

## **ABSTRACT**

The need of private network with fast data rate capability and secure is an absolute necessity at this time. To anticipate that, need to be made private network (VPN) that can pass data packets by combining MPLS technology and concept of LAN on WAN network. MPLS VPN-L2VPN is a VPN technology that offers delivery of data packets with routing by looking at MAC Address destination This is done with purpose of data transfer speed can be faster than conventional networks.

This paper do the implementation of multipoint and point-to-point MPLS VPN-L2VPN small network based on Ethernet using Mikrotik Routerboard with VoIP service. The research tried to test the performance by measuring QoS parameters and security testing by gave ARP Spoofing and MAC Flooding attacks on network.

From the results of measurements MPLS VPN-L2VPN QoS performance better with the highest throughput of 0.086633 Mbps without background traffic and 0.086 Mbps with 75 Mbps background traffic. The highest delay in MPLS VPN-L2VPN network without background traffic is 19.99187 ms and 20 124 ms with background traffic. The highest jitter on MPLS VPN-L2VPN without background traffic is 0.220733 ms and 0299 ms with 75 Mbps background traffic. The highest packet loss on MPLS VPN-L2VPN network 0.995% with 75 Mbps background traffic. Security testing with MAC Flooding attacks and ARP Spoofing attacks on MPLS VPN-L2VPN network successfully performed. It can be concluded that the MPLS VPN-L2VPN network has a good QoS performance but still vulnerable in terms of security when given attacks.

**Keywords: MPLS L2VPN, VPLS, QoS, ARP Spoofing, MAC Flooding.**