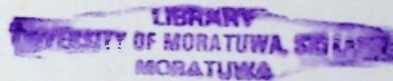# A Market-Based Web Bandwidth Management System
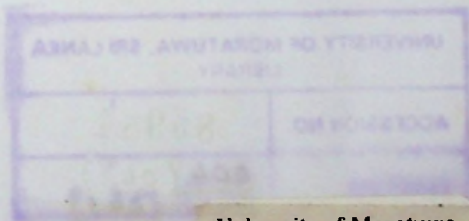
THESIS PRESENTED BY

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DR. GIHAN DIAS

This thesis was submitted to the Department of Computer Science and Engineering of
the **University of Moratuwa-Sri Lanka**
in partial fulfillment of the requirements for the
Degree of Master of Science

Department of Computer Science and Engineering
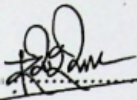University of Moratuwa
Sri Lanka
December 2005

DECLARATION

The work submitted in this thesis is the result of my own investigations, except where it is otherwise stated.

It has not already been accepted in substance for any degree, and also is not being concurrently submitted for any other degree.

....

D.A.B.C. Disanayake,
(Candidate)

....

Dr. Gihan Dias
(Supervisor)

Dedicated

to

my parents

and

teachers

who encouraged me

in my education

Abstract

The World Wide Web (WWW) is the most popular service of the Internet, which is used by millions of people in almost every country for their day-to-day operations. Since the demand for WWW is increasing rapidly, the infrastructures for this service such as bandwidth need to be developed and upgraded regularly. This is not affordable for developing countries like Sri Lanka, because of the cost and the technological deficiencies. Providing a satisfactory service to users by 'managing the existing bandwidth' is the best alternative for this. But it is very difficult to achieve both with the available bandwidth management mechanisms.

We have designed and implemented a proxy-based system, which allows each user to request, and obtain a desired amount of bandwidth for web access. The server allocates the bandwidth for users considering the available bandwidth and demand. Bandwidth is priced dynamically based on the demand at any given time. The user is charged based on the bandwidth level and the duration of usage. This allows users in a bandwidth-constrained environment to prioritize their web usage, and encourages them to carry out bandwidth-intensive applications during off-peak hours. This user involvement in bandwidth allocation is the main innovation of this system.

This feature was implemented by adding new functions to the Squid web cache server. These functions allow adding or removing IP addresses of users to the relevant delay pool of squid according to the user requested bandwidth. Users login to the proxy server through an intermediate server, which keeps the users accounts and login details. In addition to the user requested bandwidth allocation, this system provides user management and billing functions. According to our experience, this new system is highly suitable for the Internet Service Provides (ISPs) to offer a better quality user satisfied service while managing their available bandwidth resources.

Acknowledgement

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