# Learning Aims

- Explain how the internet is structured
- Define the terms:
  - Internet backbone (the different ways of connecting to the internet)
  - Point of Presence(POP)
  - Internet service provider (ISP)
  - Network Access points (NAP's)
  - Routers
  - IP address (static and dynamic)
  - DNS

Internet Definition

- The **Internet** is a massive network of networks
- A networking infrastructure of cables, wireless connections, satellites, servers and routers.

Key Terms

Internet Backbone – the multiple cables, fibre optic cables and satellite connections connect countries and continents to each other.

Local networks connect to the internet via a **Point of Presence (POP)** provided by an **Internet service provider (ISP)**

Network Access Points (NAP's) interconnect the internet backbones to form a worldwide **mesh** network

Routers forward data from one network to another across the internet from **source** to **destination.**

Every device connected to the internet is allocated an **IP address.**
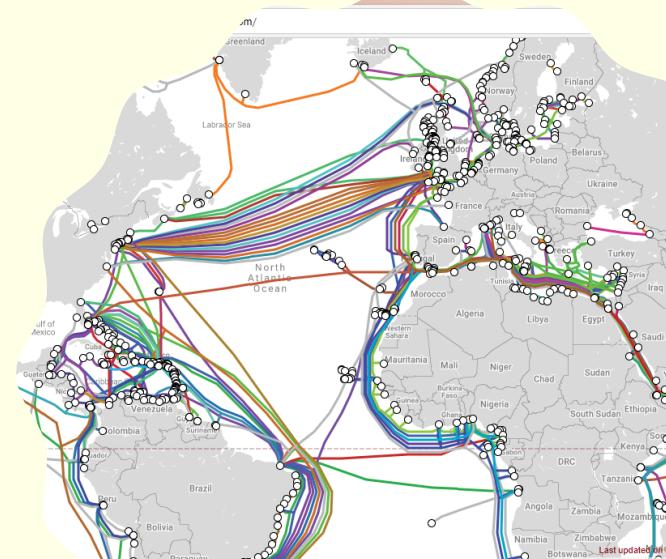
What is an ISP?

An **Internet Service Provider** (ISP) is a company that provides access to the internet. Wherever you may be, every time you connect to internet, your connection is routed through an ISP.
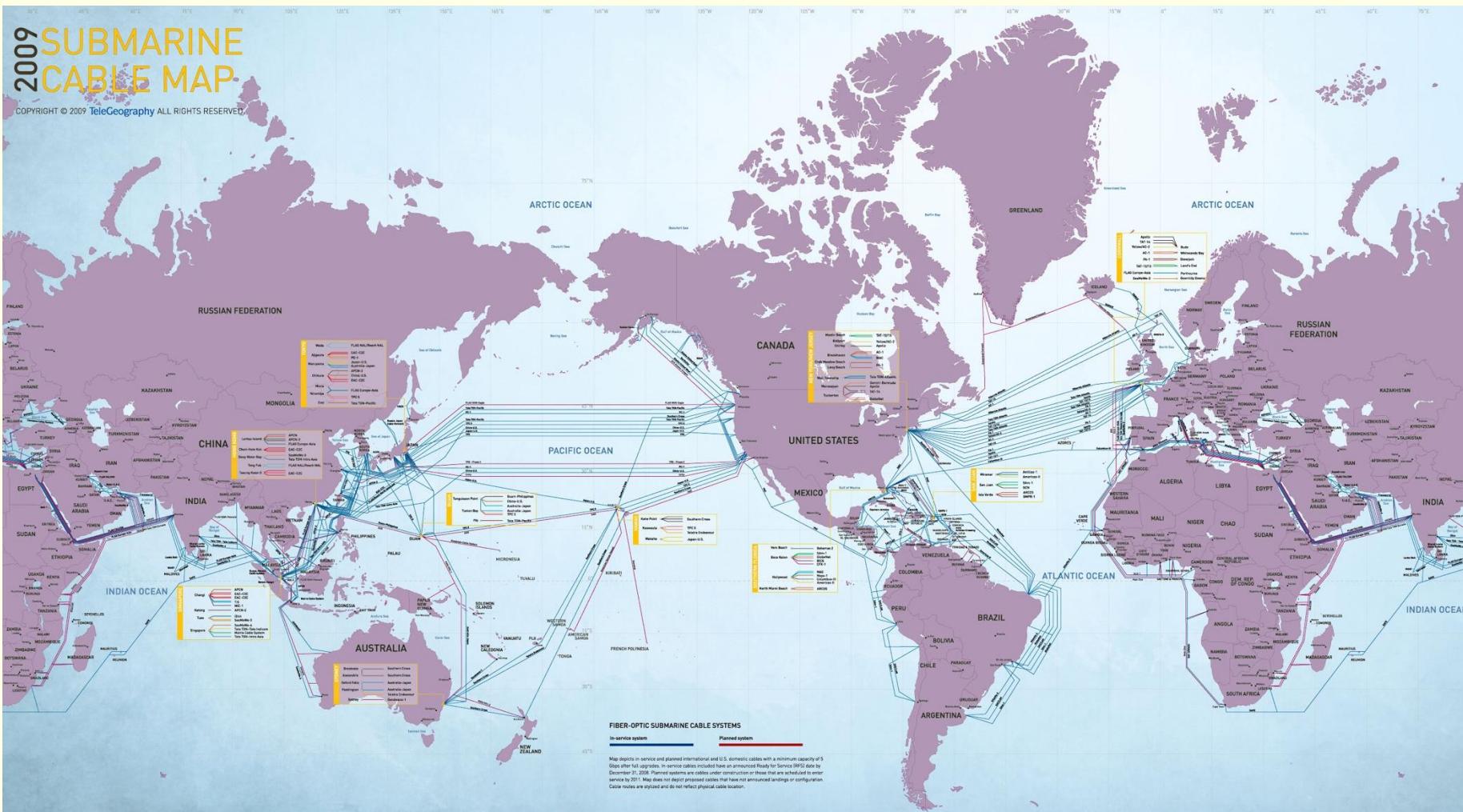
Internet backbone - **What are the different ways of connecting?**

- Cables - Copper & Fibre Optic
- 3G/ 4G/ 5G - Data is transmitted through the cellular phone network
- Satellite

# Internet Cables map
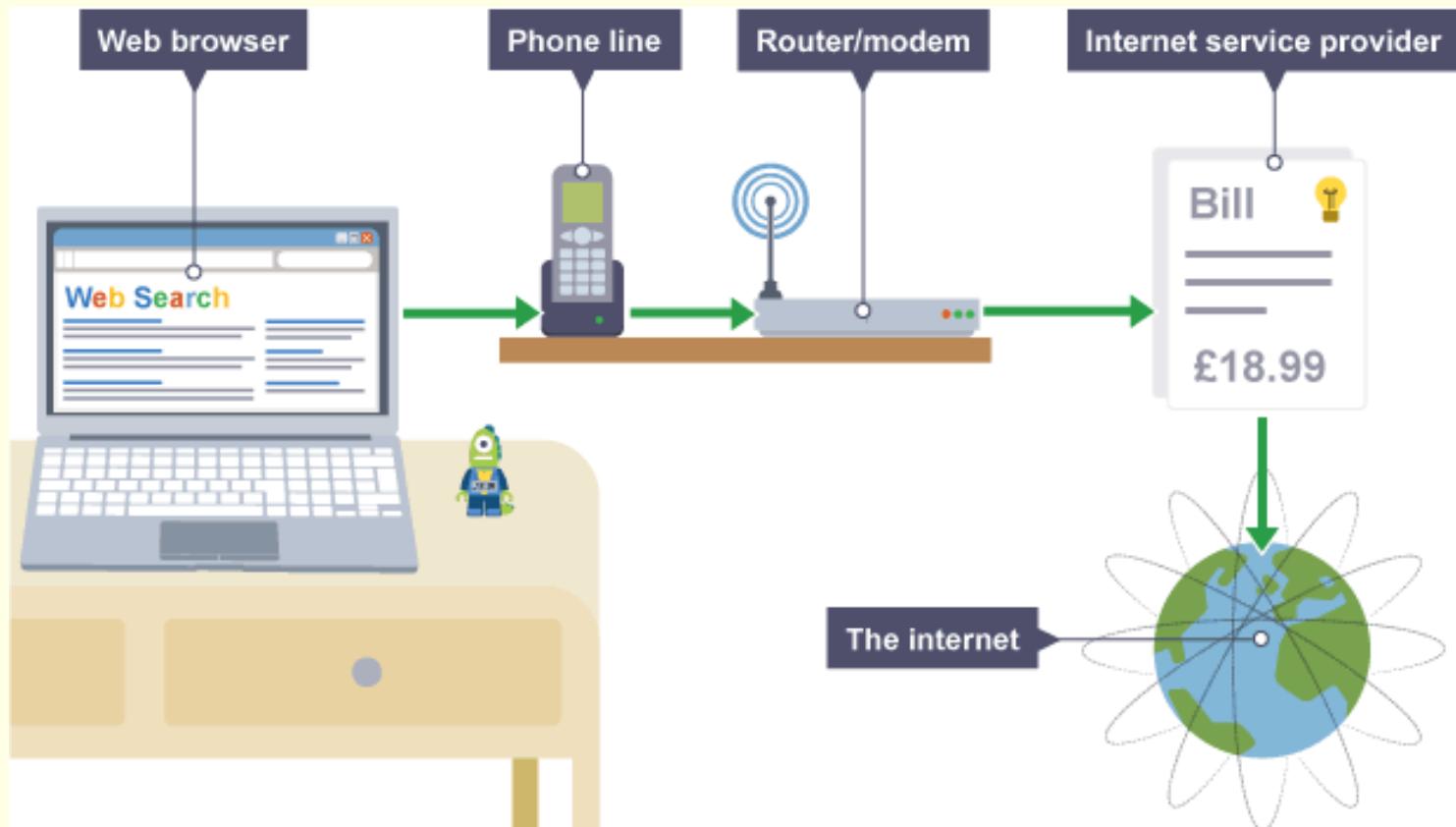
How to connect to the internet?

To connect a computer or a device to the internet, you need:
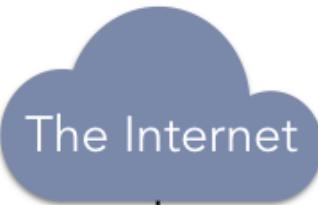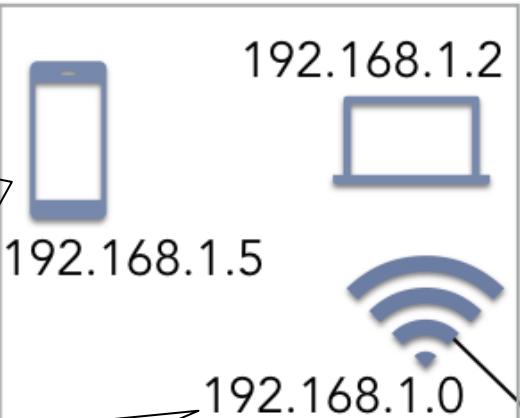
- an **ISP**
- a **modem** or **router** (wired or wireless)
- a **web browser** or **app**
- a connection to the network (through a copper wire or a **fibre optic cable**)

Web browser

Phone line

Router/modem

Internet service provider

Web Search

Bill

£18.99

The internet

The router will assign a Private IP Address for each device connected (Dynamic IP)

Private IP Address assigned for the router

Alice's Home

192.168.1.2

192.168.1.5

192.168.1.0

The Internet

75.3.28.14
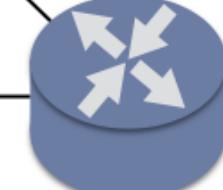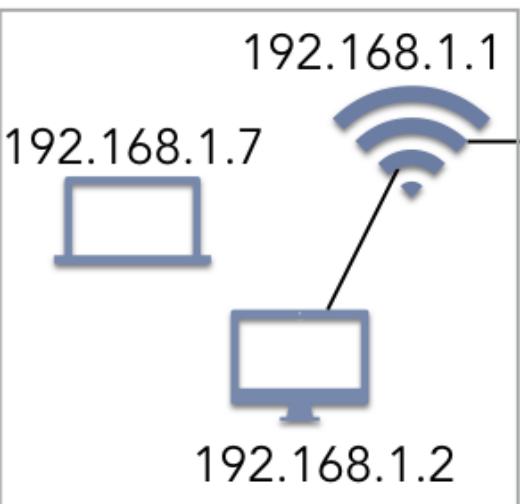
Public IP Address – link home network to the internet – assigned by the ISP
Static IP

Bob's Home

192.168.1.1

192.168.1.7

75.3.28.27

192.168.1.2

Alice and Bob's ISP

Remember the purpose of the router is to connect to the internet and send data packets to the correct destination.

Static vs dynamic IP addresses

Routers and servers will be assigned a static Ip address that will never change.

Devices have a dynamic Ip address which is assigned to them by the network when thet connect.

When you leave the network, the Dynamic IP address can be assigned to another device.

The Dynamic Host Configuration Protocol (DHCP) is used to assign dynamic IP addresses. Research DHCP and write a brief description of what it does.

- Further reading: go to networkworld.com and search for their article 'DHCP defined and how it works'.

What is a DNS Server?

- The DNS has a list of all domain names (for example www.bbc.co.uk) and their associated IP addresses (151.101.0.81)

- All packets are transmitted as IP addresses – therefore to access the server that holds the web page – we would need to know the IP address.

- This is the role of the DNS server