How does the internet work?

KS2 KS3 Ages 7-14 ⏰ 5 min read

The internet isn't a cloud (despite what all those diagrams suggest). It's a physical network — an enormous web of cables, computers, and routers stretched across the entire planet, including under every ocean. When you load a webpage, you're sending and receiving data across this network, possibly across multiple continents, in well under a second.

What actually happens when you type a URL?

Say you type *bbc.co.uk*. Your computer doesn't know where that is, so it asks a special type of server called a **DNS server** (Domain Name System) for the address. The DNS server is like a phone book — it converts the human-readable name "bbc.co.uk" into a numerical IP address (something like 212.58.244.18) that computers actually use to find each other.

Your computer then sends a request to that IP address. That request doesn't travel as one piece — it's broken up into thousands of small chunks called **packets**. Each packet travels independently across the network, potentially taking different routes, and they're reassembled at the destination.

Imagine you want to send a very long letter to someone. Instead of sending it as one letter (which might get lost), you tear it into 500 numbered pieces and post each one separately. Some go via Birmingham, some via Manchester, some via a completely different postal service. When they all arrive, the person reassembles them in order. That's packets. The internet does this millions of times per second, for millions of people at once.

What are routers?

Routers are the traffic directors of the internet. Every packet has a destination IP address on it, and as it hops from router to router, each one looks at that address and decides the best next step to get it closer to its destination. There are millions of routers around the world, and they're constantly communicating to figure out the fastest routes.

What's the physical infrastructure?

Most of the internet's long-distance traffic travels through **submarine cables** — fibre-optic cables laid across the ocean floor. Light pulses through thin glass fibres at, well, the speed of light. There are hundreds of these cables, carrying almost all international internet traffic. Your Netflix stream very likely crossed an ocean to get to you.

What's the difference between the internet and the web?

The **internet** is the physical infrastructure — all those cables, routers, and servers. The **World Wide Web** is one service that runs on top of it — the system of linked webpages you browse with a browser. Email, WhatsApp, Zoom, and online games are also internet services, but they're not the web. The web is just the most visible part.