PERFORMANCE EVALUATION OF AN FDDI-ATM
GATEWAY BY SIMULATION METHOD

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NORINI BTE HAMDAN
Department of Electrical Engineering
MARA INSTITUTE OF TECHNOLOGY
40450 Shah Alam
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ABSTRACT

Networks are evolving towards a Broadband Integrated Services Digital Network (B-ISDN). The initial steps towards B-ISDN involves the use of backbone networks to act as the switching center for linked Local Area Networks (LANs), consequently forming a Metropolitan Area Network (MAN). Fibre Distributed Data Interface (FDDI) is widely used as the most promising solution to the problem of high speed interconnection in the near term and on the local area basis. In order to realise a Broadband ISDN (B-ISDN) network, Asynchronous Transfer Mode (ATM) has been selected as a transport technology for this network. The evolution of the interconnection towards B-ISDN necessitates the backbone ring of an FDDI to be connected via an interface to ATM networks of the B-ISDN. In this thesis, an interconnected FDDI ATM based B-ISDN network is presented and the performance of FDDI ATM based B-ISDN gateway is analysed. Inter-network messages of varying sizes are transmitted from FDDI network via the gateway to ATM networks of the B-ISDN. The performance measure of concern is the Mean Waiting Time (MWT) of inter-network traffic. A simulation model is used to analyse the effect of varying the probability of inter-network packet (p), effect of load, effect of varying ring length (distance) and effect of varying message size on the overall performance of interconnected FDDI ATM based B-ISDN network subjected to different traffic conditions. A simulation model is written in C language and it is used to verify the analytical model proposed by J.Abdul Manan and D.A.Harle [1] and [2].

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Fibre Distributed Data Interface (FDDI) is widely recognised as the most promising solution to the problem of high speed interconnection. Beside this, Asynchronous Transfer Mode (ATM), provides the most promising transmission technique for Broadband ISDN (B-ISDN) which supports a variety of services such as from simple telephony to full multimedia including audio, video and high speed data.

Previously, the systems designs have not considered the interface between the FDDI based Metropolitan Area Network (MAN) and B-ISDN, although this performance study has been reported earlier. This interface is very important and it acts as the gateway for all information transfer between MAN and B-ISDN. It has also been shown that the interconnection between FDDI and ATM based B-ISDN can be realised through the gateway. Thus, this FDDI-ATM gateway is responsible for handling all interconnecting and interworking issues between these two networks. Furthermore, the evolution of the interconnection towards B-ISDN necessitates the connectionless FDDI to be connected via the interface to the B-ISDN

In this thesis, a simulation model of the interconnected FDDI-ATM gateway is presented and its resultant performance evaluation will assist in the analysing the overall performance of the system.