

An IP address or Internet Protocol address is a **unique numerical identifier** assigned to each computer on the network. It's like a phone number for your device on the internet.

IP address allows devices to communicate with each other by sending and receiving the data packets. When you type a web address, your device will send a request to the web server associated with that IP address and the server will send back the information that you have requested. An IP address is made up of four parts separated by periods.

There are two types of IP address,

1. **IPV4**

2. **IPV6**

IPv4 addresses are **32-bit numbers**, which are typically expressed in dotted decimal notation, such as **192.168.0.1**. Each of the four parts of the address can have a value between 0 and 255, allowing for about 4.3 billion unique addresses. While 4.3 billion might sound like a lot, it's actually not enough to accommodate the growing number of devices and users on the internet.

IPv6 addresses are **128-bit numbers**, which are typically expressed in hexadecimal notation, such as **2001:0db8:85a3:0000:0000:8a2e:0370:7334**. Each of the eight parts of the address can have a value between 0 and FFFF, allowing for a total of approximately 3.4×10^{38} unique addresses.

Why IPV6?

IPv6, which can accommodate an almost infinite number of devices. It improves the performance and security of the internet. Example IPV6 has built in support for encryption which helps to protect the data when it travels over the internet.

Let me Imagine I am throwing a big party at my house, I invite all my friends over there. To ensure my friends find my house, I must provide them with

an address. Well, an IP address is like an address for a computer or device on the internet.

Just like I have a unique street address, each computer connected to the internet has a unique IP address. So, when I type in a website address like 'www.google.com' in my web browser, I sent a request to Google's IP address to load the website. It is like my computer is asking Google's computer to come to my party! 😊

Just like how I have different neighborhoods and zip codes in my city, IP addresses are organized into diverse groups based on location. This helps computers find each other more efficiently and quickly.

Think IPV4 as a cozy neighborhood with a limited number of houses. When more people move in, the neighborhood starts to get crowded and cramped.

On the other hand, IPV6 as a sprawling metropolis. When the population was going to keep growing and made sure there would always be room for new residents.

Sometimes, two computers can have the same IP address. It's like if two people in your town the same phone number had - chaos would ensue! 😬 That's why there are special computers called DNS servers that keep track of which IP address goes with which website. So, when you type in "google.com" into your web browser, the DNS server tells your computer which IP address to use to talk to Google's computers.