

**ENHANCED QUEUE MANAGEMENT MECHANISM FOR
DIFFERENTIATED SERVICES NETWORKS**

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DIFFERENTIATED SERVICES NETWORKS**

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By

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ABSTRACT

In the Internet, it is supposed that all connections are treated equally in the network. Due to the limitation of network resources are limited, providing guarantees on performance measures imposes declining new connections if resources are not available. Assigning network resources to connections according to their classes requires differentiating between the connection classes. For this reason, the Differentiated Services (DiffServ) has been proposed. Many of the QoS mechanisms have been developed which allow different services carried by the Internet to co-exist. Many of these mechanisms were both complex and failed to scale to meet the demands of the Internet. MRED is the common mechanism used in DiffServ routers. It suffers from large queue length variation and untimely congestion detection and notification. These consequences cause performance degradation due to high queuing delays and high packet loss. In this project, enhanced version of MRED is developed to improve the performance of DiffServ networks that use TCP as the transport layer protocol. Enhanced MRED includes average packet arrival rate when computing the packet drop probability. Enhanced MRED showed a good performance compared to that of MRED, in term of fast congestion detection and notification. The limitation of the new mechanism is that it works only with responsive connections which play a big role in avoiding and controlling the congestion. The major contribution of this project is to provide an improved queue management mechanism for DiffServ networks that responds to congestion more quickly, delivers congestion notification timers, and controls the queue length directly to congestion which results in minimizing queue length variation. All these would help improve the DiffServ networks performance.

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CHAPTER ONE INTRODUCTION

This project is about enhancing the queue congestion management mechanism used in Differentiated Services environment to help providing good quality of service to end users based on their requirements. The goal of this chapter is to place the project in its context. In this chapter, an introduction to Differentiated Services, its issues, and the role of queue management mechanism in enhancing the network performance are provided in Section 1.1 and 1.2, respectively. The research problem is presented in Sections 1.3. Sections 1.4, 1.5, and 1.6 of this chapter, respectively, include the research questions, research scope, and objectives of the research presented in this project. The importance of the work done in this project is stated in Section 1.7 while the project organization is presented in Section 1.8 of this chapter.

1.1 Introduction

In recent years, important investments have been made in the planning and development of computer networks. The rapid growth of the Internet provides a good opportunity for creating new mechanisms for internet infrastructure to service the increase of new applications, such as web surfing, network monitoring, desktop sharing and video conferencing. The delay variations in network system affect network applications. In an acknowledgement and time-out-based congestion control mechanism, e.g., TCP, performance is related to the delay-bandwidth product of the connection (Durrezi, Sridharan, Jain, Liu, & Goyal, July 2001). Furthermore, TCP round-trip time (RTT) measurements are sensitive to delay variations, which may cause wrong timeouts and retransmissions.

The contents of
the thesis is for
internal user
only

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