

# Implementation of MPLS VPN on Multi ISP Routers using PIM

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**Abstract-** Multicasting has been developed to support efficient communication between a source and multiple destinations. Multiprotocol label switching is a type of data network traffic technique which carries data from one network to the next network using short path labels instead of long and complex network router lookups. MPLS VPN is implemented to provide a safe, secured, and fast communication. Ethernet over MPLS provides a tunneling mechanism for Ethernet traffic through MPLS-enabled Layer 3 core network. In this paper, Pseudo wires are established across an inter-autonomous system boundary or two separate multiprotocol label switching Networks. The main objective of this paper is to implement MPLS using PIM by taking a network. The MPLS VPN is illustrated by examining different communication protocols. The practical part was carried out using GNS3 simulator and 7200,3745 routers are used.

**Keywords-** BGP, IGMP, MPLS, PIM, RTT, VPN

## I. INTRODUCTION

Protocol independent Multicasting depends on a topology-gathering protocol to populate a routing table with routes. The routing information can be directly taken from the unicast routing table, or the different routes may be taken from the separate routing protocol such as MBGP. In the protocol independent multicasting, the main role of MRIB is to provide the next hop router along with the cable pathway to each destination subnet. It is also used to find the next-hop neighbor router to which any message is sent. The data flow is used to be in the reverse-path of the join messages. Routing is the act of moving information across an inter-network from a source to a destination. In spite of the different favorable circumstances, it likewise has certain impediments like the steering table made by the OSPF for sending the bundles is exceptionally huge and it makes a great deal of postponement. So as to evade this delay the idea of MPLS was presented

## II. LITERATURE SURVEY

A new normal for a brand new world of networking, MPLS could be a forwarding mechanism supported tag shift. MPLS is an innovative approach during which forwarding call is taken supported labels. It additionally provides a versatile and swish VPN answer supported the employment of LSP tunnels to encapsulate VPN knowledge. VPNs provide vital accessorial worth to the client over and on top of a basic best effort IP service, thus this represents[19] a significant revenue-generating chance for SPs. Multi-protocol Layer shift (MPLS) VPNs square measure best answer for medium and enormous enterprises that presently deploy site-to-site VPN services. MPLS

provides refined traffic engineering capabilities that, as well as IP QoS, change multiple categories of service thus business essential applications square measure treated with higher priority than decreased applications and "best effort" services. A Virtual non-public Network (VPN) provides non-public network connections over a in public accessible shared network like net, rather than mistreatment chartered lines. variety of VPN technologies are made public, among that IPsec VPN and SSL VPN [20] are the foremost ordinarily used. The integration of MPLS with VPN has been receiving a lot of attention from industries and standards bodies because it allows service suppliers to supply science services with key edges like QoS, traffic engineering and best routing over a shared MPLS backbone. Service implementation is completed for providing totally different services to the client. Layer3 virtual personal network implementation exploitation IPv4 and IPv6 routing protocol is completed and with this policy is enforced exploitation MP-BGP[16] as exterior entranceway protocol. Layer three virtual personal network in net protocol version six is understood as 6VPE technology, that is enforced exploitation BGP and layer three VPN (VPRN for alcatel) is enforced inside a network.

## III. SIMULATION RESULTS

The BGP implementation is performed for the proposed architecture of the model for communication among different customers using VPN in IPv4 and connection is established between the core customer routers through provider edge routers. While pinging core routers using commands - ping (IP address) then ping shows failed, but when we ping using ping vrf customer (IP address), then it shows full connectivity as 100% packet transfer. Figure 1 shows the success rate and round-trip time for a ping command before configuring MPLS and Figure 2 shows the success rate and round-trip time for a ping command after configuring MPLS.

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R1#ping 10.10.10.102
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.10.10.102, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/36/60 ms
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R1#
    
```

Fig.1: Ping before MPLS

connectivity. In Figure 1, it is seen that the maximum round trip time taken i.e., time taken for a packet to reach the destination and the acknowledgement to reach the source, is higher before configuring MPLS in the routers. Here the packet transmission is done using OSPF protocol only. But after configuring MPLS along with OSPF on the routers, there is a visible difference in the RTT. The RTT has reduced drastically as observed from the graph in Figure 5.

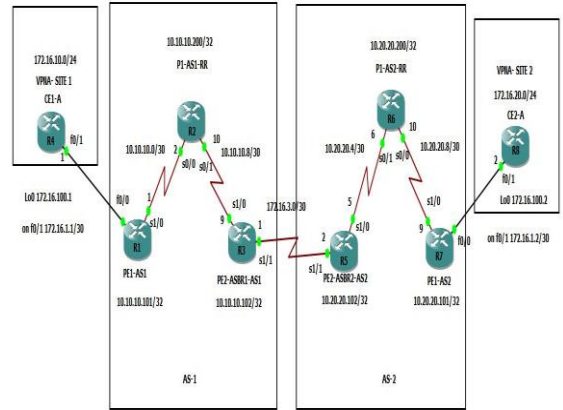


Fig.3: Network Diagram

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Success rate is 100 percent (5/5), round-trip min/avg/max = 24/32/48 ms
R1#
    
```

Fig.2: Ping after MPLS

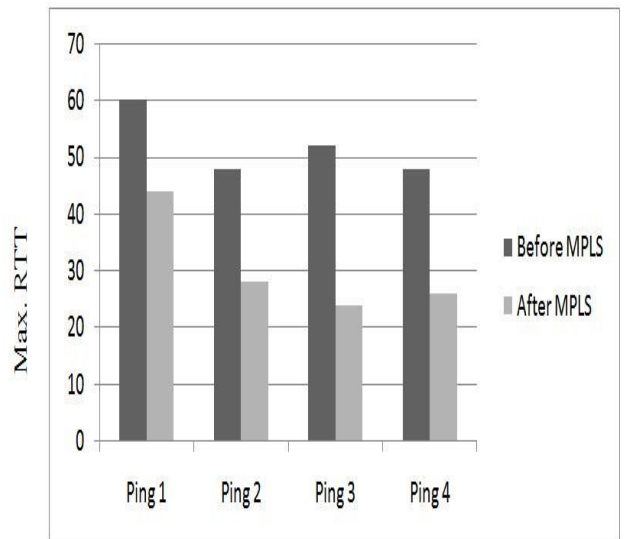


Fig.4: Comparison of RTT before and after MPLS

IV. CONCLUSION

VPN provides benefits that service providers need urgently in their networks, such as scalability, manageability and security. MPLS VPN offers many advantages including support for TE, QoS provisioning and scalability enhancements, the requirement of having MPLS support throughout the entire network is limiting its widespread usage. It would be an excellent choice for providing VPN services as it combines the benefits of both Overlay and Peer-to-Peer networks. Furthermore by using MPLS core the Service Provider can make use of other MPLS Features such as Traffic Engineering, Quality of Service and Network Management.

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