A Focus on Layer Aspects of Mobile Computing

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Abstract: ***This paper focuses on layer aspects of mobile computing. While transmission over different wires typically does Not cause Interface; this is an important topic in wireless transmission. Now days people are hang on the mobile concepts of Techniques. The wireless transmission was used in all fields in whole world. Even in homes we are using Wireless Equipments such as radio, television, etc. ATM is a technology designed for the high-speed transfer of voice, video, and data through public and private networks using cell relay technology. ATM is an International Telecommunication Union Telecommunication Standardization Sector (ITU-T) standard. ATM technology is used in every walks of life of human and in latest equipments. The practice of maximizing the uses of ATM technology has to be exercised by creating wide network in our world. Therefore, this paper is about the aspects of (TRAFFIC-CONTRACTS) from ATM technology, which are necessary for Understanding the problems of higher layers and the complexity needed to handle transmission impairments. Most people are using ATM technology but they won't have an idea upon it. But in this world we are using the ATM technology with satellite***

Keywords: ATM, wireless transmission, ITU-T, public and private

1. ATM-Asynchronous

1.1 Transfer Mode

ATM is a technology designed for the high-speed transfer of voice, video, and data through public and private networks using cell relay technology. ATM is an International Telecommunication Union Telecommunication Standardization Sector (ITU-T) Standard. Ongoing work on ATM standards is being done primarily by the ATM Forum, which was jointly founded by Cisco Systems, NET/ADAPTIVE, Northern Telecom, and Sprint in 1991.

A high-speed, broadband transmission data communication technology based on pack switching, which is used by Telco, long distance carriers, and campus- wide backbone network to carry integrated data, voice, and video information. Asynchronous Transfer mode (ATM) can be used as the underlying technology for fiber Distributed Data Interface (FDDI) Synchronous Optical Working (SONET), and other High-speed network. Plus, ATM can run on any media including coax, twisted-pair, or fiber-optic.

A cell switching and multiplexing technology, ATM combines the benefits of circuit switching (constant Transmission delay, guaranteed capacity) with those of packet switching (flexibility, efficiency for intermittent traffic). To achieve these benefits, ATM uses the following features:

Fixed-size cells, permitting more efficient switching in hardware than is possible with variable-length packets Connection-oriented service, permitting routing of cells through the ATM network over virtual connections, sometimes called virtual circuits, using simple connection identifiers

Asynchronous multiplexing, permitting efficient use of bandwidth and interleaving of data of varying priority and size the combination of these features allows ATM to provide different categories of service for different data requirements and to establish a service contract at the time a connection is set up.

This means that a virtual connection of a given service category can be guaranteed a certain bandwidth, as well as other traffic parameters, for the life of the connection.

ATM Network Interfaces

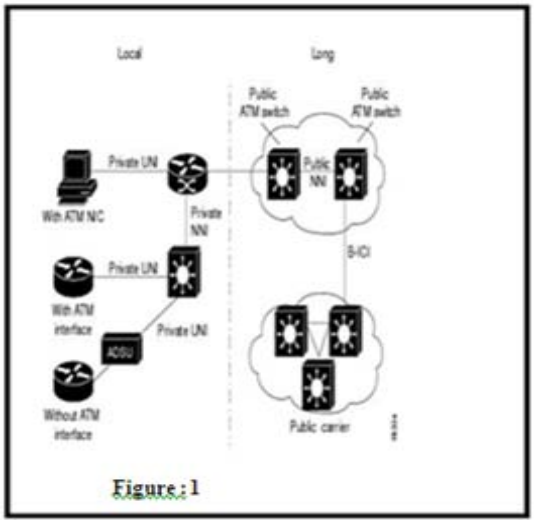

Figure : 1

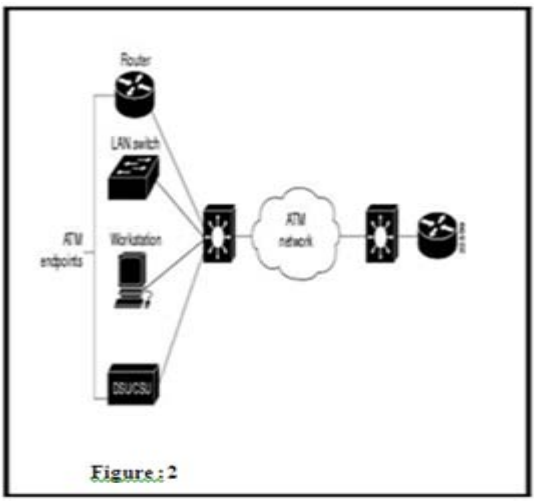

Figure : 2

2. Traffic Contracts and Service Categories

ATM connections are further characterized by a traffic contract, which specifies a service category along with traffic and quality of service (QoS) Parameters. Five service categories are currently defined, each with a purpose and its own interpretation of applicable parameters.

The following sections describe the components of the traffic contract, the characteristics of the service categories, and the service-dependent AAL that supports each of the service categories.

2.1 The Traffic Contract

At the time a connection is set up, a traffic contract is entered, guaranteeing that the requested service requirements will be met. These requirements are traffic parameters and QoS parameters:

- Traffic parameters generally pertain to Bandwidth requirements and include the following:
    - Peak cell rate (PCR)
    - Sustainable cell rate (SCR)
    - Burst tolerance, conveyed through the maximum burst size (MBS)
    - Cell delay variation tolerance (CDVT)
    - Minimum cell rate (MCR)
    - Peak-to-peak cell delay variation (PpCDV)
- QoS parameters generally pertain to cell delay and loss requirements and include the following:
- Maximum cell transfer delay (MCTD)

2.2 Traffic Parameters

Each ATM connection contains a set of parameters that describes the traffic characteristics of the source. These parameters are called source traffic parameters Peak Cell Rate (PCR) which is the maximum allowable rate at which cells can be transported along a connection in the ATM network. The PCR is the determining factor in how often cells are sent in relation to time in an effort to minimize jitter. PCR generally is coupled with the CDVT (Cell Delay Variation Tolerance), which indicates how much jitter is allowable.

2.2.1 Sustainable Cell Rate (SCR)

SCR is a calculation of the average allowable, long-term cell transfer rate on a specific connection.

2.2.2 Maximum Burst Size (MBS)

MBS is the maximum allowable burst size of cells that can be transmitted contiguously on a particular connection.

2.2.3 Minimum Cell Rate (MCR)

MCR is the minimum allowable rate at which cells can be transported along an ATM connection.

2.3 The Service Categories

One of the main benefits of ATM is to provide distinct classes of service for the varying bandwidth, loss, and latency requirements of different applications. Some applications require constant bandwidth, while others can adapt to the available bandwidth, perhaps with some loss of quality. Still others can make use of whatever bandwidth is available and use dramatically different amounts from one instant to the next.

ATM provides five standard service categories that meet these requirements by defining individual performance characteristics, ranging from best effort (Unspecified Bit Rate [UBR]) to highly controlled, full-time bandwidth (Constant

The characteristics and uses of each service category are summarizing as follows:

- VBR-RT service provides only a partial bandwidth Guarantee. Like CBR, however, some bandwidth might still go unused. Typical applications include packetized voice and video, and interactive Multimedia.
- VBR-NRT service provides a partial bandwidth Guarantee, but with a higher cell delay than VBR-NRT. This service category is suitable for busty applications, such as file transfers.
- ABR provides a best effort service, in which Feedback flow control within the network is used to increase bandwidth when no congestion is present, maximizing the use of the network.
- UBR service provides no bandwidth guarantee, but Attempts to fill bandwidth gaps with burst data. UBR is well suited for LAN protocols, such as LAN emulation. An additional category, UBR+, is a Cisco extension to UBR that provides for a nonzero.
- CBR service provides constant bandwidth with a fixed timing relationship, which requires clocking synchronization. Because CBR traffic reserves a fixed amount of bandwidth, some trunk bandwidth might go unused. CBR is typically used for circuit emulation services to carry real-time voice and video.

A set of parameters are negotiated when a connection is set up in an ATM network. These parameters are used to measure the Quality of Service (QoS) of a connection and quantify end-to-end network performance at the ATM layer. The network should guarantee the negotiated QoS by meeting certain values of these parameters.

2.3.1 Cell Transfer Delay (CTD)

The delay experienced by a cell between the time it takes for the first bit of the cell to be transmitted by the source and the last bit of the cell to be received by the destination. Maximum Cell Transfer Delay (Max CTD) and Mean Cell Transfer Delay (Mean CTD) are used.

2.3.2 Peak-to-peak Cell Delay Variation (CDV)

The difference between the maximum and minimum CTD experienced during the connection. Peak-to-peak CDV and Instantaneous CDV are used.

2.3.3 Cell Loss Ratio (CLR)

CLR is the percentage of cells that are lost in the network due to error or congestion and are not received by the destination.

Table 1: Traffic Contracts

Service Category	*Traffic Parameters*	*QoS Characteristics*	
		Cell Loss	*Cell Delay*
CBR- Constant bit rate	PCR	Low	Low
VBR-RT-Variable bit rate Real Time	PCR,SCR, MBS	Low	Low
VBR NRT- Variable bit rate; Non real Time	PCR,SCR, MBS	Low	unspecified
ABR-Available bit Rate	PCR,MCR	unspecified	unspecified
UBR- Unspecified bit rate	(no Guarantee)	unspecified	unspecified

2.4 Type of Service

Currently, five ATM Forum-defined service categories exist. These service categories provide a method to relate traffic characteristics and QOS requirements to network behavior. The service categories are characterized as being real-time or non-Real-time. CBR and NRT-VBR are the real-time service Categories. The remaining three service categories (NRT-VBR, UBR and ABR) are considered non-real-time service categories.

2.4.1 Constant Bit Rate (CBR)

The CBR service category is used for connections that transport traffic at a consistent bit rate, where there is an inherent reliance on time synchronization between the traffic source and destination. CBR is tailored for any type of data for which the end-systems require predictable response time and a static amount of bandwidth continuously available for the life-time of the connection. The amount of bandwidth is characterized by a Peak Cell Rate (PCR). These applications include services such Video conferencing, telephony (voice services) or any type of on-demand service, such as interactive voice and audio. For telephony and native voice applications CBR provides low-latency traffic with predictable delivery characteristics, and is therefore typically used for circuit emulation.

2.4.2 Real-Time Variable Bit Rate (RT-VBR)

The RT-VBR service category is used for connections that transport traffic at variable rates -traffic that relies on accurate timing between the traffic source and destination. An example of traffic that requires this type of service category are variable rate, compressed video streams. Sources that use rt-VBR connections are expected to transmit at a rate that varies with time (for example, traffic that can be considered bursts). Real-time VBR connections can be characterized by a Peak Cell Rate (PCR), Sustained Cell Rate (SCR), and Maximum Burst Size (MBS). Cells delayed beyond the value specified by the maximum CTD (Cell Transfer Delay) are assumed to be of significantly reduced value to the application.

2.4.3 Non-Real-Time Variable Bit Rate (NRT-VBR)

The NRT-VBR service category is used for connections that transport variable bit rate traffic for which there is no inherent reliance on time synchronization between the traffic source and destination, but there is a need for an attempt at a guaranteed bandwidth or latency. An application that might require an NRT-VBR service category is Frame Relay interworking, where the Frame Relay CIR (Committed Information Rate) is mapped to a bandwidth guarantee in the ATM network. No delay bounds are associated with NRT-VBR service.

2.4.4 Available Bit Rate (ABR)

The ABR service category is similar to NRT-VBR, because it also is used for connections that transport variable bit rate traffic for which there is no reliance on time synchronization between the traffic source and destination, and for which no required guarantees of bandwidth or latency exist. ABR provides a best-effort transport service, in which flow-control mechanisms are used to adjust the amount of bandwidth available to the traffic originator.

The ABR service category is designed primarily for any type of traffic that is not time sensitive and expects no guarantees of service. ABR service generally is considered preferable for TCP/IP traffic, as well as other LAN-based protocols, that can modify its transmission behavior in response to the ABR's rate-control mechanics.

ABR uses Resource Management (RM) cells to provide feedback that controls the traffic source in response to fluctuations in available resources within the interior ATM network. The specification for ABR flow control uses these RM cells to control the flow of cell traffic on ABR connections. The ABR service expects the end-system to adapt its traffic rate in accordance with the feedback so that it may obtain its fair share of available network resources. The goal of ABR service is to provide fast access to available Network resources at up to the specified Peak Cell Rate (PCR).

2.4.5 Unspecified Bit Rate (UBR)

The UBR service category also is similar to NRT-VBR, because it is used for connections that transport variable bit rate traffic for which there is no reliance on time synchronization between the traffic source and destination. However, unlike ABR, there are no flow-control mechanisms to dynamically adjust the amount of bandwidth available to the user. UBR generally is used for applications that are very tolerant of delay and cell loss. UBR has enjoyed success in the Internet LAN and WAN environments for store-and-forward traffic, such as file-transfers and e-mail. Similar to the way in which upper-layer protocols react to ABR's traffic-control mechanisms, TCP/IP and other LAN-based traffic protocols can modify their transmission behavior in response to latency or cell loss in the ATM network.

3. Conclusion

With rapid use of ATM technology the equipments of people is in demand. Hence we should afford this to an extent we conclude that each and every aspect of the people should use the ATM technology.

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