Mitigation of Channel Impairment of Traffic Loading on Ethernet LAN

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ABSTRACT

In the design of an Ethernet communication network for multiple classes of users, the appropriate choice of traffic load to be transmitted in the network is made so as not to degrade the quality of service of the particular network. This paper presents analysis of the influence of varying traffic (packet size) and the number of work stations in an Ethernet network. The major objective is to establish the influence of varying the traffic intensity and the network sizes of Ethernet quality of service parameters. It is found out that through put and utilization degrades slightly when the mean packet size is increased and the load is kept constant but collision and delay increases as the network increases. The analysis is presented using matlab modeling and simulation environment. The network was modeled and converted into MATLAB simulation model. The model was simulated and the results obtained were used to estimate the performance of the network using the quality of service parameters like collision, through put utilization and delay.

Keywords: Local Area Networks, Fiber Distributed Data Interface, Distributed Queue Dual Bus, Access with Collision Detection, Binary Exponential Back Off, Media Access Control , Frequency Division Multiple Access

I. INTRODUCTION

The term Ethernet refers to a family of protocols and standards that together define the physical and data link layer of the world's most popular type of local area network [1]. Ethernet has become the most widely used local area network access method defined by the institution of electrical and electronic Engineers (IEEE) in the 802.3 standard. Since the local area networks (LAN) concept was defined 30 years ago, many technologies have been developed to occupy this area of the market. Such as Token Ring, Token bus, Fiber Distributed Data Interface (FDDI), Distributed Queue Dual Bus (DQDB), Local Asynchronous transfer mode and local area network were once commonly related. Becoming the defector standard used in almost all the local area network. Ethernet uses carrier sense Multiple. Access with Collision Detection (CSMA/CD) as protocol to communicate among the nodes in the network and this when collision of transmission occurs, they are resolved by using the Binary Exponential Back off (BEB) transmission algorithm [2]. In practical, there are many Media Access Control (MAC) approaches which includes collision based versus collision free, those based on distributed control versus those based on central control and civil Switched types (Time division multiple access, Frequency Division Multiple Access (FDMA) versus demand assigned [3]. These media control access idea have contributed over the years to development of data networks such as Ethernet, token ring. The protocol carrier sense multiple access / collision. Detection is a random access protocol as a protocol to communicate among the nodes in the network and Ethernet does not perform well in a network with a large population of active solution. [4] As more real time multimedia traffic is involved in today's network they lack in the capability of the handling real time in traffic in a network has discouraged the future development of the protocol. Many attempts have been proposed in the past to enhance the (SMA and CSMA/CD protocol such as CSMA/CD with dynamic priorities (CSMA/CD-DP) which are still on the enhancement.
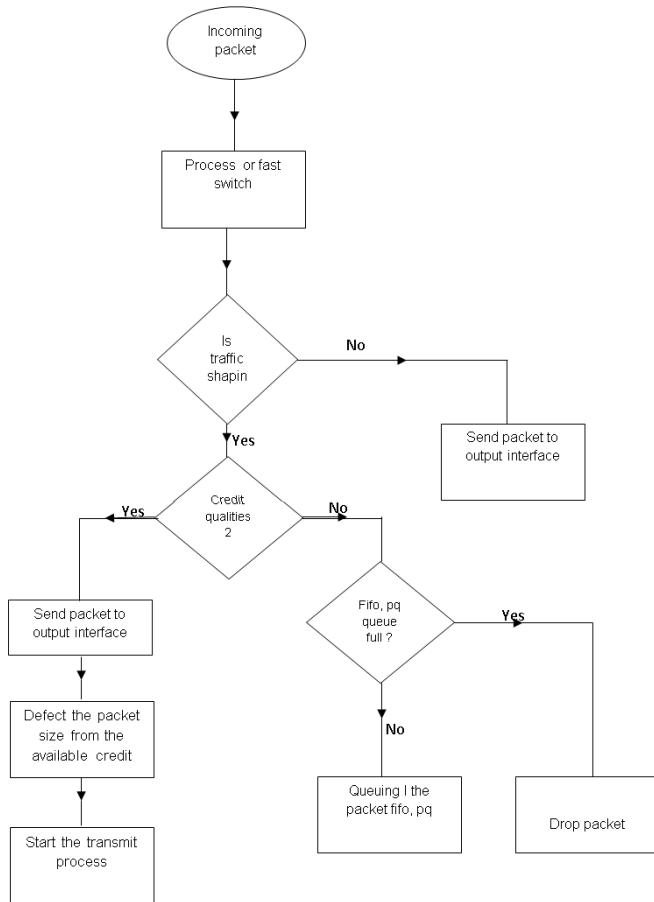
II. METHODS AND MATERIAL

Figure 1 : Flow chart of queue behaviour

Data Collection

Figure I show the flow chart for the queuing behaviour of Ethernet. The simulation is use in C language, A program that is designed to transfer packets from source to small. All packets can travel though CSMA/CD to get to the sink. The maximum time for all packets to be in the queue is 5um . The traffic data used in this paper were obtained from input Generator of the Ethernet network. The input generator modules generate input for bandwidth sizes and packet size in order to generate request. The input generator module is built inside the Ethernet local area network. The input generator runs on unit operational system and other special software that are incorporated into a counter. Also arrival process that calculate the service process that calculate the service time for each packet arrival to the system which also collect to the departure process that calculates each packet delay in the buffer and schedules the next departures.

Data Presentation and Analysis

The throughput data collected which include packet size (bytes were shown in table I. the graphical presentation of the throughput is also shown.

Table 1: Field Data Measurement

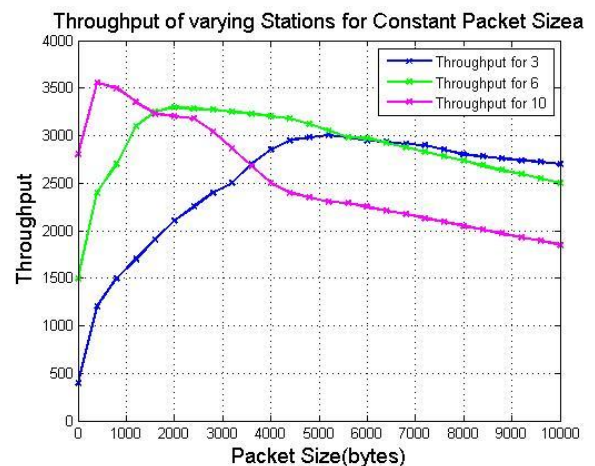| Packet Size (Bytes)	Throughout for three Stations
0	400
800	1200
1200	1700
1600	1900
200	2110
2400	2250
2800	2400
3200	2500
3600	2700
400	2850
4400	2950
4800	2950
5200	3000
5600	2980
6000	2950
6800	2930
7200	2910
7600	2900
8000	2800
8400	2780
8800	2760
9200	2740
9600	2720
10000	2700

III. RESULTS AND DISCUSSION

Figure 2 : Throughput of three stations for varying packet sizes

IV. CONCLUSION

Collision loss was seen to be increasing as the packet size is increased. It was also observed that collision occurs more when the number of workstations connected to the network increases. So to maintain a minimal collision on the network; the packet size to be transmitted and the number of stations to be connected will be moderately chosen. So throughput increases with in packet size, buffer size and the number of hope traversed and increased in the number of nodes connected to the networks increases the networks throughput.

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