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Computing

Grade 5

(Instructional Resource)

UNIT/STRAND	**Unit 3 Networks and Digital Communication**
TOPIC	**3.1 Network Hardware**
Sub Topics	
Session	**2025-26**
Prepared By	**(Ms. Anooshay)**

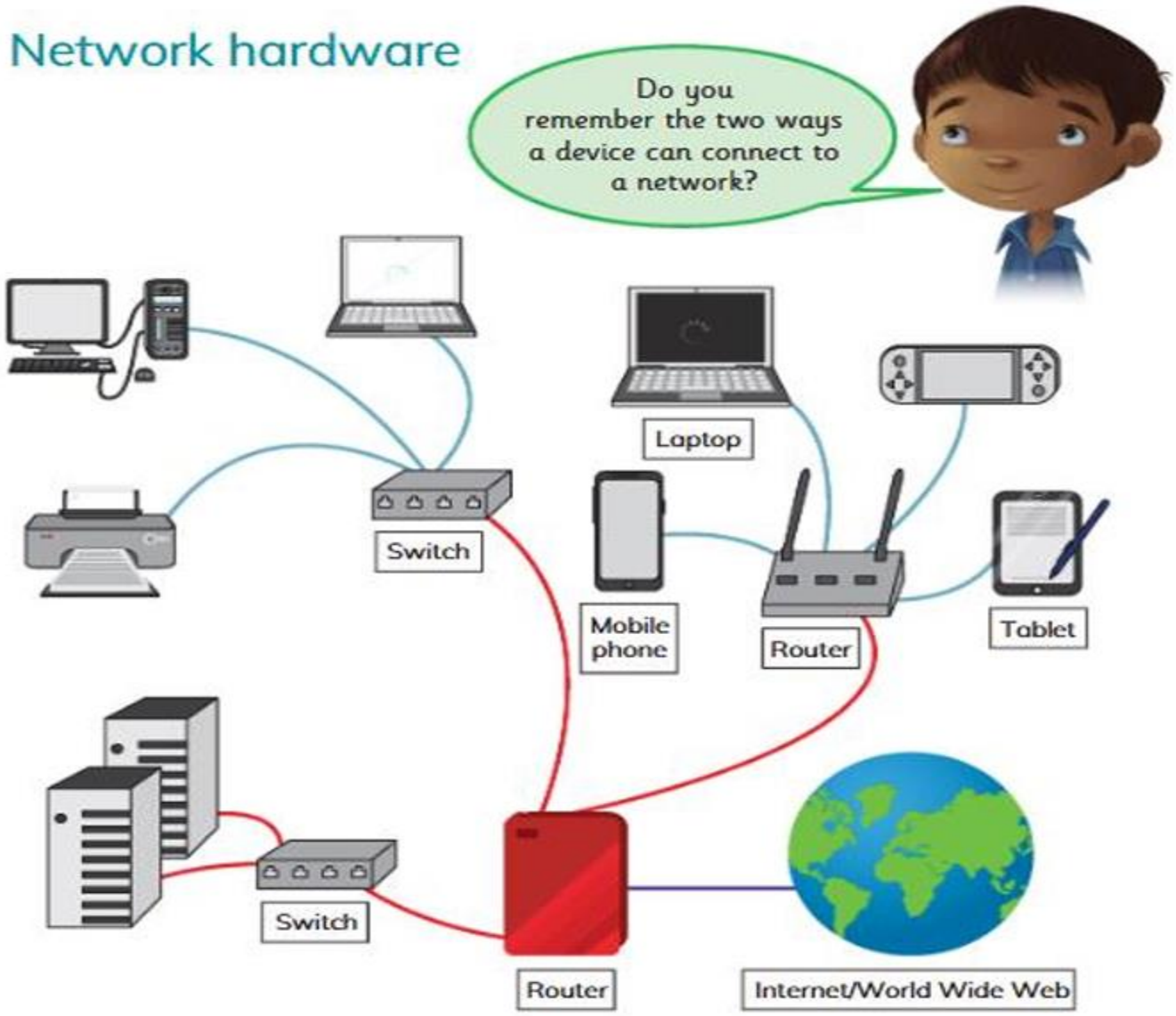
3.1 Network Hardware

Introduction to networks

- A network is a group of computers and devices that are connected to share information and resources. Networks allow people to send emails, share files, play games together, and use the internet.
- A network connects computers and devices to share information.
- Your school uses a network to connect all computers.
- Devices can connect using wires (Ethernet) or wirelessly (Wi-Fi).

3.1 Network Hardware

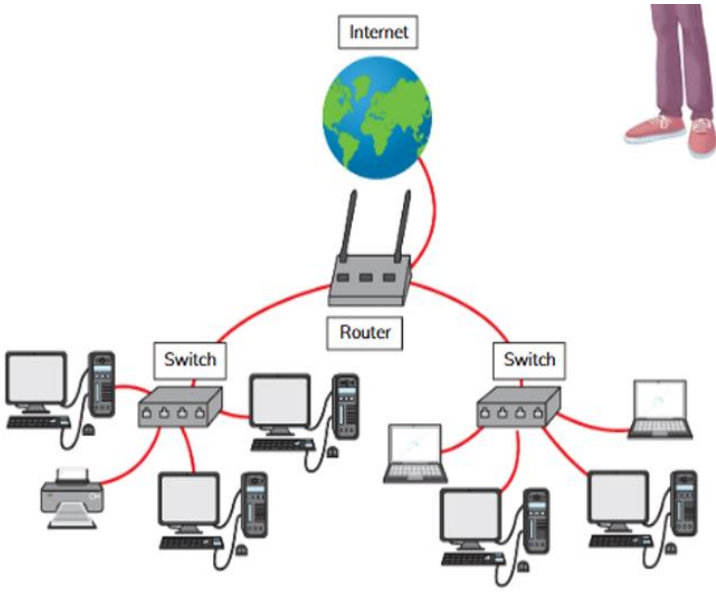
Introduction to networks



3.1 Network Hardware

Connecting with Wires (Switches | Routers)

- Wired connections use cables to link devices in a network.
- A **switch** connects devices in a local network and helps them communicate.
- A **router** connects networks together and sends data to the correct place, like from your home network to the internet.



3.1 Network Hardware

Connecting Without Wires

- Wireless networks use Wi-Fi to connect devices without cables. Devices like laptops, tablets, and phones can connect to a router wirelessly to access the internet. It gives more freedom to move around while staying connected.

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UNIT/STRAND	**Unit 3 Networks and Digital Communication**
TOPIC	**3.2 How data travels through network?**
Sub Topics	
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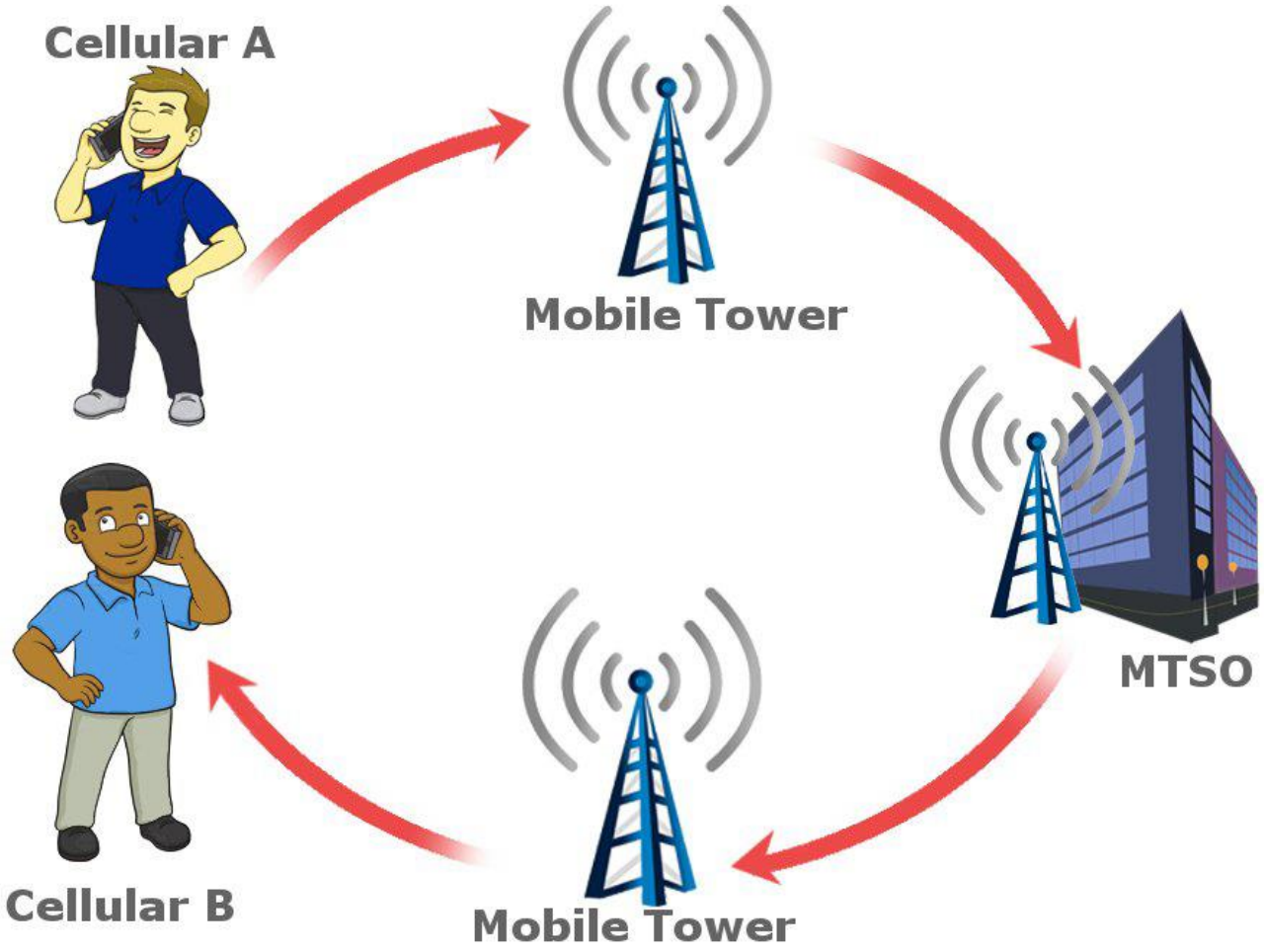
3.2 How data travels through network?

Using Cellular Networks



3.2 How data travels through network?

Using Cellular Networks

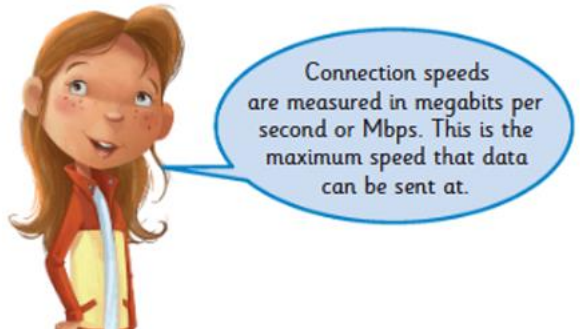
- Cellular networks connect phones and other devices to the internet using mobile signals. These networks use towers to send data, so you can access the internet even without Wi-Fi.

3.2 How data travels through network?

Comparing Different Connections

- Different types of connections include Wi-Fi, Ethernet, and cellular networks. Each has its own speed and reliability. For example, Ethernet is very fast and stable, while Wi-Fi is more flexible, and cellular networks work best when you are outside

	Wi-fi connection	Cellular connection	Ethernet connection
Wired	✗	✗	✓
Wireless	✓	✓	✗
Range	Usually around 20 m	Usually around 5 km	100 m
Speed	300–1000 Mbps	100 Mbps	1000 Mbps
Number of devices	30 per access point	Between 60 and 1500	One per wire
Chance of interference	High	Some	Low



3.2 How data travels through network?

Introduction to Wi-Fi Connection

- Wi-Fi is a wireless connection that uses radio signals to link devices to a router. It allows many devices to connect to the internet at the same time without wires.

3.2 How data travels through network?

Introduction to Ethernet Connection

- Ethernet uses cables to connect devices to the internet. It is usually faster and more reliable than Wi-Fi, especially for things like video calls or gaming.

3.2 How data travels through network?

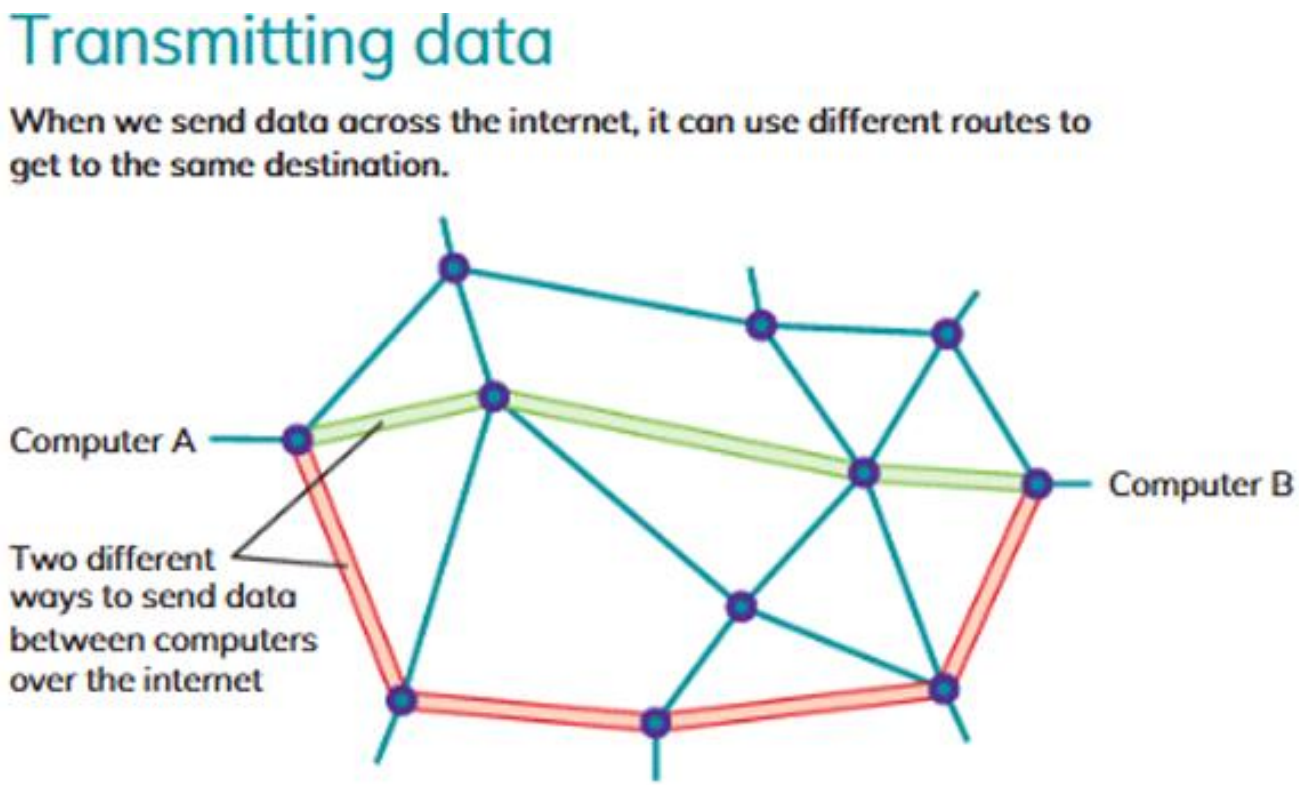
Internet Protocol (IP) Addresses

- Every device on a network has an IP address. It’s like a home address for computers. IP addresses help devices send and receive information to the correct places on the internet.

3.2 How data travels through network?

Transmitting Data

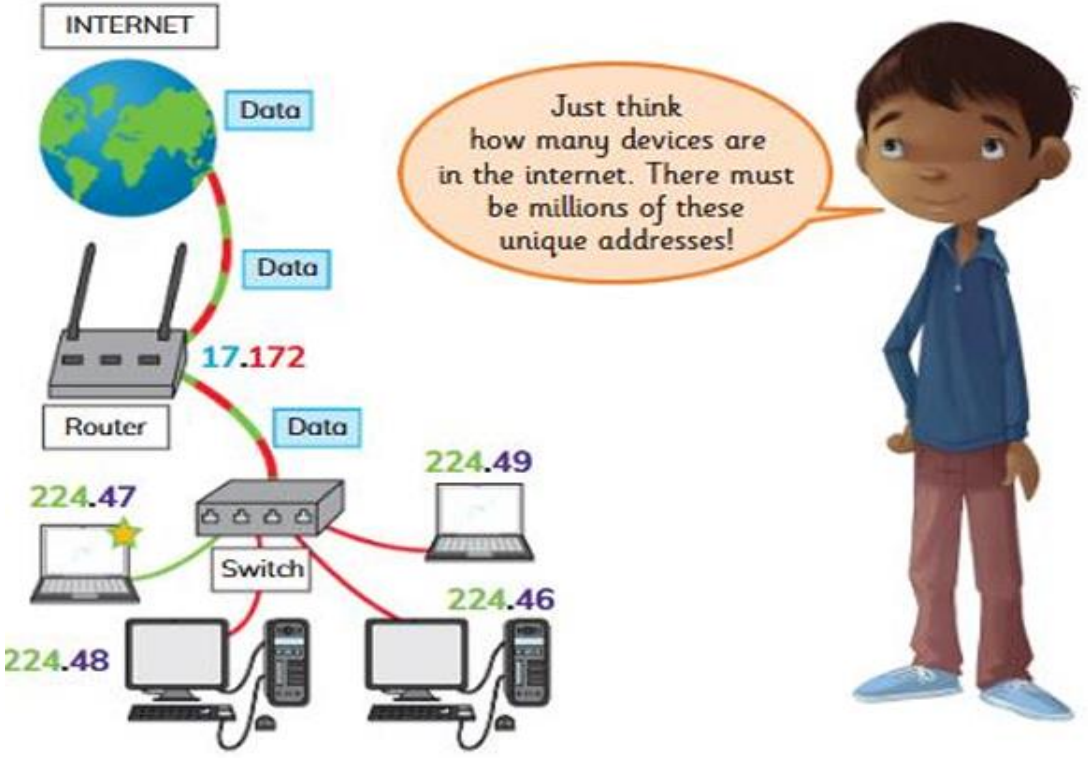
When you send something over the internet, it is turned into digital data. This data travels from one device to another through cables, airwaves, or cellular towers.



3.2 How data travels through network?

How Data Is Split Into Packets?

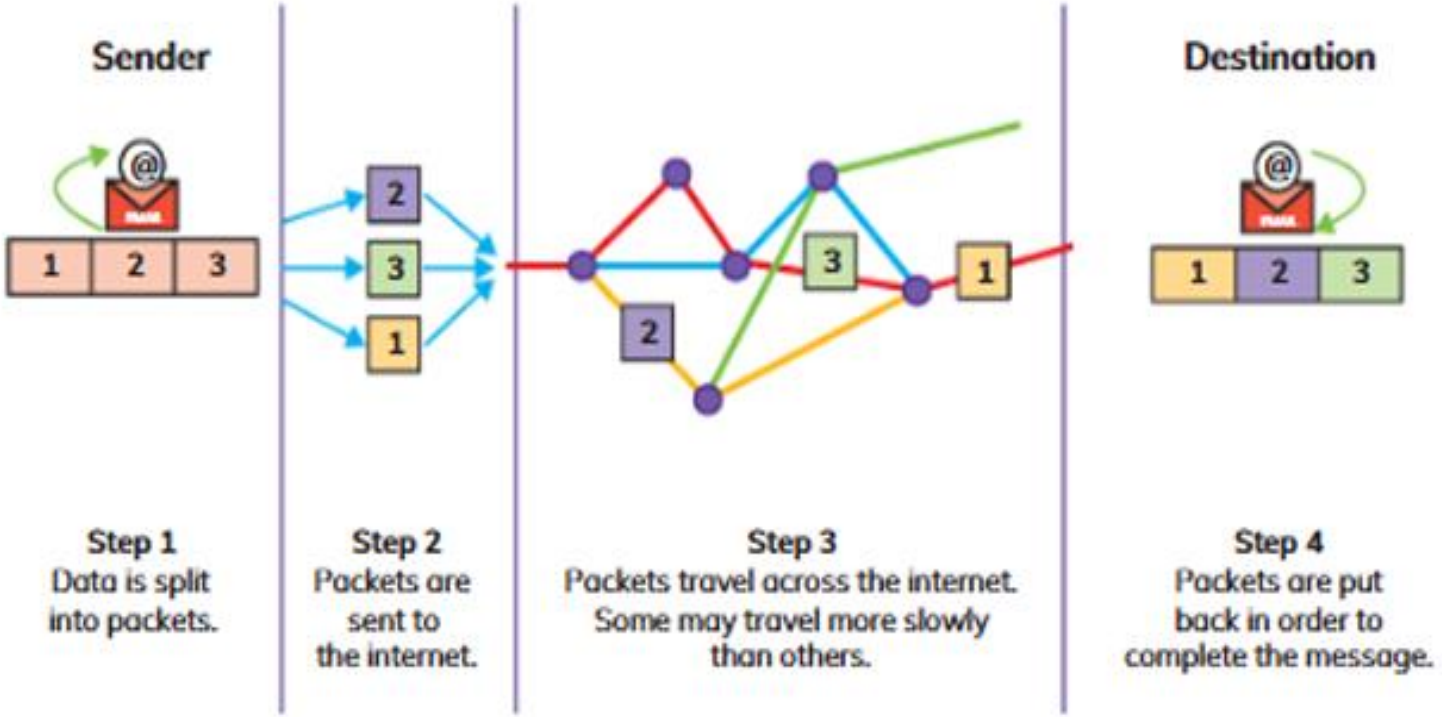
- Big files or messages are broken into smaller parts called packets. Each packet travels separately and may take a different route to the destination. This helps data move faster and more efficiently.



3.2 How data travels through network?

Further Explanation of Transmitting Data

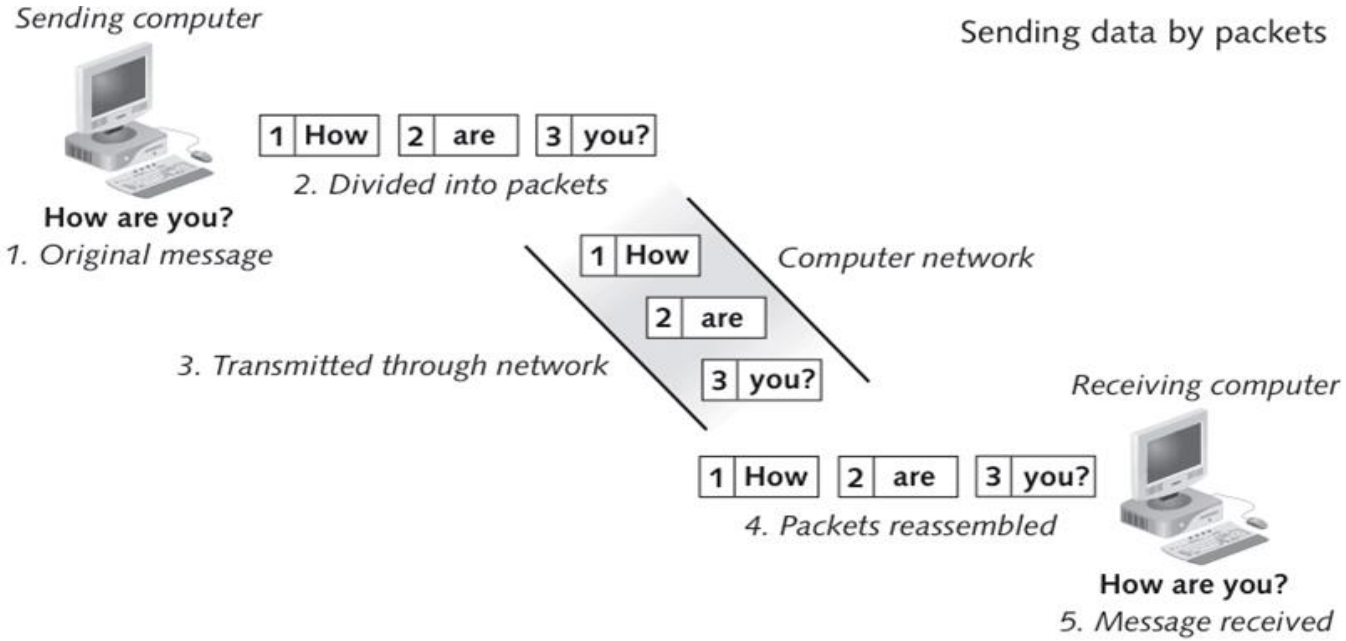
- Packets contain not just the data, but also the address of where they are going. When all the packets arrive at their destination, they are put back together to form the complete message.



3.2 How data travels through network?

Advantages and Disadvantages of Packets

- Advantages: Packets make data transfer faster and allow multiple messages to travel at once.
- Disadvantages: If a packet is lost or delayed, the message might not be complete or may take longer to load.



3.2 How data travels through network?

What Happens If Some Packets Are Lost?

- If packets get lost, the device asks for them to be sent again. This can slow down loading but ensures the message is complete and correct.

3.2 How data travels through network?

Accessing Websites

- When you type a website address, your device sends a request to a server using packets. The server sends back the website's data, and your browser puts it together for you to see. Students can try typing URLs and observing how websites load.

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UNIT/STRAND	**Unit 3 Networks and Digital Communication**
TOPIC	**3.3 Network Failures**
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3.3 Network Failure

Minor Network Failures vs Large Internet Failures

- Minor failures might happen when a cable is unplugged or Wi-Fi disconnects.
- Large internet failures can happen when servers go down or there's a power outage in a large area.

No internet

Try:

- Checking the network cables, modem, and router
- Reconnecting to Wi-Fi
- Running Connectivity Diagnostics

ERR_INTERNET_DISCONNECTED

3.3 Network Failure

Why Do Connections Break?

- Connections can break due to damaged cables, faulty devices, or bad weather. Sometimes too many users on a network can slow things down or cause a break.

3.3 Network Failure

The Effects of network failures

When a network fails, we can’t send emails, browse websites, or stream videos. In schools and offices, work might stop until the network is fixed.