# 7. Wired and Wireless networking

- Wireless: Wi-Fi and Bluetooth.
  - Spread spectrum frequency hopping: If a channel is already being used, it randomly picks another channel.
  - Wi-Fi offers much faster data transfer rates, better range and better security.
- Use of **satellite**: the curvature of the earth prevents the use of microwaves/radio waves transmitting data globally. To overcome this problem, we need to adopt satellite technology.

## Wired

- More reliable and stable network
- Data transfer rate tend to be faster
- Tends to be cheaper overall
- Devices are not mobile
- Lots of wires can lead to tripping hazards.

## Wireless

- It is easier to expand networks and is not necessary to connect devices using cables
- Devices have increased mobility
- Increased chance of interference from external sources
- Data is less secure than with wired systems
- Data transmission rate is slower than wired networks
- Signals can be stopped by thick walls.
- Different types of device can be connected at the same time

## Twisted pair

- Usage: Telephone, LANs
- Capacity: Lower bandwidth than fibre optic
- Larger and heavier cables than FO for similar data capacity

## Fibre optic:

> Transmits data as light; uses a glass/plastic thread to transmit data.

- High-speed network Asynchronous Transfer mode (ATM) and long cable runs.
- Faster data transmission
- More stable
- Greater bandwidth
- Need less signal boosting/ can travel over longer distances
- Greater security / more difficult to hack
- Lighter in weight
- Less interference in signal
- Trained personnel needed to install
- Expensive
- Difficult to terminate
- Break when bent
- Only transmits data in one direction
- If a fibre-optic cable connection fails, more services can be affected.

## Copper cable: use of existing telephone network

Carries data as electrical signals and can consist of a twisted pair.

- Less expensive overall
- Easier to install because it is more flexible
- Easier to make terminations using copper cabling
- The expertise in use of copper cabling is more extensive

## Radio waves

- Carries data wirelessly, often known as Wi-Fi.
- Carries data in the form of electromagnetic wave

## Satellite

- A communication device in Earth’s orbit that receives and transmits data.
- Due to curvature of the earth.
- Antenna to Satellite
- Signal boosted by the satellite