IP ADDRESSES

You are in a coffee shop.

You connect your device to the coffee-shop Wi-Fi.

In general terms, this is what might happen next:

- Firstly, your device connects to the coffee-shop Wi-Fi.
- A **DHCP server** assigns your device an IP address *and other network settings*.
- Your device can now communicate on **the local network**.
- Your device uses the **default gateway/router** to send traffic outside the local network.
- The router forwards your traffic towards the **Internet**.

"If multiple devices are connected to the same wifi, how can the network distinguish between the devices?"

That's where **IP addresses** come in!

TASK 1
From the unit page, did you determine your device's IP address right now?
Paste it here:

TASK 2
If your IP address has 4 numbers, it means it is composed of **4 bytes**.

So, this would be the *smallest* IP address:

0.0.0.0

Using this system, what would the *biggest* one be?

TASK 3

If 4 bytes are required to store an IP address, how many bits are required?

TASK 4

And how many combinations of IP addresses are available using this **IPv4** system?

So IP addresses allow every device on a network eg the Internet to have a unique address. This allows them to be distinguished from other devices connected to the network.

But, with the burgeoning population of planet Earth and the rise of historically poor economies, more and more people are connecting to the Internet. And more and more people have more than 1 device.

Do we have enough IP addresses using this **IPv4** system?

TASK 5

Do some research and distinguish between IPv4 and IPv6

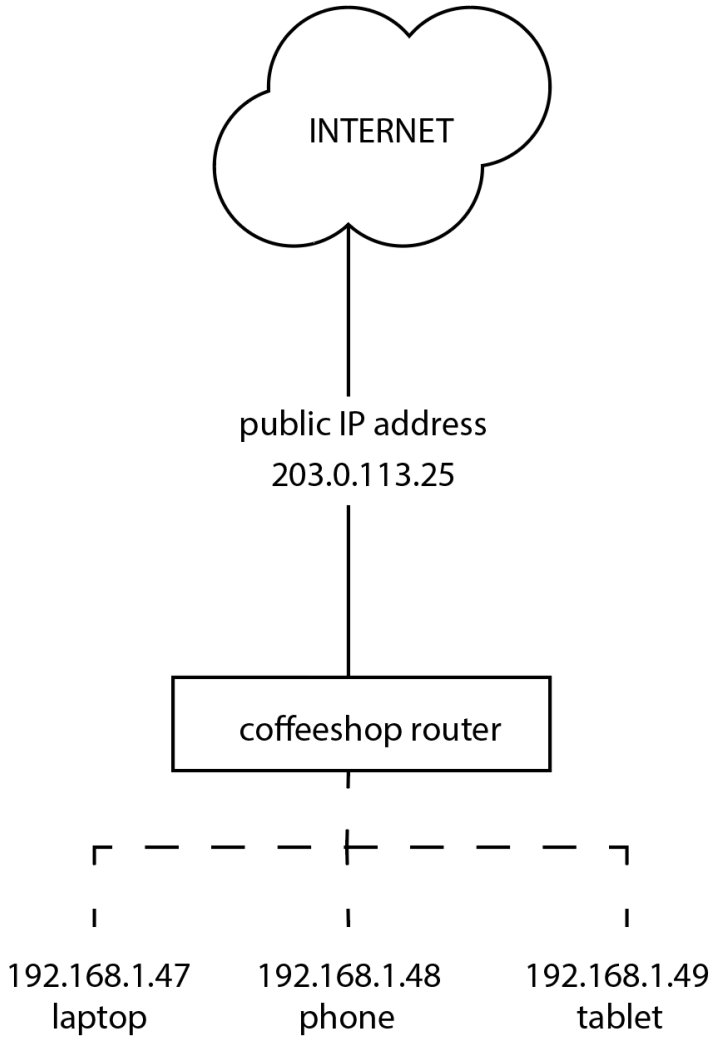
IPv4	**IPv6**

TASK 6

Is your device ready for IPv6?

Public VS Private IP addresses

Consider the following coffee shop scenario.



What you should notice:

Each device connected to the coffshop's router has its own IP address. However, the Internet only sees the router's IP address. **Each device's IP address is hidden**.

A technology called *Network Address Translation* (NAT) is used to perform this service. The router's IP address is **public**. The devices on the local network have **private** IP addresses.

TASK 7

Do some research on NAT. Why does it help devices on a network hide their IP addresses?

Static Vs Dynamic IP addresses

As we saw before, when a device attempts to connect to a network, DHCP automatically assigns it an IP address.

If we go back to the coffee shop the next day, will we be given the same IP address? Probably not. This is an example of Dynamic IP addresses.

However, there may be scenarios where a device requires an IP address that never changes ie a static address.

TASK 8

Can you find a scenario that would require a static IP address?
Make some notes here: