

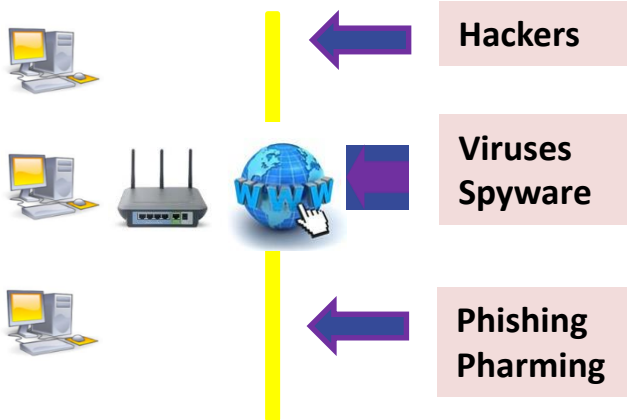
4.2 Network Issues and Communication

- Security issues regarding data transfer
- Network communication

ICT Theory – Revision Presentation - Networks Issues and Communication

4.2 Network Issues and Communication

Security Issues



How can hackers effect your network and data?

Introduce of viruses & spyware to the Network.

Threat to Data:

- Data could be **deleted, edited, corrupted** or be **replicated**.
- Data could be **sold** or **passed** on to other people.

Threat to Network:

- Network may have to be **shut down to quarantine virus**.
- This could **stop production** and cost an organisation a lot of money.

Should the internet be



Advantages

- To protect **vulnerable users** gaining **access to undesirable websites**.
- To prevent **illegal material** (software, videos) be openly posted and shared by web users.
- To bring to **justice** those users who continually **misuse the internet** for their personal gain.

Disadvantages

- It would be extremely **difficult and expensive to police the internet**.
- Infrastructure including **staff and offices** would have to be required.
- Would be difficult to **enforce different rules in different countries**.
- Could go against **freedom of speech**.

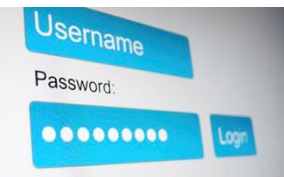
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4.2 Network Issues and Communication

User Name & Passwords: Methods of Authentication (Network Security)

Authentication techniques are used to ensure only **authorised users** are able gain access to a Network via **User Names/Passwords, Biometrics, Swipe Cards, TAN, Two Factor authentication** etc.

Passwords are a method of authentication.



symbols like ! " ? \$ % ^ & .

Strong Password

Disadvantages

- Passwords can be **guessed** especially if they are simple.
- Passwords may be **seen** by others.
- Passwords **can be stolen** and used by other people.
- **Spyware** could be used to **logs key presses** to get passwords.
- Passwords can be hacked by using **password generating software**.

Avoiding password interception

- Set strong passwords which include **multiple characters** such **letters** and **numbers**.
- Ensure password is **regularly changed**.
- Avoid **using the same passwords** for all of your accounts.
- **Install spyware software** which will block the installation of any key logging software.

4.2 Network Issues and Communication

User Name & Passwords: Methods of Authentication (Network Security)

Setting a strong Password:

- Use at least **8 characters**
- Includes **letters** and **numbers**
- Avoid using names or words which could be **easily guessed**.
- Use **upper** and **lower case** letters.



When users log onto to their online accounts they may also be asked for additional information to verify their accounts.

Security Question:

- Users may be asked to **answer security questions** related to their account.
- Typical questions includes **mothers maiden name**.




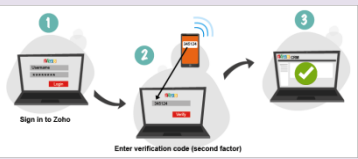
Personal Image:

- QNB (Qatar National Bank) require users to identify **an image when they log** in on the website for online banking. .
- Users will have to **confirm if the image shown** is one they selected as their **account image**.

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Alternatives Methods of Authentication (Network Security)

Device		Overview/Advantages
Biometrics <ul style="list-style-type: none"> • Finger Prints • Retina Scan • Iris Scans • Face Scans • Vocal Recognition 		<ul style="list-style-type: none"> • Biometrics use unique data. • Only the person with the biometric features can access the network. • Can not copy/replicate biometric data
Magnetic Swipe Cards		<ul style="list-style-type: none"> • Swipe cards are used to gain access to the system by swiping the card into the reader. • Swipe cards are quite easy to use and update. • Could also be used to gain entry into a room (hotel room).
Transaction authentication number (TAN)		<ul style="list-style-type: none"> • TAN is used by online banking services. • User will insert their bank card into the TAN reader which will then provide a code which will need to be entered to complete a transaction.
Two factor authentication		<ul style="list-style-type: none"> • Two Factor Authentication involves the user typing in their password and then typing in a code. • The code is sent to the registered phone number of the account as a text. • If an unauthorised attempt is made to log into an account then the text message will alert the user.

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Security issues regarding data transfer: **Viruses & Spyware**

A **computer virus** is a piece of **programming code/software** which can **install** and **replicate it self** on to a computer system without **the user's permission**. A computer virus can cause the following problems.

1. Causes the computer to crash – become slower
2. Sometimes files can be deleted – leads to computer malfunction.
3. Data files can be copied by the hacker or the files could be corrupted.
4. Could stop production until the virus has been quarantined.



Spyware gathers **data** from **computers** without the user knowing. Spyware could **monitor key presses** to **gain personal information or passwords**. This information would be sent back to the **hacker**.

Installing **anti virus** and **spyware software** and the use of a **firewall** is not enough to keep your computer safe. You also need to pay attention to the following points.

- Do **not download any files from untrusted sources** including email attachments.
- Do **not install illegal software** onto your computer.
- Do **not click on links** from unknown websites.
- Do **not connect storage devices** (e.g. USB) from unknown sources.
- Ensure virus software is up to date and virus definitions are regularly updated.



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Security issues regarding data transfer: **Firewall**



Prevents **computer accessing undesirable/unauthorised sites**

Monitors and controls **incoming and outgoing data traffic.**



Helps to prevent **malware (viruses)** getting into computer/from the internet

Keeps a list of **undesirable sites/IP addresses**
Keeps a list of **acceptable sites/IP addresses**



Prevents **unauthorised computers using the internet accessing the computer**



Warns you **regarding threats/allows you to accept/reject downloaded programs**

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4.2 Network Issues and Communication

Encryption

Encryption is the process of converting information into a form that is meaningless to anyone except holders of a 'key'.

1. Data is scrambled up (**Data is Encrypted**).



2. If the data is **intercepted** it then it prevents people from **understanding and reading the data**.



3. The person with the **key** is able to **Decrypt and understand the data**.

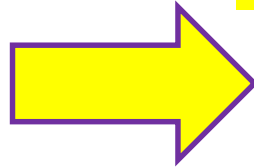


Disadvantages

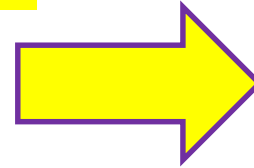
- Data can still be deleted from system
- Criminals can use encryption to keep incriminating material secure

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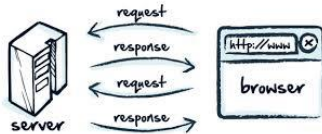
Proxy Server



Can be used to **monitor** Internet usage



Can **block** certain sites



Server passes on **requests** to the Internet

Passes the requested web pages to individual computers

Can **cache/store** the webpages



Can act as a **buffer** (between Internet and LAN)

Can act as a **web server**

4.2 Network Issues and Communication

Security issues regarding data transfer: **Data Protection Act**

Data protection Act applies to **paper based** or **electronic forms of data** stored on a computer. The data protection act is to **protect rights of the individual** who the data is obtained from.

Web based business such as Amazon or Ebay store sensitive data about customers including payment details. They would have to abide by the data protection act to keep the data secure.

Principles of the Data Protection Act




1. Data must be **fairly** and **lawfully processed**.
2. Data can only be **processed** for the **stated purpose**.
3. Data must **be adequate, relevant and not excessive**.
4. Data must be **accurate**.
5. Data must not be **kept longer** than necessary.
6. Data must be processed in accordance with the **data subject rights**.
7. Data must be **kept secure**.
8. Data must not be **transferred to another country** unless they have **adequate protection**.



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4.2 Network Issues and Communication

Network communication

Type of Communication	Overview/Advantages	Disadvantage
Physical Faxing 	<ul style="list-style-type: none">• Requires a fax machine and a telephone line.• Number of the recipient dialled before the document is copied and sent.• Physical documents are printed and can be signed.	<ul style="list-style-type: none">• Anyone can access faxed documents.• The fax may be out of paper or ink (toner).• No notification of fax received.
Email Communication 	<ul style="list-style-type: none">• Can send multiple attachments.• Can send to multiple recipients in one message.• Emails can be received instantly and accessed on many platforms including tablets and phones.	<ul style="list-style-type: none">• Email attachments may include viruses.• May receive spam (unwanted mail).• May receive phishing (scam) emails to obtain personal data.
Electronic Faxing 	<ul style="list-style-type: none">• Electronic Fax is sent via a internet connection.• No need to buy a fax machine, ink or paper.• Electronic Fax documents are sent to an email which will ensure the correct person will receive the fax – less chance of document being intercepted.• Electronic Fax's can also be sent directly to a fax machine.• Send fax's from any location with an internet connection.• No additional cost to send fax over internet network.	

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Network communication






Advantages and Disadvantages of using email compared with faxing

	Fax	Email
Advantages	<ul style="list-style-type: none">• Documents can be signed which are legally accepted.• Physical copies of documents can be sent and automatically printed.	<ul style="list-style-type: none">• Emails are password protected so less likely chance of data being intercepted.• Emails can be received instantly.• Attachments can be edited and sent back.• Can send to many recipients at the same time.
Disadvantages	<ul style="list-style-type: none">• Data is more likely to be intercepted once it is printed from the fax machine.• There could be delays in receiving the fax due to a busy telephone line or lack of paper or ink.• Fax can only be received during office hours.• Not everyone has a fax machine.	<ul style="list-style-type: none">• Cant be used when documents need to be signed.• Viruses can be download from attachments.• Unwanted emails could be received (Phishing/Spam).

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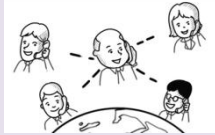


Network communication

Type of Communication		Overview	Hardware
Video Conferencing		<ul style="list-style-type: none"> • Video conferencing uses both video and sound using an internet connection. • It can be used to have business meeting when people are in different locations. 	<ul style="list-style-type: none"> • Web Camera 
Advantages	<ul style="list-style-type: none"> • No need to travel to have meetings which would cut down on travelling costs (including flights and hotel) and travelling time. • Video conference can be held at short notice. • Facilitates long distance learning – students can access live lectures without travelling. 		<ul style="list-style-type: none"> • Screen/Monitor  • Speaker 
Disadvantages	<ul style="list-style-type: none"> • Technical problems with the internet or hardware could effect the quality of the video conference. • Set up costs to purchase hardware/software and to provide relevant training to staff. • Lack of personal contact you would have if it was a face to face meeting. • Different time zones could make it difficult to find to find a suitable time to have a meeting. • Not possible to sign documents. 		<ul style="list-style-type: none"> • Microphone 

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Network communication

Type of Communication		Overview	Hardware
<p>Audio-Conferencing</p>  	<p>Audio conference can be done over the telephone network or using a computer making use of VOIP.</p> <ol style="list-style-type: none"> 1. The organiser of the phone conference is given a unique Pin which can be shared participants. 2. For Participants to join they have to dial the conference phone number. 3. Then they would have to enter a PIN. 	<ul style="list-style-type: none"> • Telephone  <p>VOIP</p> <ul style="list-style-type: none"> • Microphone • Speakers 	
<p>Web-Conferencing</p> 	<ul style="list-style-type: none"> • Web conference can be done using internet connection. • It is very similar to video conference as participants can hear audio and see a live video stream. • Participants can join the web conference by clicking on the supplied link from the organiser. • Participants can join and leave the web conference at any time. • Instant messaging (IM) feature is available to communicate with other participants. • Participants can be given permission to speak and can share content such as images, video or presentations. 	<ul style="list-style-type: none"> • Same as video conferencing. • Keyboard could be use for IM. 