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MPLS Vs IP Routing and its Impact on QoS Parameters

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***Abstract*— this paper aim to measure the performance of two protocol MPLS and IP routing and to make some sort of comparative study between them , according to simulation result the values of throughput , delay ,packet drop we measured ,the obtain results show that the Flow Label approach implemented in MPLS Routing Technology is better than IP based routing. Simulation result which relies on Opnet that the MPLS Routers performance is better than IP routers especially in Throughput and the Packet drop and delay.**

***Index Terms*— Op net , IP routing, MPLS , flow label, non flow label , throughput ,Delay, Internet Engineering Task Force (IETF),**

I. INTRODUCTION

According to the fast growing technology all over the world certainly in the internet field tacking in our calculations the high demand of internet address Internet Engineering Task Force (IETF) was developed as a newer numbering system implemented in IPv6 which provides a much larger address than IPv4 and also gives a lot of improvements "Better Support For Security, Easier TCP/IP Administration, Modern Design For Routing, Better Support For Multicasting and Better Performance".

IPv6 defined in a series of RFCs published in December 1998 and increase of the address space from 32 bits to 128 bits The Internet Protocol (IP) is considered to be a best effort service, so in the future There are built some policies based on flow-labels to manage the routing of the packets (channels) to the nodes (subscribers)during the transmission with IP-multimedia approach. As it know throughput is one of the important feature of QoS Routing, because the management of throughput offers a better QoS performance. It is interesting to mention that IPv6 not only overcomes the shortcoming problems in the IPv4, but also it takes the benefits in Quality of service (QoS). QoS in IPv6 plays an important role in the Stream Model Approach between broadcasters [1], [4], [3] MPLS technology has some advantages, but the most one is speed routing. Based on some executed tests we can present that bandwidth utilization is another good feature compared with IP routers technology.

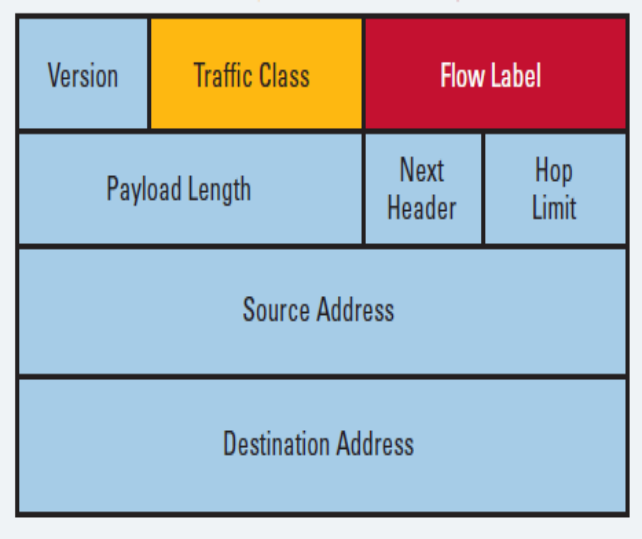
MPLS Routing Technology Vs IP Routing

1. In Traditional IP Routing protocols are used to distribute Layer 3 and Forwarding packets is based on the destination address only , Routing lookups are performed on every hop and Every router may need full Internet routing information.
2. MPLS is a new forwarding mechanism in which packets are forwarded based on labels, Labels may correspond to IP destination , the networks (equal to traditional IP forwarding) and the Labels can also correspond to other parameters (QoS, source address, etc.) , MPLS was designed to support forwarding of other protocols as well [6]
3. MPLS is faster than IP routing because it is based on label.
4. MPLS is in 2,5 OSI Layer and IP is in layer 2 OSI.

II. QOS IN IPV6

IPV6 brings quality of service that is required for several new applications such as IP telephony, video/audio, interactive games or ecommerce. Whereas IPv4 is a best effort service, IPv6 ensures QoS, a set of service requirements to deliver performance guarantee while transporting traffic over the network.

For networking traffic, the quality refers to data loss, latency or bandwidth. In order to implement QOS marking, IPv6 provides a traffic-class field (8 bits) in the IPv6 header. It also has a 20-bit flow label.



Flow label

A 20-bit field defining the packets of the flow known as the flow label field by RFC 3697 The flow label enables per-flow processing for differentiation at the IP layer. It can be used for special sender requests and is set by the source node. [1] The flow label must not be modified in the network , Fragmentation or encryption is not anymore problem, as in IPv4.

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Traffic Class

An 8-bit field used to distinguish packets from different classes or priorities. The traffic class field may be used to set specific precedence or differentiated services code point (DSCP) [1] values and provides the same functionality as the type of service field in the IPv4 header.

Experimental analysis design and result:

In this section, I want to test the Time Delay, Throughput, packet drop in IPv6 technology using ip routing and MPLS packets technology. As we presented above we have used IPv6 technology because it offers more flexibility and QoS features than IPv4.

III. Simulation and Result

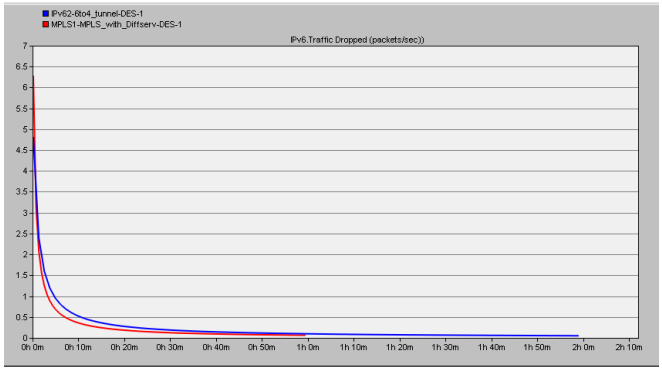

Fig1: Traffic Dropprd

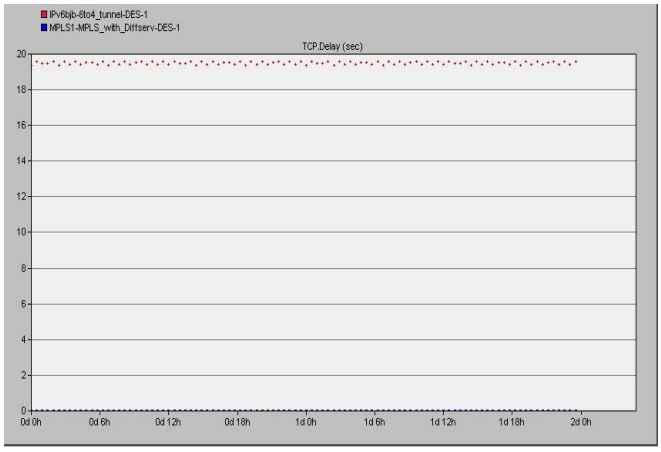

Fig2: delay

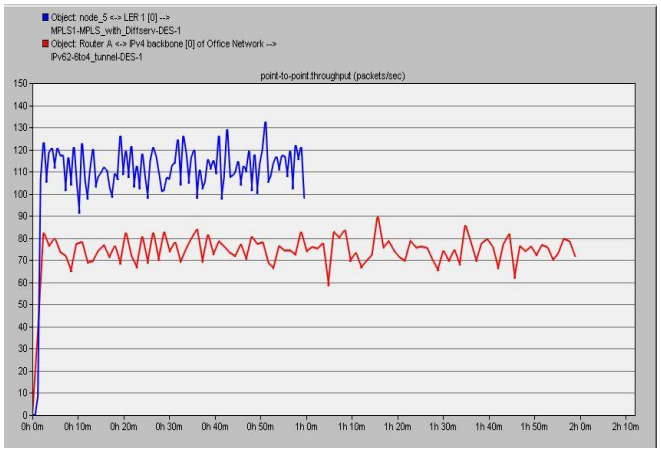

Fig3: througput

IV. Simulation and Discussion:

The model was run about 4 hours long for each scenarios, The metrics were set to be collected every second ,in simulation result that measured the values of throughput, delay and packet drop show in that value of packet drop in fig 1, of IP routing is high comparing with MPLS values that obviously show in the graph and the value of delay in fig_2 is high than MPLS delay value we calculate the TCP values because the most application running is TCP, the last graph is the throughput and show that the value of throughput is high in MPLS.

V. Conclusion

In this research paper we find the MPLS Routers performance can be better than IP routers especially in Throughput Utilization and Packet drop and delay.

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