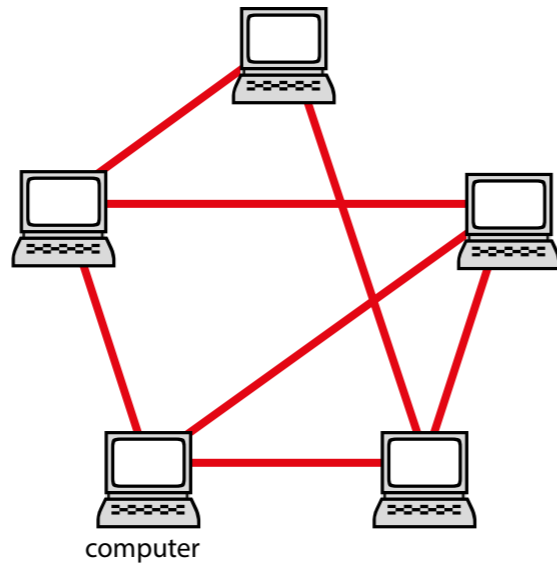# Unit 1.3.1 Mesh Topologies

Full-Mesh Topology

Every single computer device in the network has a **direct connection to every other computer device**.
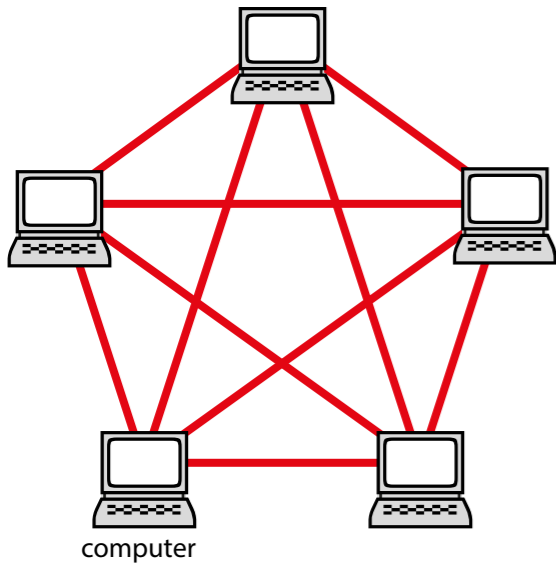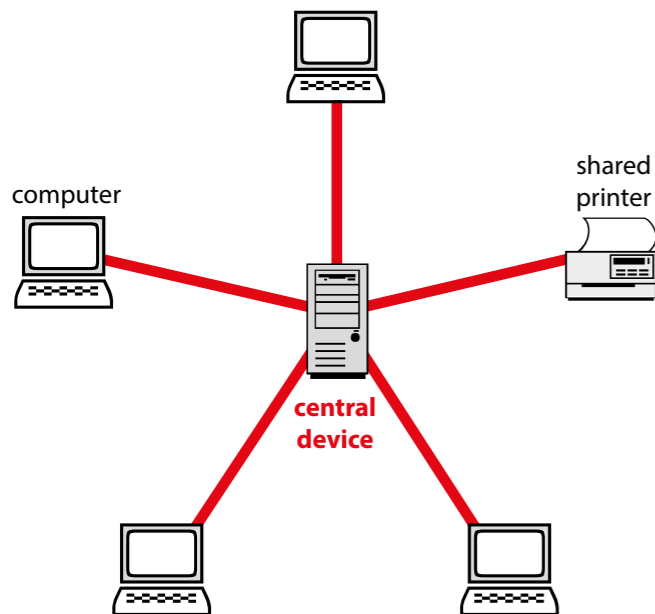

computer

Partial-Mesh Topology

Every single computer device in the network is **connected to every other device**, either through a **direct** connection or an **indirect** connection.

computer

Unit 1.3.1 Star Topology

Uses a **central device** to **control** all **data transmission** across the network between client devices

computer

shared printer

central device

In a star network **each device has a single connection to a central computer device**.

The central device controls the operation of the network.

All communication between any client devices **must pass through the central device**.
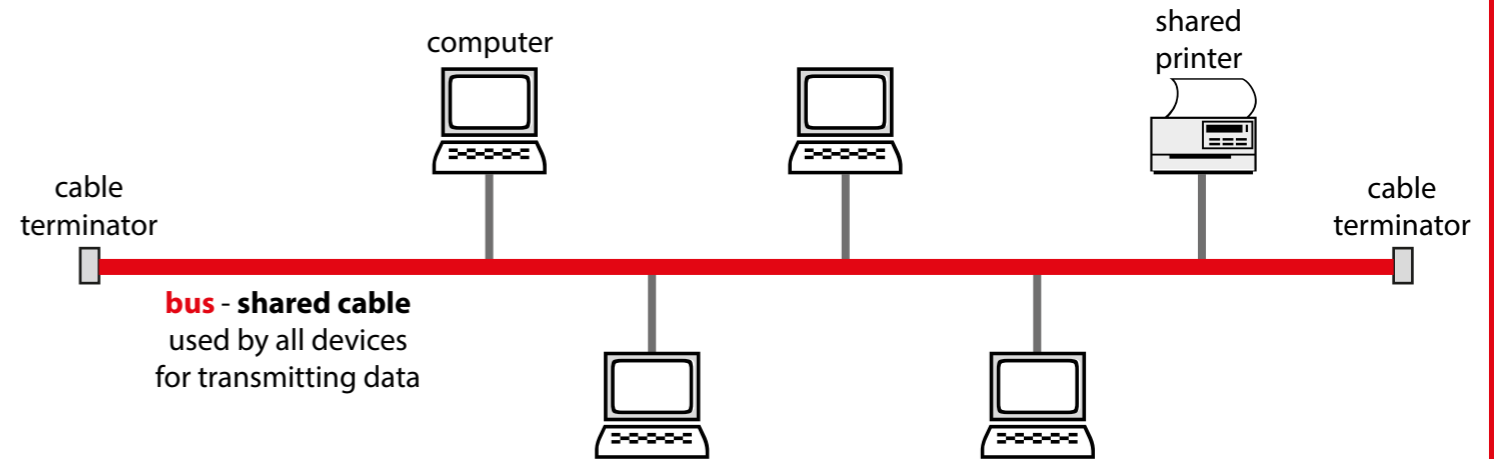
Communication between devices is fast because there are only two links between any client devices on the network.

If the central device breaks down then the **whole** network will be affected: **none of the devices will be able to communicate with each other**.

Unit 1.3.1 Bus Topology

The bus network topology uses the **Ethernet protocol** to control **data transmission** and **collision detection**.

No single computer or device is in control of the network.

computer

shared printer

cable terminator

cable terminator

bus - **shared cable** used by all devices for transmitting data

All devices are connected together through a **shared communication cable**, called a **bus**.
All data that passes between devices **must** travel along the bus.
The data is delivered to **all** devices connected to the bus... they **all** get it!
Data is only processed by the device that it was intended for… other devices **ignore** data that was not meant for them.

Only one device can send data across the shared bus cable at a time.
If two devices transmit data **at the same time** then the data will get mixed up - their data transmissions will become **corrupted**.
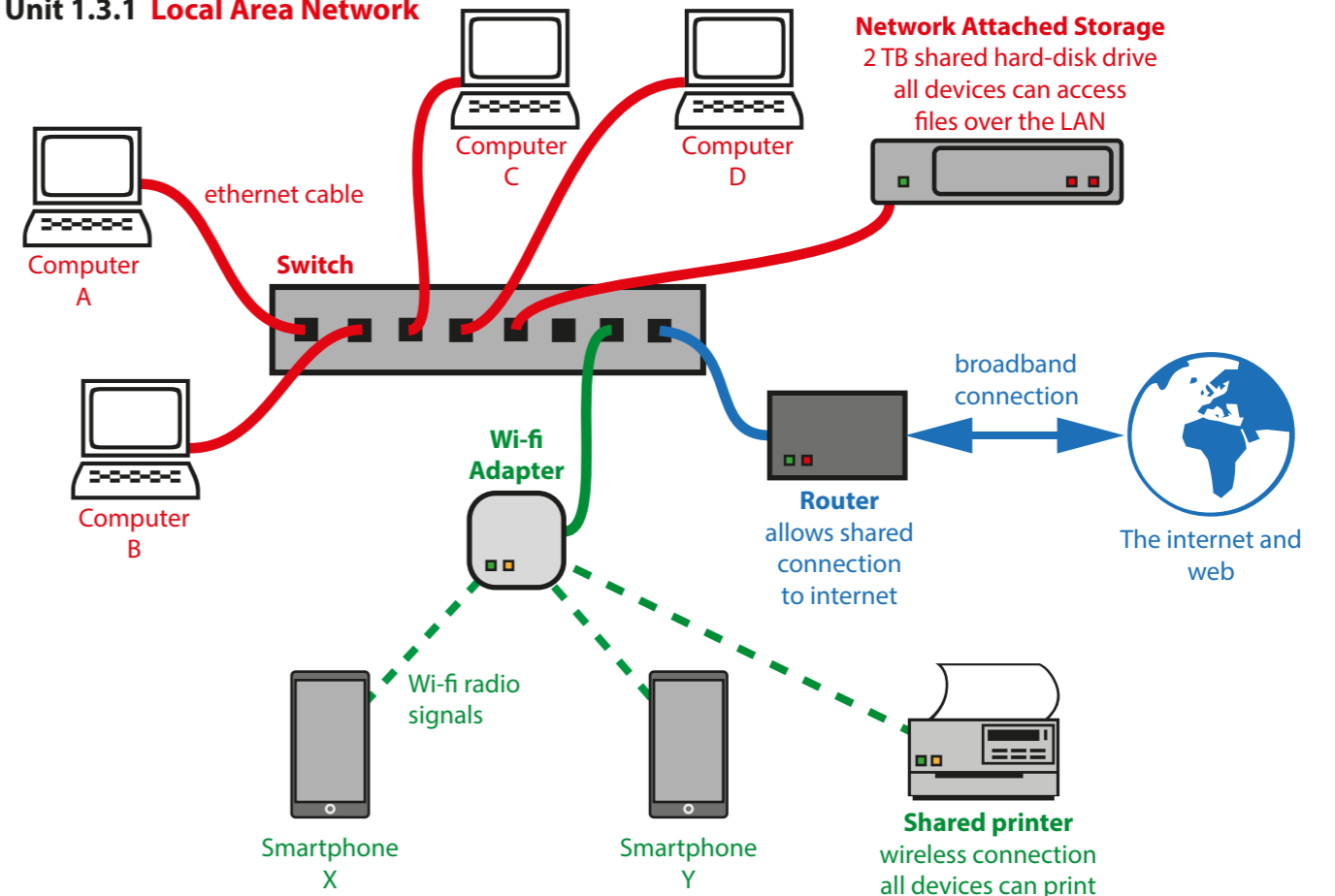When two devices send their data at the same time this is known as a **collision**.
To **detect** and **recover** from collisions, the **Ethernet protocol CSMA/CD** is used.

Bus networks are simple to build. They are also reliable: a problem with a single device is unlikely to affect the overall network.
However, a problem with the bus may affect the **whole** network: if the bus cable breaks, none of the devices can communicate at all.

Unit 1.3.1 Local Area Network

Network Attached Storage
2 TB shared hard-disk drive
all devices can access
files over the LAN

Computer C

Computer D

Computer A

ethernet cable

Switch

Computer B

Wi-fi Adapter

Wi-fi radio signals

Smartphone X

Smartphone Y

Router
allows shared connection to internet

broadband connection

The internet and web

Shared printer
wireless connection
all devices can print