Atm Essay, Research Paper

Traditional local area networks, such as Ethernet and Token Ring, use a connectionless or unreliable approach when sending information across the network. Each client is connected to the network by an adapter card, which has a driver, and above that driver is a protocol driver, such as TCP/IP. The protocol driver bundles information into frames of varying size, and gives each bundle an appropriate header. Then, when the wire is available, the data packets are shipped off to be individually routed through the maze of hardware and software. Each packet in a series of packets could conceivably take a different route to reach the same destination. Traditional LAN technologies do not guarantee that data will arrive on time or in the proper order. Ethernet and Token Ring can detect errors, but they provide no service guarantees and are not responsible for recovery from missing or corrupted data packets.

Because they are joined by a common medium, each station on the traditional LAN sees the packets of data put on the wire by each of the others, regardless of whether the packet is passed sequentially from one station to the next (as in a ring topology) or broadcast to all stations simultaneously (as with Ethernet). Each station has an adapter card, which processes the packet and examines the destination address. If the address applies to that machine, the adapter does a hardware interrupt and accepts the packet.

Because a traditional LAN is connectionless, it cannot provide guarantees or similar features. For example, it cannot determine the status of the target machine. It cannot ensure that bandwidth will be available throughout the transmission. Unanticipated bottlenecks are common, which can hinder a traditional LAN’s ability to support time-sensitive applications such as video-on-demand or voice traffic. Traditional LANs can use upper-level protocol drivers are to do such things as verify packet arrival (retransmitting, if necessary), partition big messages into smaller ones, use time stamps for synchronization, and so forth. However, these services add time to the transmission, and none of them provide end-to-end quality of service guarantees.

ATM, on the other hand, is connection-oriented. An ATM end point establishes a path (a virtual circuit, or VC) to the destination end point prior to sending any data out on the network. It then sends a series of same-size packets (called cells) along this path towards the destination. Note that while establishing the connection, the ATM end point also negotiates a quality of service (QoS) contract for the transmission. This contract spells out the bandwidth, maximum delay, acceptable variance, and so forth that the VC will provide, and this contract extends from one end point to the other. ATM provides guaranteed quality of service through a LAN, a WAN, and a public internetwork.

Unlike LAN traffic, ATM traffic does not need to be redirected at each router or switch. Its path is identified at the outset, and the switching hardware merely needs to examine a simple header to identify the proper output port. Note, however, that ATM is an unreliable transmission protocol. It does not expend bandwidth sending or waiting for data acknowledgement. As with LANs, missing or corrupted information must be detected and corrected by upper-level protocols.

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Bibliography

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