

Background Information – IT Topics

For beginners in the field of information technology, there are some common topics that may seem trivial. For instance, a person may know what an IP address is, but that same person may not truly understand its purpose. In this guide, the purpose is ultimately to explain some of the basics when it comes to computer networks. Here you will learn what an IP address is, the forms it comes in, how to find it on your personal computer, and some other concepts linked under the same topic. Images will be given to help with processing this visually.

IP addresses

At its Basics

To know what an IP address is, it surely helps to know its full meaning. IP address is an acronym for Internet Protocol Address which is, at its very fundamentals, the set of rules that allow devices to communicate with one another over the internet. As the IP is part of an internet protocol suite, the two handle the rules that help to route, transmit, packet, and receive data over networks.

Who Has One?

As a matter of fact, every person who has a device that is connected to a local network or the internet has an IP address. They are, in essence, an identifier for that device, however, this set of networks is not linked to the hardware.

How Does it Work?

Firstly, it is important to note that an IP address will be seen as a string of numbers that are separated by periods. These periods occur between any set of 32-bit integers between 0 and 255.

Examples:

- 17.172.224.47
- 0.0.0.0
- 255.255.255.255
- 192.168.0.50

The IP address is not simply a set of numbers, but rather an allocated set of numbers that is assigned by your Internet Service Provider (ISP). An IP address can change though, and this is because there is a difference between static and dynamic IP addresses.

Static vs Dynamic Addresses?

For a short perquisite to this topic, IPV4 is the version of IP address that covers static addresses. A 32-bit address space makes it so that there are a limited number of static addresses in the world. So what if one is not able to get this IPv4 address?

Since IPv4 is limited, it led to the introduction of dynamically assigning IP addresses. Many devices connected to the internet are assigned a temporary IP address. When a random user connects to the internet the ISP (internet service provider) assigns them an IP that was given from a pool of IP addresses. It is cost effective for the service provider because assigning everyone a permanent static IP address is not efficient due to its limited space.

This is where DHCP – Dynamic Host Configuration Protocol—comes in. As computers and other connected devices are often connected and disconnected to the internet, or brought to and from home to other networks, it is almost necessary that most of these devices don't have a static address.

As mentioned, if all devices had a static IP address, then a laptop, per say, would not be able to change address based on where it is.

A DHCP is the management of IP addresses in a network. In homes, the router may act as the DHCP server. It helps to configure the DNS server info (for DNS info see below). So, a person requests an IP address from the router and then it is assigned by the router. DHCP helps this management of dynamic IP addresses as creating new IP's creates a unique identity to communicate in the network.

What is DNS?

The DNS is a Domain Name System which can be compared to the phonebook of the internet. Online information comes from DNS. DNS also translates the domain names to IP addresses so browsers can load the websites. DNS is the reason why people do not need to remember an IP address as it converts it into a hostname.

Are MAC Addresses and IP Addresses the Same?

This question is brought simply for the nation that it is not hard to find oneself a little confused initially when seeing two sets of numbers that may look alike, however, a MAC Address—or a Media Access Control address—is a unique address to identify a network. At this point their difference is not obvious, but its address is assigned by the manufacturer of the product so in order to connect with particular devices, you may have to look at the devices' hardware to locate its MAC Addresses per the object itself so it is assigned by the manufacturer and stored in the hardware.

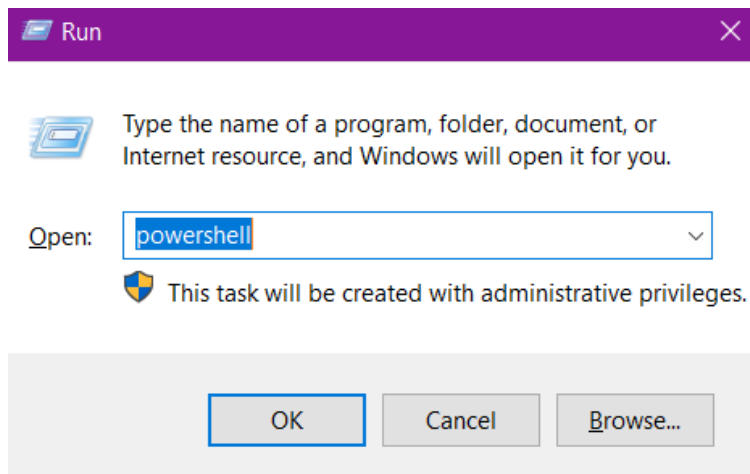
Simple answer: The MAC address is the number bonded to the physical hardware and never changes. The IP address is the number that identifies a network location and can be changed. A MAC address can be seen closer to one's social security number whereas the IP address (static) can be seen close to one's phone number

Let's Attempt to Answer a Few Questions

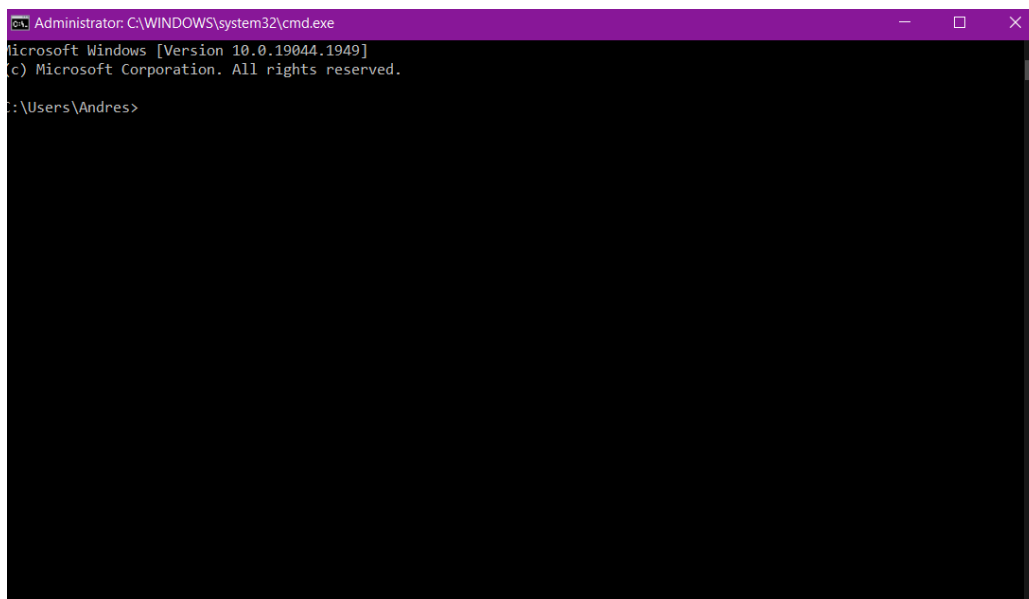
- 1.) What is your IP address?
- 3.) Is your IP address Static or Dynamic?
- 4.) What is your DNS Server Address?

Question 1

To find your IP address, on Windows, you will want to open up your command line terminal. Press the *Start* button along with *R* and the following tab will open.



In the search function, type in *cmd* and your command line will open.



Typing *ipconfig* and pressing enter will prompt a lot of information on your screen, but what you will look for a *Wireless LAN adapter Wi-Fi*:

```
Wireless LAN adapter Wi-Fi:
```

You are looking for your IP address, so it may resemble a 192.168.x.x

Question 2

To learn whether your IP address is static or dynamic, try typing into the same command prompt the following:

```
ipconfig /all
```

What do you see?

If typed correctly, you may see a lot more information now of the same vein. So you will need to locate the *Wireless LAN adapter Wi-Fi*: section once again

```
Wireless LAN adapter Local Area Connection* 2:
```

This time within the section, you will want to look for DHCP Enabled which looks like this

```
DHCP Enabled. . . . . :
```

If on the right-hand side of the colon, if you see a *Yes*, then you now know that you have a dynamic IP address. If it says a *No*, then you now know that you have a static IP address.

Question 3

To find your IP address on your DNS nameserver, you will want to remain in the command line and prompt

Under the same section:

```
Wireless LAN adapter Wi-Fi:
```

You will need to look for *DNS Servers*

```
DNS Servers . . . . . :
```

The numbers on the right-hand side of the colon will represent this address.