

BANDWIDTH MANAGEMENT IN SMALL ORGANIZATIONS USING PFSENSE

**VICTOR KIMUTAI FRIDAH MUTHIO KAVISA**

I132/0885/2013 I132/0501/2013

SUPERVISOR

PAUL ABUONJI

# **ABSTRACT**

Small organizations are growing rapidly with the current economy with each of them wanting to achieve high profits and minimize of their cost of expenditure. The growing digital error has seen each small organization having to adopt the use of technology in order to perform their operations efficiently. Every small organization faces the challenge of bandwidth management since most of them are focus mostly on the operations that seem to give quick returns. Most of the small organizations spend a lot of funds on purchasing bandwidth not knowing that bandwidth however much they purchase bandwidth it can never be enough until it is managed. Bandwidth management reduces the cost incurred by small organizations in purchasing bandwidth.

In this project, we address the problem of bandwidth management in small organizations and propose efficient economic-based solution in order to deal with these issues at different bandwidth management levels, and hence enhance the QoS support the small organizations’ network. Specifically, we propose pfsense firewall to be used for bandwidth management in a small organization environment. The firewall is configured to support multiple classes of traffic with different users having different QoS requirements, maximize speed of traffic of some services with reserved bandwidth in some queues, support inter- and intra-class fairness, prevent network congestion and maximize the network operator’s revenues. The framework consists of three related components, namely packet scheduling, bandwidth allocation and limiting. On implementing this project, CBQ scheduling method was able to be used, limiting of bandwidth to specific queues, blocking of some services from some queues like Facebook in the transport and customer care department. Captive portal was configured and we were able to authenticate users in the network and reject the ones that didn’t have an account in the Radius server. Ntopng packet was installed and it helped in accounting for bandwidth usage by different departments of the organization with details of why and what is using the bandwidth. By efficiently managing the network’s bandwidth prior to users’ admission (i.e., pre-admission bandwidth management) and during the users’ connections (i.e., post-admission bandwidth management), these schemes are shown to achieve the design goals of our project.