Section 1: Hardware and Software

Every computer device has hardware and software. Together, they make a system.

Hardware

These are the parts of a computer that you can see or touch. Computers have internal and external hardware parts.

Internal Hardware Parts

- **Central processing unit (CPU):** This is the brain of the computer. It thinks and tells the computer what to do.
- **Memory:** This is where the computer keeps data.

External Hardware Parts

- **Monitor:** This shows information, images, and videos from a computer. You can see what the computer is doing.
- **Mouse:** With this, you tell the cursor where to go on the monitor. It opens a file or runs a program when you click on it.
- **Keyboard:** This is what you use for typing. It tells your computer what to write on the monitor.

Unit 1
Lesson 2

Sharing Data between Devices

How Hardware Parts Work Together

When you press a key on the **keyboard**, you give the computer an input. This tells it what to do. The computer then works with this input. It does this with the **CPU**. Then it gives you text as output. The output appears on the **monitor**.

Router Device

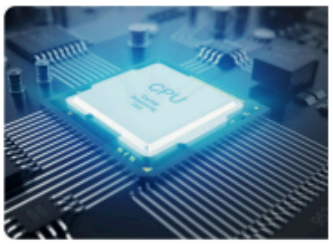
A **router** is a network device. It has its own internal and external hardware parts. They all work together to make sure your data gets to where it needs to go.

External Router Hardware Parts

- **Ports** are where the cables go. This way they can join devices. Routers have external ports to connect cables. These cables connect the router to another hardware device, such as a computer or a switch.
- **Antennas:** Wireless routers can have external antennas. These antennas help the device connect with other devices wirelessly.

Click on each box

Internal Router Hardware Parts



- **Central processing unit (CPU):** The CPU is the brain of the router. It works with what the router chooses to do.
- **Storage:** This is the place where the router stores its information.

How a Router's Parts Work Together

The antennas and ports on the router let devices connect to the network. Inside, the CPU follows the instructions. It chooses what to do. It uses its memory to help it. The parts inside and outside make sure you stay connected to the internet. They can send information to other devices.

Software

Software is the set of programs that tell the hardware devices what to do. The software allows you to do many things. You can use software to play games, write stories, send data, and so much more. Not all hardware devices have software.

Unit 1
Lesson 2

Sharing Data between Devices

How Hardware and Software Devices Work Together

To understand networks, think of them as groups. In these groups, hardware and software work together.

This example shows how they work.

- **Input:** You tell the computer you want to watch a video on the internet.
- **Processor:** Inside the router or computer, the CPU uses software to find a way to do what you asked.
- **Storage:** While the processor works, storage might hold some data for a little while.
- **Output:** The video is played on the monitor. This happens because the hardware and software worked together.

It is like when you ask a teacher a question (input). The teacher thinks (processing), remembers information from books (storage), and then gives an answer (output).

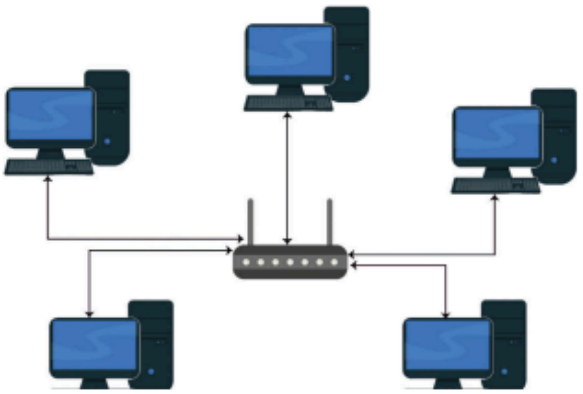
Network Devices and Connections

Connections are like roads that let data travel between devices. They can be cables or wireless.

A **network node** is a connecting point in a network. A node can send and get data between different points. Examples of network nodes are switches, computers, and routers.

To make a network, the devices should be connected.

Here is an example of devices connected by cables.



Unit 1
Lesson 2

Sharing Data between Devices

Why Networks Are Helpful

Networks can help you work easily. They help you work with others and keep your files safe.

Share information faster. Instead of sending letters by mail, you can send messages quickly through the network. You can use email or text messages.

Share and work together. People working in a team can use special tools to work together on the same file. It is important to check copyrights when sharing information.

Back up files. You can save files on a computer network. You can make a backup by making extra copies of the same document. This way, you will not lose important files.

Unit 1
Lesson 2

Sharing Data between Devices

... 7 8 9 10 11 ...

Go to:

Activity Lab 1

Activity 1:

Choose the correct answer.

Which part of the computer is like the brain?

A keyboard

B monitor

C CPU

Correct

Activity 2:

Fill in the blanks with the words from the box.

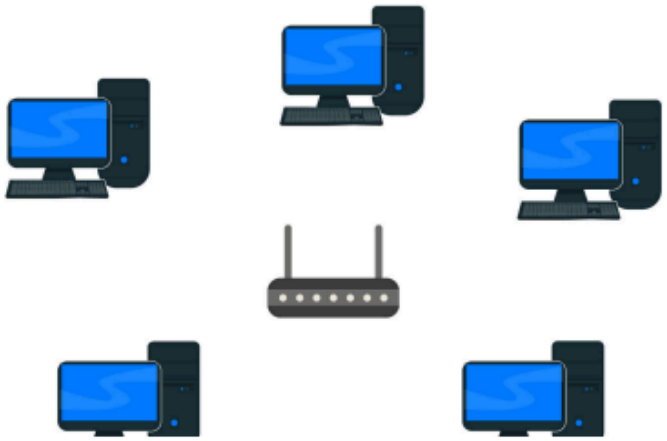
A. Every computer device has hardware and software.

B. Antennas and ports are external hardware parts of a router .

C. You can send email messages through a network.

Activity 3:

Draw lines to connect the computers to the router to make a network.



Activity 4:

Make a new Microsoft PowerPoint file.

1. Click on the ***Insert*** tab and choose ***Pictures***.
2. Click on ***Stock Images***, and then click on ***Icons***.
3. In the search box, write *Desktop PC*, choose a picture, and then click ***Insert***.
4. Copy and paste the desktop PC icon five times.
5. Go back to the ***Insert*** tab. Add a router icon from ***Pictures*** > ***Stock Images***. Remember to check the copyright of the images with your teacher.
6. Connect the desktop PC icons to the router by drawing a line between them.
7. Add the title *Building My First Network*.
8. Share your work with the class.

Activity 5:

Read the sentence. Choose True or False.

Hardware and software do not work together to form a system.

True False

Section 2: Data Packets

IP Address

The internet is huge. It connects billions of devices around the world. They follow rules called protocols. Protocols let the devices talk to each other.

Every device has its own special address on the internet. This is the internet protocol address, or IP address. An **IP address** is a special set of numbers for each device. The address lets you see any device on a network.

One of the main types of IP addresses is IPv4. An IPv4 address has four sets of numbers. The sets have a dot after them. Each set can have the numbers from 0 to 255. An example of an IPv4 address is 192.168.0.101. In this lesson, we will refer to an IPv4 address as an IP address.

IP Address Parts

An IP address has two parts.

- **The network ID** shows which network the computer belongs to. It is the same for devices connected to the same network, such as all the devices in your home network.
- **The host ID** shows one computer on the network. It is different for each device on the same network.

192 . 168 . 0 . 101

Network ID Host ID

192.168.0. 102 192. 168. 0. 103

When you send messages on the internet, the network devices use an IP address. This shows who is sending the message and where it needs to go.

Watch and Learn

Watch this video to learn more about how the internet works.

Unit 1
Lesson 2

Sharing Data between Devices

Super Tech Tips

Understanding Source and Destination

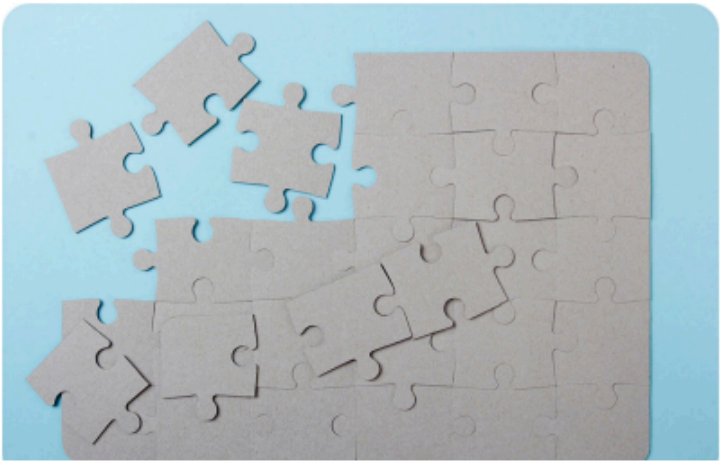
Source is the starting point. It is where data comes from.
Destination is the end point. It is where the data should go.

Packets

Sending data between computers can make a network slow. That can stop other computers from sending and getting messages, too.

To stop this from happening, the network breaks the data into smaller parts. These parts are called packets. A **packet** is a smaller part of a larger message sent across the internet. Think of it as a piece of a puzzle. Each piece is a packet. It has a part of the information.

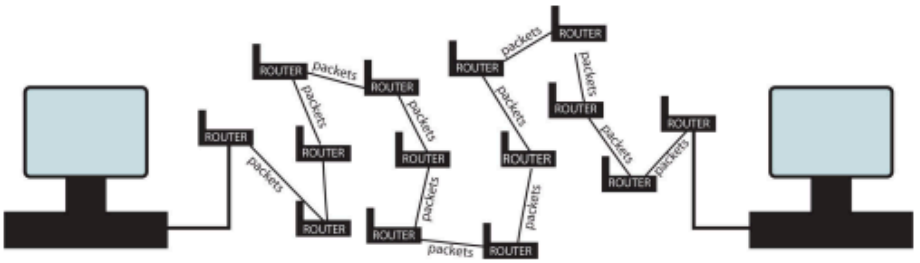
These packets do not travel together. They come together to make the complete message at the destination.



Unit 1
Lesson 2

Sharing Data between Devices

The Path of a Packet

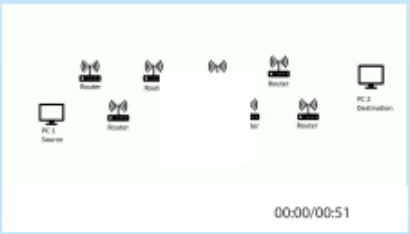


Packets travel from source to destination. Along the way, they move through different routers. They do not move together.

Packets can take different paths to travel. They all join together again at the destination.

Watch and Learn

Watch this video to learn how packets move in a network.



Microsoft Office

OOPS! Is that right?

Does a message break into small pieces and travel from one place to another?

Answer

Yes! Messages break down into small pieces so

Activity Lab 2

Activity 1:

Choose the correct answer.

1. What is an IP address?

- (A) a special address for each computer on the internet
- (B) a special device used to connect to a network
- (C) a set of rules for sending information

2. How is a message sent from one computer to another?

- (A) over wireless connections only
- (B) using the English language
- (C) in the form of packets

Activity 2:

Complete the sentences. Use the words from the box.

destination source

1. The starting point where data comes from is the .

2. The point where the data should end is the .

Activity 3:

Fill in the blanks with the words from the box.

packets together four

1. An IP address is made up of _____ sets of numbers. There is a dot between the sets of numbers.
2. Routers are computers on the internet that help move _____ to their destination.
3. Packets do not move _____ from the source to the destination.

Activity 4:

Show how two packets move from the source to the destination.
Draw packets as rectangles.

source router destination