SIMULATION STUDY OF REAL-TIME DATA COMMUNICATIONS OVER CSMA/CD NETWORK USING OMNET++

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ABSTRACT

Ethernet refers to a family of LAN multiple access protocols that vary in details such as bandwidth, collision detection mechanism etc. Ethernet uses a bus or star topology and supports data transfer rates of 10 Mbps. The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers. It uses the CSMA/CD access method to handle simultaneous demands.

The main objective of this project is to perform a simulation study on communicating voice packets over the CSMA/CD Ethernet and analyze its performance of IEEE 802.3. The simulation is done by using a discrete-event simulator called OMNeT++. This project basically has two parts, simulation part and analysis part. The simulation part will simulate the program to analyzed the behavior of CSMA/CD. The result then have been analyzed with plotting graph. At the end of this project, the graph will build after data has been collected. Data collected based on how many packet sending are success to hub and the time taken to send the packet to hub. The graph shown are %successful packet transmission vs no. of nodes and % successful packet transmission vs interarrival time (s).

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2.7.1 A Shared Medium

CHAPTER 1

INTRODUCTION

1.1 Introduction

Distributed real-time systems comprise a large number of intelligent processing nodes connected together over a communication network. The nodes co-operatively control real-world processes like industrial plants or air traffic systems. All processing nodes are autonomous and work concurrently. In soft real-time systems, such as multimedia and videoconferencing, voice and image data are being transmitted. Excessive delays over the network can significantly degrade the quality of voice and video received. Therefore, these systems need a communication network that can support the transmission of these kind of messages.

The most popularly used network nowadays is Ethernet. This is because it is fast (available in 10Mbps, 100Mbps and 1000 Mbps), simple, widely available and easy to setup. However, since it is a CSMA/CD – based network, the channel access is random and this leads to unpredictable delay of messages whenever collisions occur. This property (unpredictability) is unsuitable for real-time communications.