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Computers, part of your life

Grade 11

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Local area networks

Module 2.1

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Types of networks

Classified according to the area that they cover

- ▀ PAN – organised around an individual
- ▀ HAN – network in a home environment
- ▀ LAN – small area, generally in one building
- ▀ Internet – worldwide computer network
- ▀ Intranet – organisation's private network



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Basic components of a network – Hardware

Computers and peripherals

Client

desktop

laptop

tablet

smartphone



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Basic components of a network – Hardware

Computers and peripherals

Server

file server

email server

internet / proxy server

web server

print server

database server



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How do you know you are connected to a network?

- Presence of extra (logical) drives such as U:, V: and T:
- Presence of other computers in Network
- Access to devices (e.g. printers) not directly attached to the computer
- Indicator showing network activity in the notification area

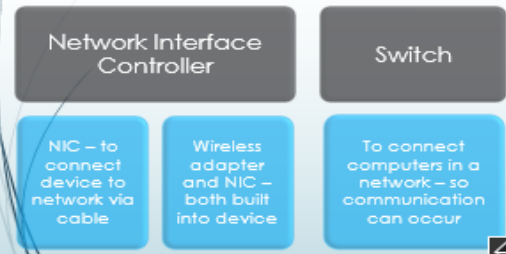


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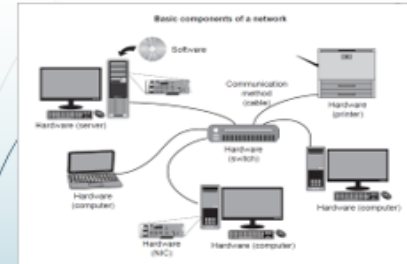
Basic components of a network – Hardware



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Basic components of a network



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Basic components of a network – Communication methods

WLAN advantages compared to LAN

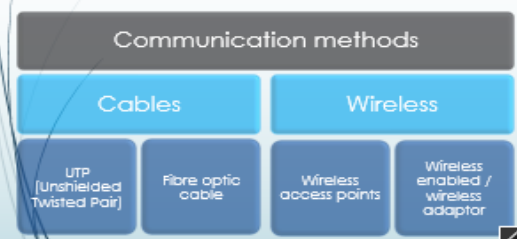
- ✓ Easier to install
- ✓ Easier and more practical between buildings
- ✓ Easy to add or move computers
- ✓ Adds mobility – users with mobile devices
- ✓ Avoids clutter



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Basic components of a network



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Basic components of a network

UTP cable	Fibre cable
<ul style="list-style-type: none"> • Only spans certain distance – signal loss • Can be "eavesdropped" on • Affected by electrical sources • Uses electrical signals to transmit data 	<ul style="list-style-type: none"> • Spans much longer distances • Immune to "eavesdropping" • Not affected by electrical sources • Uses light signals to transmit data • Faster data transmission than UTP cable



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Basic components of a network

Data transmission speed
 Rate at which data is transferred over the media used
 E.g. 100 Mbps / 1000 Mbps

- Maximum speed depends on cabling and devices (switches and NICs)
- 802.11 specification – wireless adapter (802.11g and 802.11n – different speeds)
- WLAN is slower than a cabled LAN

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Basic components of a network – Network software

- Software that controls communication and security in a network
- Most operating systems have **built-in** networking capabilities
- For larger networks 'Server' editions of the operating system are installed on the servers

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Advantages and disadvantages of a LAN

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Advantages of a LAN

- Files stored on central computer – users access from any computer in network
- Files transferred without use of devices
- Software shared by users
- Hardware shared by users
- Security in network controlled
- Single internet connection shared by users
- Easier to keep software up to date
- Software can be demonstrated or broadcast to other computers
- Internet access monitored and controlled

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English (South Africa)

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Disadvantages of a LAN

- Can be expensive to install and maintain
- Network administrator often needed to manage
- Network security must be maintained
- If file server faulty, no one can access their files

Additional potential disadvantages if wireless (WLAN)

- Security can be compromised – easier for unauthorised persons to gain access
- Performance can decrease as number of computers connected increases
- Signal loss or interference due to electrical interference

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Basic network security

Rules to ensure the security of a network – preventing unauthorised access to information and network misuse

- Access to confidential files must be restricted
- In a school situation – important that learners do not have access to tests before they are written
- A username and password are used to gain access to network resources
- Choose a password known only to you
- Keep your password secret!

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Choosing and managing passwords

- At least 8 characters long
- Mixture of upper and lowercase letters, numbers and special characters
- Do not use anything that is easy to guess about you
- Do not use passwords that follow a pattern on the keyboard such as 'asdf' or '1234'
- Change password every 2 months or so
- Do not use same password for more than one site

Example of a good password

Q1w2E3R4t%y



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Ethical use of networks

- Need for acceptable, ethical practices
- Acceptable Use Policy (AUP) outlines the rights and responsibilities of users, especially in networked environments
- AUP lists what users may and may not do on the network
- Designed to protect both the user and the business / organisation / school when using ICT facilities



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What should be included in AUP

- Basic netiquette rules
- Restrictions on what may be accessed online
- Restrictions on amount of data downloaded from internet
- Importance of responsible ethical / legal / safe practices
- Details on where and when portable storage devices may be used
- Restrictions on installing hardware and software
- Procedures for victims of identity theft, malware, cyber-bullying, cyber-stalking
- Consequences of violating conditions set out in AUP



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