

ATM Networks: Basic Ideas and Health

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INTRODUCTION

Telephone companies are finding themselves confronted with a very basic problem: multiple networks. The solution that was devised is a unique new network for the future that will replace the entire telephone system and all the specialized networks with a unique completed network for all types of transport of information. This new network will support enormous rhythm of data compared to all the existing networks and services, and will render possible the offer of a large variety of new services.

The new service network for a wide region is called Digital Network of Completed Services of Wide Area broadband integrated services digital network (B-ISDN). The technological infrastructure that renders it feasible is called asynchronous way of transport: asynchronous transfer mode (ATM) because the transmission is not modern; that is, attached in a being first clock.

GENERALLY FOR THE ATM

The ATM was materialized initially in order to be used in the WANs, however, its value quickly appeared for the LANs. The topology that is used is that of aster. The stations are connected via an ATM Switch. Each Switch can now be connected, with his line in some other hierarchically superior Switch that plays the role of backbone. It should be noted that these appliances allow the transfer of data of concrete breadth of area; however, capacities today reach 10Gbps.

The flexibility of ATM springs from the segmentation of parcels in smaller departments that are named cells. Each cell has a length of 53 bytes from the five constituting the heading (header).

The ATM Switch undertakes the promotion cells to the recipient after decoding the address of the destination from the heading of each cell.

BASIC IDEA

The basic idea behind the ATM is the transport of all information in small determined length parcels that are named cells.

The reasons for cell choice are many. Some of them selectively are:

- The cell transfer is exceptionally flexible and it can easily handle the movement of constant rhythm (e.g., sound, video) and the movement of variable rhythm (data).
- In the very high speeds that are expected, the digital cell transfer is easier than the use of traditional multiplex techniques.
- With regard to television distribution, the possibility of emission is essential. The cell transfer can support it, while the transfer of circuit cannot.

The ATM is based on protocols of virtual connection (e.g., virtual paths, virtual circuits). The user of the ATM has the possibility of accessing in entirety the breadth of area of channel whenever he or she wants for as long as he or she wants. The ATM ensures that services such as voice and moving pictures are transmit-

ted in priority, while the longest time of waiting in the tail of transmission is the time of transmission of cell 53 bytes (roughly 3m sec in rhythm 155 Mbps).

The means of transmission for the ATM is usually the optical fibres, but for connections under 100 meters, coaxial cables or double conductor category 5 can also be used. The fibers can have a length of many kilometres. Each junction is extended between a computer and a transporter ATM or between two transporter ATMs. Each junction from point to point is one way. For completely bidirectional communication, they need two parallel junctions for the movement to each direction.

That is to say, the ATM Connections can become:

- Point to point (point-point)
- Point to a lot of points (point-multipoint)
- Points-to-points (multipoint-multipoint)

The forecasted speeds for ATM networks are 155 Mbps and 622 Mbps, with the possibility of speeds a Gigabit later. The speed of 155 Mbps became in order to be compatible with the system of transmission SONET. The speed of 622 Mbps was selected so with this can be sent four channels of 155 Mbps.

CATEGORIES OF SERVICES OF ATM

Category of constant rhythm bit constant bit rate (CBR) has as its aim to assimilate the cupreous cable or the optical fiber.

The next category of variable rhythm bit variable bit rate (VPR) is divided to subclasses for real time and not real time, respectively. Real-time variable bit rate (RT-VPR) is intended for services that have variable rhythm bits and is combined with strict requirements of real time, as the dialogic video. The other subclass, non-real-time (nrt-VBR) serves the movement; the convenient delivery is important, but a certain small quantity is bearable from the application.

Finally, we reach the unspecified bit rate (UBR), which does not promise anything and does not provide retroaction for the congestion.

USES OF ATM

The widespread deployment of high-speed networks has spurred the development of multimedia applications such as voice and video. In the medical domain, the transmission of medical images over networks opens up the possibility of improved education by allowing remote participation in clinical conferences, or improved and more cost-effective diagnoses by allowing remote consultations with experts. This development is aligned with trends such as the rise of managed health care organizations and the increased pressures for cost reduction in medical care. For example, the Hamad Hospital in Dubai (1998) has signed an agreement in order to organize the installation of a health care network based on asynchronous transfer mode (ATM) technology. This network would enable the hospital to take up a pioneering role in providing innovative telemedicine solutions throughout the whole of the region for many years to come. ATM can be used in:

- **LAN:** Network ATM can function as LAN that connects separate users or as bridges that connect more LAN.
- **WAN:** The ATM offers important faculties for the WAN networks:
 - efficient management
 - control of network
 - the ATM does not face problems with the distance
 - the integrity of a transmitted signal is even ensured when different types of movement are presented in the same network
 - it can offer different services in various speeds and a lot of levels of output
- **MAN:** The movement in a MAN network is limited in distances of certain kilometers.
- As network of trunk

The ATM had big success as a network. It supports a lot of different technologies such as:

- DSL
- IP Ethernet
- Frame Relay
- SONET

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