

## IPv6 TO IPv4 TUNNEL

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**Abstract**— In Networking Internet Protocol (IP) is the most important factor. Ip has basically two version IPv4 and IPv6. In day today life IPv4 address rang are get empty, so we use Ipv6 address rang. But IPv4 and IPV6 cannot communicate directly due to this reason we have use or implement tunneling mechanism. IPv6-IPv4 tunnel is used to achieve direct communication between IPv4 network and IPv6 network. In general ipv4 network do not configure with directly ipv6 network, so we have do tunneling configuration. Translation happens on the IPv4-IPv6 border, so the translator would be an AFBR (Address Family Border Router). For this project we have to use GNS3 software. By using this software all configurations we have to done and at the output we have to show dada transfer from live pc to different system desktop. Live Pc and another desktop configure with IPv6 address configuration and tunnel creates in IPv4 network by use in RIP routing Protocol and IPv6 configure with OSPF routing protocol. Data transfer can show by using http web server and wireshark software. By using this project we have to easily communication with two different networks i.e. Internet protocol version 6 can easily communicate with internet protocol version 4.

**Keywords**-IPv4,IPv6,Tunnel,Version4,version6,Translation.

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### I. INTRODUCTION

The Internet Protocol (IP) is the method by which data is sent from one computer to another computer on the internet. Each computer known as host and it has its Owen ip address that identifies from all other computers on the Internet. When you send or receive data (like as, an e-mail note or a Web page), the message gets divided into small chunks and chunks called as packets. Each of these packets contains the sender's Internet address as well as the receiver's address. Internet Protocol has two types one is IPV4 (version 4) and second is IPV6 (version 6). The most widely used version of IP is Internet Protocol Version 4 (IPv4). However, IP Version 6 (IPv6) is also beginning to be supported. IPv6 provides for much longer addresses and therefore for the possibility of many more Internet users. IPv6 includes the capabilities of IPv4 and any server that can support IPv6 packets can also support IPv4 packets. The process of Internet appraisal, the translation from IPv6 to IPv4 has become unavoidable and fairly crucial [1]. IANA (Internet Assigned Numbers Authority) has exhausted the global IPv4 address space .Both IPv4 and IPv6 networks are present during the translation period time, while these networks are not consistent in nature. Therefore it is important to maintain the availability, as soon as to provide the inter-communication between IPv4 and IPv6. Tunneling consists of the encapsulation of the packets of a IPV6 network protocol within the packets of a second network IPV4 protocol, such that the former regards the latter as its datalink layer The IPv6 specifications define several

types of IPv6-in-IPv4 tunnels, including configured tunnels and automatic tunnels 6to4.[1]

### II. METHODOLOGY

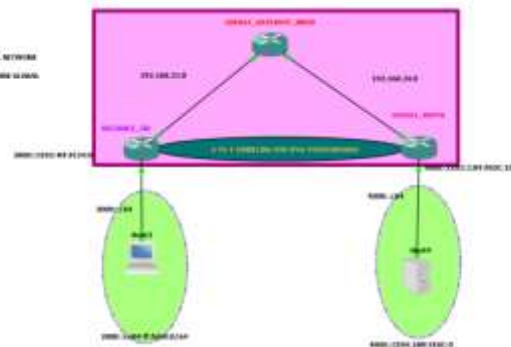


Fig No.1 Methodology of IPv6 to IPv4 Tunnel

### III. PROPOSED WORK

It gives automatic IPv6 to IPv4 address transmission. IPv6-IPv4 translation is used to achieve communication between IPversion6 and IPversion4. The basic principle of translation is shown in Figure.2 and 3 the idea is to convert the semantics between IPv4 and IPv6, turning IPv6 packet into IPv4 if the packet is destined to IPv4 network and vice-versa. Usually, translation happens on the IPv4-IPv6 border, so the

translator would be an AFBR (Address Family Border Router). [1]

"6to4 tunneling" is an IPv6 translation mechanism. Like other translation structure, it enables summarize of IPv6 packets into IPv4 for transport across an IPv4 network. It gives automatic IPv6-to-IPv4 address translation, and it operates under IPv4 network as one big Non-Broadcast Multi-access (NBMA) network, other than the collection of point-to-point links.

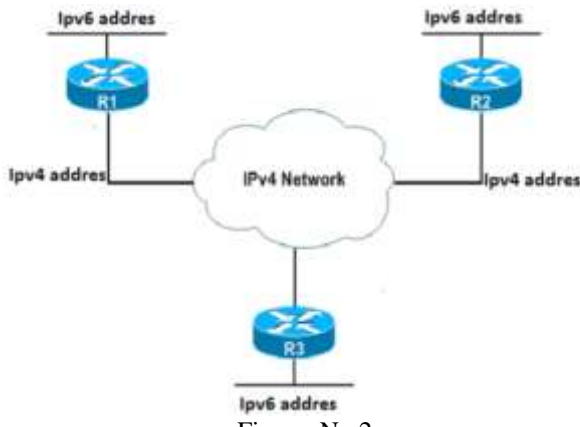


Figure. No 2

There are three sites, each site its separate IPv6 LAN and they are connected to each other via an IPv4 like as backbone network. When to connect the IPv6 LANs should be to configuration individual point-to-point IPv6-in-IPv4 tunnels, so each site should have a separate individual tunnel interface to get other site.

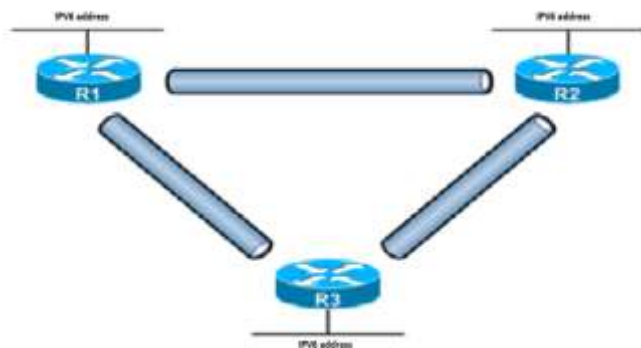


Figure No.3

In fig.1 shows actual project working diagram, in that Host3 and Host4 configured with IPv6 network. Host3 connect to the live pc and Host4 connect to a another system. Router1 name as reliance-jio, which are configure with both ipv6 and ipv4 network address. Also router2 name as Google BGP-v6, it has one port configure with IPv6 and one port configure with IPv4. Router3 name as Google-Getaway-India, it can be used only pass the data to R1 to R2. So tunnel will be create between R1 and R2. IPv6 routing can be done by using OSPF routing protocol. Open Shortest Path First (OSPF) used to find-out shortest path between sender and receiver. It is also call as Link-state Protocol Link-state routing protocols like as a navigation system. It can operate by sending link-state advertisements (LSA) to all other link-state routers. [3]

This project also depend a little RIP routing protocol, since this is the used to perform the connectivity tests with IPv6, RIPng (Routing Information Protocol next generation) is the new generation of RIP for IPv6 and is based on RIP Version2, It is a distance-vector routing protocol that uses hop count, 15 count is a maximum count, it's multicast updates are displayed every 30 seconds each connected router, it uses split into horizon and poison reverse updates to prevent routing loops. [2]

Final result can check by using Ping command. And some data can be sending by live pc to another system. Also we can access http server using live pc.

#### IV. CONCLUSION

Tunneling provides end to end connectivity between two different versions (IPv6 and IPv4). Due to this tunnel mechanism there has no any issue to communicate IP version 6 and IP version 4. Transition Mechanisms are devoted to the transmission of IPv6 Packets in an IPv4 routing Environment. So, we can easily agglutinate IPv6 adders by using IPv4 network and vice-versa.

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