

## ABSTRACT

MPLS is a method of forwarding data over a network using the information in the label attached to an IP packet. One of MPLS application is Virtual Private Network (VPN). MPLS-VPN is usually constructed by using a routing protocol Border Gateway Protocol (BGP). BGP is routing protocol for inter-Autonomous System (AS) in which BGP systems within the AS should connect to all other BGP systems to form a full-mesh configuration. Therefore, increasing number of networks will result to more routing table on BGP routers.

In this final project will implement an MPLS-VPN technology using *full-mesh* BGP with 4, 5, and 6 routers in a small network uses GNS3 as an MPLS Router emulator and compared to uses of full-mesh. Measurements taken include QoS consists time delay, jitter, throughput and packet loss. The result of this implementation is expected to provide a snapshot of number of BGP router's influence on MPLS-VPN.

From the results of measurements, it is showed that full-mesh 6 routers topology have delay 0.11% better than full-mesh 4 router and 0.33% better than full-mesh 5 routers. Full-mesh 6 routers topology have throughput 0.12% better than full-mesh 4 routers and 1.21% better than full-mesh 5 routers. And these three topology have same packet loss which is 0. And for jitter full-mesh 6 routers topology 0.92% worst than full-mesh 4 routers and 1.51% better than full-mesh 5 routers. Full-mesh 6 routers can be better than other topology because it have more path to choose so it can choose better path. But Full-mesh 4 routers can be better than other topology because with less routers quantity so it no need much bandwidth when updating table routing.

**Keyword : QoS, MPLS-VPN, BGP**