Cambridge IGCSE

Computer Science

Section 2

Data Transmission

2.1.1 Types and methods of data transmission

- Data Packets

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Objectives

- Understand that data is broken down into packets to be transmitted
- Describe the structure of a packet
- Describe the process of packet switching

Vocabulary

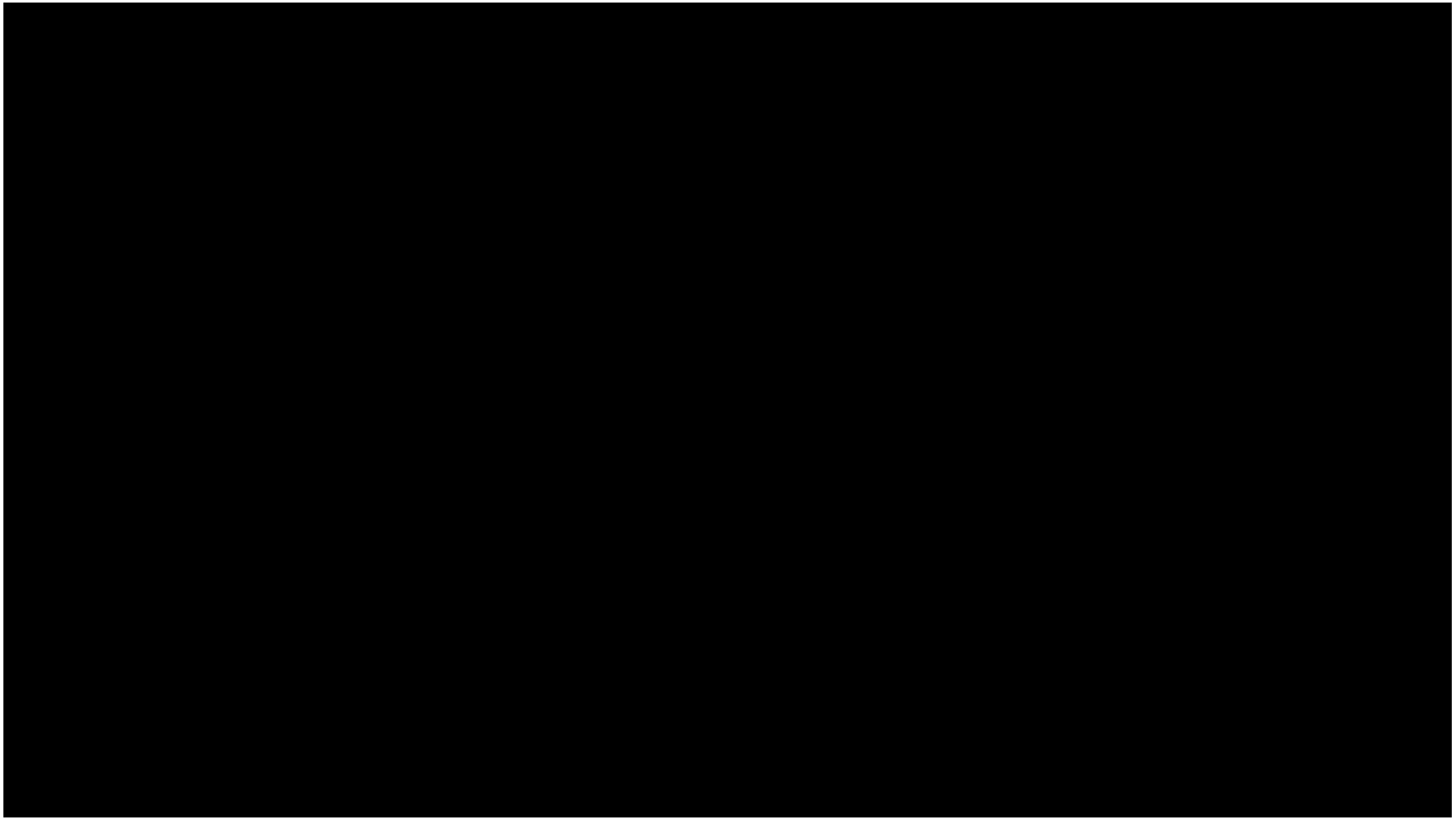
- **data**
- **data transmission**
- **packet**
- **header**
- **payload**
- **trailer**
- **protocol**
- **destination**
- **IP address**
- **originator**
- **route**
- **router**
- **network**

Data transmission

- The **transfer of data from one digital device to another**
- There are rules, or standards, which allow different devices to communicate and send data to each other, these are called **Protocols**.
- When digital devices are connected, they become part of a **network**. The internet is an example of a very large network.

Data transmission

Video – Packets, routing and reliability

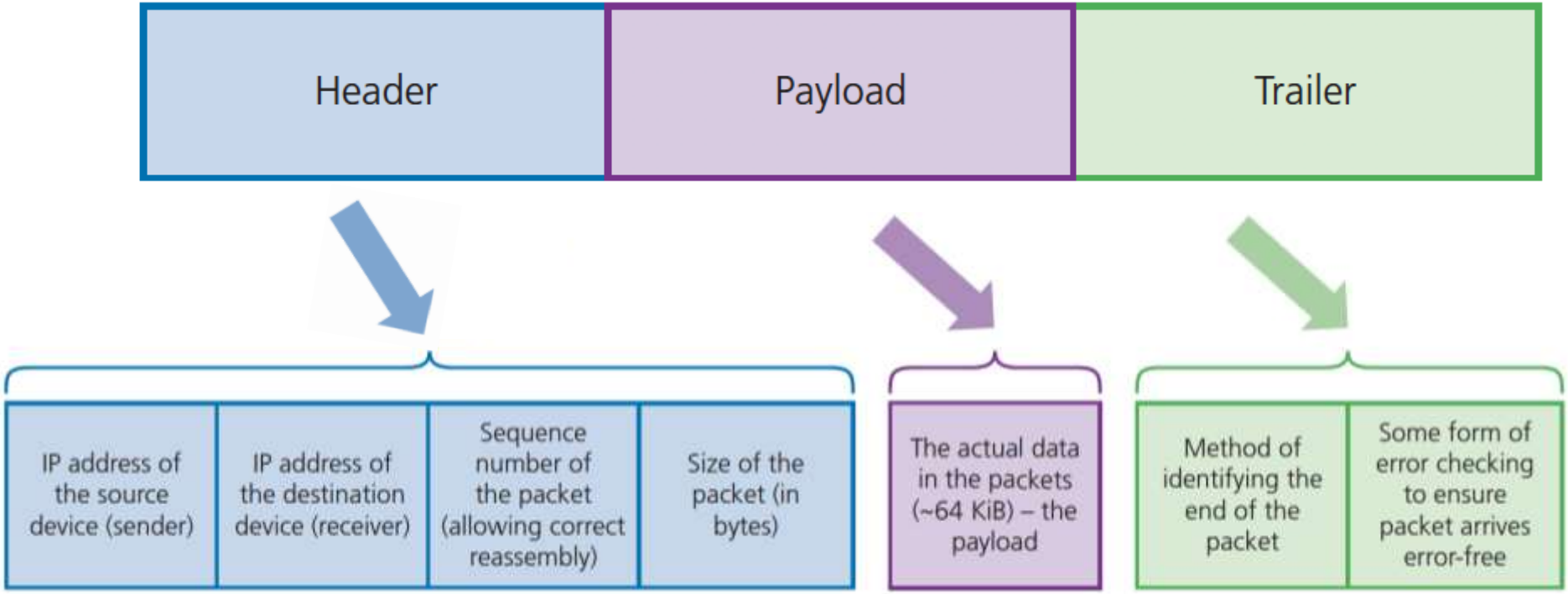


Data Packets

- When data is sent from one device to another, it is broken down into **packets**.
- This applies to any kind of data e.g. emails, videos, songs

Data Packets

- Each packet has three parts - a **Header**; the **Payload**; a **Trailer**



Packet switching

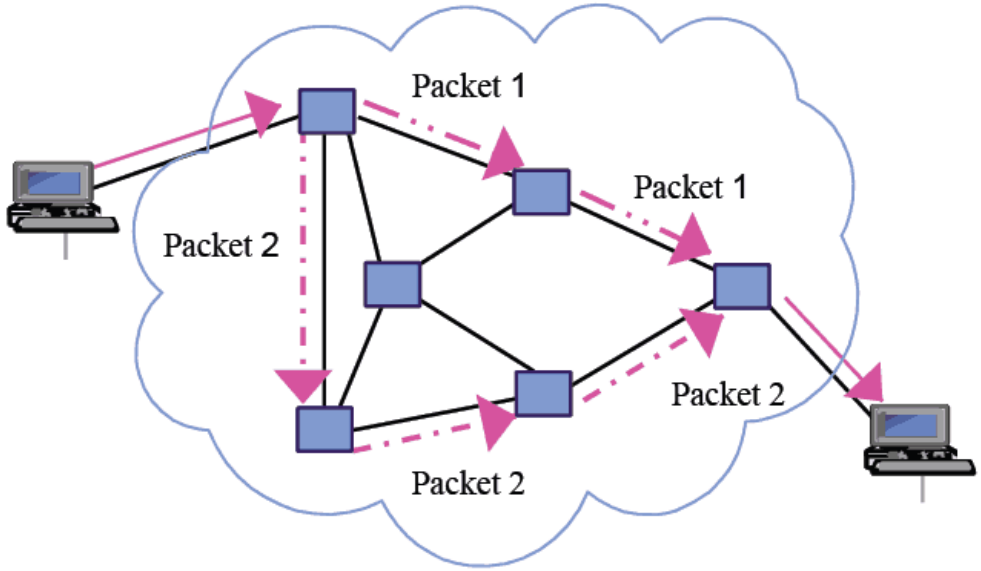
- Suppose you want to send a file of 3Mb across the Internet
- The file is broken up into data “packets” of 512 bytes
- Each packet is given a **header** containing
  - The IP (Internet Protocol) address it is going to - **destination address**
  - The IP address it has come from - **originator’s address**
  - The sequence number of the packet - **packet number**
  - The **total number of packets** in the whole communication

Packet switching

- Every device connected to the Internet has an **IP address**
- E.g. 81.101.137.12
- Packets are labelled with the sender's IP address and the destination IP address
- Packets are sent across the network separately along different routes and reassembled (put together again) at the end

Packet switching

- Devices called **Routers** are used to connect different parts of a network, and control the route (path) a packet takes.
- Each packet is passed along from one router to another, until it reaches it's destination.
- The packets may take a different path **and** arrive in a different order to which they were sent.
- Once all the packets have arrived they are reordered and the data is reassembled.



Summary - data packets and switching

- A network is when two or more devices are connected.
- Data is broken down into packets before being transmitted from one device to another.
- The packet header contains the destination address, packet number and originator's address.
- The method by which packets are sent across a network from one router to the next is called packet switching.
- Protocols (IP and TCP) are used to control how the data is sent over the network.