

## ABSTRACT

Density control of queue (congestion control) in a network until now is still remained as a high priority and an important issue. Internet growth is very fast, not only the number of the users but also the applications such as voice, data and video, it caused the amount of data that was taken to a router becomes larger. This increasing requires a design of an effective congestion control algorithms to manage these queues.

Designing strategy for an effective congestion control in a network is quite difficult because it involves a variety of dynamic parameters. So some researchers are now using an alternative scheme that has the ability to overcome these difficulties from an existing algorithm to produce an effective congestion control algorithms. Today's the most well known congestion control algorithm is the RED algorithm (Random Early Detection).

This final project is trying to implement the RED algorithm to control the queue in the router. But this RED algorithm, as valued by some researcher is having less qualified to deal with a congestion conditions. The author tried to utilize an alternative scheme by adding the fuzzy logic algorithm to control the RED while there is a congestion. This implementation will be carried out an analysis of network QoS aspects and will be compared with RED algorithm's network QoS. Analysis is based on a peer-to-peer *triple-play* services trial such as VoIP, video streaming and file transfers.

From the testing and analysis, RED algorithm based on *fuzzy* was able to provide a better QoS while congestion conditions occur. For voice services, the resulting *delay* is smaller in the ammount of 6.462 ms or 17.37% of the RED algorithm. Mean while for video service, the *packet loss* is smaller, it's about 19.7%. And for data services, RED algorithm based on *fuzzy* logic can improve the throughput more than 100% compared with the RED algorithm it self.

**Keywords:** RED algorithm, Fuzzy logic, Congestion control, Triple play, and QoS.