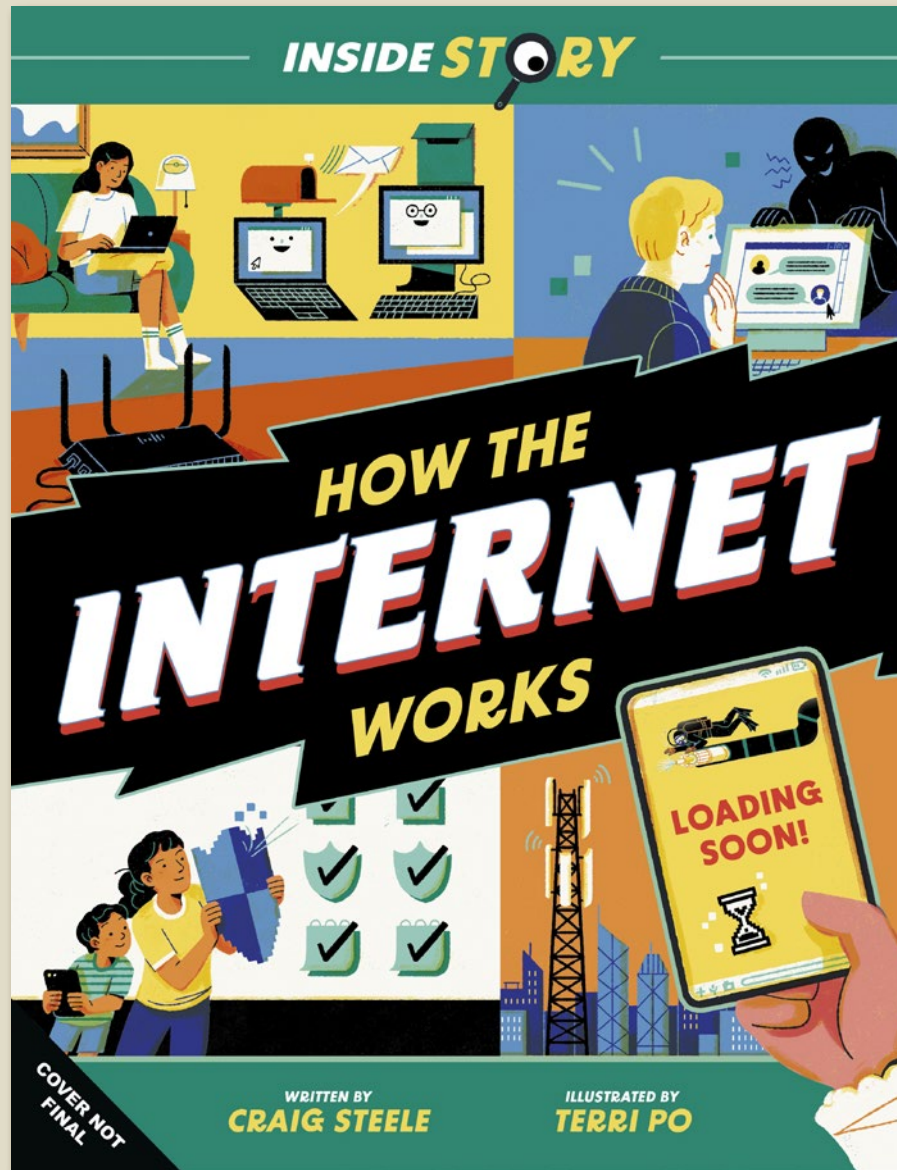


Inside Story: How the Internet Works



Get the inside story on today's most important topics and learn to navigate the internet like a pro!

- An all-encompassing guide to the internet, looking at how it's made and who by, how the internet plays a role in different areas of our lives (e.g. communication, entertainment, shopping and business), the latest issues surrounding the internet and how to work with parents and guardians to stay safe online.
- Written by an expert author - Craig Steele, a computer scientist and digital skills educator. Plus tips from other contacts in the industry who can provide first-hand knowledge.

Inside Story: How the Internet Works

THE INFRASTRUCTURE OF THE INTERNET

Some parts of the internet you can see easily, like your broadband router at home. But did you know most of the internet's structure is actually hidden? Below the sea there are long lines of cables, above you, thousands of satellites orbit Earth, and dotted around the globe are warehouses full of powerful computers. These work together to form the physical foundation of the internet – its infrastructure – and each one plays an important role.

Cables
There are hundreds of thousands of miles of internet cables zig-zagging across entire continents, and along the seabed, undersea cables are laid to connect countries and islands. These are used to transfer data across long distances. Most of these cables use fibre optic strands, which are super-thin threads of glass (each one thinner than a human hair) that transmit data as pulses of light.

Satellites
In less populated and more rural areas of the world, satellites are used to connect people to the internet. They orbit high above Earth, beaming signals to and from ground stations. These satellites also provide internet access to people travelling in aeroplanes.

5G Cell Towers
When you use the internet on your phone while out and about, it connects to a nearby cell tower using a high-speed 5G connection. These cell towers are used by mobile network operators (like EE or O2), who send your data through their own networks before it goes to the internet.

Home Wi-Fi
All of your devices at home are most likely connected to the internet using a technology called wireless fidelity, better known as Wi-Fi. Instead of wires or cables, data from your devices is transmitted to a home router using radio waves. The router gives you access to the internet, and it's a smaller, less powerful version than the ones in data centres.

Data centres
A data centre is a giant building that processes data for the internet. They're filled with powerful computers called servers that store the files, code and databases needed by websites and apps. Servers handle millions of requests from across the internet and send data to your device in a fraction of a second. These centres have thousands of machines running all day which get very hot, so need to be cooled constantly. One cooling system uses 4 million litres of water per day, that's the same amount used by a town of 10,000 people!

Routers
Routers are like the internet's traffic officers – they are computers that help direct data around busy sections of the internet. When a router receives a packet of data, it forwards it along the right path to its destination. These powerful computers are set up at important junctions across the internet world, such as at data centres.

Internet Service Provider
To connect to the internet at home or work, people join a company called an internet service provider (ISP) for access. They provide network equipment (like a wireless router) and manage the connection to make sure users have reliable speeds, making getting online a breeze.

Internet Exchange Points
An internet exchange point (IXP) is a location where different ISPs connect their networks to each other. By sharing traffic, data can take the shortest route across multiple networks. Companies that use the internet sometimes keep copies of popular data at an IXP so that it doesn't have to travel as far to reach people, for example, film and TV streaming sites.

HOW DATA IS SENT ACROSS THE INTERNET

Have you ever thought about the internet your family, school, teacher robot – really your whole world – uses to get on? You'll need some computers, mobile phones, tablets or laptops. But there's also a network of cables, satellites and servers that connect them. This network is called the internet. It's made up of many different parts, and it's constantly changing and growing.

Step 1 - You use a device to connect to the internet. The data is sent to a nearby cell tower or Wi-Fi router.

Step 2 - The data is sent to an internet service provider (ISP) which connects it to the rest of the internet.

Step 3 - The data is sent to a data centre where it is stored and processed.

Step 4 - The data is sent to a destination server, which then sends it back to your device.

INTERNET UPDATE
The internet is constantly changing and growing. New technologies are being developed, and old ones are being replaced. This means the internet is always getting better and faster.

INTERNET UPDATE
What is smart? Smart devices can do more than just connect to the internet. They can also learn from their users and make decisions for them. This is called artificial intelligence (AI). AI is used in many ways, from recommending movies to driving cars.

CYBER CRIME ON THE INTERNET

There's a dark side to the internet. Some people use it to do bad things, like steal money, spread lies, or harm others. This is called cyber crime. It's a big problem, and we need to know how to protect ourselves.

Malware most wanted
There are many types of malware, but these are the most dangerous:
 - **Spies**: These can steal your personal information without you knowing.
 - **Ransomware**: This locks your files and demands money to get them back.
 - **Scams**: These trick you into giving away your money or personal information.

Who protects us from cyber crime?
 - **Police**: They investigate and catch cyber criminals.
 - **Digital Forensics Specialists**: They find evidence of cyber crime.
 - **Cyber Threat Researchers**: They look for new ways to protect us from cyber crime.

Protecting the human
 - Use strong passwords.
 - Don't click on suspicious links.
 - Keep your software up to date.
 - Be careful of what you share online.

ON ASSIGNMENT
 - Check for updates.
 - Read the instructions.
 - Follow the steps.
 - Complete the task.
 - Check your work.

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