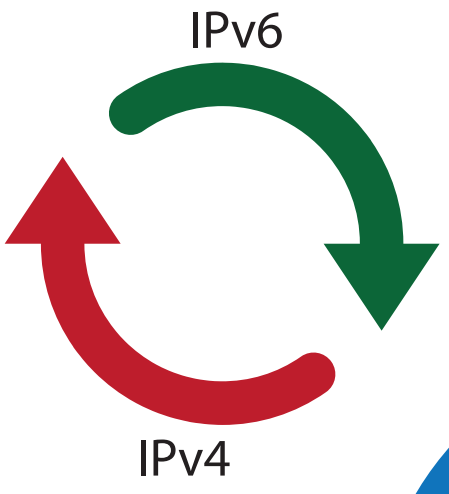
IPv4 and IPv6 - FAQs

Q: What is IPv4?
A: IPv4 stands for Internet Protocol version 4. It is the fundamental technology that makes it possible for us to connect our devices to the Internet. Whenever a device accesses the Internet it is assigned a unique, numerical IP address such as 128.255.244.221. To send data from one computer to another through the Internet, a data packet must be transferred across the network containing the IP addresses of both the sender and the receiver. Without IP addresses it is not possible for devices to communicate with each other. It is fundamental to the existence of the Internet.

Q: Why are we running out of IPv4 addresses?
A: IPv4 uses 32 bits to address computers on the Internet. That means it can support 2^32 IP addresses in total – around 4.29 billion. In the 1980's a 4 billion computers on the Internet seemed like impossibility. Surprisingly, almost all 4.29 billion IP addresses have now been assigned to various institutions, leading to the crisis we face today. We have not totally run out of these addresses but with the growing population and the ever increasing number of devices that connect to the Internet, the day when we shall completely exhaust these addresses is very near. Hence the need to shift to a system that offers a larger addresses space.

Q: What is IPv6?
A: IPv6 is an improvement and the next version to IPv4. The core functionality of IPv6 is similar to that of IPV4 in the sense that it is used to address computers on the Internet. It however uses a larger address space (128 bits instead of 32 bits) and can accommodate more devices. Exactly how this happens is explained in the latter half of this tutorial.



Q. What happened to IPv5?
A: IPV5 was an experimental protocol that was in experimental stages primarily used for videos. Since it did not serve much purpose, the shift was made to IPV6.

Q: How does IPv6 solve this problem?
A: As previously stated, IPv6 uses 128-bits for Internet addresses. Therefore, it can support 2^128 Internet addresses – 340,282,366,920,938,000,000,000,000,000,000,000,000 of them to be exact.
2^32 = 4.4 x 10^9 addresses (IPv4)
2^128 = 3.4 x 10^38 addresses (IPV6) -
That is 6.7x10^19 addresses. 15 billion IPV4 internets per sq.cm of Earth's surface!

Q: So why don't we just switch?
A: To make the switch, software and hardware will have to be changed to support the more advanced addressing. This will need time and money. The first live test of the IPv6 network was done on June 8, 2011, World IPv6 Day. Google, Facebook and other prominent web companies test drove the IPv6 network.

IPV4 and IPV6 - Differences

	Internet Protocol version 4 (IPv4)	Internet Protocol version 6 (IPv6)
Deployed	1981	1999
Address Size	32-bit number	128-bit number
Address Format	Dotted Decimal Notation: 192.149.252.76	Hexadecimal Notation: 3FFE:F200:0234:AB00: 0123:4567:8901:ABCD
Prefix Notation	192.149.0.0/24	3FFE:F200:0234::/48
Number of Addresses	2^{32}=~4,294,967,296	2^{128}=~340,282,366,920, 938,463,463,374,607, 431,768,211,456

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