

## **ABSTRACT**

Quality of Service (QoS) is represent the important thing which must be attention in a communications system. To fulfill the QoS requirements of the internet multimedia services has been developed by several network architectures, such us differential service, resource reservation protocol (RSVP), multi protocol of label switching (MPLS), and use of routing management.

Multi-Protocol of Label Switching (MPLS) is a method of forwarding data through a network by using information in label attached at packet IP. There are many applications that are used in MPLS, one of which is a Virtual Private Network (VPN). MPLS-VPN is usually built by using the routing protocol Border Gateway Protocol (BGP). IBGP system in an AS should be linked with all other BGP systems so configured a full-mesh configuration. Increasing number of networks will effect in the number of routing table more and more on BGP routers. To overcome this can be done with the Route Reflector. Route Reflector will reduce the number of connections required in AS.

In this final project is implemented the use of Route-Reflector on MPLS-VPN technology in a small network using GNS3 as MPLS Router and compared with the use of Full Mesh on MPLS-VPN. Measurement is done by VoIP communications through a network that has been determined. Measurements taken include QoS consists of time delay, jitter, throughput and packet loss. The results of this implementation, it can give description of MPLS-VPN technology using Route Reflector.

From the results conducted in a laboratory testbed showed that the use of Route-Reflector can generate a better QoS. Obtained from Route-Reflector measurements, it can minimize the delay up to 10.1%, increase throughput up to 12.5%, to minimize packet loss up to 44.9%, and reduce the jitter of up to 23%. This suggests the use of Route-Reflector on MPLS-VPN network has a better performance than the use of Full Mesh on MPLS-VPN network.

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