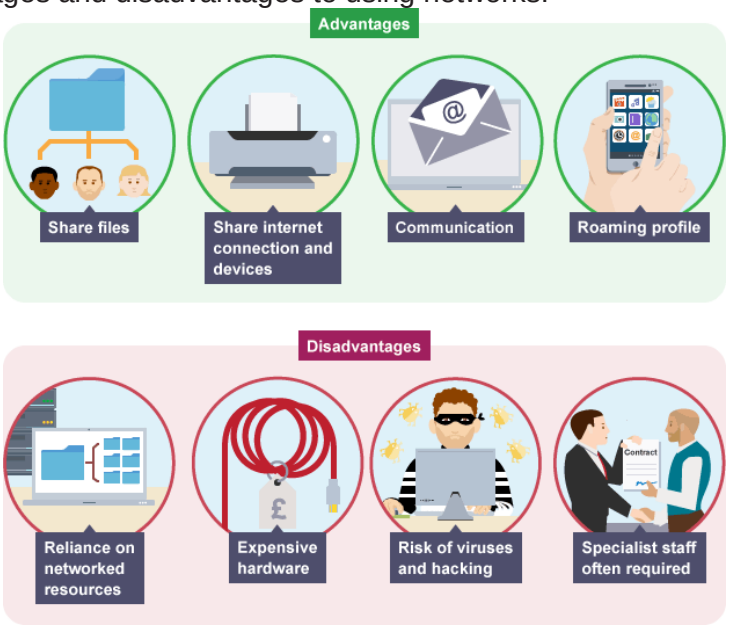
Networks

A **network** is created when more than one device is connected together. A network can be a small collection of computers connected within a building (eg a school, business or home) or it can be a wide collection of computers connected around the world.

Data packets

The main purpose of networking is to share data between computers. A file has to be broken up into small chunks of data known as data packets in order to be transmitted over a network. The data is then re-built once it reaches the destination computer. Networking hardware is required to connect computers and manage how data packets are communicated. **Protocols** are used to control how data is transmitted across networks. There are advantages and disadvantages to using networks.



Advantages

- **Communication** – it is easy (and often free) to communicate using email, text messages, voice calls and video calls.
- **Roaming** – if information is stored on a network, it means users are not fixed to one place. They can use computers anywhere in the world to access their information.
- **Sharing information** – it is easy to share files and information over a network. Music and video files, for instance, can be stored on one device and shared across many computers, so every computer does not need to fill the **hard drive** with files.
- **Sharing resources** – it is easy to share resources such as printers. Twenty computers in a room could share one printer over a network.
- **Sharing software** – it is possible to **stream** software using **web applications**. This avoids needing to download and store the whole software file.

Disadvantages

- **Dependence** – users relying on a network might be stuck without access to it.
- **Hacking** - criminal hackers attempt to break into networks in order to steal personal information and banking details. This wouldn't be possible on a stand-alone computer without physically getting into the room, but with a network it is easier to gain access.
- **Hardware** – **routers**, **network cards** and other network hardware is required to set up a network. At home, it is quite easy to set up a wireless network without much technical expertise. However, a complicated network in a school or an office would require professional expertise.
- **Viruses** - networks make it easier to share **viruses** and other malware. They can quickly spread and damage files on many computers via a network.

LANs and WANs

A network can be anything from two computers connected together, to millions of computers connected on the internet. There are many different types of networks such as **LAN**, **WAN**, **VPN**, **WPAN** and **PAN**.

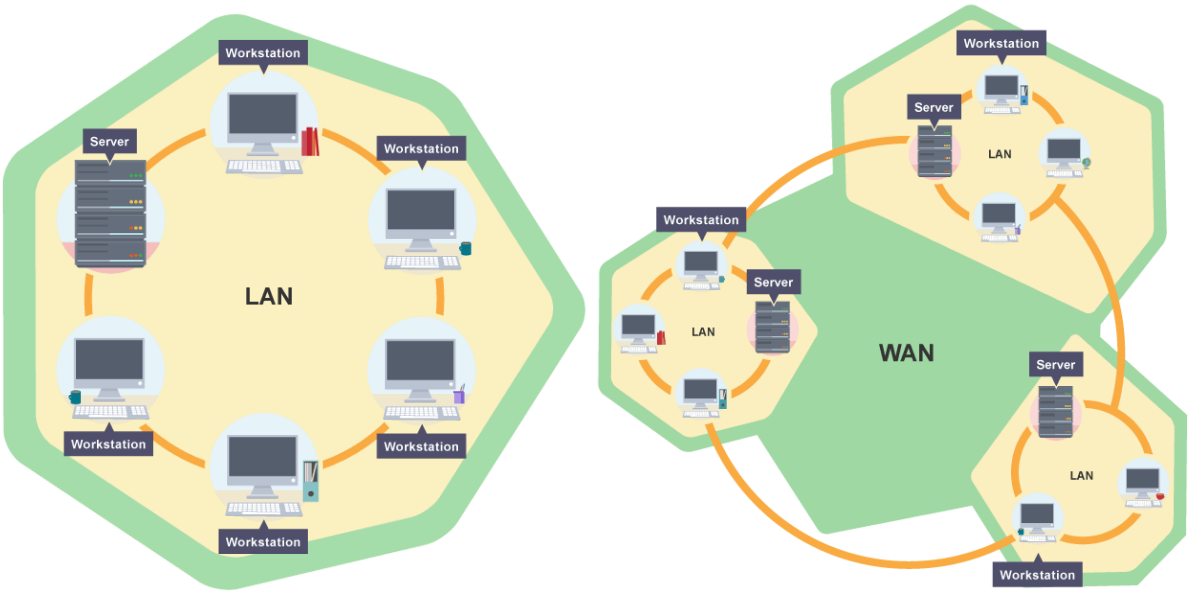
Computer networks - LAN and WAN

LAN

A LAN (local area network) is a network of computers within the same building, such as a school, home or business. A LAN is not necessarily connected to the internet.

WAN

A WAN (wide area network) is created when LANs are connected. This requires media such as **broadband** cables, and can connect up organisations based in different geographical places. The internet is a WAN.



VPN

A VPN (virtual private network) is usually hosted securely on another network, such as the internet, to provide connectivity. VPNs are often used when working on secure information held by a company or school.

WPAN

A WPAN (wireless personal area network) allows an individual to connect devices (such as a **smartphone**) to a desktop machine, or to form a **Bluetooth** connection with devices in a car. A wired personal network is called a **PAN (personal area network)**.