Queens College

The IP Address

Profile of an Internet Technology

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In simplest terms, Internet Protocol, or IP, addresses are unique numbers that are assigned to every device that is connected to the internet (ICANN). Your computer, smartphone, game console, etc. each have their own unique IP address. Additionally, another important function that they serve is to identify every device connected to the internet which, in addition to your common devices, include web servers or mail servers (ICANN). The purpose of assigning devices their own unique numbers is so they can communicate with each other directly. Data can be sent and received easily because there is an origin IP address that has the information of the destination IP address to directly send the data packets to. IP addresses make today’s everyday tasks possible such as sending and receiving emails, streaming videos, and online shopping.

It is important to note that currently, considering that the internet is constantly growing and there are growing numbers of people using new devices to connect to the internet, that the current version of IP addressing, IPv4 designed in 1973 and introduced in the 1980s, provides for only 4 billion unique addresses (ICANN). As Paola Mejia, software engineer for Microsoft, said, four billion unique addresses simply are not enough for the ever-expanding internet economy, and ICANN states that the remaining unallocated addresses left in IPv4 have been allocated to ISPs and users already. IPv6, which was standardized in 1996, and currently being developed and used, is significantly bigger than IPv4. IPv6 has 128-bit address space (the unique number assigned to your device) compared to IPv4’s 32-bit address space. Additionally, IPv6 has capacity for about 340 undecillion addresses compared to IPv4’s 4 billion (ICANN).

The historical development of the IP address begins with The Advanced Research Projects Agency Network (ARPANET) a branch of the United States Department of Defense. ARPANET, “developed a network that could share a single communication link for communication between multiple pairs of receivers and transmitters… the basis for a computer network” (Crea, “Part 1”). ARPANET was able to develop communication networks at major scientific research institutions across the country and overseas as well. They were growing extraordinarily, and needed to improve the system they developed up to this point.

Two computer scientists, Robert Kahn and Vint Cerf, invented TCP/IP from which originated not only IP, but the internet as well (Crea, “Part 1”). In 1973, they were responsible for creating the next ARPANET protocol generation, and by the following year they laid out the foundation for TCP/IP (Crea, “Part 2”). They first developed the Transmission Control Program (TCP), and that handled both datagram transmission and routing, but the protocol kept expanding, which meant that these two functions needed to be split, therefore TCP/IP was introduced to address this issue (Crea, “Part 2”). The Internet Protocol (IP) part of this development had a main function of “addressing hosts, putting data into datagrams, and routing those datagrams from the source-host to the destination host, which can be across one or more IP networks,” (Crea, “Part 2”). When TCP/IP was implemented to ARPANET, TCP/IP v4 was developed simultaneously. TCP/IP worked so effectively for ARPANET that in 1985, the Internet Advisory Board held a workshop to discuss the commercial use of protocol (Crea “Part 2”). Of course, as the internet became more commercial, the devices that were using the network needed to be identified and categorized with their own IP addresses.

As mentioned before, IP addresses are essentially what makes the internet work, not just communication across the internet. They allow for communication from device to device, allows our devices to connect to web pages, which is the basis of internet use. We can stream videos, shop online, access information databases to do assignments about doing a profile on an internet technology, etc.

Evaluating the IP address as an internet technology is easy because it is essentially the foundation for internet access and usage for the masses. In terms of its ease of use, we do not need to do anything regarding our IP addresses, they are essentially routed into our devices, and we just simply use our devices that have their own IP addresses. This technology is effective because not only does it account for devices, it is already being made to scale for an unimaginable number of devices that will come to connect to the internet. Its possibilities are endless for the coming future and it seems to have no limitations because essentially it grows as the internet grows. However, on the more controversial side, our individual privacy can be threatened because it is very easy for hackers, or even our own government and corporations to see what we do with our devices, and what pages we visit, etc. In all, IP addresses are essential, and is not an expendable technology.

References

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