute (ANSI). The CCITT is now known as the ITU-T, the International Telecommunications Union-the Telecommunications Services Sector.
- Frame Relay**     **Committed Burst Size (Bc)**  
The maximum data transfer rate that a carrier agrees to provide under normal conditions, over a time interval  $T_c$ . See also Excess Burst Size (Be).

**Frame Relay** Committed Rate Measurement Interval (Tc)  
The time interval used in frame relay service agreements in reference to the parameters CIR (Committed Information Rate), Bc (Committed Burst Size) and Be (Excess Burst Size). The time interval is calculated as  $Tc = Bc/CIR$ , and is applied as a "sliding window" rather than as a periodic time interval.

**Token Ring** Congestion Errors  
Token Ring frames are received by the Token Ring adapter on-board receive buffers, and are then passed through the PC bus to the host receive buffers. If any of these components becomes a bottleneck to incoming traffic, congestion occurs. Broadcast traffic can contribute to congestion errors in adapters that are on the verge of congestion. This is because broadcast packets are copied by all adapters, whether or not the data is meant for them. Therefore, try to keep broadcast traffic to a minimum by tuning upper-layer protocols, since these layers use broadcast services the most. Broadcast traffic on your network should generally not exceed 3% of available bandwidth.

**LAN** Connectionless  
Not requiring prior establishment of a connection before data transmission.

Connectionless Protocols  
Connectionless protocols send data with a source and destination address appended. No setup handshake is done to determine if the destination is available. Connectionless protocols are often referred to as Datagram Service. Datagram protocols usually do not support error recovery or acknowledgment routines, and would therefore be known as unreliable transmission services.

Connection Oriented Protocols  
In connection-oriented protocols, a connection process (handshake) occurs between two stations before the transmission of data. Connections are also referred to as sessions, virtual circuits, or logical connections. Most connection-oriented protocols require some form of acknowledgement routine as data is transmitted. Protocols using acknowledgement routines provide a reliable data transmission service over a network. They also provide error detection and error recovery routines. When data is found to be in error, the sending side is requested to retransmit. Or, if the sending side has not received an acknowledgement, it will retransmit after a specified period of time.

**GPRS** CONS  
Connection Oriented Network Service: Like X.25 protocol.

- ATM** CPCS  
Common Part Convergence Sublayer. The segment of an AAL convergence sublayer which is constant for all types of traffic.
- ATM** CPCS-SDU  
Common Part Convergence Sublayer – Service Data Unit. A PDU (Protocol Data Unit) that the destination CPCS (Common Part Convergence Sublayer) delivers to the receiving AAL.
- ATM** CPE  
Customer Premises Equipment. Equipment located at the customer site that may not be owned by the local exchange carrier.
- ATM** CPN  
Calling Party Number. A parameter identifying the originating endpoint in the initial address message sent to the destination.
- ATM-PNNI** Crankback  
A method which enables the partial release of a connection setup in progress when a failure is encountered so that an alternate routing can be established.
- CRC  
Cyclic Redundancy Check. An algorithm used by the receiver as an indicator of data integrity—i.e., to verify whether or not the data has been corrupted during transmission. A CRC value is calculated based on the contents of a data unit, and is calculated at the source before the unit is transmitted. When the data unit is received, the receiver uses the same algorithm to calculate CRC. A difference indicates that the data is corrupted. If the CRC calculated at the destination has the same value, the data has been transmitted correctly.
- Ethernet** CRC Errors  
CRC errors are frames of length greater than or equal to 64 bytes, but less than 1519 bytes with an invalid Cyclical Redundancy Check. (CRC errors in frames of length less than 64 bytes are classified as collisions. CRC errors in frames of length greater than 1519 bytes are considered jabber.) CRC errors can indicate a number of different possible error conditions on the network:
- Faulty network interface cards (NICs) and drivers
  - Electro-Magnetic Interference (EMI) or some other type of line noise
  - Overloaded routers and bridges (possible bit swapping errors)
  - Violation of cable length standards.

To troubleshoot any of these problems, check the network information statistics to display the hardware address of the stations generating CRC errors. Then look for logical relationships between these stations.

In some cases, a CRC error might indicate that late collisions are occurring on the network. When a CRC error indicates that a late collision has occurred, the hex pattern within the frame will terminate in either the string AAAAAAAAAA or 55555555. Late collisions indicate a serious configuration problem on the LAN segment. Typically, this occurs either as a result of a cable flaw (a badly kinked cable or a missing terminator) or a faulty NIC card or driver. Cable faults are best fixed with a Time Domain Reflectrometer (TDR).

Late collisions that occur as the result of a faulty NIC card or driver are especially difficult to troubleshoot. The source address shown for a late collision is the address of a station that is operating properly. The actual error is being introduced by some other station that is unable to make proper use of the CSMA/CD MAC technique. Unfortunately, in this case there is no easy way to determine which station is introducing the problem. You must physically disconnect stations from the network until the problem disappears, and then replace the NIC card or the driver on that station.

- ATM** CRF  
Cell Relay Function. An ATM network's basic task of transmitting (or relaying) cells to various endpoints using a number of network terminals.
- ATM** CRF  
Connection Related Function. A Traffic Management term to reference a point in a network or a network element where per connection functions are occurring. This is the point where policing at the VCC or VPC level may occur.
- ATM** CRM  
Missing Resource Management (RM) Cell Count. A service parameter which limits the number of forward RM-cells that a source can send in the absence of received backward RM-cells.
- ATM** CRM  
Cell Rate Margin. A measure of disparity between effective allocation of bandwidth and allocation for a sustainable transmission rate (in cells per second).

**ATM** CRS  
Cell Relay Service. A carrier service supporting the transmission and receipt of ATM cells between end users in compliance with ATM standards and implementation specifications.

**ATM** CS  
Convergence Sublayer. The group of procedures and functions that convert between ATM and non-ATM formats.

**GPRS** CS  
Circuit Switched. Opposite to packet switched.

**Ethernet** CSMA/CD  
Carrier Sense Multiple Access/Collision Detection. A channel access mechanism in which devices wanting to transmit first check the channel for a carrier. If no carrier is sensed for a period of time, devices can transmit. If two devices transmit simultaneously, a collision occurs and is detected by all colliding devices, which subsequently delays the retransmission for some random length of time. CSMA/CD access is used by Ethernet and IEEE 802.3.

#### Channel Service Unit (CSU)

An ancillary device needed to adapt the V.35 interface on a Frame Relay DTE to the T1 (or E1) interface on a Frame Relay switch. The T1 (or E1) signal format on the Frame Relay switch is not compatible with the V.35 interface on the DTE. Therefore, a CSU or similar device, placed between the DTE and the Frame Relay switch, is needed to perform the required conversion.

CSU also refers to an interface for digital leased lines that performs loopback testing and line conditioning.

#### CT

Conformance Test. A test to determine whether equipment (hardware and software) implemented on a network complies with the specifications of a protocol standard and behaves according to that standard.

**ATM** CTD  
Cell Transfer Delay. The elapsed time between a cell exit event at the measurement point 1 (e.g., at the source UNI) and the corresponding cell entry event at measurement point 2 (e.g., the destination UNI) for a particular connection. The cell transfer delay between two measurement points is the sum of the total inter-ATM node transmission delay and the total ATM node processing delay.

## D

### ATM

DA

One of the following:

- Destination MAC Address: A six octet value uniquely identifying an endpoint and which is sent in IEEE LAN frame headers to indicate frame destination.
- Destination Address. Information sent in the forward direction indicating the address of the called station or customer.

### ATM

Data Connections

Data VCCs that connect the LECs to each other and to the Broadcast and Unknown Server.

Data Link Layer

The data link layer services the network layer by providing the functions between adjacent nodes on the network. The data link layer also services the network layer by encapsulating the network layer Protocol Data Unit (PDU) into a frame that provides:

- A synchronized field for the receiver
- Destination and source hardware address fields
- A type field that specifies which network layer protocol is being implemented.

### ATM

DCC

Data Country Code. An ISO standard (ISO 3166) country code that indicates the country in which an address is registered.

DCE

Data Communications Equipment. Typically refers to the devices that interface between terminal equipment such as a server, a user's PC, or other user device and the network. See also DTE.

### TCP/IP

DHCP

Dynamic Host Configuration Protocol is an option installed on a UNIX or Windows® NT server which automatically assigns an IP address to a host.

### Frame Relay

DLCI

Data Link Connection Identifier. The unique number of the Permanent Virtual Circuit (PVC) which is significant only within the user's access channel and corresponds to a specific destination in that channel.

**ATM****Demultiplexing**

The identification and separation of Service Data Units (SDUs) from a single connection into more than one connection.

**Digital Data Service (DDS)**

DDS requires the use of both a Data Service Unit (DSU) and a Channel Service Unit (CSU). They perform the following functions:

- The DSU encodes the DS-1 multiplexer output into an AMI signal
- The CSU performs signal shaping to minimize bandwidth requirements, loopback testing, and general protection of the telco circuit.

**DNS**

Domain Name System. The distributed name/address mechanism used in the network.

**Frame Relay****Discard Eligibility (DE)**

A user-set bit indicating that a frame may be discarded in deference to other frames if congestion occurs, to maintain the committed quality of service within the network. Frames with the DE bit set are considered excess data. See also Excess burst Size (Be).

**GPRS****DRX**

Discontinuous Reception. Designates a situation in which MS does not receive all the time.

**DS-0**

Digital Signal, Level 0. The 64 kbps rate that is the basic building block for both the North American and European digital hierarchies.

**DS-1**

Digital Signal, Level 1. The North American digital hierarchy signaling standard for transmission at 1.544 Mbps. This standard supports 24 simultaneous DS-0 signals. The term is often used interchangeably with T1 carrier, although DS-1 signals may be exchanged over other transmission systems.

**DS-2**

Digital Signal, Level 2. The North American Digital Hierarchy signaling standard for transmission of 6.312 Mbps that is used by T2 carrier which supports 96 calls.

### DS-3

Digital Signal, Level 3. The North American digital hierarchy signaling standard for transmission at 44.736 Mbps. DS-3 is used by T3 carriers. DS-3 supports 28 DS-1s plus overhead.

### DSU

Data Service Unit. The equipment that connects users' computing equipment to a public network.

### DTE

Data Terminal Equipment. Any equipment used to interface with a network (for example, a modem).

### ATM

#### DTL

Designated Transit List. A list specifying the ID of every node to be used in a transit path across a single PNNI (Private Network-Network Interface) peer group. Optionally, a DTL can also identify the logical links that will be used between the nodes.

### ATM

#### DTL Originator

The node in an entire PNNI routing domain that originates a connection request, and builds the DTL (Designated Transit List) to be used for the requested connection.

### ATM

#### DTL Terminator

The last node in the entire PNNI routing domain to process a connection and its associated DTL (Designated Transit List).

### Token Ring

#### Duplicate Active Monitors

Also known as the Multiple Monitor Error. If an Active Monitor (AM) detects a purge or active monitor present MAC frame that is not its own, it immediately terminates all AM functions and increments the Multiple Monitors counter. This soft error is rare.

## E

### ATM

#### E.164

A public network addressing standard which uses up to 15 digits to identify network entities.

## E1

Also known as CEPT1, the 2.048 Mbps rate used by European CEPT carrier to transmit 30 64 kbps digital channels for voice or data calls, plus a 64 kbps signaling channel and a 64 kbps channel for framing and maintenance.

## E3

Also known as CEPT3, the 34.368 Mbps rate used by European CEPT carrier to transmit 16 CEPT1s plus overhead.

## EBCDIC

Extended Binary Coded Decimal Interexchange Code. The character code used by most mainframe computers. Each character is composed of eight bits, as opposed to ASCII, which is composed of seven bits.

## Edge Device

A device which forwards packets between the interfaces for legacy networks (for example, Ethernet or Token Ring) and ATM interfaces, based on data-link and network layer information. Edge Devices are not involved in running network layer routing protocols, but obtain forwarding descriptions using the route distribution protocol.

## ATM

### EFCI

Explicit Forward Congestion Indication. An indicator in the ATM cell header, which can be used by a network element to inform other network elements about its congested or impending congested state. For example, an endpoint system can use EFCI to implement a protocol that adaptively lowers the cell rate of the connection during congestion or impending congestion. Impending congestion is the state when a network element is operating around its engineered capacity level.

## Frame Relay

### Egress Frame

Frame relay frames leaving a frame relay network in the direction toward the destination device. Contrast with Ingress.

## GPRS

### EIR

Equipment Identity Repository. A database used to verify the validity of mobile telephone service equipment. It provides security features, such as blocking calls from stolen mobile stations and preventing unauthorized access to the network. Black-listed equipment prevents the user from completing the call.

- ATM**    **ELAN**  
Emulated Local Area Network. A logical network initiated by using the mechanisms defined by LAN Emulation. This network can include ATM and legacy end stations.
- EMI**  
Electromagnetic Interference. Equipment that is used in high-speed data systems that generates and transmits many signals in the radio frequency portion of the electromagnetic spectrum. Interference with other equipment or radio services can result if sufficient power from these signals escapes the equipment enclosures or transmission media. National and international regulatory agencies set limits for these emissions. Class A is for industrial use and Class B is for residential use.
- Encapsulation**  
A process by which an interface device places an end device's protocol-specific frames inside a frame. For example, a frame relay network accepts only frames formatted specifically for frame relay; consequently, interface devices acting as interfaces to a frame relay network must perform encapsulation. See also Interface device or Frame-Relay-Capable Interface Device.
- End Device**  
The ultimate source or destination of data flowing through a frame relay network—sometimes referred to as a Data Terminal Equipment (DTE). As a source device, it sends data to an interface device for encapsulation in a frame relay frame. As a destination device, it receives de-encapsulated data (i.e., the frame relay frame is stripped off, leaving only the user's data) from the interface device. An end device can be an application program or some operator-controlled device (e.g., workstation). In a LAN environment, the end device can be a file server or host. See also DCE (Data Communications Equipment).
- ATM**    **End Station**  
A host or PC which provides a means for communication either between ATM end stations and end stations on legacy networks (LANs) or among ATM end stations.
- ATM**    **EOM**  
End of Message. A flag used in the AAL to indicate the last ATM cell in a series of cells containing information converted from a single data packet.
- ATM**    **ER**  
Explicit Rate. An RM cell field which instructs the source to set its ACR (Allowed Cell Rate) to a specific rate.

**ATM** ES  
End System. Equipment that originates (originating end system) or terminates (terminating end system) an ATM connection.

**Ethernet** Ethernet Repeater (hub)  
Ethernet repeaters connect users together logically as a bus when star wiring is installed. Ethernet repeaters are usually cabled with 10BaseT but can also use other Ethernet cable types. A repeater can also extend the physical distance limitation to the Ethernet cabling standard used.

ETSI  
European Telecommunications Standards Institute.  
The primary telecommunications standards organization.

**Frame Relay** Excess Burst Size (Be)  
The maximum amount of uncommitted data (in bits) in excess of Bc that a frame relay network can attempt to deliver during a time interval Tc. This data (Be) is generally delivered with a lower probability than Bc. The network treats Be data as discard-eligible. See also Committed Burst Size (Bc).

## F

FCS  
Frame Check Sequence. Refers to any mathematical formula that is used to verify whether a data unit received by its destination was transmitted without error. An FCS is used at the data source to calculate a number based on the bit pattern of the unit; the same calculation is applied to the data as it is received by the destination. A difference in the calculated value indicates transmission errors. *See also CRC.*

**Token Ring** FCS Errors  
Frame Check Sequence (FCS) Errors are also known as CRC errors. Every station on the ring performs a CRC check on every frame as it is repeated. A station sets the Error Detected Indicator bit (in the Start Delimiter byte) when it detects a CRC error so that downstream stations do not report the same error.

If a station consistently reports a CRC error, it usually indicates a bad adapter in the station's upstream neighbor. If a number of stations on the ring are intermittently reporting CRC errors, look for other error conditions such as burst errors or induced noise on the ring.

## FDDI

Fiber Distributed Data Interface. A 100 Mbps LAN standard developed by ANSI for use on fiber optic cables, using techniques similar to Token Ring.

## ATM

### FEBE

Far End Block Error. A maintenance signal transmitted in the PHY overhead that one or more bit errors have been detected at the PHY layer at the far end of the link. An FEBE is used to monitor bit error performance of the link.

## ATM

### FEC

Forward Error Correction. A technique to detect and correct errors in a digital data stream.

## ATM

### FG

Functional Group. A collection of functions related in such a way that they are provided by a single logical component. Examples include the Route Server Functional Group (RSFG), the IASG (Internetwork Address Sub-Group), Coordination Functional Group (ICFG), the Edge Device Functional Group (EDFG) and the ATM attached Host Behavior Functional Group (AHFG).

## Fiber Optic Cable

Can be one of two types:

- Single Mode fiber optic cable 8/125 micron (core/cladding diameter)
- Multimode fiber optic cable 62.5/125 micron (core/cladding diameter)

Features of fiber optic cable:

- Long distances supported:
  - Multimode 2000 meters
  - Single Mode up to 50 miles.
- High bandwidth capabilities
- Immune to Electromagnetic Interference (EMI)
- Good Security Qualities.

## Frame Relay

### Forward Explicit Congestion Notification (FECN)

A bit set by a frame relay network to notify an interface device (DTE) that congestion avoidance procedures should be initiated by the receiving device. See also BECN (Backward Explicit Congestion Notification).

- Frame Relay** Frame Check Sequence (FCS)  
The standard 16-bit cyclic redundancy check used for HDLC (High level Data Link Control) and frame relay frames. The FCS detects bit errors occurring in the bits of the frame between the opening flag and the FCS, and is only effective in detecting errors in frames no larger than 4096 octets. See also Cyclic Redundancy Check (CRC).
- Frame Relay** Frame-Relay-Capable Interface Device  
A communications device that performs encapsulation. Frame-relay-capable routers and bridges are examples of interface devices used to interface the customer's equipment to a frame relay network. See also Interface Device and Encapsulation.
- Frame Relay** Frame Relay Frame  
A variable-length unit of data, in frame-relay format, that is transmitted through a frame relay network as pure data. Contrast with Packet. See also Q.922A.
- Frame Relay** Frame Relay Network  
A telecommunications network based on frame relay technology. Data is multiplexed. Contrast with Packet-Switching Network.
- Frame Relay** Frame Relay Service  
A connection-oriented service that can carry up to 4096 bytes per frame.
- ATM** FRM  
Forward Resource Management cell. An RM cell that is generated by the source, and sent to the destination. The RM cell informs the destination about current connection conditions and the source's current transfer rates through a series of RM-cell parameters.
- ATM** FRTT  
Fixed Round Trip Time. The sum of the fixed and propagation delays between the source and the furthest destination, and back.
- Frame Relay** FRS  
Frame Relay Service: A connection-oriented service that can carry up to 4096 bytes per frame.

# G

## Gateway

A gateway is an internetworking device that usually implies some level of protocol translation. A gateway can allow different types of systems to communicate. An example of a gateway would be a user on a Token Ring LAN communicating with an IBM mainframe through a gateway. The gateway allows both systems to understand the messages sent between them.

## GPRS

### Gb

An interface between an SGSN (Serving GPRS Support Node) and a BSS (Base System Station). It is usually E1 or T1 Frame Relay.

## GPRS

### Gc

An interface between GGSN (Gateway GPRS Support Node) and an HLR (Home Location Register).

## GPRS

### Gd

An interface between an SMS-GMSC (Short Message Service Gateway MSC) and an SGSN (Serving GPRS Support Node), and between an SMS-IW MSC (Short Message Service Interworking MSC) and an SGSN.

## ATM

### GCRA

Generic Cell Rate Algorithm. The GCRA is used to define conformance for the traffic contract of the connection. For each cell arrival, the GCRA determines whether the cell conforms to the traffic contract. The UPC function may implement the GCRA, or one or more equivalent algorithms to enforce conformance. The GCRA is defined with two parameters: the Increment (I) and the Limit (L).

## GPRS

### Gf

An interface between an SGSN and EIR (Equipment Identity Repository).

## ATM

### GFC

Generic Flow Control. A field in the ATM header used to provide local functions only, such as flow control. The value encoded in the GFC field is not constant through the life of a data transmission.

## GPRS

### GGSN

Gateway GPRS Support Node. A router with GPRS specific protocol support.

**GPRS** Gi  
A reference point between GPRS and an external packet data network. It is usually Ethernet.

**GPRS** Gi  
A reference point between GPRS and an external packet data network. It is usually Ethernet.

#### GMM/SM

GPRS Mobile Management/Session Management. This layer is responsible for signalling between MS and SGSN. Mobile management involves, for instance, roaming, and MS authentication. Session Management deals with the establishment and control of PDP contexts.

**GPRS** Gn  
An interface between two GSNs within the same PLMN.

**GPRS** Gp  
An interface between two GSNs in different PLMNs. The Gp interface allows the support of GPRS network services across areas served by the co-operating GPRS PLMN.

#### GPRS

General Packet Radio Service. A multimedia data service that allows you to send and receive information across a mobile telephone network. This service is primarily used for wireless Internet access.

#### **GPRS** GPRS Interfaces

General Packet Radio Service uses the following interfaces:

- Gb – the interface between a Serving GPRS Support Node (SGSN) and a Base Station System (BSS).
- Gc – the interface between a Gateway GPRS Support Node (GGSN) and a HLR.
- Gd – the interface between a Short Message Service-Gateway Message Service Center (SMS-GMSC) and a Serving GPRS Support Node (SGSN), and between a Short Message Service-InterWorking Message Service Center (SMS-IW MSC) and a Serving GPRS Support Node (SGSN).
- Gf – the interface between a Serving GPRS Support Node (SGSN) and an Equipment Identification Register (EIR).
- Gi – the reference point between GPRS and an external packet data network. The GPRS function testing uses this interface to transmit generated traffic.

- Gn – the interface between two GPRS Support Nodes (GSN) within the same Public Land Mobile Network (PLMN).
- Gp – the interface between two GPRS Support Nodes (GSN) in different Public Land Mobile Networks (PLMNs). This interface supports GPRS network services across areas served by co-operating GPRS PLMNs.
- Gr – the interface between a Serving GPRS Support Node (SGSN) and a Home Location Register (HLR).
- Gs – the interface between a Serving GPRS Support Node (SGSN) and a Message Service Center/Visitor Location Register (MSC/VLR).
- R – the reference point between a non-ISDN compatible TE and NT. Typically, this reference point supports a standard serial interface.
- Um – the radio interface between a Mobile Station (MS) and the network side.

**GPRS** Gr  
An interface between an SGSN and an HLR.

**GPRS** Gs  
An interface between an SGSN and MSC/VLR.

**GSM**  
Global System for Mobile Communications. The standard digital cellular phone service you will find in Europe, Japan, Australia and elsewhere - a total of 85 countries around the world. GSM is a set of ETSI standards specifying the infrastructure for a digital cellular service.

**GSN**  
GPRS Support Node.

**GTP**  
GPRS Tunnelling Protocol. Tunnels user data and signalling between GPRS Support Nodes in the GPRS backbone network. All PTP PDP PDUs are encapsulated by the GPRS Tunnelling Protocol.

## H

**H-Channel**  
H-Channels are ISDN bearer services that have pre-defined speeds, starting, and stopping locations on a PRI (Primary Rate Interface). H-Channels are contiguously transported from one PRI site through networks to another PRI site.

#### H0 Channel

A 384 kbps channel that consists of six contiguous DS0s (64 kbps) of a T1 line.

#### H10 Channel

The North American 1472 kbps channel from a T1 or primary rate carrier. This is equivalent to twenty-three (23) 64 kbps channels.

#### H11 Channel

The North American primary rate used as a single 1536 kbps channel. This channel uses 24 contiguous DS0s or the entire T1 line except for the 8 kbps framing pattern.

#### H12

The European primary rate used as a single 1920 kbps channel (30 64 kbps channels or the entire E1 line except for the 64 kbps framing and maintenance channel.

#### H.320

A video conferencing protocol which defines a standard for video conferencing over ISDN and other narrow-band transmission media. H.320 is one in a series of "H" protocols, defined by the International Telecommunications Union (ITU), that define the central technologies used in multimedia teleconferencing.

#### H.323

A standard approved by the International Telecommunications Union (ITU) that defines how audiovisual conferencing data is transmitted across networks.

#### **ATM**

##### HBFG

Host Behavior Functional Group. The functions performed by an ATM-attached host that participates in a Multi-Protocol over ATM (MPOA) service.

#### **ATM**

##### HDLC

High Level Data Link Control. An ITU-TSS link layer protocol standard for point-to-point and multi-point communications.

#### **ATM**

##### Header

The beginning portion of a PDU, containing protocol control information.

## HEC

The fifth octet in the ATM cell header, HEC can be used to check for an error, correct single bit errors, and detect multiple bit errors in the contents of the header.

## ATM- PNNI

### Hello Packet

A PNNI (Private Network-Network Interface) routing packet sent between neighboring nodes to exchange information about the identity of neighboring nodes and the status of the links between them.

## ATM- PNNI

### Hierarchically Complete Source Route

A route expressed as a series of DTLs (Designated Transit Lists) across a PNNI routing domain that includes each hierarchical level between and including the level of the originating switch and the lowest level visible to the source.

### High Level Data Link control (HDLC)

A generic link-level communications protocol developed by the International Organization for Standardization (ISO). HDLC manages synchronous, code-transparent, serial information transfer over a link connection. See also Synchronous Data Link Control (SDLC).

## GPRS

### HLR

Home Location Register.

### Hop

A single trunk line between two switches in a frame relay network. An established PVC (Permanent Virtual Circuit) consists of a certain number of hops, spanning the distance from the ingress access interface to the egress access interface within the network.

### Hop-by-Hop Route

A routing method where each switch along the transmission path uses the routing information at its disposal to determine the next hop of the route, until the call reaches its destination.

## GPRS

### HPLMN

Home Public Land Mobile Network. The home network.

## GPRS

### HSCSD

High Speed Circuit Switched Data. GSM service for circuit switched connections.

# I

- ATM** ICD  
International Code Designator. A two-octet field used to identify an international organization. The British Standards Institute maintains registration authority for ICD values.
- ATM** ICR  
Initial Cell Rate. In ABR service, ICR indicates the rate at which a source should begin sending data after it has been idle for a period of time.
- TCP/IP** ICMP  
Internet Control Message Protocol. A network-layer Internet protocol that provides message packets to report errors and other information relevant to IP packet processing.
- IEEE  
Institute of Electrical and Electronics Engineers: A worldwide engineering publishing and standards-making body for the electronics industry.
- Ethernet** IEEE 802.3  
A Local Area Network protocol suite commonly known as Ethernet. Ethernet has either a 10 Mbps or 100 Mbps throughput and uses a Carrier Sense Multiple Access bus with Collision Detection CSMA/CD. This method allows users to share the network cable. However, only one station can use the cable at a time. A variety of physical medium dependent protocols are supported.
- Token Ring** IEEE 802.5  
A Local Area Network protocol suite commonly known as Token Ring. A standard originated by IBM for a token passing ring network that can be configured in a star topology. Versions supported are 4 Mbps and 16 Mbps.
- IETF  
Internet Engineering Task Force. The organization that provides the coordination of standards and specification development for TCP/IP networking.
- IGP  
Interior Gateway Protocol. The protocol used to exchange routing information between routers in the Internet. RIP and OSPF (Open Shortest Path First) are examples of IGPs.

- ATM** **ILMI**  
Integrated Local Management Interface. An interim specification for network management functions between an end user and a public or private network, as well as between a public and a private network. ILMI is defined by the ATM Forum, and its capabilities are a sub-set of SNMP (Simple Network Management Protocol) capabilities.
- ATM** **IMA**  
A physical layer protocol that allows for new link rates between lower-rate links (DS1, E1) and higher-rate links (DS3, E3).
- GPRS** **IMSI**  
International Mobile Subscriber Identity. A user's unique ID in GSM/GPRS networks.
- Frame Relay** **Ingress**  
Frame relay frames from an access device approaching the frame relay network. Contrast with Egress.
- GPRS** **Interface**  
Well standardized point in the GPRS standard that typically has multi-vendor possibility. Opposite to a reference point.
- Ethernet** **Invalid Broadcast**  
There are several possible causes for invalid broadcast reports. An IP address can have a node value of zero according to the following subnet masks:
- Class A 255.255.0.0
  - Class B 255.255.255.0
  - Class C 255.255.255.0.
- The zero IP Broadcasts are obsolete and are incompatible with stations that send all ones for broadcasts.
- Another cause for this report is that an Ethernet source address was detected with multicast bit set.
- ATM** **IOP**  
Interoperability. The ability of equipment from different manufacturers (or different implementations) to operate together.

## IP

Internet Protocol. A connectionless protocol that operates at Layer 3 of the OSI model, and usually works together with TCP (Transmission Control Protocol). The combination is usually identified as TCP/IP.

## IP Datagram

The fundamental unit of information passed across the Internet. Contains source and destination addresses along with data and a number of fields that define such things as the length of the datagram.

### **GPRS**

#### IPv4

Internet Protocol version 4. The currently used IP version.

### **GPRS**

#### IPv6

Internet Protocol version 6. Next generation IP version, not yet widely used.

## IPX

Novell Internetwork Packet Exchange. A networking protocol for Novell Netware. It was derived from the Xerox Network System protocol and operates at the network layer of the OSI protocol model.

## ISDN PRI

Physically and electrically based on an E1 circuit, but channelized so that two channels are used for signaling and 30 channels are allocated for user traffic. ISDN PRI (Integrated Services Digital Network/Primary Rate Interface) is available in E1 and T1 frame formats, depending on country.

## (N)ISDN

Narrowband Integrated Services Digital Network: Services include basic rate interface (2B+D or BRI) and primary rate interface (30B+D - Europe and 23B+D - North America or PRI). Supports narrowband speeds at/or below 1.5 Mbps for North America or 2.048 Mbps for Europe.

## ISO

International Organization for Standardization: An international organization for standardization, based in Geneva, Switzerland, that establishes voluntary standards and promotes global trade of 90 member countries.

### **GPRS**

#### ISP

Internet Service Provider. An organization or operator that sells Internet access.

## ITU-T

International Telecommunications Union Telecommunications. ITU-T is an international body responsible for defining recommendations and standards for the international telecommunications industry. The fundamental standards for ATM have been defined and published by the ITU-T (Previously CCITT).

- ATM** ITU Q.2100  
B-ISDN Signaling ATM Adaptation Layer Overview. (Also referred to as Q.SAAL).
- ATM** ITU Q.2110  
B-ISDN Adaptation Layer – Service Specific Connection Oriented Protocol. (Also referred to as SSOP).
- ATM** ITU Q.2130  
B-ISDN Adaptation Layer – Service Specific Connection Oriented Function for Support of Signaling at the UNI.
- ATM** ITU Q.2931  
The signaling standard for ATM to support Switched Virtual Connections. This is based on the signaling standard for ISDN.
- ATM** ITU Q.931  
The signaling standard for ISDN to support SVCs. The basis for the signaling standard developed for Frame Relay and ATM.
- ATM** ITU Q.933  
The signaling standard for Frame Relay to support SVCs. This is based on the signaling standard for ISDN.

## IUT

Implementation Under Test. The equipment and systems being tested during a test session.

## J

- Ethernet** Jabber  
Jabber is defined as frames of length greater than 1518 bytes with an invalid cyclical redundancy check (CRC). Jabber indicates a serious problem on the network.

Typically, jabber occurs when a faulty NIC card or driver is unable to properly apply the CSMA/CD (Carrier Sense Multiple Access/Collision Detection) MAC technique, and instead transmits data onto the Ethernet regardless of whether or not another station is currently using the media. If two long frames are overlapped on top of one another, it may create either jabber or an alignment error.

Jabber is extremely difficult to troubleshoot. Traditional network troubleshooting techniques use the source address of the error frame to indicate the station that is introducing the error. With jabber, the source address of the frame is a station on the Network that is behaving "normally". The faulty station is the second station that begins transmitting, and cannot be easily identified.

#### JPEG

Joint Photographic Experts Group. An ISO group which defines the JPEG file format used to compress still pictures.

## L

#### LAN

See Local Area Network.

#### ATM

#### LANE

LAN Emulation. The set of services, functional groups, and protocols that provide for the emulation of LANs using ATM as a backbone to allow connectivity among LAN and ATM attached end stations.

#### LAN Protocols

A range of LAN protocols supported by a frame relay network, including Transmission Control Protocol/Internet Protocol (TCP/IP), Apple Talk, Xerox Network System (XNS), Internetwork Packet Exchange (IPX), and Common Operating System used by DOS-based PCs.

#### Latency

The time for information to get through a network, sometimes referred to as delay.

#### ATM

#### LB

Leaky Bucket. An analogy used to describe the Generic Cell Rate Algorithm (GCRA), the algorithm used to check cell flows from a user or network for conformance to protocol standards.

The leaking hole in the bucket represents a sustained rate at which the cells can be accommodated. while the depth of the bucket represents the network's tolerance to cell bursting over a given time period. *See also Generic Cell Rate Algorithm (GCRA).*

<b>ATM</b>	LE LAN Emulation. Refer to LANE.
<b>ATM- PNNI</b>	Leadership Priority A value assigned to each logical node that determines which logical node is elected peer group leader of its peer group.
<b>ATM LANE</b>	LE_ARP LAN Emulation Address Resolution Protocol: A message issued by a LE client to solicit the ATM address of another function.
<b>ATM</b>	LEC LAN Emulation Client. The end-system entity responsible for control functions, including data forwarding and address resolution.
<b>ATM</b>	LECS LAN Emulation Configuration Server: This implements the policy controlled assignment of individual LE clients to different emulated LANs by providing the LES ATM addresses.
<b>ATM</b>	LES LAN Emulation Server. A server that implements the control coordination function for an Emulated LAN.
<b>ATM- PNNI</b>	LGN Logical Group Node. Represents all of the members of a peer group in the next higher level of the routing hierarchy. LGNs summarize information about the members of the peer group and floods this information to the members of the higher level in the hierarchy.
<b>Frame Relay</b>	Link Access Procedure Balanced (LAPB) The balanced-mode, enhanced version of HDLC (High level Data Link). Used in X.25 packet-switching networks. Contrast with LAPD.
<b>Frame Relay</b>	Link Access Procedure on the D-channel (LAPD) A protocol that operates at the data link layer (layer 2) of the OSI architecture. LAPD conveys information between layer 3 entities across the frame relay network. The D-channel carries signaling information for circuit switching. Contrast with LAPB.

## LLC

Logical Link Control. IEEE-defined sub-layer of the OSI link layer. LLC handles error control, flow control, and framing. The most prevalent LLC protocol is IEEE 802.2, which includes both connectionless and connection-oriented variants.

## ATM

### LNNI

LANE Network Node Interface. The standardized interface between two LAN servers (LES-LES, BUS-BUS, LECS-LECS and LECS-LES).

### Local Area Network (LAN)

A privately-owned network that offers high-speed communications channels to connect information processing equipment in a limited geographic area.

## ATM

### LOC

Loss of Cell Delineation. Refers to either the condition at the receiver, or to a maintenance signal transmitted in the overhead of the physical layer and indicating that the receiving equipment has lost cell delineation. LOC is used to monitor the operation of the physical layer (PHY).

## ATM

### LOF

Loss of Frame. Refers to either the condition at the receiver, or to a maintenance signal transmitted in the overhead of the physical layer, and indicating that the receiving equipment has lost frame delineation. LOF is used to monitor the operation of the physical layer (PHY).

## ATM

### Logical Group Node

In any given level of a PNNI (Private Network – Network Interface) routing hierarchy, this is a logical node representing an entire lower level peer group as a single point.

## ATM

### Logical Link

A representation of the means of communication between two logical nodes, including physical links and virtual path connections.

## ATM

### Logical Node

A representation of a peer group or a physical node (switching system) as a single point.

## ATM

### Logical Node ID

A value that uniquely identifies a logical node within a routing domain.

- Ethernet** Long Frame  
Long frames are frames with length greater than 1518 bytes with a valid cyclical redundancy check (CRC). Long frames indicate a serious violation of the Ethernet specification in the transmitting driver. System administrators should immediately replace any driver that is introducing long frames onto the network. You can immediately correlate long frames with a specific hardware address either by manually inspecting the frames, or by using the Network Information statistics application.
- ATM** LOP  
Loss of Pointer. Refers to either a condition at the receiver, or to a maintenance signal transmitted in the overhead of the physical layer and indicating that the receiver has lost the pointer to the start of cell in the payload. LOP is used to monitor the operation of the physical layer (PHY).
- ATM** LOS  
Loss of Signal. Refers to either a condition at the receiver, or to a maintenance signal transmitted in the overhead of the physical layer and indicating that the receiver has lost the received signal. LOS is used to monitor the operation of the physical layer (PHY).
- Token Ring** Lost Frame  
A Token Ring lost frame error is a soft error that occurs when the adapter is in transmit (stripping) mode and fails to receive the end of the frame it transmitted.
- When a station transmits the trailer of a frame, it sets a timer. If the timer goes off before the trailer is stripped off, the station aborts all transmissions without transmitting a token and increments its lost frame counter. Burst errors that destroy the frame typically cause lost frames.
- A ring station knows if it has lost a frame, but does not know where the frame was lost. However, in rare cases, a single ring station may consistently report lost frames and you can detect no burst or other errors to justify them. In these cases the adapter is probably starting to fail.
- ATM** LSAP  
Link Service Access Point. The logical address of the boundary between Logical Link Control sublayer 2 (LLC) and layer 3.
- ATM** LSB  
Least Significant Bit. The lowest order bit in the binary representation of a numerical value.

**ATM** LUNI  
LANE User-Network Interface: The standardized interface between a LAN Emulation (LE) client and a LE Server (LES, LECS and BUS).

## M

**ATM** MAC  
Media Access Control. IEEE specifications for the lower half of the data link layer (layer 2) that defines topology dependent access control protocols for IEEE LAN specifications.

**ATM** MAN.  
Metropolitan Area Network. A network designed to carry data over an area larger than a campus, such as an entire city and its outlying area.

**ATM** MaxCR  
Maximum Cell Rate. The maximum capacity usable by connections belonging to the specified service category.

**ATM** MBS  
Maximum Burst Size. In the signaling message, the Burst Tolerance (BT) is conveyed through the MBS that is coded as a number of cells. The BT together with the SCR (Sustainable Cell Rate) and the GCRA (Generic Cell Rate Algorithm) determine the MBS that may be transmitted at the peak rate and still be in conformance with the GCRA.

**ATM** MCDV  
Maximum Cell Delay Variance. The maximum two-point CDV objective across a link or node for the specified service category.

**ATM** MCLR  
Maximum Cell Loss Ratio. The maximum ratio of the number of cells that do not pass the link or node to the total number of cells arriving at the link or node.

**ATM** MCR  
Minimum Cell Rate: An ABR service parameter, ABR is the rate (in cells per second) at which the source can always send data.

**ATM** MCTD  
Maximum Cell Transfer Delay. The total of the fixed delay component across the link or node and the MCDV (Maximum Cell Delay Variation).

### Metropolitan Area Network (MAN)

A network that is designed to carry traffic between locations within a single metropolitan area. It is obtained through a provider of MAN services and you do not normally install the required cabling yourself and it usually operates of fiber optic cables.

### MIB

Management Information Base: A definition of management items for some network component that can be accessed by a network manager. A MIB includes the names of objects it contains and the type of information retained.

### ATM

#### MIR

Maximum Information Rate. Refer to PCR (Peak Cell Rate).

#### MMF

MultiMode Fiberoptic Cable. Fiberoptic cable in which the signal or light propagates in multiple modes or paths. Since these paths may have varying lengths, a transmitted pulse of light may be received at different times and smeared to the point that pulses may interfere with surrounding pulses. This may cause the signal to be difficult or impossible to receive. This pulse dispersion sometimes limits the distance over which a MMF link can operate.

#### MPEG.

Motion Picture Experts Group. An ISO Standards group dealing with video and audio compression techniques and mechanisms for multiplexing and synchronizing various media streams.

### MPLS

#### MPLS

Multi-Protocol Label Switching. An IETF defined standard for routing data packets through a network using simple labels rather than complex lookup of IP information. MPLS offers many benefits over the commonly used network layer protocol (IP), including the ability to use source routing, offer greater privacy and security through the use of VPNs, and extend the use of labels to differentiate class of service or traffic priority.

### ATM

#### MPOA

Multi-Protocol Over ATM. An ATM Forum defined specification integrating LANE (LAN Emulation) and NHRP (Next Hop Resolution Protocol) so that multiple internetwork layer protocols can be deployed over ATM.

### GPRS

#### MS

Mobile Station. The phone (in general).

**ATM** MT  
Message Type. The field in a Resource Management cell (RM cell) that contains bit flags indicating the cell's direction, its source, the network congestion indicator for the end-system, and whether the transmission rate can be increased. The direction bit (DIR) indicates whether the RM-cell is forward (DIR=0) or backward (DIR=1). The source bit (BN) indicates whether the RM-cell is source generated (BN=0) or non-source generated (BN=1), indicating that this cell is BECN (Backward Explicit Congestion Notification). The congestion indicator (CI) is 1 to indicate network congestion is present, or 0 if network congestion is not present. The no increase indicator (NI) is 1 to indicate that no increase in the transmission rate is allowed, and 0 otherwise.

**GPRS** MTP2  
Message Transfer Part Layer 2: SS7 protocol layer 2.

**GPRS** MTP3  
Message Transfer Part Layer 3: SS7 protocol layer 3.

#### Multicasting

The transit operation of a single PDU (Protocol Data Unit) by a source interface where the PDU reaches a group of one or more destinations.

#### Multiplexing

Multiplexers (MUXs) combine data from multiple low-capacity input channels onto a single high-capacity output channel. Multiplexing is cost-effective in that it reduces the number of transmission lines required. It is also useful because one input channel would not always keep the output channel busy. There are two types of multiplexing in today's WANs:

- Time Division Multiplexing (TDM)
- Statistical Time Division Multiplexing (STDM)

**ATM** Multipoint-to-Multipoint Connection  
A collection of associated ATM VC (Virtual Channel) or VP (Virtual Path) links, and their associated nodes, with the following properties:

- All nodes in the connection, called endpoints, serve as a Root Node in a Point-to-Multipoint connection to all of the (N-1) remaining endpoints.
- Each of the endpoints on the connection can send information directly to any other endpoint, but the receiving endpoint cannot distinguish which of the endpoints is sending information without additional (e.g., higher layer) information.

**ATM** Multipoint-to-Point Connection  
A Point-to-Multipoint Connection may have zero bandwidth from the Root node to the Leaf Nodes, and non-zero return bandwidth from the Leaf Nodes to the Root Node. Such a connection is also known as a Multipoint-to-Point Connection. Note that UNI 4.0 does not support this connection type.

## N

**ATM** NE  
Network Element. A system that performs network element functions, and that may also perform operation system functions and mediation functions in an ATM network. A network element can be a single device or a geographically distributed system.

**ATM** NEF  
An ATM system or equipment function that supports ATM's network transport services, which include multiplexing and cross-connection.

**ATM** NEL  
Network Element Layer. Refers to those functions that are specifically related to the systems, equipment, vendor, and technology that provide basic communications services

Network Interface Card (NIC)

The NIC builds frames, sends out frames and accepts frames from the LAN. The NIC needs to be of the same type as the LAN to operate. NIC cards vary in speed, complexity, manageability, cost and require drivers to operate.

Network Layer

The network layer provides an end-to-end route between the source and destination stations using software addressing. The network layer PDU (Protocol Data Unit) specifically services the transport layer by providing:

- Source and destination network numbers
- Source and destination node addresses
- Source and destination sockets.

Network Operating Systems (NOS)

The Network Operating System (NOS) is the software portion of the computer network which logically allows devices on a network to communicate with one another.

- ATM** NNI  
Network Node Interface. An interface between ATM switches or nodes.
- ATM** NPC  
Network Parameter Control. The set of procedures implemented to monitor and control traffic from the Network–Node Interface, and designed to protect network resources from malicious or unintentional violations of the negotiated transmission contracts. Such misbehavior within a network can adversely affect QoS (Quality of Service) of already established connections. NPC detects violations of negotiated service parameters, and in response takes appropriate actions to curb such violations.
- GPRS** NS  
Network Service. The protocol layer between BSS and SGSN.
- ATM** NSAP  
Network Service Access Point. An OSI generic standard for a network address, used in ATM for private network addresses. NSAP addresses are 20 octets in length.
- GPRS** NSAPI  
Network Layer Service Access Point Identifier: Identifier that specifies the PDP context in MS and in SGSN.
- NT  
Network Termination. Represents the termination point of a Virtual Channel, Virtual Path, or Virtual Path/Virtual Channel at the UNI.
- nx64K  
Refers to a circuit bandwidth or speed provided by the aggregation of nx64 kbps channels (where n= integer > 1). The 64K or DS0 channel is the basic rate provided by the T Carrier systems.
- O**
- ATM** OAM  
Operations Administration and Maintenance. A group of network management functions that provide network fault indication, performance information, and data and diagnosis functions.
- Octet  
A data unit consisting of eight bits.

## Open System Interconnection (OSI) Reference Model

The OSI model is a 7-layer international standard developed under the auspices of the International Organization for Standardization (ISO). This model is often used to help explain the complexities of a multilayer protocol stack, and as a reference for other protocol stacks.

## OSPF

Open Shortest Path First. A link-state routing algorithm that calculates routes based on the number of routers, transmission speed, delays and route cost.

## Ethernet OUI

Organizationally Unique Identifier. The OUI is a three-octet field in the IEEE 802.1a defined SubNetwork Attachment Point (SNAP) header, identifying an organization which administers the meaning of the following two octet Protocol Identifier (PID) field in the SNAP header. Together they identify a distinct routed or bridged protocol.

# P

## Packet

A group of fixed-length binary digits, including the data and call control signals that are transmitted through a packet-switching network as a composite whole. The data, call control signals, and possible error control information are arranged in a predetermined format. Packets do not always travel the same pathway but are arranged in proper sequence at the destination side before forwarding the complete message to an addressee.

## Packet-Switching Network

A telecommunications network based on packet-switching technology, wherein a transmission channel is occupied only for the duration of the transmission of the packet. Contrast with Frame Relay Network.

## ATM PAD

Packet Assembler and Disassembler. Assembles packets of asynchronous data and emits these buffers in a burst to a packet switch network. The PAD also disassembles packets from the network and emits the data to the non-packet device.

## Payload

The portion of a frame or cell that carries user traffic, that is, the frame or cell exclusive of any headers or trailers.

<b>ATM- PNNI</b>	<p>Parent Node</p> <p>The logical group node that represents a peer group at the next higher hierarchy level. For example, a logical node L01 represents peer group P01 at the next higher level in the routing hierarchy, in peer group P1. L01 is the parent node of P01</p>
<b>ATM- PNNI</b>	<p>Parent Peer Group</p> <p>The peer group that contains the logical group node of a peer group one level lower in the hierarchy. For example, if peer group P1 includes logical group nodes L01, L02, L03 representing peer groups P01, P02, and P03, respectively, from the next lowest level in the hierarchy, then P1 is the parent peer group of P01, P02, and P03.</p>
<b>GPRS</b>	<p>PC</p> <p>Personal Computer. A PC can be also a “laptop” computer.</p>
<b>ATM</b>	<p>PCO</p> <p>Point of Control and Observation. A place (point) within a testing environment where the occurrence of test events is to be controlled and observed as defined by the particular abstract test method used.</p>
<b>ATM</b>	<p>PCR</p> <p>Peak Cell Rate. The rate in cells per second that the source is never allowed to exceed.</p>
<b>GPRS</b>	<p>PCU</p> <p>Packet Control Unit. Functional element in BSS that handles upper level GPRS control in radio.</p>
<b>GPRS</b>	<p>PDA</p> <p>Personal Digital Assistant. A handheld device used for taking notes, storing phone directories, appointment schedules, etc.</p>
<b>GPRS</b>	<p>PDN</p> <p>Packet Data Network. A network that carries user data in packets (e.g. Internet and X.25).</p>
<b>GPRS</b>	<p>PDP</p> <p>Packet Data Protocol. A protocol that is used by user, e.g. IP or X.25.</p>
<b>ATM</b>	<p>PDU</p> <p>Protocol Data Unit: A unit of information formatted and transmitted according to a particular protocol standard. A PDU includes payload data and protocol-specific control information, which is typically contained in a header.</p>

- ATM-PNNI** Peer Group (PG)  
A collection of logical nodes that are located at the same level in the routing hierarchy.
- ATM-PNNI** Peer Group Identifier  
A value which uniquely identifies a peer group.
- ATM-PNNI** Peer Group Leader (PGL)  
A node of a peer group that assembles the data needed to represent the entire peer group as a single node. The peer group leader floods the information about the higher levels in the routing hierarchy to the other member nodes of the peer group.
- ATM-PNNI** Peer Group Level  
An indicator in a peer group identifier specifying the number of significant digits in the peer group identifier.
- ATM-PNNI** Peer Node  
A node in the same peer group as a given node.
- PES  
Packetized Elementary Stream. In MPEG-2, after the media stream has been digitized and compressed, it is formatted into packets before it is multiplexed into either a Program Stream or Transport Stream.
- ATM** PHY  
Physical Layer. In the OSI (Open System Interconnection) model, the layer that provides a physical medium connecting two ATM devices. The physical layer consists of two sublayers, PMD (Physical Medium Dependent) and TC (Transmission Convergence).
- Ethernet** Physical Errors  
For Ethernet, physical errors include CRC (Cyclic Redundancy Check), alignment errors, runts, and long packets. Physical errors are often caused by a faulty NIC (network interface card), bad cables, repeaters or sometimes by a device which does not defer correctly (CSMA/CD).
- Physical Layer  
The physical layer of the OSI model defines connector and interface specifications. Electrical, mechanical, functional, and procedural specifications are all required to insure compatibility.

## Physical Layer Errors

The physical layer provides attachment to the transmission medium and consists of the cable and the circuit switches used to reconfigure the physical equipment. The primary function of the physical layer is to encode, transmit, recognize, and react to bits (0,1), code violations, and signal losses. The physical layer also manages the master clock, the latency buffer (which compensates for minor differences in timing between two ring stations), and the phantom circuit (which provides voltage so that ring stations can attach to the ring). Physical errors occur in the cable, in the switches, or in any of the above-mentioned functions.

### **ATM- PNNI**

#### PICS

Protocol Implementation Conformance Statement. A proforma statement developed for a protocol specification, and completed by a product supplier to indicate the specification requirements and options with which the product conforms. See also PIXIT.

### **TCP/IP**

#### PING

Packet Internet Groper utility is used to troubleshoot TCP/IP networks and test access to an address by sending an ICMP Echo Request, and waiting for an ICMP Echo Reply. The term is used as a verb- "Ping host X and see if it is running."

### **ATM- PNNI**

#### PIXIT

Protocol Implementation eXtra Information for Testing. A statement completed by the product vendor or implementor that provides additional information, outside the scope of a PICS, on the implemented options and features of a protocol. A PIXIT provides additional information needed to run appropriate dynamic tests on an IUT (Implementation Under Test). See also PICS.

#### PLCP

Physical Layer Convergence Protocol. The protocol defined by IEEE 802.6 and used to transmit ATM traffic using DS3.

#### PLL

Phase Lock Loop. A means of setting the timing of the local clock to timing information received within an incoming data stream, for the purposes of setting the signal element timing on the local equipment.

### **ATM**

#### PLMN

Public Land Mobile Network.

**PM**  
Physical Medium. The actual physical interfaces used to transmit and receive ATM traffic.

**PMD**  
Physical Media Dependent. A sublayer of the PHY layer (physical layer) in the OSI model.

**ATM–  
PNNI** **PNNI**  
Private Network-Network Interface: A routing information protocol that enables extremely scalable, full function, dynamic multi-vendor ATM switches to be integrated in the same network.

**ATM–  
PNNI** **PNNI Protocol Entity**  
The switch software that provides routing functions and executes the PNNI protocol.

**ATM–  
PNNI** **PNNI Routing Control Channel**  
VCCs (Virtual Channel Connections) used to transmit and receive PNNI routing information.

**ATM–  
PNNI** **PNNI Routing Domain**  
In a PNNI network topology, a group of adjacent systems running one instance of PNNI routing. A routing domain can include one or more peer groups organized into one or more hierarchical levels.

**ATM** **PNNI Routing Hierarchy**  
The collection of peer groups organized into a hierarchy.

**ATM** **PNNI Topology State Element (PTSE)**  
Routing information that is flooded among all logical nodes of a peer group.

**ATM** **PNNI Topology State Packet (PTSP)**  
A routing packet used to flood PTSEs (PNNI Topology State Elements) among the logical nodes of a peer group.

**Point-of-Presence (POP)**  
Physical place where a long distance carrier interfaces with a local exchange carrier (LEC) network.

**ATM** Point-to-Multipoint Connection

A Point-to-Multipoint Connection is a collection of associated ATM VC (Virtual Channel) or VP (Virtual Path) links, with associated endpoint nodes, with the following properties:

- One ATM link, called the Root Link, serves as the root in a simple tree topology. When the Root Node sends information, all of the remaining nodes on the connection, called Leaf Nodes, receive copies of the information.
- Each of the Leaf Nodes on the connection can send information directly to the Root Node. The Root Node cannot distinguish which Leaf is sending information without additional (higher layer) information. (See note below for UNI 4.0 support)
- The Leaf Nodes cannot communicate directly to each other with this connection type.

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**Note:** *UNI 4.0 does not support traffic sent from a Leaf to the Root.*

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**ATM** Point-to-Point Connection

A connection with only two endpoints.

PPP

Point-to-Point Protocol. (1) Successor to SLIP. Provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits. (2) A protocol which allows a computer to use a modem and a regular telephone line to make a TCP/IP connection directly to the Internet.

**GPRS** PPP

Point-to-Point Protocol. Widely used protocol under IP to connect, e.g. PC and ISP via modems.

**Ethernet** Preamble Collisions

Before transmitting a frame's destination address out onto the network, Ethernet stations transmit an eight-byte long frame preamble used for clock synchronization between the transmitting station and the receiving station. A preamble collision is a collision that occurs completely within the frame preamble. A preamble collision contains no information about the stations involved in the collision.

Preamble collisions represent a normal part of a functioning Ethernet and should not necessarily be a cause for alarm on the part of a system administrator. However, if the number of preamble collisions increases to more than three or four percent of the total number of frames on the network, the system administrator should consider segmenting the Ethernet.

#### Presentation Layer

The presentation layer specifies how end users want to see the data formatted. A common syntax allows compatibility between all types of end user applications and machines. This layer provides for translation between local representations of data and the representation of data that will be used for transfer between and-systems. The results of encryption, compression, and virtual terminal are examples of this translation service.

**ISDN** PRI  
Primary Rate Interface. An ISDN standard for provisioning 1.544 Mbit/s (DS1 – North America, Japan, and others) or 2.048 Mbit/s (E1 – Europe) ISDN services.

**ATM** Private ATM Address  
A 20-octet value that identifies an ATM end system in a Private ATM network.

#### Protocol

A set of rules and formats (semantic and syntactic) that determines the communication behavior of layer entities in the performance of the layer functions.

**ATM** PT  
Payload Type. A three-bit field in the ATM cell header whose value identifies the cell's purpose and contents. PT distinguishes management cells from user (data) cells.

**ATM** PTI  
Payload Type Indicator. Refers to the value inserted in the PT (Payload Type) field to differentiate between management cells and user cells. For example, an RM cell (Resource Management cell) has a PTI of 110 (110 appears in the Payload Type field).

**GPRS** PTM  
Point To Multipoint. One sender, multiple receivers.

**GPRS** P-TMSI  
Packet TMSI. Packet temporary mobile system identity.

**GPRS** PTP  
Point To Point. One sender, one receiver.

**ATM-  
PNNI** PTSE  
See PNNI Topology State Element.

**ATM-  
PNNI** PTSP  
See PNNI Topology State Packet.

PVC  
Permanent Virtual Circuit. A static communications link established between two network elements, before any data transfer takes place. PVCs are usually set up manually.

**ATM** PVCC  
Permanent Virtual Channel Connection. An ATM connection where switching is performed on the VPI/VCI fields of each cell. A Permanent VCC is one which is provisioned through some network management function and left up indefinitely.

**ATM** PVPC  
Permanent Virtual Path Connection. An ATM connection where switching is performed on the VPI field only of each cell. A Permanent VPC is one which is provisioned through some network management function and left up indefinitely.

## Q

**Frame  
Relay** Q.922 Annex A (Q.922A)  
The international draft standard that defines the structure of frame relay frames. Based on the Q.922A frame format developed by the CCITT. All frame relay frames entering a frame relay network automatically conform to this structure. Contrast with Link Access Procedure Balanced (LAPB).

**Frame  
Relay** Q.922A Frame  
A variable-length unit of data, formatted in frame-relay (Q.922A) format, that is transmitted through a frame relay network as pure data (i.e., it contains no flow control information). Contrast with Packet. See also Frame Relay Frame.

**ATM** QD  
Queuing Delay. Queuing Delay refers to the delay imposed on a cell by its having to be buffered because of unavailability of resources to pass the cell onto the next network function or element. This buffering could be a result of oversubscription of a physical link, or due to a connection of higher priority or tighter service constraints getting the resource of the physical link.

**ATM** QoS  
Quality of Service. Quality of Service is defined on an end-to-end basis in terms of the following attributes of the end-to-end ATM connection:

- Cell Loss Ratio (CLR)
- Cell Transfer Delay (CTD)
- Cell Delay Variation (CDV).

## R

**GPRS** R  
Reference point between a non-ISDN compatible TE and MT. Typically this reference point supports a standard serial interface.

**GPRS** RA  
Routing Area. A set of cells that belongs to one group. RA is always a subset of a LA (location area).

**TCP/IP** RARP  
Reverse Address Resolution Protocol. A part of the TCP/IP protocol suit used to determine a destination host's IP address using its hardware MAC address. Commonly used by diskless workstations.

**ATM** RDF  
Rate Decrease Factor. An ABR service parameter which controls the decrease in the transmission rate.

**Token Ring** Ring Purge  
The Active Monitor (AM) uses the ring purge process to restart the ring after a break in the token protocol. A ring purge is performed by a ring station either when it first becomes the AM, or when it detects a lost or corrupted token or frame.

When the AM needs to clear the ring to originate a new token, it broadcasts a ring purge MAC frame to all stations; this is a part of normal Token Ring behavior. However, if a hardware error is detected by the AM, ring purge is the first step in the recovery process. A large number of ring purge frames can indicate potential hardware problems.

#### RFC

Request For Comment. The development of TCP/IP standards, procedures and specifications is done via this mechanism. RFCs are documents that progress through several development stages, under the control of IETF, until they are finalized or discarded. These documents can be found at [www.ietf.org](http://www.ietf.org).

#### ATM

##### RIF

Rate Increase Factor. An ABR service parameter which controls the increase in the transmission rate.

##### RISC

Reduced Instruction Set Computing. A computer processing technology in which a microprocessor understands a few simple instructions thereby providing fast, predictable instruction flow.

#### GPRS

##### RLC

Radio Link Control. A protocol between MS and BSS that handles retransmission and other radio related issues.

#### ATM

##### RM

Resource Management. The management of critical resources in an ATM network. Two critical resources are buffer space and trunk bandwidth. Provisioning may be used to allocate network resources to separate traffic flows according to service characteristics. VPCs (Virtual Path Connections) play an essential role in resource management. By reserving capacity on VPCs, the processing required to establish individual VCCs (Virtual Channel Connections) is reduced. Refer to RM-cell.

#### ATM

##### RM-Cell

Resource Management Cell. An ATM management cell used in the ABR service category's flow control mechanism to transmit information on current network conditions (such as bandwidth availability, congestion, and impending congestion) and control the rate at which the source transmits information.

##### RMON

A standard Management Information Base (MIB) defined in RFC 1271 to allow remote monitoring of networked devices.

## Router

An internetworking device that connects networks at the Network Layer (OSI Layer 3). A router uses software addresses (such as IP or IPX address) contained in packets to determine which network the data is destined toward.

## Routing Protocol

A general term indicating a protocol run between routers and/or route servers to exchange information used to allow computation of routes. The result of the routing computation is one or more forwarding descriptions.

## Ethernet Runt

Runts are frames with lengths less than 64 bytes with valid Cyclical Redundancy Checks (CRCs). On non-switched Ethernet networks, runts represent a serious error condition. For the CSMA/CD (Carrier Sense Multiple Access/Collision Detection) MAC technique to operate properly, Ethernet drivers should always pad short frames to a minimum of 64 bytes in length. Failure to do so is a violation of the Ethernet specification. System administrators should immediately replace any driver that is generating runt frames in a non-switched environment.

You can immediately correlate runt frames with a specific hardware address either by manually inspecting the source address of the frame, or by using the Network Information statistics application. The new switched Ethernet specification has relaxed the original requirement of a 64-byte long minimum frame size.

# S

## ATM SAAL

Signaling ATM Adaptation Layer. The SAAL resides between the ATM layer and the Q.2931 function. The SAAL provides reliable transport of Q.2931 messages between Q.2931 entities (e.g., ATM switch and host) over the ATM layer; two sublayers: common part and service specific part.

- ATM**      **SAP**  
Service Access Point. A SAP is used for the following purposes:
- When the application initiates an outgoing call to a remote ATM device, a `destination_SAP` specifies the ATM address of the remote device, plus further addressing that identifies the target software entity within the remote device.
  - When the application prepares to respond to incoming calls from remote ATM devices, a `local_SAP` specifies the ATM address of the device housing the application, plus further addressing that identifies the application within the local device.
  - There are several groups of SAPs that are specified as valid for Native ATM Services.
- ATM**      **SAR**  
Segmentation and Reassembly. A method of breaking up arbitrarily sized cells.
- ATM**      **SCR**  
Sustainable Cell Rate. The SCR is an upper bound on the conforming average rate of an ATM connection over time scales that are long relative to those for which the PCR (Peak Cell Rate) is defined. Enforcement of this bound by the UPC (Usage Parameter Control) could allow the network to allocate sufficient resources, but less than those based on the PCR, and still ensure that the performance objectives (e.g., for Cell Loss Ratio) can be achieved.
- SDH**  
Synchronous Digital Hierarchy. The ITU-TSS International standard for transmitting information over optical fiber.
- ATM**      **SF**  
SuperFrame. A DS1 framing format in which 24 DSO timeslots plus a coded framing bit are organized into a frame which is repeated 12 times to form the superframe.
- ATM**      **SEAL**  
Simple and Efficient Adaptation Layer. An earlier name for AAL5.
- GPRS**      **SGSN**  
Serving GPRS Support Node. Second new functional element of the GPRS network.

## S-HTTP

Secure HTTP. An extension of HTTP for authentication and data encryption between a Web server and a Web browser.

## Signalling Systems 7 (SS7)

Signal System Number 7. A family of signaling protocols originating from narrowband telephony. They are used to set-up, manage, and tear down connections, and exchange non-connection associated information. Refer to BISUP, MTP, SCCP and TCAP.

### **GPRS**

#### SLIP

Serial Line IP Protocol. Similar protocol to PPP.

### **GPRS**

#### SM

Short Message. Service to send/receive 140 bytes (160 characters) messages.

### **ATM**

#### SMDS

Switched Multi-Megabit Data Services. A connectionless service used to connect LANs, MANs and WANs to exchange data.

#### SMF

Single Mode Fiber. Fiber optic cable in which the signal or light propagates in a single mode or path. Since all light follows the same path or travels the same distance, a transmitted pulse is not dispersed and does not interfere with adjacent pulses. SMF fibers can support longer distances and are limited mainly by the amount of attenuation. Refer to MMF.

#### SMS

Short Message Service. SMS is the ability to send and receive text messages to and from mobile telephones. The text can comprise of words or numbers or an alphanumeric combination.

### **GPRS**

#### SM-SC

Short Message Service Center. A computer that handles short messages.

### **GPRS**

#### SMS-GMSC

Short Message Service Gateway MSC. MSC is used to deliver data to/from SGSN.

### **GPRS**

#### SMS-IWMSC

Short Message Service Interworking MSC. MSC is used to deliver data to/from SGSN.

## SMTP

Simple Mail Transfer Protocol. A protocol that governs mail transmissions. It is defined in RFC 821, with associated message format descriptions in RFC 822.

## ATM

### SN

Sequence Number. SN is a 4 octet field in a Resource Management cell defined by the ITU-T in recommendation 1.371 to sequence such cells. It is not used for ATM Forum ABR (Allowed Bit Rate). An ATM switch will either preserve this field or set it in accordance with 1.371.

## ATM

### SN Cell

Sequence Number Cell. A cell that is sent periodically on each link of an AIMUX to indicate how many cells have been transmitted since the previous SN cell. These cells are used to verify the sequence of payload cells reassembled at the receiver.

## SNA

Systems Network Architecture. IBM's seven layer, vendor-specific architecture for data communications.

## GPRS

### SNDC

SubNetwork Dependent Convergence. A protocol layer between MS and SGSN.

### SNDCP

Subnetwork Dependent Convergence Protocol. This transmission functionality maps network-level characteristics onto the characteristics of the underlying network.

## SNMP

Simple Network Management Protocol. Originally designed for the Department of Defense network to support TCP/IP network management. It has been widely implemented to support the management of a broad range of network products and functions. SNMP is the IETF standard management protocol for TCP/IP networks.

## SONET

Synchronous Optical Network. An ANSI standard for transmitting information over optical fiber. This standard is used or accepted in the United States and Canada and is a variation of the SDH (Synchronous Digital Hierarchy) International standard.

## SSL

Secure Sockets Layer. A transport-level technology for authentication and data encryption between a Web server and a Web browser.

## ATM

### SSCOP

Service Specific Connection Oriented Protocol. An adaptation layer protocol defined in ITU-T Specification: Q.2110.

## ATM

### SSCS

Service Specific Convergence Sublayer. The portion of the convergence Sublayer that is dependent upon the type of traffic that is being converted.

## Token Ring

### Stations Removed

If a station receives a Remove Ring Station MAC frame in which the destination address is its own address, the station must remove itself from the ring. The only way to reinsert onto the ring is to reload the adapter's driver.

### Statistical Time Division Multiplexing (Statmuxing)

Statmuxing is designed around the idea that not all input channels will be busy at the same time. Only those channels that are active are sampled. Statmuxing provides for overbooking of the composite channel. Common applications for Statmuxing are slow speed asynchronous inputs. Frame relay and X.25 networks often work on this premise.

## ATM

### STM

Synchronous Transfer Module. STM is a basic building block used for asynchronous multiplexing hierarchy defined by the CCITT/ITU-T. STM-1 operates at a rate of 155.52 Mbps (same as STS-3).

## ATM

### STM-1

Synchronous Transport Module 1. SDH (Synchronous Digital Hierarchy) standard for transmission over OC-3 optical fiber at 155.52 Mbps. Also referred to as OC3.

## ATM

### STS-n

Synchronous Transport Signal "n" (where n is an integer). SONET standards for transmission over OC-n optical fiber by multiplexing "n" STS-1 frames, (e.g., STS-3 at 155.52 Mbps; STS-12 at 622.08 Mbps and STS-48 at 2.488 Gbps).

**ATM** STS-nc  
Synchronous Transport Signal “n” concatenated (where n is an integer). SONET standards for transmission over OC-n optical fiber by multiplexing “n” STS-1 frames. For example, STS-3 at 155.52 Mbps STS-12 at 622.08 Mbps and STS-48 at 2.488 Gbps but treating the information fields as a single concatenated payload.

**SUT**  
System Under Test. The real open system where the Implementation Under Test (IUT) resides.

**ATM** SVC  
Switched Virtual Circuit. A connection established via signaling. The user defines the endpoints when the call is initiated.

**ATM** SVCC  
Switched Virtual Channel Connection. A Switched VCC is established and taken down dynamically through control signaling. A Virtual Channel Connection (VCC) is an ATM connection where switching is performed on the VPI/VCI fields of each cell.

**ATM** SVPC  
Switched Virtual Path Connection. A Switched Virtual Path Connection is established and taken down dynamically through control signaling. A Virtual Path Connection (VPC) is an ATM connection where switching is performed on the VPI (Virtual Path Identifier) field only of each cell.

**ATM** Switched Connection  
A connection established via signaling.

**Switches**  
A switch usually operates at the Data Link Layer (like a bridge) but is able to reduce latency by processing only the destination address of the frame immediately (instead of processing the whole frame like a bridge) and sending it on its way. Switches can be cut-through design, can be store and forward design, there are no standards for switches, can speed up a sluggish Ethernet network by reducing latency through other internetworking devices such as bridges and routers.

**ATM–  
PNNI** Switching System  
One or more physical machines that act together as a single entity to perform PNNI (Private Network–Network Interface) routing.

**Frame Relay** Synchronous Data Link Control (SDLC)  
A link-level communications protocol used in an International Business Machines (IBM) Systems Network Architecture (SNA) network that manages synchronous, code-transparent, serial information transfer over a link connection. SDLC is a subset of the more generic High-Level Data Link Control (HDLC) protocol developed by the International Organization for Standardization (ISO).

## T

**T1**  
Transmission rate of 1.544 Mbps on T1 communications lines. A T1 facility carries a 1.544 Mbps digital signal. Also referred to as digital signal level 1 (DS-1). See also E1 and channel.

**T3**  
A digital transmission facility operating at 45 Mbps bandwidth. Composed of 28 DS-1 channels in many cases.

**ATM** **TBE**  
Transient Buffer Exposure. The target number of cells to limit the source to sending over the network during startup periods, before the first RM cell returns.

**ATM** **TC**  
Transmission Convergence. The TC sublayer transforms the flow of cells into a steady flow of bits and bytes to be transmitted over the physical medium. On transmission, the TC sublayer maps the cells to the frame format, generates the Header Error Check (HEC), sends idle cells when the ATM layer has none to send. On reception, the TC sublayer delineates individual cells in the received bit stream, and uses the HEC to detect and correct received errors.

**GPRS** **TCAP**  
Transaction Capabilities Application Part. SS7 protocol layer.

**TCP**  
Transmission Control Protocol. Originally developed by the Department of Defense to support interworking of dissimilar computers across a network. A protocol that provides end-to-end, connection-oriented, reliable transport layer (layer 4) functions over IP controlled networks. TCP performs the following functions: flow control between two systems, acknowledgments of packets received and end-to-end sequencing of packets.

## TCP/IP

Transmission Control Protocol/Internet Protocol: The common name for the suite of protocols developed by the U.S. Department of Defense in the 1970s to support the construction of world-wide internetworks. TCP and IP are the two best-known protocols in the suite. TCP corresponds to Layer 4 (the transport layer) of the OSI reference model. It provides reliable transmission of data. IP corresponds to layer 3 (the network layer) of the OSI reference model and provides connectionless datagram service.

## ATM

### TCR

Tagged Cell Rate. An ABR (Allowed Bit Rate) service parameter, TCR limits the rate at which a source can send out-of-rate forward RM-cells. TCR is a constant fixed at 10 cells/second.

## ATM

### TCS

Transmission Convergence Sublayer. This is part of the ATM physical layer that defines how cells will be transmitted by the actual physical layer.

### TDM

Time Division Multiplexing. A method in which a transmission facility is multiplexed among a number of channels by allocating the facility to the channels based on time slots.

### TDMA

Time Division Multiple Access. One of several technologies used to separate multiple conversation transmissions over a finite frequency allocation of through-the-air bandwidth.

### TE

Terminal Equipment. Terminal equipment represents the endpoint of ATM connection(s) and termination of the various protocols within the connection(s).

## GPRS

### TID

Tunnel Identifier. Uniquely identifies the MIS and also the PDP context in the GPRS backbone network (between SGSN and GGSN).

### Time Division Multiplexing (TDM)

In TDM, each input channel is given a time slot during which the multiplexer receives data from that channel. Data is serialized over the composite channel one input channel at a time. At the receiver, each input channel is directed to the appropriate output channel TDM is most commonly used in digital networks.

**ATM** Time Stamp (TS)  
Time Stamping is used on OAM (Operations Administration Maintenance) cells to compare time of entry of cell to time of exit of cell to be used to determine the cell transfer delay of the connection.

**GPRS** TLLI  
Temporary Logical Link Identity. Identifier of the mobile used between MS and SGSN.

**ATM** TM  
Traffic Management. Traffic Management is the aspect of the traffic control and congestion control procedures for ATM. ATM layer traffic control refers to the set of actions taken by the network to avoid congestion conditions. ATM layer congestion control refers to the set of actions taken by the network to minimize the intensity, spread and duration of congestion. The following functions form a framework for managing and controlling traffic and congestion in ATM networks and may be used in appropriate combinations:

- Connection Admission Control
- Feedback Control
- Usage Parameter Control
- Priority Control
- Traffic Shaping
- Network Resource Management
- Frame Discard
- ABR (Allowed Bit Rate) Flow Control.

**Token Ring** Token Error  
Token Error is only reported by the Active Monitor (AM). Every time the AM needs to purge the ring, it reports a token error. The following interruptions can cause the AM to report a token error:

- Corrupted Token or Frame – If a ring station detects a corrupted token or frame, it transmits an abort sequence. The AM detects this and purges the ring.
- Lost Token – The AM must detect a valid token or frame on the ring at least every 10 ms to ensure proper operation of the token protocol. If a valid token or frame is not detected in this period of time, the AM purges the ring.
- Circulating Frame or Priority Token – When the AM detects a frame or token with a priority greater than 0 that has the Monitor Count bit in the Access Control field set to 1, it strips the frame or token and purges the ring.

## Token Ring

As defined in IEEE 802.5, a communications method that uses a token to control access to the LAN. The difference between a token bus and a token ring is that with a token ring, the LAN does not use a master controller to control the token. Instead, each computer knows the address of the computer that should receive the token next. When a computer with the token has nothing to transmit, it passes the token to the next computer in line.

### Token Ring

Token Ring Multistation Access Unit (MAU)

The term Multi-station Access Unit, or (MAU), usually refers to the device used to connect Token Ring stations and LANs together. The MAU is usually located in a Telecommunications Closet and supports 8-48 users each.

### ATM

Traffic Shaping (TS)

Traffic Shaping. Traffic Shaping is a mechanism that alters the traffic characteristics of a stream of cells on a connection to achieve better network efficiency, while meeting the QoS objectives, or to ensure conformance at a subsequent interface. Traffic shaping must maintain cell sequence integrity on a connection. Shaping modifies traffic characteristics of a cell flow with the consequence of increasing the mean Cell Transfer Delay.

### ATM

Trailer

Protocol control information located at the end of a PDU (Protocol Data Unit).

### ATM

Transit Delay

The time difference between the instant at which the first bit of a PDU crosses one designated boundary and the instant at which the last bit of the same PDU (Protocol Data Unit) crosses a second designated boundary.

## Transmission Services

- STS-48 = 2.488 Gbps
- STS-12 = 622.08 Mbps
- STS-3 = 155.52 Mbps
- DS-3 = 44.736 Mbps
- T1/DS-1, PRI = 1.544 Mbps
- BRI = 128 Kbps
- DS-0 = 64 Kbps

## Transport Layer

The transport layer provides end-to-end integrity that is analogous to the point-to-point integrity provided by the data link layer. The transport layer provides two types of basic services to an upper layer protocol:

- Connection-oriented service provides functions to ensure end-to-end integrity
- Connectionless (datagram) service does not provide for any feedback from the receiver.

## TCP/IP TTL

Time to Live. A field in the IP header that indicates how long this packet should be allowed to survive before being discarded. It is primarily used as a hop count.

## U

### ATM UBR

Unspecified Bit Rate. An ATM service category that does not specify traffic related service guarantees. Specifically, UBR does not include the notion of per-connection negotiated bandwidth. No numerical commitments are made with respect to the cell loss ratio experienced by a UBR connection, or as to the cell transfer delay experienced by cells on the connection.

### TCP/IP UDP

User Datagram Protocol. Part of the TCP/IP protocol suite and provides a means for applications to access the connectionless features of IP. UDP operates at layer 4 of the OSI reference model and provides for the exchange of datagrams without acknowledgments or guaranteed delivery.

### GPRS Um

Radio interface between MS and the network side.

### GPRS UMTS

Universal Mobile Telecommunication System.

### ATM Unassigned Cells

A cell identified by a standardized virtual path identifier (VPI) and virtual channel identifier (VCI) value, which has been generated and does not carry information from an application using the ATM Layer service.

**ATM**     **UNI**  
User-Network Interface: An interface point between ATM end users and a private ATM switch, or between a private ATM switch and the public carrier ATM network; defined by physical and protocol specifications per ATM Forum UNI documents. The standard adopted by the ATM Forum to define connections between users or end stations and a local switch.

**Unicast**  
The transmit operation of a single PDU by a source interface where the PDU reaches a single destination.

**ATM**     **UPC**  
Usage Parameter Control. Usage Parameter Control is defined as the set of actions taken by the network to monitor and control traffic, in terms of traffic offered and validity of the ATM connection, at the end-system access. Its main purpose is to protect network resources from malicious as well as unintentional misbehavior, which can affect the QoS of other already established connections, by detecting violations of negotiated parameters and taking appropriate actions.

**ATM**     **UTOPIA**  
Universal Test & Operations Interface for ATM. Refers to an electrical interface between the TC (Transmission Convergence) and PMD sublayers of the PHY layer.

**UTP**  
Unshielded Twisted Pair. A cable having one or more twisted pairs, but with no shield per pair.

## V

**ATM**     **VBR**  
Variable Bit Rate. An ATM Forum-defined service category designed for data which is transferred at rates which may vary greatly over the transfer time. VBR is used for real-time applications such as voice and video traffic as well as for non real-time applications.

**ATM**     **VBR / nrt**  
Variable Bit Rate / non-real time. One of five ATM Forum-defined service types. Supports variable bit rate traffic with average and peak traffic parameters which can tolerate variable but predictable transit delays.

- ATM** VBR / rt  
Variable Bit Rate / real time: One of five ATM Forum-defined service types. Supports variable bit rate traffic that requires strict timing control, such as packetized voice or video, with average and peak traffic parameters.
- ATM** VC (Virtual Channel)  
A communications channel that provides for the sequential unidirectional transport of ATM cells.
- ATM** VCC  
Virtual Channel Connection. A concatenation of VCLs (Virtual Channel Links) that extends between the points where the ATM service users access the ATM layer. The points at which the ATM cell payload is passed to, or received from, the users of the ATM Layer (i.e., a higher layer or ATM-entity) for processing signify the endpoints of a VCC. VCCs are unidirectional.
- ATM** VCI  
Virtual Channel Identifier. A unique numerical tag (as defined by a 16 bit field in the ATM cell header) that identifies the virtual channel used to transfer a cell.
- Virtual Circuit  
A communications link - voice or data - that appears to the user to be dedicated point-to-point circuit. A virtual circuit is referred to as a logical, rather than a physical path, for a call.
- ATM** Virtual Path Switch  
A network element that connects VPLs (Virtual Path Links). It translates VPI (not VCI) values and is directed by Control Plane functions. It relays the cell of the Virtual Path.
- ATM** VLAN  
Virtual Local Area Network. Work stations connected to an intelligent device that provides the capabilities to define LAN membership.
- GPRS** VLR  
Visitor Location Register.
- ATM** VP  
Virtual Path. A unidirectional logical association or bundle of Virtual Channels.

- ATM** VPC  
Virtual Path Connection. A concatenation of VPLs (Virtual Path Links) between Virtual Path Terminators (VPTs). VPCs are unidirectional.
- ATM** VPI  
Virtual Path Identifier. An eight bit field in the ATM cell header which indicates the virtual path used to transfer a cell.
- ATM** VPI/VCI  
Virtual Path Identifier / Virtual Channel Identifier. Combined, these fields identify a connection in the ATM network.
- ATM** VPL  
Virtual Path Link. A means of unidirectional transport of ATM cells between the point where a VPI value is assigned and the point where that value is translated or removed.
- GPRS** VPLMN  
Visited Public Land Mobile Network. The network where the mobile is currently located.
- VPN  
Virtual Private Network. A network service offered by public carriers in which the customer is provided a network that in many ways appears as if it is a private network (customer-unique addressing, network management capabilities, dynamic reconfiguration, etc.) but which, in fact, is provided over the carrier's public network facilities.
- ATM** VTOA  
Voice and Telephony Over ATM. The ATM Forum voice and telephony over ATM service interoperability specifications address three applications for carrying voice over ATM networks; desktop (or LAN services), trunking (or WAN services), and mobile services.

# W

## WAN

Wide Area Network. This is a network that spans a large geographic area relative to office and campus environment of LAN (Local Area Network). WAN is characterized by having much greater transfer delays due to laws of physics.

## WAP

Wireless Application Protocol. WAP is simply a protocol - a standardized way that a mobile phone talks to a server installed in the mobile phone network.



# 2 Reference

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This chapter contains information on standards organizations, the 820.x committee and subcommittees, and the Open Standards Interconnection (OSI) Reference Model.

**Chapter Contents:**

Standards Organizations. . . . .	78
What Does 802.x Mean? . . . . .	79
Open Standards Interconnection (OSI) Reference Model	80

# Standards Organizations

The following organizations influence and add to the networking specifications available today or in the future, and are responsible for defining open protocol stacks:

ANSI	American National Standards Institute	<a href="http://www.ansi.org">www.ansi.org</a>
ATM Forum	Asynchronous Transfer Mode Forum	<a href="http://www.atmforum.com">www.atmforum.com</a>
EIA	Electronic Industries Alliance	<a href="http://www.eia.org">www.eia.org</a>
ETSI	European Telecommunications Standards Institute (ETSI)	<a href="http://www.etsi.org">www.etsi.org</a>
IAB	Internet Architecture Board	<a href="http://www.iab.org">www.iab.org</a>
IEC	International Electrotechnical Commission	<a href="http://www.iec.ch">www.iec.ch</a>
IEEE	Institute of Electrical and Electronic Engineers	<a href="http://www.ieee.org">www.ieee.org</a>
IETF	Internet Engineering Taskforce	<a href="http://www.ietf.org">www.ietf.org</a>
IRTF	Internet Research Taskforce	<a href="http://www.irtf.org">www.irtf.org</a>
ISOC	The Internet SOCIety	<a href="http://www.isoc.org">www.isoc.org</a>
ISO	International Organization for Standardization	<a href="http://www.iso.ch">www.iso.ch</a>
ITU	International Telecommunications Union (formerly CCITT – International Telegraph Consultative Committee)	<a href="http://www.itu.int">www.itu.int</a>
NIST	National Institute of Standards and Technology	<a href="http://www.nist.gov">www.nist.gov</a>
TIA	Telecommunications Industry Association	<a href="http://www.tiaonline.org">www.tiaonline.org</a>
IANA	Internet Assigned Numbers Authority	<a href="http://www.iana.org">www.iana.org</a>

# What Does 802.x Mean?

## IEEE and ANSI Local & Metropolitan Area Committees and Subcommittees

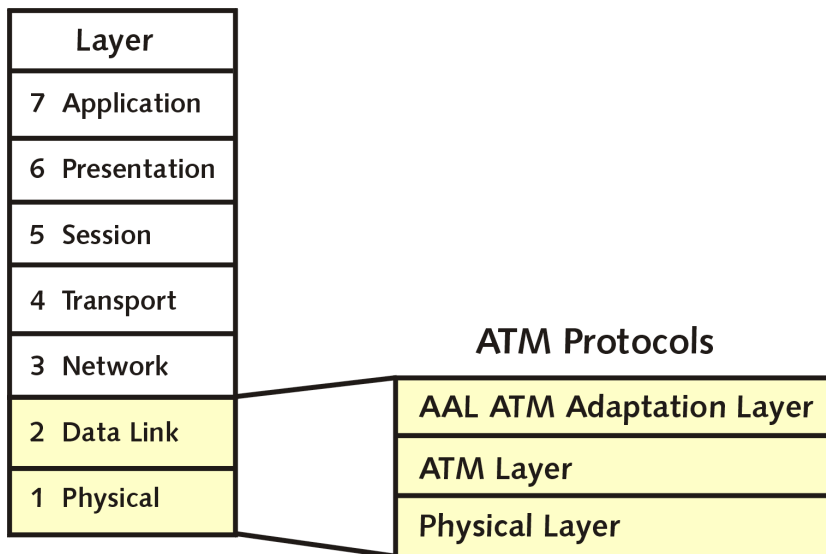
Institute of Electrical and Electronic Engineers (IEEE)

Committee		
802	802.1	High Level Interface
	802.1Q	Standard for VLANs in Layer 2 Switches
	802.2	Logical Link Control Sublayer
	802.3	CSMA/CD networks (1Base5, 10Base-5, 10Base-T Ethernet)
	802.3u	100 Mbps Ethernet (100Base-T or Fast Ethernet)
	802.3z	Gigabit Ethernet Over Fibre
	802.4	Token Bus Networks
	802.5	Token Ring Networks
	802.6	Metropolitan Area Networks
	802.7	Broadband LANs Technical Advisory Group
	802.8	Fiber Optic LANs Technical Advisory Group
	802.9	Packetized Voice and Data LAN Working Group
	802.10	LAN Security Working Group
	802.11	Wireless Networking Working Group
802.12	Demand Priority Access Methods (Standard for 100VG-AnyLAN)	

# Open Standards Interconnection (OSI) Reference Model

## ATM Protocols and the OSI Model

International Organization of Standardization.



## Summarizing the OSI Layers

International Organization of Standardization (Geneva, Switzerland)

### Summary of OSI layers

Layer 7 – Application	Contains functions for particular applications services, such as file transfer, remote files access and virtual terminals.
Layer 6 – Presentation	Provides transparent communication services by masking the differences of varying data formats (character codes, for example) between dissimilar systems.
Layer 5 – Session	Concerned with dialog management. It controls the use of the basic communications facility provided by the Transport layer.
Layer 4 – Transport	Defines the rules for information within and between networks, including error recovery and flow control.
Layer 3 – Network	Determines how data is transferred between computers. It also addresses routing within and between individual networks.
Layer 2 – Data	Concerned with the procedures and protocols for operating the communications lines. It also has a way of detecting and correcting message errors.
Layer 1 – Physical	Deals with the physical means of sending data over lines (i.e. the electrical, optical, mechanical, and functional control of data circuits).

**TIP:** Mnemonic for the layer names: "Please Do Not Throw Sausage Pizza Away."

