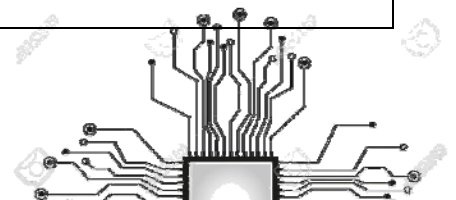




Wired and Wireless – Workbook

Task 1: LAN vs WAN

Key point to research	LAN	WAN
How big is the area that this type of network covers? <ul style="list-style-type: none"> Geographically small? Geographically large? 		
How are computers normally connected together in this type of network <ul style="list-style-type: none"> Wired (Ethernet) Wirelessly Dedicated Lines Leased Line The Internet Satellite Phone Lines 		
What is the average speed of data transmission on this type of network? <ul style="list-style-type: none"> Kbps? Mbps? Gbps? 		
What kind of costs is involved in setting up this type of network? <ul style="list-style-type: none"> Initial purchase of hardware? On-going costs (subscriptions)? Cable costs 		
How secure is this type of network? <ul style="list-style-type: none"> What security risks are there? What could be done to help the security? 		
Can you give an example of this type of network?		
Advantages of Networks:		
<ul style="list-style-type: none"> i i i i 		







Task 2 – Client Server vs Peer to Peer

Tick the correct box(es) to show whether the statement applies to a client-server, a peer-to-peer or both networks.

Statement	Client-Server	Peer-to-peer
Computers are networked together.		
It has a central computer that provides all the services to the network.		
Each computer in the network is equal, there is no central computer controlling services.		
Most commonly found in a home or small office.		
Most commonly found in larger offices and organisations.		
Files can be automatically backed-up to a central location from each computer on the network.		
Peripherals on the network can be shared.		
An expensive network to set up as more hardware needs to be purchased		
A cheaper network to set up as less hardware needs to be purchased		
Files can be shared using the network.		
Each computer on the network needs to be maintained separately.		

Task 3 – Performance of Networks

List the factors that could affect the performance of a network
<div><div></div><div></div><div></div><div></div></div>

Task 4 – Network Hardware

In order to connect to and set up a network you need the following hardware. Describe the role of each:

Wireless Access Point	
Router/Switch	
Network Interface Card (NIC)	
Transmission Media	

Task 5 – The Cloud

What is the Cloud?	
Advantages	Disadvantages

Task 6 – Matching

Term	Definition
Coaxial cable	The least expensive transmission media that consists of two wires that wrap around each other. Used as a standard (Ethernet)
Router	Connects together different networks and forwards data packets along a network.
Wireless access point	A transmission media that consist of a central wire, surrounded by insulation and a shield of braided wire to minimise interference.
Switch	A connection point for devices in a network. Unintelligent – packets are broadcast to every device.
Twisted pair cable	A device that allows other devices to connect to a network using standards such as Wi-Fi and Bluetooth.
Network interface card	A transmission media that consists of a bunch of glass or plastic threads.
Fibre optic cable	A hardware device internal to a computer that allows a computer to connect to a network.
Hub	Filters and forwards data packets within a single network. This creates a direct connection between devices (intelligent)

Task 7 – Domain Name System and Hosting

What is a DNS Server?
What is Hosting?
What is meant by the Internet?

Exam Style Questions

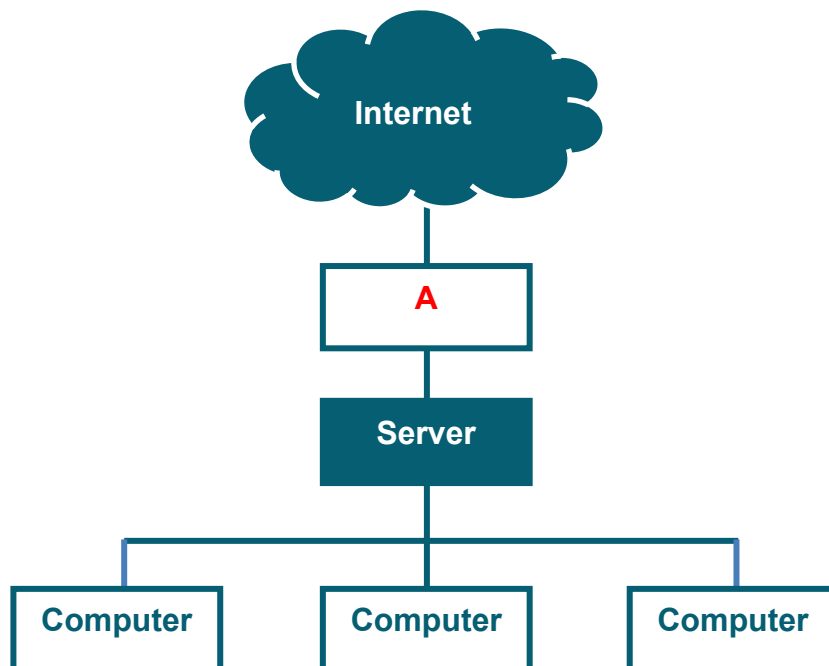
1. Tick a column to show whether the following statements are true or false: [2]

	True	False
The worldwide web is an example of client-server computing		
A local area network may be configured as a client-server network		

2. The diagram below shows the computers for a small accountancy firm connected together in a local area network.

- (a) Does the diagram show peer-to-peer network or a client-server network? [1]

-
- (b) What is the device **A** which connects to the Internet? [1]
-



(c) Name **three** functions of the server in this network.

[3]

(d) Name **three** advantages of linking computers in a small office in a peer-to-peer network. [3]

3. The accountancy firm uses a file hosting service in the Cloud to manage their files and data.

(a) Briefly describe what is meant by 'The Cloud'

[2]

(b) Give two advantages to using cloud-based services over local storage.

[2]

- (c) Office staff notice that the network is running slowly compared to their home network connections.

Explain two factors that can affect network performance.

[4]

- (d) State **two** types of network transmission media.

[2]

[Total 20 marks]

Answers:

Key point to research	LAN	WAN
Area it covers	Small geographical area that covers a single building or a single site	Large geographical area e.g. several sites, town, county, country, continent
Connection	Wireless Ethernet Cable (Wired) Fibreoptic Use of Network Interface Cards Use of Wireless Adapter Connected via a Router / Switch	Phone lines Internet connection Fibre Optic Satellite Public network systems Leased lines Dedicated lines
Speed	Very High Speed (up to 100 gbps)	Slower speed (approx 150 mbps)
Cost	Cheaper to set up – need for additional hardware such as a router and cables (although could use wireless)	Using a dedicated line would be costly for a company. Using a leased line would incur monthly subscription costs WAN would require ongoing costs of using external infrastructure
Security	More control over security Anti-virus Firewalls User names / Passwords Account management	Less control over security especially hackers & DDOS attack. Would need to configure firewalls & up-to-date anti-virus
Example	A school network A home network	A council network Argos network

Extension:

- You have recently had an Internet connection put into your home and decide to set up a LAN so that you can connect your PC, tablet, mobile phone and game consoles to share The Internet and also photos/videos from these devices.
 - Why is a LAN the most appropriate choice?

Because it is a single site – over a small geographical area

b) What hardware would you need to buy?

Would need a connection device like a router, potentially Ethernet cables to link the PC and the consoles for the best speeds. Would also need a Network Interface Card for the PC (or a wireless adapter)

c) How would each device connect to the network?

Either by Ethernet wired cable or through wireless (wifi)

d) Discuss the factors that would affect the speed of the network

The type of Ethernet cable would affect the speed – Cat 5e / Cat6 cable would offer the fastest speeds. If devices are connecting wirelessly – walls and other interference from other radio waves could affect the speed of the network e.g. how far from the router is the device.

2. If a company wanted to connect to a WAN – they may make use of a Dedicated Line or a Leased Line – discuss the difference between these two.

Leased line – a company would pay a monthly subscription cost to rent a line (which is external infrastructure) that would allow devices to connect over a large geographical area. The company that the line is being rented from would have the responsibility of maintenance.
Dedicated line would be one in which the company would pay to have an external cable dedicated to their data transmission. If there were any problems with the cable then they would be responsible for maintenance. This can be very costly but offers great transfer speeds.

Statement	Client-Server	Peer-to-peer
Computers are networked together.	Yes	Yes
It has a central computer that provides all the services to the network.	Yes	
Each computer in the network is equal, there is no central computer controlling services.		Yes
Most commonly found in a home or small office.		Yes
Most commonly found in larger offices and organisations.	Yes	
Files can be automatically backed-up to a central location from each computer on the network.	Yes	
Peripherals on the network can be shared.	Yes	Yes

Statement	Client-Server	Peer-to-peer
An expensive network to set up as more hardware needs to be purchased	Yes	
A cheaper network to set up as less hardware needs to be purchased		Yes
Files can be shared using the network.	Yes	Yes
Each computer on the network needs to be maintained separately.		Yes

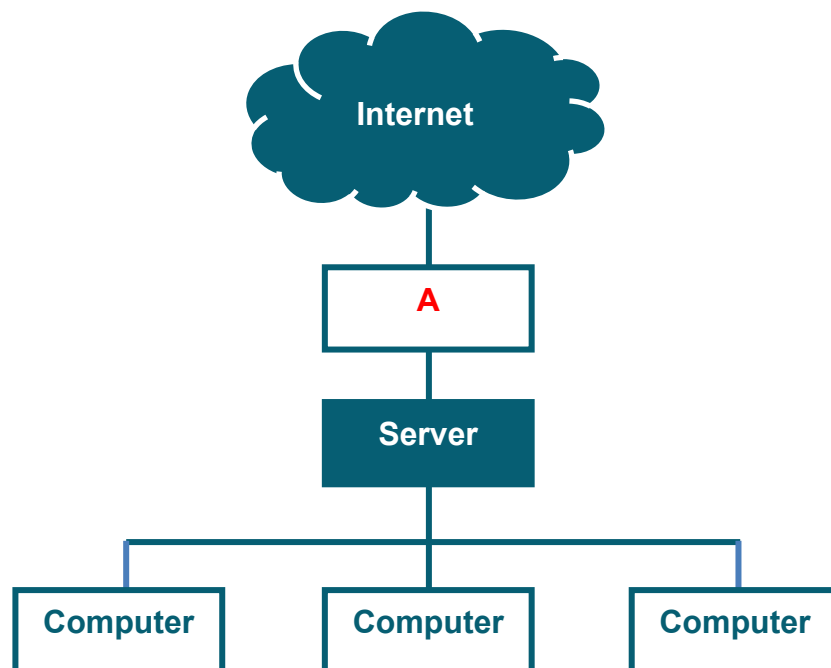
2. The diagram below shows the computers for a small accountancy firm connected together in a local area network.

(a) Does the diagram show peer-to-peer network or a client-server network? [1]

Client-server

(b) What is the device **A** which connects to the Internet? [1]

Router/modem



- (c) Name **three** functions of the server in this network. [3]

File server will hold all the data files

Manage backups

Email server will receive emails, detect and block spam

Print server may organise printing on different printers

- (d) Name **three** advantages of linking computers in a small office in a peer-to-peer network. [3]

Individual computers can share hardware such as printer, scanner, router, modem

Users can communicate directly with each other and share each other's files

Easy and cheap to set up and no special software required

3. The accountancy firm uses a file hosting service in the Cloud to manage their files and data.

- (a) Briefly describe what is meant by 'The Cloud' [2]

Remote servers that host your data, resources and applications; via the Internet.

- (b) Give two advantages to using cloud-based services over local storage. [2]

Data can be accessed from any computer in the world, not just your own local machine.

Local storage on your hard disk is significantly reduced if software and files are stored remotely.

Backing up is no longer crucial since cloud service providers will include this as part of their service.

- (c) Office staff notice that the network is running slowly compared to their home network connections.

Explain two factors that can affect network performance. [4]

Bandwidth: the amount of data that can be transferred at one time.

Latency: the speed that data travels during transfer (or delay in receiving).

Error rate: the number of collisions in high network traffic.

Retransmission rate: how promptly corrupted or lost packets can be resent.

- (d) State **two** types of network transmission media. [2]

Copper cable (twisted pair Ethernet cable); fibre optic cable; wireless (WiFi) signals.

[Total 20 marks]