What is: IP Address

IP (Internet Protocol) addresses are used to identify hardware devices on a network. The addresses allow these devices to connect to one another and transfer data on a local network or over the internet.

Each address is a string of numbers separated by periods. There are four numbers in total and each number can range between 0 and 255. An example of an IP address would be: 106.157.14.112

We need billions of IP addresses to identify every computer, router and website on the internet. One day we'll run out of unique addresses and a new IPv6 protocol has been designed to meet this need.

How Do I Find Out my IP Address?

If your computer is connected to both your local network and the internet, then it will have two IP addresses. You'll have a private IP address locally, and a public IP address on the internet.

A **private IP address** is used to connect your computer or device to your home or business network. This address is normally assigned by your network router.

Private IP addresses are in the range 40.xxx.xxx.xxx or 192.168.xxx.xxx. An example of a private IP address is 192.168.1.1.

There are a few ways to discover your private IP address. For example, on Windows you can type *ipconfig* on the command prompt. Similarly, Mac users can type the command *ifconfig* in the Terminal app.

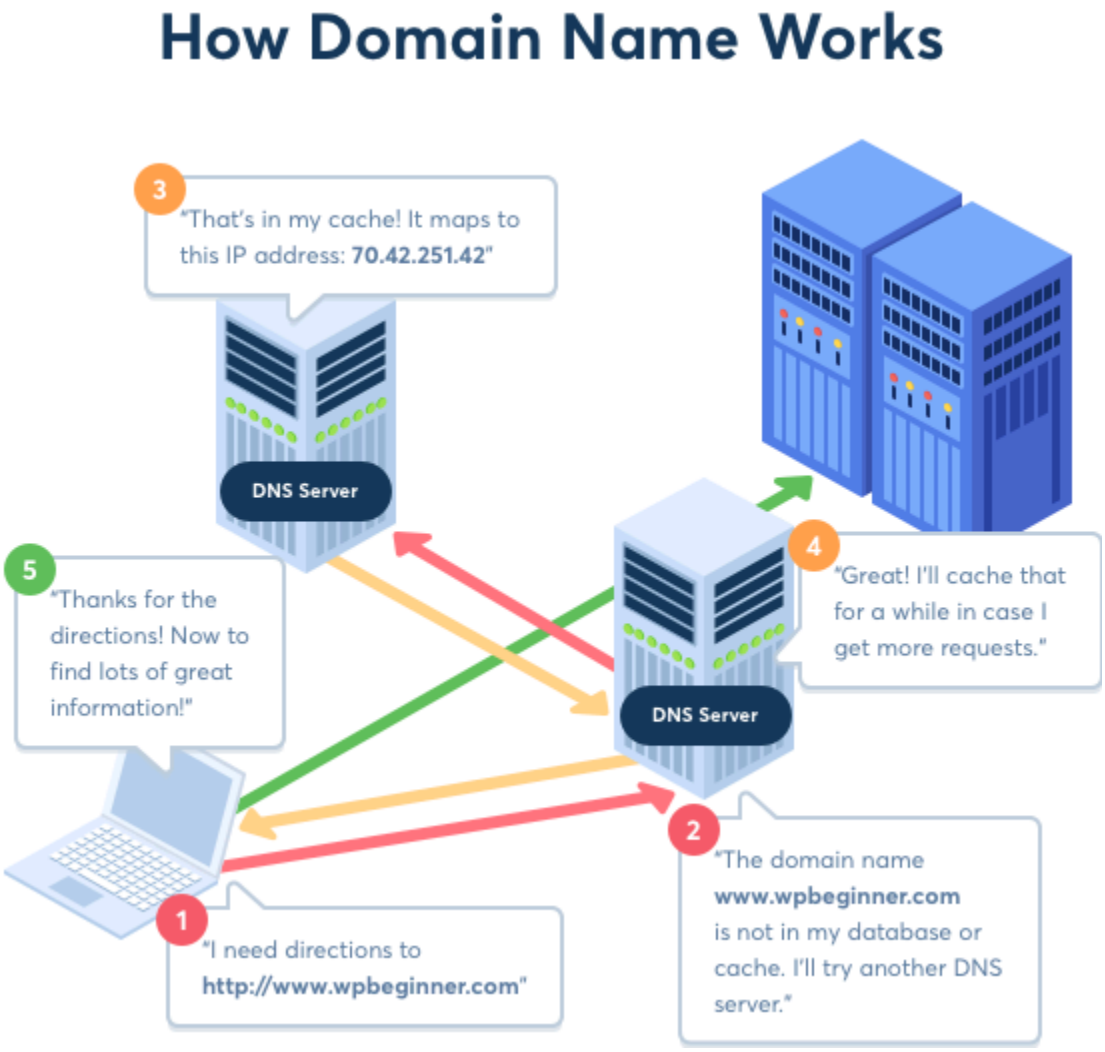
Your **public IP address** is used to connect your home or business network to the internet. This address is assigned by your internet service provider (ISP).

To find your public IP address, simply go to WhatIsMyIP.com in your web browser. This site will display your public IP address and other information.

IP Addresses and Domain Names

Humans are more comfortable with names than numbers. It's easier to remember a domain name like wpbeginner.com than a long list of numbers like 192.124.249.166.

The internet's Domain Name System (DNS) is like a phone book. When you type a domain name like wpbeginner.com, it automatically looks up the number, the IP address, and connects you to the website.



Dynamic and Static IP Addresses

Most internet users have a **dynamic IP address** that automatically changes from time to time. This is better for internet service providers that need to deal with customers joining and leaving the service, and changing address.

Most websites have a **static IP address** that doesn't change. This is important because the DNS system uses your website's IP address when someone navigates to your site or sends you an email.

If you plan on hosting your own website, then you will need to purchase a static IP address from your internet service provider, which will cost you extra.

The IPv4 and IPv6 Protocols

The original Internet Protocol is IPv4. As we've seen, it defines an IP address as a 32-bit number like 106.157.14.112

. That only allows for around 4 billion IP addresses, and that's not enough for ongoing use.

IPv6 is a new protocol that was introduced in 1998. Deployment commenced in the mid-2000s and is ongoing. When you visit WhatIsMyIP.com you can discover whether you've been assigned an IPv6 IP Address.

The new protocol uses 128-bit IP addresses that look like 4ggr:1925:5656:7:600:t4tt:tc54:98vt.

This means that IPv6 is able to provide about 340 trillion trillion trillion IP addresses. That's more than enough to meet the growing need for IP addresses for websites, computers, smartphones, smartwatches, and smart refrigerators for years to come.

QnE

1. What is an IP address?
   A unique numerical label assigned to each device on a network.
2. How many numbers are in a common IPv4 IP address?
   4 numbers
3. What character is used to separate each number?

A period (dot)

4. What is the range of these numbers?
   0-255
5. Why has IPv6 been designed?
   To accommodate the growing number of internet-connected devices
6. Go to https://www.whatsmyip.org/ and find and list your public IP address here:
   85.131.168.225
7. Open up the windows command prompt and type in ipconfig/all. Find and list your private IPv4 address here:
   IPv4 Address. . . . . : 192.168.1.10
8. Why are there 2 addresses for one computer?
   One for public network access, one for private network communication.
9. What does DNS stand for?
   Domain Name System
10. What is the role of DNS?
    Translates domain names into IP addresses
11. What is a domain name?
    A human-readable address for websites
12. Why do humans use domain names when identifying a device on the internet rather than its IP address?
    Easier to remember than numerical IP addresses
13. What happens if the DNS server does not have the IP address of a domain name?
    It queries other DNS servers or returns an error
14. What is a dynamic IP address?
    An IP address that changes periodically
15. Why is it that you are assigned a dynamic IP address from your ISP but a business computer has a static one?
    Dynamic IP addresses conserve address space, while static IP addresses ensure consistency for business functions
16. Why is an IPv4 IP address referred to as a 32 bit address while the IPv6 is a 128 bit address?
    IPv4 uses 32 bits, IPv6 uses 128 bits
17. How many possible addresses can be represented with 32 bits? With 128 bits?
    Approximately 4.3 billion (IPv4) and 340 undecillion (IPv6) addresses