

ABSTRACT

The demand for stable and reliable internet connectivity continues to grow, particularly in home and small office network environments. One viable solution to improve availability and connection efficiency is implementing load balancing methods that distribute network traffic across multiple internet connections simultaneously. This study compares the performance of two load balancing methods, Per Connection Classifier (PCC) and Equal Cost Multi-Path (ECMP), implemented using MikroTik devices and tested in a home network scenario with two active ISP connections (Biznet and Telkomsel).

Testing was conducted on several Quality of Service (QoS) parameters across 108 different scenarios, covering variations in bandwidth and failover conditions. The results show contrasting advantages. In terms of throughput, the ECMP method was superior, achieving a combined speed of 17 Mbps, compared to 14 Mbps for PCC. However, PCC proved to be far more reliable in maintaining connection stability, excelling in 5 out of 7 bandwidth categories in minimizing packet loss, and demonstrating lower delay under high-bandwidth conditions.

The results of this study indicate that the selection of a load balancing method should be adjusted according to the specific requirements and conditions of the network. PCC is more suitable for networks requiring high stability and adaptability, whereas ECMP can be a suitable choice for symmetrical network connections aiming to maximize throughput with a simpler configuration.

Keywords: *load balancing, equal cost multi path, per connection classifier, mikrotik, quality of service, network development lifecycle, internet service provider*