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A Review on IPv4 and IPv6: A comprehensive survey

A Review Paper on IPv4 and IPv6: A comprehensive survey

[1] [2]

Abstract

Even though more customers are regularly coming to the Internet, IPv4 addresses have been reduced by the Internet Assigned Numbers Authority (IANA) and have been deactivated in domain name registries (RIRs). IPv6, being the sole important next-generation Internet protocol, has yet to be fully developed and deployed, owing to the lack of a scheme that might address the transfer of IPv4 resources to IPv6 networks as well as collective incompatible protocols. The Transmission Control
communication between the two
Protocol/internet version 4 (TCP/IPv4) addresses have been reported as being on the verge of collapsing, while the next generation Internet Protocol version 6 (IPv6) is being identified on a regular basis. Among other advantages, IPv6 provides a significantly wider address space, better address design, and more security. IPv6 distribution necessitates a thorough and meticulous setup in order to avoid network disturbance and reap the benefits of IPv6. Because of the problems with IPv4, IPv6 is currently becoming increasingly popular among organizations, businesses, and Internet Service Providers (ISP).

Keywords: IPv4, IPv6

I. Introduction

In the early days of computers, a network was defined as a collection of interconnected hosts connected by common media, which could be wired or wireless. A computer network allows its users to communicate and exchange data and information through a network. A network can be a local area network (LAN) that connects several offices, a greater metropolitan area network (MAN) that connects multiple cities, or a wide area network (WAN) that connects multiple cities and colonies [5]. The Internet Protocol (IP) is a collection of technological rules that govern how computers communicate over the internet. The two most recent versions are Transmission Control Protocol/internet Version 4 (IPv4) and Internet Protocol Version 6 (IPv6) [6].

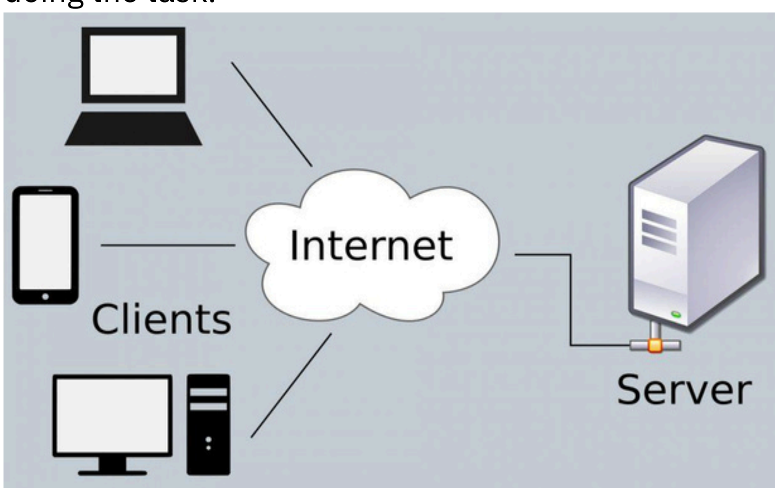
II. Networking's Challenges

The key idea of the Internet Protocol is to allow logical participation in the establishment of support for the routing of Internet Protocol nodes using something like IPv4 or IPv6. As a recent search on the IETF website shows, numerous surveys and research have been conducted and are still being conducted in this sector. Researchers are also working on a platform called obilenet that will connect entire subnets with the help of Mobile IPv6. Because of the behavior of internet protocol address (IPV4) addresses, route devices could not connect after 255 routers in the previous method, and secondly, IPV4 addresses are 4.3 billion, and when all of these addresses have been used in the future, it will be impossible to use IPv4 due to limited numbers, so there is a solution in IPv6, but this methodology can't change the entire world network. Intra-Domain Movement is a problem in IPv4; frequent intra-domain movement of the MH within a short area will result in continual handoff. As a result, a large number of communication activities have been registered.

The network develops 210 worldwide journals of computer science and technology, and the system capacity is drastically altered.

III. Networking Architecture

Various individual computers are connected to each other across a communication network in networking. Out of all the hosts, one acts as a master or server node, allocating tasks to the information systems fields that are applicable or capable of doing the task.



Network Architecture (Figure 1)

IV. IPv4

IPv4 was the first extensively utilized variant of IP, and it now accounts for the majority of Internet traffic. IPv4 addresses number a little over 4 billion. A node that receives data packets in Mobile IPv4 is assigned to a specific network by its matching IP address. Today, IPv4 is the most widely used addressing protocol on the Internet and in most private networks. The limited addresses of IPv4 are not capable of handling the present internet with the arrival of a broad array of devices and forthcoming technologies. IPv6 was created primarily to address addressing issues as well as security concerns that IPv4 did not address. The deployment of IPv6 [1] is one of the key issues on the internet.

V. IPv6

IPv6 (Internet Protocol Version 6) is the sixth iteration of the basic internet protocol. The Internet Protocol (IP) is the common language of the Internet, and every device on the network must be able to communicate in it.The current version of Internet Protocol version 4 (IPv4) contains a number of flaws that are inescapable and compound issues such as address space exhaustion, security issues, and the lack of auto-configuration, and, in some circumstances, create a barrier to the Internet's continued expansion. While that is a large number of IP addresses, it is insufficient to last indefinitely. IPv6 is the Internet Protocol's sixth iteration and the successor to IPv4. It works in the same way as IPv4 in that it assigns unique numerical IP addresses to devices that can interact over the Internet. It does, however, have one significant difference: it uses 128-bit addresses. In a moment, we'll explain why this is significant. The number of IP addresses is the primary distinction between IPv4 and IPv6. IPv4 address numbers are 4,294,967,296. 938,463,463,374,607, 431,768,211,456; 340,282,366,920; 938,463,463,374,607; 431,768,211,456Both versions of the Internet function in the same way technically, and both versions are expected to continue to run on networks independently in the future. Currently, most IPv6 networks accept both IPv4 and IPv6 addresses on their networks [2].

VI. Review of Literature

Dipti Chauhan and Sanjay Sharma's study, "A Survey on Next Generation Internet Protocol: IPv6", proposes that as the Internet evolves, the transition from Internet Protocol Version 4 to Internet Protocol Version 6 has become unavoidable and rather immediate. The Internet Assigned Numbers Authority (IANA) has finally used up all of the worldwide IPv4 address space, leaving the community with little alternative but to accelerate the IPv6 transition. Given that IANA has run out of IPv4 address space, the Internet will inevitably transition to IPv6. Despite this, IPv4 and IPv6 networks will coexist for a long time during the transition. The move to IPv6 should be gradual and painless. As a result, IPv4 and IPv6 coexisting networks should maintain both IPv4 and IPv6 availability, as well as support IPv4-IPv6 connectivity [1].

The document "A Review of Implementation Issues in IPv6 Network Technology" is a review of implementation issues in IPv6 network technology. According to Ramesh Chand Meena and Mahesh Bundele, IPv4 addresses are already depleted in the Internet Assigned Numbers Authority (IANA) and have run out in regional Internet registries (RIRs), despite the fact that more clients are joining the Internet every day. Because a system to address the transfer of IPv4 resources to IPv6 networks, as well as mutual communication between the two incompatible protocols, has not been fully developed and deployed, IPv6, as the only accessible next peer group Internet protocol, is still not commercially successful. Security, address, error detection, and wireless sensor network difficulties were the four main issues that were

Srinidhi K. S., Smt. R. Anitha, and A.V. Srikantan presented "Tunnel-based IPv6 Transition with automatic bandwidth control."

Because the present IPv4 allocation is likely to run out, the Internet will soon be sailing in very stormy waters. Because IPv4 and IPv6 are incompatible protocols, switching from IPv4 to IPv6 is not easy. The IETF has recommended a number of transition strategies to make the shift from IPv4 to IPv6 as painless as possible. Since the depletion of IPV4 addresses, it has become imperative (rapid) for all internet service providers to move to a new addressing technique, IPv6, which may assign IP addresses to up to 2128 devices [3].

In comparison to 4.3 billion (232) IPv4 addresses, it was designed to accommodate +340 undecillion (2128) Internet Protocol addresses. If every person on the planet (6.77 billion) needs three IP addresses, then calculate the total number of IP addresses required for everyone on the planet (6.77 billion x 3 = 20.31 billion IP addresses [4].

VII. Conclusion

Secondly, IPv4 route devices could not connect after 255 routers due to the behavior of internet protocol address (IPv4) addresses; they could only ping up to 255 routers. Thirdly, IPv4 addresses are 4.3 billion and when all of these addresses are used in the future, it will be impossible to use IPv4 due to the limited number of addresses.

So, rather than using IPv6, a new solution is employed to overcome these problems because switching the entire global network from IPv4 to IPv6 is challenging.

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