

# Unit 11 Computer Networks P1 M1

D1

Deadline:29/09/2016

By Sarah Ameer

# P1- Uses and features of a computer Network

# What is a computer network?

This is group of computer systems which are linked together with other hardware devices using a wire or wireless. This allows a computers to share resources and communicate with each other. The PC's connected to a huge mainframe server which then creates a network for PC's to share resources.

# Small Office Network

For a standard office system you need the minimum of these things which will build a successful small office network

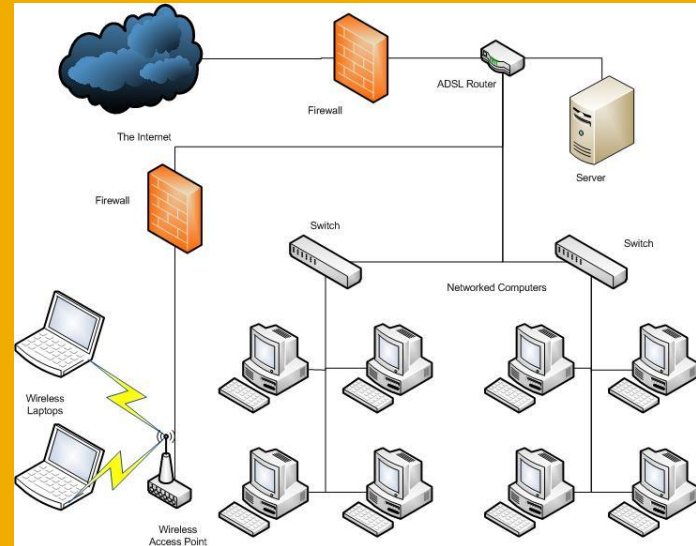
## Standard Office Systems include:

- 4 x Main PC's
- 2 x Laptops,
- 2 x Printers
- 1 x Internet connection
- 1 x Backup device (Network Attached Storage)

## Network Technology required:

- 1 x Broadband Modem/Router
- 1 x 4 Port Network Switch
- 1 x 8 Port Network Switch
- 1 x Wireless Router
- 15 x 10 meter Patch Cables
- 2 x Ethernet over Power Adapters
- 1 x Print Server

Reference: <http://medianassociates.co.uk/consultancy/network-design/small-office-network>



# How to build a small office network?

In order to build a small office network you need to think of a foolproof plan which will not waste any of your materials needed for a small office network.

The most crucial and vital part of a small office network is the computer network that will be installed and helps when troubleshooting.

Also you need to think about shared resources such as internet and office resources. E.g. scanner which will help companies as the print out accurate images or documents.

Also you need make sure that you have the correct technology for a network so that it has a smooth process. E.g. Wired/ Wireless.



Reference: <https://www.linkedin.com/pulse/20141027151821-302916649-know-your-network-basics-wired-vs-wireless-networking>

# Uses of a Small of computer network

Communication: This type of network is mostly used to communicate through email software and social networking. By sending emails this allows users access to the internet. For e.g. email can be used to share documents and also security will help with use of authorization.



Reference: <http://www.glasbergen.com/?count=8&s=communication>

# Uses of a Small of computer network

Sharing hardware: A small computer network can share hardware that will be inexpensive.

For e.g. Many PC'S can be linked to a scanner or printer. The advantage of this is that they all connected to one output device that takes up less space in the network which can be used for something else.

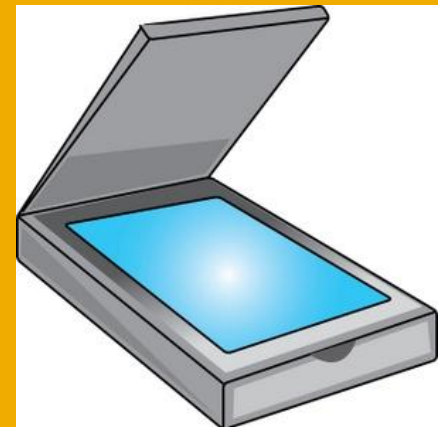
Reference:

<http://www.clipartpanda.com/categories/computer-printer-clipart>



Reference:

<http://www.clipartkid.com/scanner-cliparts/>



# Uses of a Small of computer network

**Exchanging Information:** In this network many of the users can exchange information so that it will be useful to their recipients This will allow them to make any changes they feel is necessary or just access the information which is stored on the network.



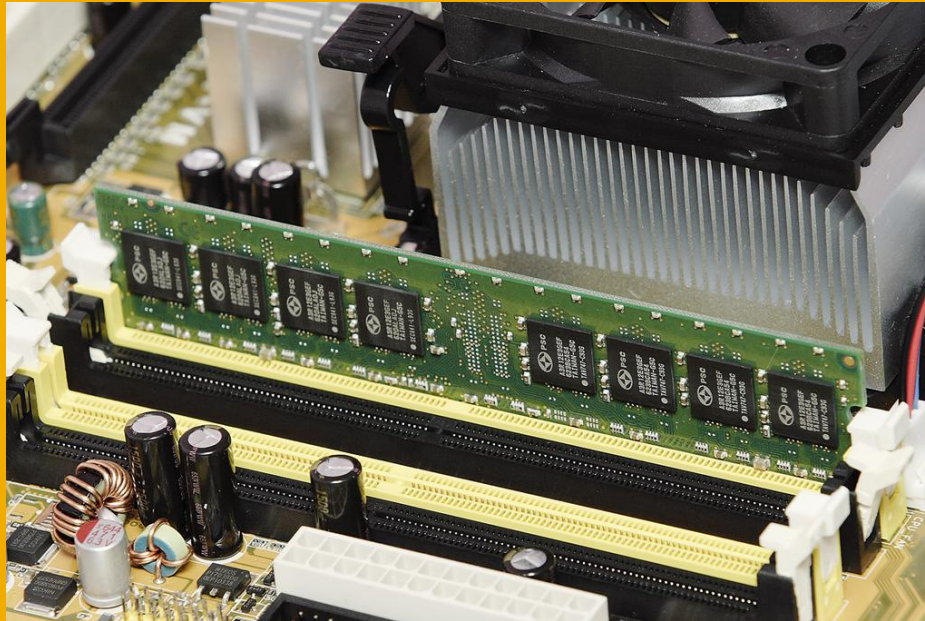
Reference:

<http://historic.al/image/cartoon-men-trying-to-exchange-cards-while-getting-tangled-up-by-al-146>



# Uses of a Small of computer network

Storage: this is very useful to the network as information can be stored or retrieved on a hard disk located on the network. Security also helps people with the right authorization to access it, so therefore becoming more difficult to be hacked.



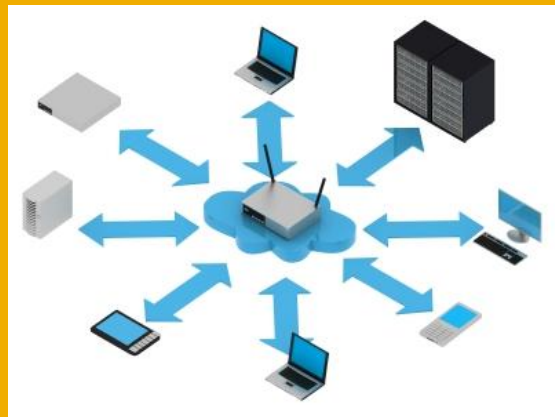
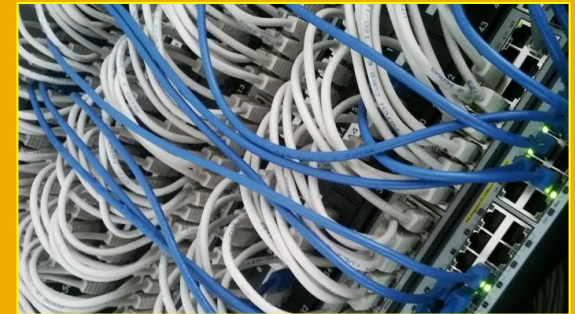
Reference: [https://en.wikipedia.org/wiki/Computer\\_data\\_storage](https://en.wikipedia.org/wiki/Computer_data_storage)

# Connection Methods

Reference:

<https://www.reference.com/technology/disadvantages-wired-network-b84c5ff39a5acb63>

Wireless: If the Small Office Network is connected wirelessly, this will reduce cables but on the downside as more people connect to the internet this will therefore cause slower connections and the speed is limited.



Reference:

<http://www.expertsitsol.com/wireless-networking-services-for-businesses>

Wired: If the Small office Network is connected through wires then the connection will enhance faster but will require cables that will have to go through ceilings, walls and floors. Also this helps with security as it will difficult to access the network without Authorization. The benefits of this is that there is wired infrastructure and is cost effective.

# Wireless Networking

Desktop Computers do not come with a wireless networking hardware so therefore you will need a network card, which will be then placed inside of the computer. There is also another connection you could access through a USB connection. This will allow you to connect to a wireless networking adapter.

Many portable computers have a built in wireless networking hardware. Which is the same as a desktop computer. All you will need is a network card and that will allow for wireless networking.

A Wireless Network needs a wireless router, which consists of giving radio signals to transfer data between computers whilst on a network. This also allows them to share a one high speed internet Connection such as DSL or a Cable Modem. This will also allow you to directly connect on a printer on which everyone on the network uses.



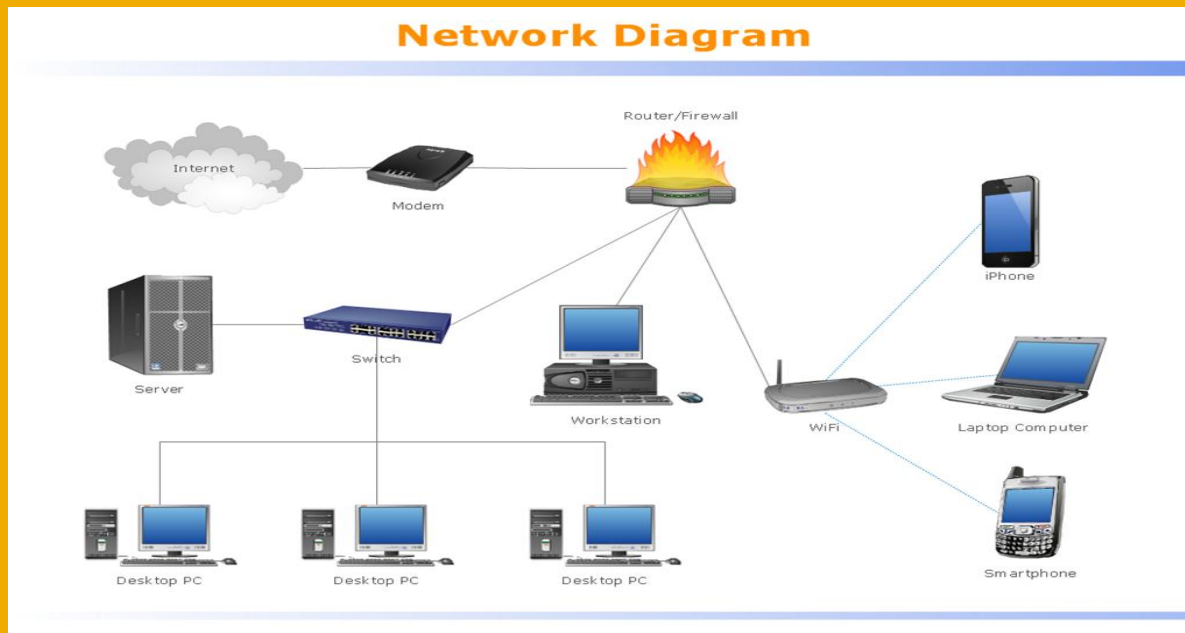
Reference:

<http://www.transfz.com/wireless-network-design-can-stand-high-density/>

Overall the benefits of this is that there is better coverage as they can communicate on the move and rarely out of touch and No need for cables.

# Type of Network

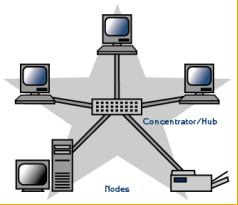
LAN: This stands for 'Local Area Network'. This Network is usually found in Schools, Offices , etc. this is a very useful network as resources are shared amongst others such as files, printers, and other applications. This network is built in with cheap hardware. For e.g. Ethernet Cables, Network adapters and Hubs. A LAN can be connected to the internet as it is made up of switches that can be used to connect to the router and modem also known as a 'Sub Network'.



## Reference:

<http://www.conceptdraw.com/How-To-Guide/Local-Area-Network>

# Which Topology is used in small office network:



## Reference:

<https://fcit.usf.edu/network/chap5/chap5.htm>

Star: This is the best topology to use as it uses nodes in a certain number to connect to the router to give connection to all the nodes, which then sends out the packet out in different directions.

## Disadvantages:

- Requires cables which could cost
- Installation has to be done perfectly so that it doesn't cause any problems in the future
- Extra Hardware is needed such as Hubs and Switches
- Performance is dependant on the capacity of the hub.

## Advantages

- Reliable as it does not affect entire network if one node breaks down
- Easy to connect new nodes or devices.
- Centralized management which helps in monitoring the network.

# Type of protocol used e.g. Ethernet

**Ethernet** is a family of computer networking technologies that is mostly used (LANs) and (MANs). It was commercially introduced in 1980 and first standardized in 1983 as IEEE 802.3, and has since been refined to support higher bit rates and longer link distances.

Also TCP/IP would be used so that a set of communication protocols are used for the internet and other similar networks. This allows devices and nodes to communicate with each other. This also sets limits and setting to the network.

Reference: <https://support.itel.com/hc/en-us/articles/202467089-What-is-an-Ethernet-Cable->





# Gaming Network

A Gaming Network is when multi-users can access games through a Wide Area Network. This is because you are able to communicate as well as playing games. For e.g. PS4's, XBOX One, etc.



Reference:

<http://www.express.co.uk/entertainment/gaming/609366/Xbox-Live-down-Xbox-One-why-is-Xbox-Live-down-Microsoft-online>

Reference: <http://wccfttech.com/sony-announces-ps4-ultimate-player-edition/>

# What do you need to build a gaming network?



You will need:

- Cable Modem
- Router
- Firmware
- Ethernet Cable



You will also require to have a speed test to assess speeds from your ISP. If you are not getting the right speed then you will not be able to use the gaming network.

Reference:

<http://www.online-tech-tips.com/computer-tips/reset-wireless-router-default-settings/>

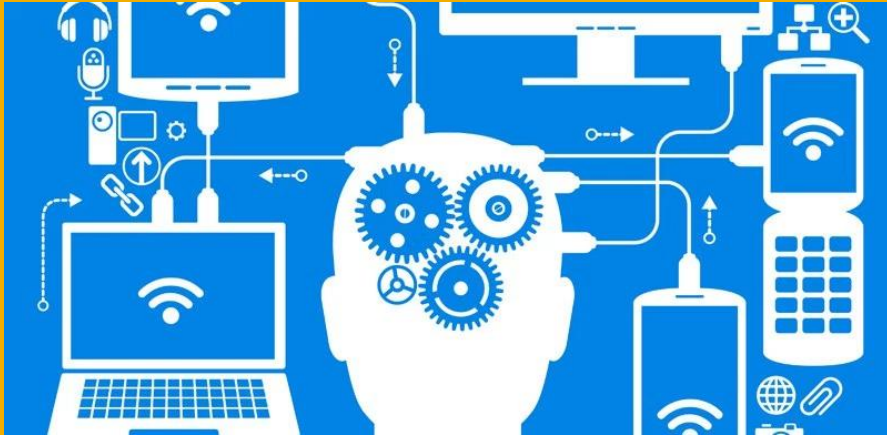
Reference: <http://www.dlink.com/uk/en/support/product/dsl-2740b-adsl2plus-modem-with-wireless-n-300-router>



# Uses of a Gaming Network

Communication: This is used in a gaming network as many people can contact each other whilst entertaining themselves.

This also can be done without wifi which is great for people who don't have internet access.



Reference:

<https://confusedmango.wordpress.com/2016/01/21/impact-of-ict-information-communication-technology/>



Reference:

<https://www.emaze.com/@ALRTZLZC/Interpersonal-Communication>

# Uses of a Gaming Network

## Switch

This is a device that connects network segments.

It has good recognition of cables that will allow for communication.



Reference:

<http://www.dlink.com/uk/en/business-solutions/switching/unmanaged-switches/desktop/dgs-1024d-24-port-copper-gigabit-switch>

## Hub

This is a device that connects multiple devices. Which act as a single network segment.

A hub also delivers a packet to all parts of the network but receives it from one port.

This shows that it is not the same as a switch as it has no intelligence of where destination is.

Sharing hardware: This is when a Switch, Hub and Server is used in a Gaming Network so that the bandwidth is not consumed by the Ethernet hub and router which will allocate multiple devices to connect.

## Server

This is a computer program that will provide services to other computer programs in other computers



Reference:

[http://www.jvzoohost.com/dedicated\\_servers.html](http://www.jvzoohost.com/dedicated_servers.html)

# Uses of a Gaming Network

Exchanging information: Gamers can exchange information on a network by using their headsets or email. This allows them to send messages through wifi which may be secure if wired.

## Reference:

<http://www.shutterstock.com/pic-26162260/stock-vector-cartoon-spies-exchanging-information.html>



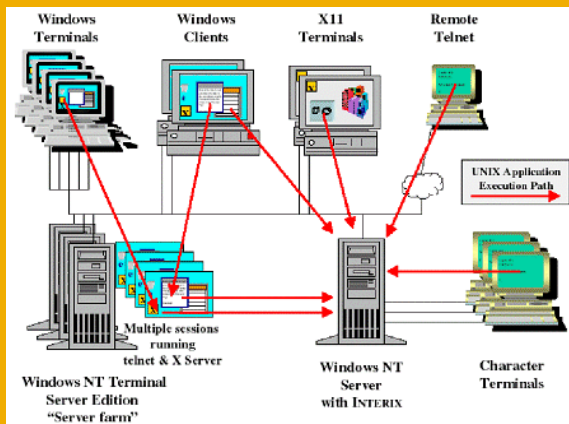
# Uses of a Gaming Network

Multi-user environments: This allows gamers to interact with each other as they can form alliances on games which is known as 'Collaborative Working'. This will help gamers to feel more entertained as they can choose who they want to play with.



Reference:

<http://www.attentiontoretail.net/cw2.html>



Reference:

<https://technet.microsoft.com/en-us/library/bb463198.aspx>

# Uses of a Gaming Network

Storage: A gaming network uses storage as several games are stored and retrieved on there without having to input CD's and DVD's all the time. One advantage is that it is less time consuming.

Reference:

[https://en.wikipedia.org/wiki/Data\\_storage\\_device](https://en.wikipedia.org/wiki/Data_storage_device)

Reference:

<https://uk.pinterest.com/vanillat/storage-devices/>



# Connection method

Wired: If the gaming network uses a wired connection. This will be more secure as there is less risk of hacking username and logins.

Wired connections are a lot more faster and data transfers. On the downside they will require the use of cables which include extra costs.



Wireless: If the network is connected wirelessly then cables will not be needed. Someone may be easily hacked by connecting wirelessly. Also speed may be limited.

Reference:

<https://www.asus.com/ROG-Republic-Of-Gamers/ROG-Strix-Wireless/>



Reference:

[http://www.aliexpress.com/store/product/Original-Bluetooth-Wireless-Wired-Connection-Gamepad-Game-Controller-Ipega-9038-Smart-Mini-Gamepad-for-iOS-Android/611469\\_32386288518.htm](http://www.aliexpress.com/store/product/Original-Bluetooth-Wireless-Wired-Connection-Gamepad-Game-Controller-Ipega-9038-Smart-Mini-Gamepad-for-iOS-Android/611469_32386288518.htm)

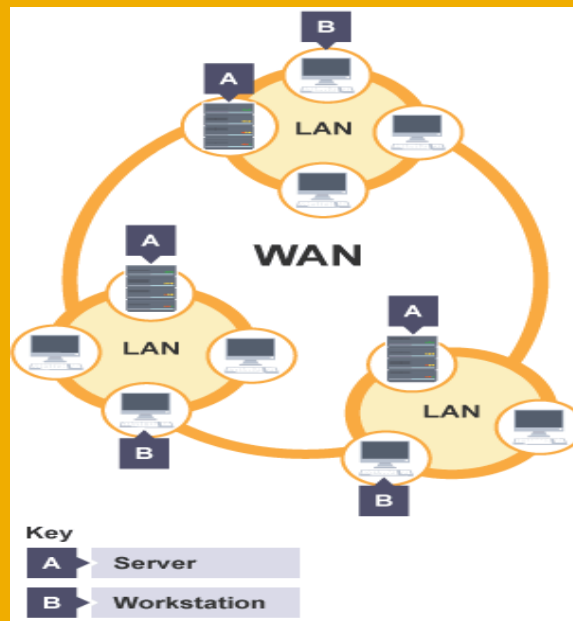
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# Type of network

WAN: this is a complex network system, which consists of interconnected LAN's.

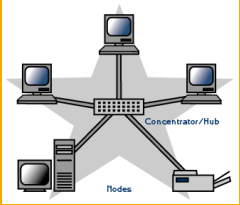
WAN's are used to connect LAN's and other types of networks so that computers can communicate in other locations according to theirs.

The Network protocols that are used are 'TCP/IP'.



Reference:  
<http://www.bbc.co.uk/education/guides/z36nb9q/revision>

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# M1- Review how the uses and features of a Small Office Network affect user Experience

# Small Office Network: Network Devices

## How is the User's experience affected?

**Speed:** If you use a Switch this will more likely increase your speed as it connects network segments and allows the network to adapt in order to communicate.

**Connectivity:** If you use a router. This will forward and routes data packets along networks. It is also part of a switch, Therefore creating faster data transfers across the network.

**Reliability:** if you use a bridge in a small office network then this will connect two networks to act as one. One of its jobs is to divide a large network into two small efficient networks. This works best in networks which are isolated.

# Small Office Network: Network Devices

How is the Reliability affected?. Is there any chance of network failure?

The reliability will not be affected as the same software will continue to run as well as same security measures used to protect the network won't change. Also the network will be secure as the users needed to login to access the small office network which will help it last long. By using the switch and router this should help it last long as one of them is connected to the internet and certain changes can be made from there.

There will no chance of network failure as there will be future measures which will protect the office of any new changes made in the next couple of years.

# Small Office Network: Network Devices

The performance will be fairly good as it will have a good wifi connection and also if it has very fast upload and download speed these will allow for fast data transfers. This will increase the performance and which will result in higher data transfers. Also the small office network will be able to keep running but may a bit slow at times. But will not crash full as the topology is star. This will not let the network get affected if one node breaks down.

# Networking Cabling and connectors.

These are wires that physically connect a computer and equipment on the network..  
The 2 main cables used are 'Twisted pair' and 'Fibre optic'.

# Fibre Optic Cable

This is an expensive type of cable but carries information more faster over long distances than the twisted cable.

This type of cable is more secure and also because it transfers data at an infinite speed, you will not need an upgrade.



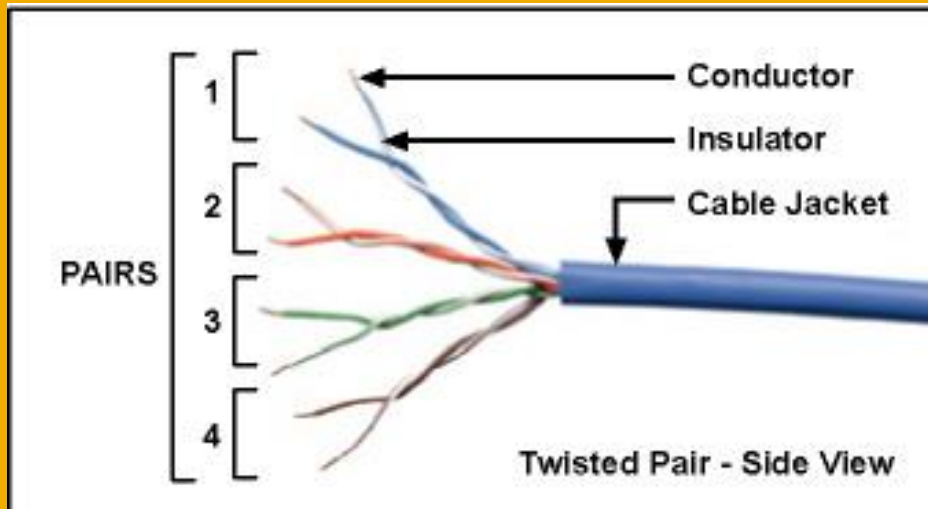
A glass or plastic strand that transmits information using light and is made up of one or more optical fibres enclosed together in a sheath or jacket.

Reference:

<http://www.twlvoiceanddata.co.uk/services/data-cabling/fibre-optic-cabling/>

# Twisted Pair

This is an ordinary copper wire that connects the homes and many business computers, e.g. a 'Small Office Network', to the telephone company. This is consisted of two insulated copper wires combined into one so that there are multiple connections for telephone sets and desktop locations. For a small office network you will need a 'Shielded twisted pair', and at home you will need a 'Unshielded twisted Pair'. This has a length of a 100 metres as it is known as a 'Cat5e' cable.



## Reference:

<http://www.infocellar.com/networks/cables/twisted-pair-cables.htm>



# D1- Discuss the strengths and Weaknesses of a Small Office Network

# Small Office Network

## Strengths:

- File Sharing: this will help in group working situations and also help for storage
- Productivity: this is when the group is networked linking to faster responses to group working documents
- Resources: They have Hard drives, Printers, Network attached storage, this is most useful to them whereas for e.g. printers are limited as they often need replacing with ink cartridges.
- Shared Internet services: this allows them to use a single internet giveaway to supply internet to the systems.
- Wireless Access: By being wireless networks are free from being wired and don't need

## Reference:

[https://en.wikipedia.org/wiki/Hard\\_disk\\_drive](https://en.wikipedia.org/wiki/Hard_disk_drive)



# Small Office Network:

## Weaknesses:

- Security: when you open your personal computer onto the network, you need consider some things before inserting the cable, such as Access control, Access rights.. You need make everything secure. For e.g. using firewalls and antivirus programs.
- DPA: you need to make sure personal data and company data and completely secured as if data is lost, you may end up being prosecuted.
- Internet Violations: The internet is a good place but also cruel. So making sure you company data is secure is vital. For e.g. you joined another network, that network may take over your company's data and release Trojans or malicious software.