Sarcouncil Journal of Engineering and Computer Sciences

**ISSN(Online): 2945-3585**

Volume- 01| Issue- 02| 2022

**Research Article** **Received:** 05-04-2022 | **Accepted:** 20-04-2022 | **Published:** 25-04-2022

# Role of Asynchronous Transfer Method (ATM) for Corporate

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**Abstract:** The Asynchronous Transfer Mode (ATM) is being developed as a highspeed networking technique for the public network capable of supporting many classes of trafficc. ATM is also well suited for applications within corporate networking: as a private wide area network; as the campus backbone network; and as a highspeed local area network. This article discusses ATM technology in relation to the requirements of corporate networking. An introduction to ATM switch architecture is presented. The various approaches to ATM switch design that have appeared in the literature are reviewed. Finally, a discussion is presented of some of the current issues facing the development of ATM networks. It is argued that much simpler solutions to many of these issues may be adopted in the context of the corporate network than is permissible for the public broadband network.

**Keywords:** Asynchronous Transfer Mode, Corporate networking, Broadband network.

## INTRODUCTION

We are all aware of the continual expansion in thecapabilities of the desktop workstation. The steady growth in the processing speed of reduced instruction set processors seems likely to continue. The client/server model of networked operation continues to gain favor in the commercial environment. Even the humble personal computer no longer stands alone but is increasingly being networked. Already these developments are causing the network bandwidth requirements at the desktop to exceed the shared 10 Mbits/s of most current local area networks. Furthermore, video and multimedia applications are beginning to move from astate of speculation and research, to active commercial consideration. Several workstation manufactures are currently integrating video capabilities into their desktop workstations. Such productsare already within striking distance of an acceptable cost. These developments will demand networks with a capacity of several orders of magnitude beyond the current shared 10 Mbits/s. In addition, multimedia applications require the abilityto handle multiservice tra c in a single integratednetwork. Commercial demand for local area bandwidth measured in gigabits/s is fast becoming a reality.

In the last few years the physical topology of local area networks has migrated from the ring and the multidrop bus towards a star con guration (the hub) even though the technology remains shared medium. Even at 10 Mbits/s this topology is easier to manage and offers higher reliability. As the bandwidth requirement of the local area approaches the gigabit/s range, switched star topologies are the most likely to be favored in the commercial envi ronment. The majority of desktop applications are unlikely to require individual access much in excess of one or two hundred Mbits/s. Shared medium access in the gigabit/s range is likely to remain significantly more expensive than access at around 100 Mbits/s for some time. Thus for commercial applications the switched star approach with 150 Mbits/s to the desktop and an aggregate capacity in the gigabit/s range will undoubtedly prove more cost efective than a gigabit/s shared medium design. This implies an approach based upon ATM technology.

## LITERATURE REVIEW

ATM is a highspeed packet switching techniqueusing short xed length packets called cells. Fixed length cells simplify the design of an ATM switch at the high switching speeds involved. The selection of a short xed length cell reduces the delayand most signi cantly the jitter (variance of delay) for delay sensitive services such as voice and video. ATM thus presents a single integrated switching mechanism capable of supporting a wide range oftra c types such as voice, video, image and various classes of data. ATM has been selected as the multiplexing and switching technique for use in the public Broadband Integrated Services DigitalNetwork (B-ISDN) and is receiving much standardization activity ATM is a switching technique developed for the wide area so a local area ATM network will alsoover seamless access to private wide area networking as well as tothe public broadband network. Thus high capacity multiservice local networks are more likely to be based upon ATM than upon other proprietary highspeed packet switching schemes.





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DOI- https://doi.org/10.5281/zenodo.6529819

In the literature ATM technology is almost always discussed in the context of its application to broadband ISDN. The application of ATM technology to corporate networking (i.e. high capacity local area networks, campus area networks, backbonenetworks, private broadband networks) results in a rather di erent set of requirements than those of B-ISDN. The most obvious difference in the designof an ATM switch for commercial applications is that a smaller aggregate capacity is required than that envisaged for the public B-ISDN. The initial commercial market is likely to center on the high capacity interconnection of existing data networking applications. So initially an aggregate switch capacity in the region of 1 or 2 Gbits/s will probably be sufficient. As highspeed workstation access and multimedia applications gain acceptance in the workplace, the switch design must be capable of signi can't growth. With growth to switch capacities of 10 Gbits/s and beyond, reliability is likely to become an issue so redundancy will be required of the switch design. Cost per access port will be a sensitive parameter for direct ATM access by workstations so the ability to over various degrees of concentration on access to the switch will be important. Highspeed access ports at 600 Mbits/s may also be required to support applications such as high performance servers.

## METHODS

The descriptive approach was adopted in this study through the collection of previous literature and examples to illustrate what is Asynchronous transfer method (ATM) role for corporate. This journal will provide sample case that may be occur in company.

The aim of the journal is to help users how to know about Role of Asynchronous transfer method (ATM) for Corporate.

## RESULTS AND DISCUSSION

ATM switches designed for corporate networks will very soon become available. The initial commercial application will be a high capacity backbone to relieve the bandwidth bottleneck that is beginning to constrain current solutions. Today's data networking services will use tomorrow's bandwidth to remove congestion, o er highspeed data services, and eliminate many of the current problems of managing large data networks. Within the campus or local area, the physical structure of the network will no longer constrain the communication bandwidth available. Corporate wide area ATM networks will soon arise as local ATM sites are interconnected via leased lines. Given sufficient bandwidth this will erode the distinction between the local area net work and the wide area network from the user's perspective. The ATM LAN will expand to include remote sites participating in network applications as though they were locally connected, ultimately limited only by the speed of light.

The emergence of ATM networks in the commercial environment will stimulate the development of new communication services. Multimedia applications are an obvious candidate, as is highspeed data networking, but advanced services as yet unknown will be enabled by the introduction of ATM technology. The availability of such applications will encourage direct ATM connection to the workstation. So ATM switch designs for corporate networks must have the ability to grow to a large number of ports and the cost per connection must fall to permit the direct attachment of individual workstations.

The majority of existing ATM switch prototypes constructed by the leading telecommunication equipment manufacturers are based upon a time division switch module. Each design has developed a chip set in 0.8 m CMOS or BiCMOS technology to implement the switch module. These switch modules are interconnected in a Clos structure to achieve a large internally bu ered switch. A time division switch module can be very exible as it may also be designed for use as an access multiplexer and a tra c concentrator. One manufacturer has chosen a space division matrix structure with crosspoint bu ers for the basic switch module. A switch designed for a campus network application has selected a buffered banyan approach. The construction of a large Batcher banyan switch is also currently under investigation. Most of the other designs reported in the literature tend more towards research investigations rather than manufacturing prototypes. While there is much research value in investigating new selfrouting space division structures, it appears that the safe money is behind internally bu ered switch modules at least with current implementation and interconnection technology.

However, the ATM switch prototypes from the telecommunication manufacturers have been designed to satisfy the requirements of the public broadband ISDN. There are a number of signi can't differences between broadband ISDN and the



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application of ATM technology to the corporate network environment. In the corporate network, ATM technology must interwork with current LANs, bridges, routers, and protocols. Existing data traffic sources are not going to declare their traffic characteristics before submitting traffic to the network. Nor have appropriate simple traffic descriptors, or algorithms to compute the effective bandwidth, yet been designed. A simple reactive congestion control scheme with reasonably large bu ers will allow an ATM network to offer a campus-wide high-speed data service with the characteristics of a LAN. The support of multicast groups will assist existing protocols to operate over an ATM LAN. Wide area connectivity can employ traffic shaping at the source and employ packet discard on outbound trunks to alleviate congestion. A substantial number of classes of priority within the switch will be helpful as the network matures to support new classes of loss and delay sensitive traffic.

An ATM switch is of no use if there are no products with ATM interfaces. An ATM network interface chip is required for high-speed data applications with properties similar to today's LAN controllers. This device must perform the adaptation layer functions of packet to cell segmentationand reassembly to offer a packet level interface to the host. It would be very useful if the device also supported rate control, for the congestion control scheme, and traffic shaping to improve wide area network performance and to allow the accurate definition of worst case tra c characteristics.

The use of large buffers and queue monitoring for reactive congestion control, with multiple queue priorities and an exible queue service algorithm, suggests that an externally buffered switch may be more appropriate for corporate networking applications. Internally buffered designs tend to have a limited buffer space and place greater reliance upon the preventive congestion control mechanisms of accurate traffic characterization, source policing, call admission, and bandwidth allocation. External bu ering also permits traffic to be evenly distributed across a multiple path switch fabric without knowledge of the traffic characteristics and without requiring resequencing. However, the design of the switch itself is not the most critical issue in the successful application of ATM technology to the corporate network. Cost per port, capacity, growth capability, and the range of existing products for which ATM interfaces are offered will of course play their part. But the solution of the ATM networking issues, and the support that the switch and the network interface provide to implement these solutions, will have a critical impact upon the success of any offering in the corporate ATM networks market.

## CONCLUSION

Accounting and interworking are issues facing theintroduction of the public broadband ISDN.Charging on a per cell basis for each virtual connection would seem to introduce additional and un-necessary complexity to the user network interface. Charging on the basis of negotiated traffic parameters is likely to be insufficient for very bursty traffic sources such as the majority of interactive dataapplications. Detailed accounting is generally not required in private networks.Compatibility of new broadband services is required with existing services and customer premisesequipment. This forms a much greater challenge for public networks than for private networks. Equipment in the private domain is amortized more rapidly so there is less of a requirement to inter- work with aging technology. Also, useful services may be delivered by ATM technology in the private domain without requiring universal and immediate interworking with all existing telecommunications equipment.

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**Source of support:** Nil; **Conflict of interest:** Nil.

**Cite this article as:**

Kosasih, F.G., Yustanto, A. and Muda, I. "Role of Asynchronous Transfer Method (ATM) for Corporate."*Sarcouncil Journal of Engineering and Computer Sciences* 1.2 (2022): pp 1-3






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