

# Internet and Network Technologies

## ‘sub-scenario’

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The organising committee wants to set up a network in the hall so that they can run Computer Literacy and Adult Basic Education courses. They have also appointed Sibü as an administrative assistant to assist Mary with the day-to-day running of the trust’s affairs. Sibü has some basic networking knowledge as she has set up a basic Home Area Network (HAN) at her family’s home.

1. Give two broad advantages of setting up a network for the trust in this specific context.
  1. Any two of:
    - To enable users to share resources such as information and software
    - To share hardware such as a networked printer
    - To save costs (as a result of sharing the hardware, etc.)
    - To increase control and security, etc.
  2. Would the network in the school hall also be an example of a HAN? Briefly motivate your answer.
  2. No, a HAN refers to a Home Area Network. The network in the school hall would be an example of a LAN (Local Area Network) as it covers a larger area than a home, but it is still limited to one physical location.
3. The organising committee is considering using *crowdfunding* to finance the network. They will use the Digital Divide as a motivation.
  - 3.1 Explain what crowdfunding is and how it works. Also mention two popular crowdfunding platforms in your answer.
    - 3.1 Crowdfunding refers to the funding a project or business venture by raising small amounts of money from a large number of people, typically via the internet. Examples of crowdfunding sites include Kickstarter and Indiegogo.
  - 3.2 What is the Digital Divide?
    - 3.2 The Digital Divide refers to a scenario where large sections of the populations of many of the developing countries (such as South Africa) and poorer communities have limited access to technology and limited knowledge of it, as opposed to communities that have fuller access to these facilities.
4. A choice has to be made between connecting the network using UTP cables and connecting it wirelessly.
  - 4.1 Give two advantages of connecting the network wirelessly, in other words, by using a WLAN.
    - 4.1 Any two of:
      - A WLAN saves costs, requires less effort and presents fewer difficulties than laying cables.
      - It is easy to add additional equipment to the network.
      - It allows for mobility – you can connect wherever you can access the signal in the hall.
      - There is no clutter that is associated with using cables, etc.

4.2 Give two possible disadvantages of connecting the network wirelessly.

4.2 Any two of:

- The school will need to purchase extra hardware, like wireless access points and possibly wireless network cards, for the computers.
- There might be interference with the wireless signal, which would cause the devices to lose their connection to the network.
- A WLAN requires a greater level of expertise to set up.
- The school would need to guard against people illegally accessing the network by 'intercepting' the wireless signal, etc.

5. A file server and a switch will need to be purchased to implement the network.

5.1 How does a *server* differ from any other computer connected to a network?

In your answer, you should also refer to the specific role that the *file server* will play in this context.

5.1 A server is a more powerful computer that provides resources or services to the other computers on a network. It is not used to 'work on' like the other 'client' computers on the network. A file server is used to store all the users' files in one central location.

5.2 Give one way in which the hardware specifications of a file server typically differ from those of any other 'client' computer connected to the network.

5.2 Any one of:

- More hard drives or hard drive space
- More RAM
- More powerful CPU, etc.

5.3 What is a switch used for in a network?

5.3 It is a central hardware device with multiple network ports to which each computer connects. It, in turn, connects to the server and then directs 'traffic' or data from the server to the appropriate computer.

6. A trust member is concerned that unauthorised users might be able to gain access to confidential data stored in the files on the network.

Name one way to prevent users gaining access to confidential files stored on the network.

6. Any one of:

- Set user rights or permissions
- Encrypt the files and add passwords, etc.

7. The trust wants to install an internet connection which all the users on the network can share. They need to choose an ISP and a broadband connection.

7.1 A trust member was tasked with approaching various ISPs to get quotes.

7.1.1 Explain what an ISP is by explaining its role or function in internet access.

7.1.1 An ISP (Internet Service Provider) is a company that has a permanent, fast connection to the internet. These companies sell internet access and services to individuals or organisations (like the trust) for a monthly fee. In other words, the trust would connect to the internet via the ISP's connection.

- 7.1.2 An ISP will provide wireless or wired internet access. Give three other kinds of service that an ISP will typically offer.
- 7.1.2 Providing email addresses, web page hosting, fax-to-email, spam filtering services, etc.
- 7.2 All the internet packages that were researched refer to broadband. Explain what broadband is and why it is of such importance to someone using the internet.
- 7.2 Broadband refers to a high-speed, high-bandwidth connection to the internet. Bandwidth refers to the total amount of data that can be transferred from one point to another in a given period of time. It is normally measured in Kilobits per second (Kbps) or Megabits per second (Mbps).
- This allows users to have fast access to websites and fast download and upload speeds. In addition, some services, such as video or TV streaming, will not work effectively (if at all) unless one has a broadband connection.
- 7.3 What is the main question to ask if you need to make a choice between an ADSL and a 3G/4G(LTE) internet connection?
- 7.3 Do you need to be mobile? If you need to be mobile, you would have to choose a 3G/4G(LTE) connection.
- 7.4 The trust finally decided on an ADSL package with the following specifications:

***4 Mbps / 512 Kbps uncapped ADSL***

***Shaped for normal web browsing, email, online banking and social networking services***

***Free 5 GB cloud storage account***

- 7.4.1 Give an advantage of ADSL (other than the cost and the fact that it is a broadband connection).
- 7.4.1 Any one of:
- You can make and receive telephone calls on your landline and use the line for internet access at the same time.
  - Most ADSL routers include WiFi, so the users may be able to access the internet wirelessly inside the hall with a mobile device like a smartphone, etc.
- 7.4.2 Give two possible benefits of using fibre compared to ADSL (other than the fact that it is 'faster').
- 7.4.2 Two benefits:
- Fibre generally provides much cheaper and more stable connections to the internet than ADSL.
  - With a fibre connection, data can travel much further than ADSL to or from an exchange, before the signal starts weakening, so distance from the exchange is less of a problem.

- 7.4.3 Why are there two different speeds given in the specifications (4 Mbps / 512 Kbps) and what would the benefit of these speeds be to the trust?
- 7.4.3 The 4 Mbps is the maximum download speed and 512 Kbps the upload speed. It is beneficial to have a higher download speed (4 Mbps), as more data is downloaded than uploaded.
- 7.4.4 What does uncapped mean in this context?
- 7.4.4 Uncapped means that there is no limit placed on the amount of data that can be uploaded or downloaded in a month.
- 7.4.5 What does the term 'shaped' mean in this context?
- 7.4.5 Shaped connections give 'preference' or first priority to certain internet services (according to specifications, email might be a priority) while other services are considered a 'lower priority', and are therefore slower. The term unshaped means that all the internet services are given the same priority. A shaped connection works well, unless you have a specific need, such as wanting to do a lot of online gaming.
- 7.4.6 If the package is uncapped, what would the trust have to pay for each month?
- 7.4.6 The costs include a monthly ISP cost (depending on the package chosen) as well as a fixed monthly cost for the rental of the line (depending on the speed configuration chosen). They will not pay for their connection time to the internet, but they will still pay the normal rate for normal telephone calls made on the line.
- 7.4.7 Briefly explain what the 'free 5 GB cloud storage' refers to and give two general advantages of cloud storage.
- 7.4.7 Cloud storage refers to storing data on servers on the internet ('the cloud').
- Any two advantages:
- You can access your data from any location that has internet access, including via mobile devices such as smartphones.
  - Saves storage space on your local machine or device as the data is stored online.
  - It is easier to share data.
  - Files can be synchronised to other computers and devices so that they all have the same 'versions' of the files.
- 7.4.8 Give one example of a service or website that offers cloud storage.
- 7.4.8 Google Drive, SkyDrive, Dropbox, iCloud, etc.
- 7.4.9 Explain what the difference between cloud computing and cloud storage is.
- 7.4.9 Cloud storage refers to storing files on an online storage computer (server) on the internet. Cloud computing is a general term that refers to the sharing and use of resources (including cloud storage) and applications offered as services over the internet.

8. The chairman of the trust normally uses an ADSL connection at home to connect to the internet. However, when travelling to Cape Town to meet potential sponsors he had to use another way of connecting to the internet.
- 8.1 One of the ways to connect to the internet would be to use the WiFi hotspot in the hotel. Explain what this means and refer to the concepts of *WiFi* and *hotspot* and how to use them to access the internet.
- 8.1 WiFi is a wireless technology which you can access by using any computer or mobile device with wireless capabilities. WiFi provides a way to connect to an existing internet connection wirelessly.
- Many public places such as restaurants, hotels, airports and shopping malls provide WiFi connectivity for free or as a service you can pay for (usually by the hour). Hotels often give you a small data 'cap' that you can use for free.
- The area in which you can access the WiFi signal is known as a 'hotspot' or an 'access point'. Most hotspots are protected by a password which you will need in order to connect to the internet via the hotspot.
- 8.2 Name another way in which the chairman could possibly connect to the internet from his hotel room, besides WiFi.
- 8.2 He can use a 3G/4G(LTE) cellular modem to connect to the internet.
- 8.3 The chairman has an integrated webcam on his laptop and wants to 'Skype' with one of the potential sponsors in London.
- 8.3.1 Skype is a form of application software. Give the general name or category of software that Skype falls under and briefly describe its function.
- 8.3.1 VoIP software.
- VoIP (Voice over Internet Protocol) is a technology that allows telephone calls to be made over LANs, WANs and the internet, allowing you to talk to anyone who also has a VoIP system anywhere in the world. When using VoIP, voice is transmitted on a network. It also allows you to speak to many people at the same time using conference call technology.
- 8.3.2 What does it mean to 'Skype' someone?
- 8.3.2 It means to have an audio or audio-visual conversation with someone using a computer and a network (usually the internet).
- 8.3.3 What does it mean when we say the webcam is *integrated*?
- 8.3.3 It is built into the computer and it is usually positioned at the top of the screen.
- 8.3.4 Give one reason why it might not be a good idea to use a webcam during a 'Skype session'.
- 8.3.4 Any one of:
- It uses a lot of bandwidth or cap.
  - It can slow down the computer and the 'link'.
  - There are issues regarding privacy, etc.

9. A LAN and an internet connection have been set up so that all of the computers can connect to the internet via a proxy server that was purchased for this purpose. Mary has also been tasked with finding sites with good resources that may be used in the Computer Literacy courses. She has also started to use e-banking for the trust.

9.1 Give two broad benefits or features of e-banking that are not applicable to normal, 'conventional' banking.

9.1 Any two of:

- There is no need to travel or to stand in queues.
- There is less of a need for cash.
- One can use e-banking anytime and in any location where one has internet access, etc.

9.2 Why do the websites of banks often start with 'https'? For example, <https://www.newsavingsbank.co.za>.

9.2 It indicates that communication with the site is secure (encrypted) for security reasons.

9.3 Mary found a very useful site with material that can be used under a Creative Commons agreement.

It has the following URL: [www.indigonam.org.uk](http://www.indigonam.org.uk).

9.3.1 What is a URL? Do not just give the meaning of the abbreviation as your answer.

9.3.1 A Uniform Resource Locator (URL) is the address of a web page or other resource on the internet.

9.3.2 What do we mean when we say that material can be used under a Creative Commons agreement?

9.3.2 Creative Commons is a copyright licence which allows authors or creators of material to specify which rights they reserve, instead of the stricter, more traditional 'all rights reserved' copyright agreement.

9.3.3 While viewing the above web page, Mary was asked to install a Flash plug-in. Explain what a plug-in is and what it generally allows one to do by referring to this specific example. Also explain the difference between a *plug-in* and a *browser extension* or *add-on*.

9.3.3 A plug-in is simply a (third-party) app that the browser can call on to display specialised content such as flash animations.

A browser add-on or extension is a useful third-party party app that can be downloaded (often for free) to extend the functionality of a browser beyond browsing. Examples include add blockers and video capturing tools.

9.3.4 Give two things one can deduce ('figure out') from the URL of the website ([www.indigonam.org.uk](http://www.indigonam.org.uk)).

9.3.4 It is the website of a non-profit organisation (.org) that is based in the United Kingdom (UK).

- 9.3.5 Mary would like to email the webmaster of this website, but no email address is given.  
Suggest an email address that she could perhaps use to contact the webmaster.
- 9.3.5 [webmaster@indigonam.org.uk](mailto:webmaster@indigonam.org.uk) (or any other appropriate username such as 'info' or 'admin')
- 9.3.6 Give two ways in which Mary can set the browser to 'remember' the name of this website so that she can easily return to it in the future.
- 9.3.6 Mary could use the Bookmark facility to record the URL of the website.  
She could also add the URL to the 'Favorites' section of the web browser.
- 9.4 Sibü noticed that when she opens her web browser it goes to the CNN website. She would prefer it to go directly to a search engine like Google when she opens the browser.
- 9.4.1 What is the difference between a web browser and a search engine?
- 9.4.1 A web browser is a type of application software used to allow people to access and view web pages on the internet. A search engine is also software (located on a website), but it is used to search for documents located on the internet by using keywords or phrases entered by the user.
- 9.4.2 Briefly explain how Sibü can get the web browser to always go to the search engine website when she first opens her web browser.
- 9.4.2 The Home Page setting sets the web page that will automatically load when the web browser is opened. She can change this setting to the URL of the search engine she prefers, for example, [www.google.com](http://www.google.com).
- 9.4.3 Sibü noticed that when she and Mary go to the same news website on their individual computers, she sometimes gets an older version of the web page.  
Explain why this happens by referring to the concept of web caching and how to resolve the problem when it occurs.
- 9.4.3 Web caching refers to the process of storing recently accessed files locally on the hard drive. This is to reduce bandwidth usage and to allow previously visited web pages to load more quickly. The web page therefore may not be the latest version. The refresh button can be clicked to display the latest version.
10. Sibü has set up a *Gmail* account to help with the day-to-day administration of the trust.
- 10.1 What is the main difference between Instant Messaging (IM) systems like WhatsApp and email?
- 10.1 Instant Messaging (IM) occurs 'live' or in real time.
- 10.2 One of the sponsors sent a set of zipped files to Sibü and 'Cc-ed' the chairman of the trust.
- 10.2.1 Explain what 'Cc' means in this context. Do not just write the meaning of the abbreviation.
- 10.2.1 It means the email was sent to Sibü and a copy was sent to the chairman of the trust so that each recipient could see who else the email had been sent to.

- 10.2.2 What difference, if any, would it make if the sponsor 'Bcc-ed' the documents to the chairman as opposed to 'Cc-ing' him?
- 10.2.2 Sibü would not see that a copy of the email had been sent to the chairman.
- 10.2.3 Explain what the term *zipped* means in this context, and why the files may have been zipped.
- 10.2.3 Zipping means to use compression software to zip or reduce the size of the files so that they are smaller to send, which means that they will use less cap to upload and download and that they will upload and download faster.
- 10.3 When Sibü needs to reply to an email message, she is not always sure whether she should use the Reply or Reply to all option.  
Explain the difference between these two options.
- 10.3 The Reply option should be used to reply only to the sender of the original message (the email address that appears in the From section). 'Reply to all' will send the reply to the original sender and anyone else that received the original message (Cc section).
- 10.4 Sibü found that there is a limit to the number of recipients she can send to simultaneously. This is the email program's way of trying to prevent spam and the solution to this problem is to use a contact group (distribution list).
- 10.4.1 What is spam?
- 10.4.1 Spam is the electronic equivalent of 'junk mail' and usually consists of advertisements that you have not requested.
- 10.4.2 Give three ways to reduce the amount of spam you receive.
- 10.4.2 Any three of:
- Use an ISP that filters for spam
  - Use the spam filters provided by the email program that you use
  - Use anti-spam software
  - Do not give out your 'main' email address on websites unless it is absolutely necessary
  - Use different email addresses for different purposes (e.g. business and private affairs), etc.
- 10.4.3 Explain what a contact group is and how it is used.
- 10.4.3 A contact group is a group of email addresses that are grouped under one name – the name of the list. A message sent to this list or group is then sent to all the recipients that are listed in the group. This saves time, because the sender can just send an email to the list or group, instead of adding all the addresses individually each time.
- 10.5 Sibü found that she cannot send certain types of files as attachments.  
Briefly explain why this is the case.
- 10.5 Some email systems block certain potentially dangerous file extensions, such as .exe, for security reasons (in case they are viruses, etc.).



- 10.6 Sibü found that there is a restriction of the size of the email attachments she can send. Someone suggested that she should try using a 'Dropbox' type of service.
- 10.6.1 Briefly explain how Sibü could make a file available to others using a service like Dropbox.
- 10.6.1 Sibü would need to install the (generally) free software on her computer and then she would have to register with the site. She could then upload the file to the site and send the recipient a link and password for the relevant folder. This link can then be used by the recipient to download the file.
- 10.6.2 Give one possible disadvantage of using a service like Dropbox to share files.
- 10.6.2 Any one of:
- The amount of space allocated for saving files is quite small for free users. You have to pay a monthly or yearly subscription fee or invite more people to join the system to get extra space.
  - The people who you have shared folders with or who you have given access to the files can remove the files by mistake.
- 10.7 Sibü uses Gmail, which is a popular example of a web-based email system. Her email address is Sibü\_100@gmail.com.
- 10.7.1 Why do you think she used the username *Sibü\_100* instead of just *Sibü*?
- 10.7.1 The username *Sibü* was probably already in use, so she had to use a variation of the name to make it unique.
- 10.7.2 Give the main advantage of using a web-based email system as opposed to an ISP-based email system, besides any cost issues.
- 10.7.2 The emails are permanently stored on the web so you can access your emails from any location where there is internet access.
- 10.8 One of the trust members suggested that they make use of Facebook instead of email to communicate with clients.
- 10.8.1 What is the general name given to services and websites such as Facebook, Pinterest and Twitter?
- 10.8.1 Social networking sites or services.
- 10.8.2 Give two advantages of using Facebook to communicate with clients instead of using email.
- 10.8.2 Any two:
- More and more people are using Facebook as opposed to email.
  - You don't have to know the email address of the recipient.
  - You don't have problems in terms of people changing their email addresses.
- 10.8.3 Give one potential disadvantage of using Facebook to communicate with clients instead of using email.
- 10.8.3 Any one of:
- Not everyone uses Facebook.
  - Privacy issues, etc.

11. The current booking system for the computer short courses simply involves the community members writing their names down in a book. A trust member proposed that the booking system should be 'computerised' so that the community members' details are captured on a computer system immediately.

Give three benefits of having a computerised booking system for the computer short courses.

11. Three of:

- It is quicker and more efficient.
- It can reduce the number of errors if it is a properly designed system.
- Users can easily process the electronic data for queries and reports.
- Users can make copies of data, etc.

12. Sibü went onto a website to book a plane ticket for one of the trust members. A message appeared saying that she has to enable '*pop-ups*' for the website to function properly.

12.1 What is a pop-up?

12.1 A pop-up is a small window that appears when viewing a website.

12.2 What is a pop-up blocker?

12.2 It is a feature of web browsers that lets the user block pop-up windows.

12.3 What is the best way for Sibü to resolve this problem so she can use the website?

12.3 If Sibü trusts the specific site, she can change the settings of the pop-up blocker of her web browser to allow pop-ups from that site.

13. Mary wants to send a picture of her daughter from her cellphone to Sibü's cellphone by linking their cellphones on a network.

13.1 What type of network would we classify this as?

13.1 A PAN – Personal Area Network.

13.2 What type of wireless technology would they most likely use to send the picture?

13.2 Bluetooth.