

Network devices

A network is a collection of interconnected computers and devices that communicate with each other to share information and resources. A range of different devices is used to create a network.

Match the correct name to the description for each of the following network devices.

Description	Device
Connects multiple computers or devices within a LAN and efficiently manages data traffic by forwarding data only to the intended recipient.	<div></div>
Directs data between different computer networks, facilitating communication between devices within a local network and external networks, such as the internet.	<div></div>
Enables a computer to connect to a network, providing the necessary interface for communication with other devices.	<div></div>
Manages and connects various devices within a home network, providing features such as internet access, WiFi, and device communication.	<div></div>
Provides centralised data storage and file-sharing services to multiple users and devices over a network.	<div></div>
Allows WiFi-enabled devices to connect to a wired network using wireless communication.	<div></div>

Items:

switch

file server

network interface card

network access device (home hub)

wireless access point

router

Bandwidth definition

In the context of computer networks, which of the following best defines the term **bandwidth**?

Choose one of the following options.

- ☐ The maximum speed at which data can be transmitted over a network
- ☐ The number of devices that can be connected to a network
- ☐ The geographical area covered by a wireless network
- ☐ The physical width of network cables

Network performance

Ethernet is a very common communication protocol for local area networks.

In a busy Ethernet network, are possible. This will occur when two or more devices attempt to at the same time. This can really slow down a network because communication must stop, and the computers must wait a amount of time before attempting to again.

One solution is to use Ethernet. In this type of network, are replaced by , which manage data traffic by forwarding data only to the intended recipient.

Items:

fixed

random

routers

collisions

hubs

communicate

switches

switched

Network performance



Transmission across shared network media has to contend with . This is where multiple signals are sent on the network at the same . This is unavoidable on any network of more than a couple of computers.

If there is a collision the signals cannot reach their destination. Devices that are trying to send must stop and wait for a amount of time before trying again.

Items:

time

collisions

set

interference

random

Wireless connection issues 2

Sanjit is working from home but has found that his WiFi connection is variable. Complete the following paragraph that describes some potential problems and their causes, by dragging and dropping the words from the list provided into the correct place to complete the text.

A good wireless connection needs a strong . This can be affected by the of the device from the wireless access point. If this is a problem, Sanjit could use a , which will rebroadcast the wireless signal.

Another potential problem is , which can be caused by other devices that broadcast on the same . If this is an issue, Sanjit could change the so that there is less contention.

If the connection is still a problem, Sanjit might need to connect the device using a ; this can sometimes be the only solution.

Items:

interference

cable

repeater

signal

distance

channel

frequency

IP addresses 1



IP addresses are used to identify devices connected to the internet.

IPv4 is the original addressing scheme; each IPv4 address is 32 bits. A newer addressing scheme, IPv6, uses 128-bit addresses.

Which of the following addresses is a valid IPv4 address?

- ☐ 255.254.253.252
- ☐ 192.12.1.258
- ☐ 172.16.257.100
- ☐ 256.1.100.020

IP addresses 2

IP addresses are used to identify devices connected to the internet.

Under which circumstances is it possible for a device on a local area network to have the same IP address as a device on a different local area network?

- ☐ When the two devices are each given a non-routable address.
- ☐ When the two devices are protected by a firewall.
- ☐ When the two devices use different network protocols.
- ☐ When the two devices will never communicate with each other.

IP addresses 3

A Level



An IP address is split into two parts. The first part is the network ID and the second part is the host ID.

If the length of the network ID is 24 bits, how many hosts can there be on the network?



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Routers 1



The internet is a global network. It is estimated that there are over 750 million routers in use across the internet.

What is the role of a router?

- ☐ It splits data into packets and attaches a packet header so the packet can be routed.
- ☐ It inspects a packet for the destination IP address and then routes the packet towards its destination.
- ☐ It allows wireless devices on a home network to connect to the internet so that wireless messages can be routed.

Routers 2



Routing is the process of moving packets from one router to another from a source network to a destination network.

Consider the process of a webpage being sent from a web server to a web client (i.e., the browser that requested the page).

Put the following steps into order to describe the journey from the server to the client.

Available items

The destination IP address is inspected. It is not on the local network, so the packet is sent to the default gateway.

The packet is routed across the internet. At each stage, the destination IP address is inspected and the packet is sent on until it reaches the destination network.

The destination address of the client is added to each packet header.

At the destination network, the packets are directed to the client that made the request.

The HTML document (that represents the webpage) is split into packets.

The packets are reassembled and the page is displayed.