

2.1 NETWORK CONFIGURATION

ESSENTIAL EQUIPMENT

Network Interface Controller	<ul style="list-style-type: none">- Allows a computer to communicate with a network- Wirelessly / via cable connecting network to NIC in computer- Most PCs have an onboard NIC
Switch	<ul style="list-style-type: none">- Used to connect computers in a network to a central location so that communication can occur- Directs traffic between devices connected to the network
Cables	<ul style="list-style-type: none">- UTP cables used to connect computer to the switch- Fibre optic cables used as a backbone to connect diff section of the network to ensure fast data transfer
Wireless Base Station	<ul style="list-style-type: none">- Also called Access point- Sender/receiver and antenna which transmits and receives radio waves- Allows wireless devices to communicate with each other using the network

METHODS OF CONNECTING TO THE INTERNET

ADSL	<ul style="list-style-type: none">- Permanent digital connection to the internet using a telephone line- Diff packages and bandwidth specifications available from service providers- Download speed faster than upload speed- Used for small or large networks
WIFI / WIMAX	<ul style="list-style-type: none">- Devices connect to wireless base station using radio waves- Wimax = more secure connection over wider area than WIFI- Signal strength can drop:<ul style="list-style-type: none">→ physical objects (walls)→ geography (valley/hills)→ electromagnetic interference (lightening)- Communication speed & reliability is affected by signal strength

Cellular	<ul style="list-style-type: none"> - Provides data connectivity to mobile devices - Slowest to fastest: Edge, 3G, 4G/LTE - Can provide mobile connectivity to computers by <ul style="list-style-type: none"> → Dongle/modem that connects to the cellular network → Creating a personal hotspot with a smartphone/tablet
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MODEM – device that converts the data or signal from a computer to a format that can be transmitted over a communication medium

ROUTER - device that makes communication between networks over the internet possible by directing data to its correct destination

PERMISSIONS

Read	Read or copy
Write	Write to and modify
Execute	View and access a folder and file’s content & run the program
List Folder Contents	Allows listing of files and subfolders in a folder
Modify	Reading, writing and deletion of files & folder
Full Control	Allows reading, writing, deletion Allows you to add, change and remove access permissions for users

USERS RIGHTS

Administrators: - full control over the system

- install hardware and software drivers
- create and modify new user accounts and groups & can reset passwords
- full access to all files and folders

Standard users: - log on, run programs, customize accounts,

- work with files in their user folder/ in common folders with access to
- change their own password (not others) – can’t make system changes

BitTorrent

Files shared – downloadable from website

Problem = traffic managed by single server

- server = slow and unresponsive (too many people)
- downloads timeout = people angry
- website has limited bandwidth & can only handle limited amount of people at once

Some websites get past this problem by having “mirrors ”

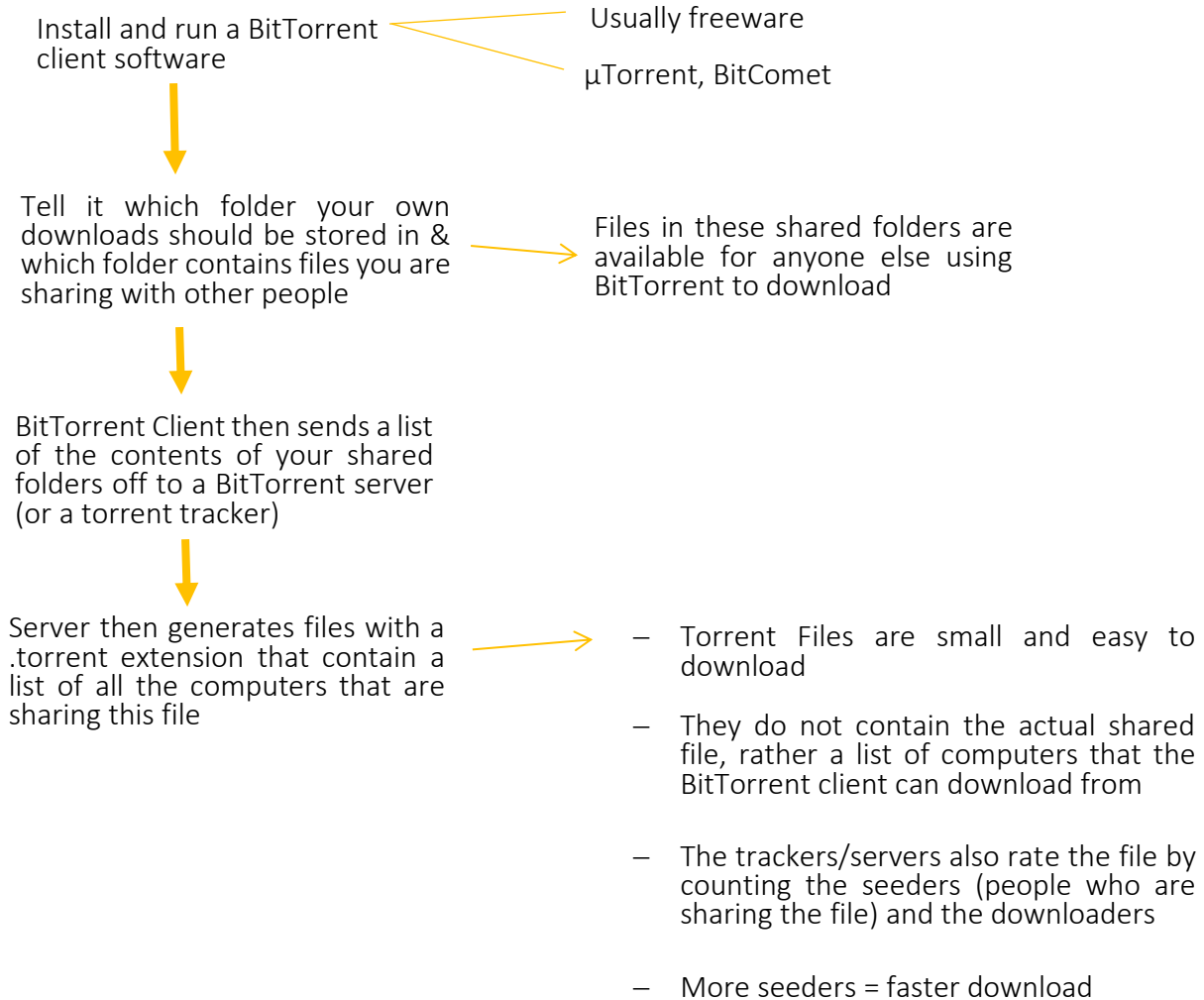
- copy of website hosted on other servers
- not cheapest & most effective solution

What is BitTorrent

Peer-to-peer protocol used to share large files over a network

You can download a file from anyone who has the smallest part of that file on their computer

How it works:



Downloading a file using BitTorrent

1. Search for the file on a torrent tracking site
2. Find a .torrent file which you will download with your browser and open with BitTorrent client software
3. BitTorrent client begins the process of downloading the file
4. As long as the client is open it allows people to download any files that you are sharing & all the files in your download folder

BitTorrent client splits the file you are downloading into many small parts.

Downloads parts separately from many diff computers

Finally puts all the parts together to recreate the original file

Benefits

- **Many users can download a file quickly** (increases speed because not overloading single server)
- **Reduces cost to host** (no single host pays for millions of people downloading from their server)
- **Forces equality in sharing** (when you run the software people download from you)
- **Offers effective use of available download bandwidth**
- **Client software usually free**

Risks

- **Infected files/malware**
(BitTorrent client guarantees that the file has not been altered from when the torrent was created but it could have been infected before.
Run malware scan on files first & infected files usually found + deleted quickly)
- **Make piracy easy**
- **Not anonymous** (does not prevent anyone from seeing your IP address and file you download can be traced back to you)

Online Services

- **Remote, network-based storage / Online storage**
 - use the service like an external hard drive but connect via internet not cable
 - use a browser to see file and download/upload
- **File Sharing**
 - give someone access to files you have uploads
 - useful to get around file size limits for e-mail attachments
- **File syncing**
 - Choose a folder on your hard drive that is linked to the service's online storage by their software
 - As you edit files in this folder, software monitors & mirrors changes in the online storage
 - useful because:
 - Can work on your hard drive as usual and changes copied automatically
 - Have access to local files when offline
 - Have access to latest synced version of a file online from any computer
- **Collaboration**
 - File Sharing collaboration:
 - Group of people all have access to the same folder
 - Can work on documents they upload for people to look at & comment on
 - Simultaneous document editing:
 - Service has to offer an online application for editing files
 - People can open doc on their web app and make changes at the same time
 - All user's changes are updated & appear instantly on everyone's screen
 - Can see what others are doing, comment and suggest and changes

- **Limited Free Space**
 - attract users by offering a free version of the services
 - count on you liking the service & wanting to buy more storage space and extra features

Remote Access

REMOTE CONTROLLING A COMPUTER

- When need to access software on a computer that is far away from you but it is connected to the internet
- install software that allows you to:
 - View the screen of target computer on the remote computer on your target computer
 - Use the local computer's mouse and keyboard to control the target computer remotely
- Remotely controlling a computer involves configuring software on the host **AND** target computers
- connected = window opened on host computer showing target computer's desktop
- **You are working on the remote target computer therefore changes to files are made on target computer and not saved on local computer**

REMOTE CONTROL SOFTWARE

- **Apple, Windows and Linux** all have a form of desktop connection software but it is limited to controlling machines with the same operating system
- **TeamViewer, LogMeIn, GoToMyPC** = third party remote control software that allows you to connect to computer with any operating system

VIRTUAL PRIVATE NETWORK (VPN)

- When you need to access files or other resources on your home or work network
- VPN is then faster and more useful than remote controlling the computer
- **VPN creates a secure, encrypted connection between your computer & your target network**
- allows you to work as if your computer is connected to all the resources in the network
- Advantage = you can route all your communications (emails etc) through the remote network
- Important because you know you can trust the security (firewall, malware protection etc) on network you are connecting to, whilst the connection at a hotel/internet café while travelling might not be secure