

## ABSTRACT

Human need for information are increasingly growing. The world of telecommunications and informatics continues to present new things in order to improve the quality of service. Multi Protocol Label Switching (MPLS) is present as one of the solutions in terms of improving the quality of network especially in the core network. With MPLS, we can simplify and optimize the process of selecting a path/route to the core network. Therefore, the interaction within the network can be established quickly. But there are another factors that must be considered, namely security. The security factor can be met by adding a feature to the MPLS service, namely MPLS Virtual Private Network (MPLS VPN). With this feature, we can connect two or more private remote networks through the core network that already configured MPLS. Therefore we can do the communication between client faster and more secure than using a regular IP network.

In this final project done 3 scenarios. Scenario 1 testing VoIP QoS on GRE Tunnel VPN, MPLS VPN, MPLS VPN MBM, MPLS VPN NGOs. Then in the second scenario testing VoIP QoS on MPLS VPN network MBM when the Link Failure. In Scenario 3 done proving that it can be implemented as a protocol VRRP Load Sharing.

From the measurement and analysis, scenario 1 can be concluded that the MPLS VPN network has the best performance compared to other network models because there are processes in MPLS VPN network core labeling thus speeding up the process of forwarding on the network. For the worst performance of MPLS VPN network is owned by Master-Backup Mode (MBM) for network traffic on the network is getting congested due of VRRP advertisement packets. In scenario 2 (Link Failure), it can be proved that VRRP is able to maintain the quality standards of VoIP with QoS despite the failed link. In scenario 3 also found that redundant VRRP is an efficient solution because it proved to function as load sharing protocol.

Key words : VRRP, MPLS VPN Layer 3, QoS, *Downtime*