

What is a Network?

Pam Taylor
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A network can be described as a collection of things that are physically or virtually linked together

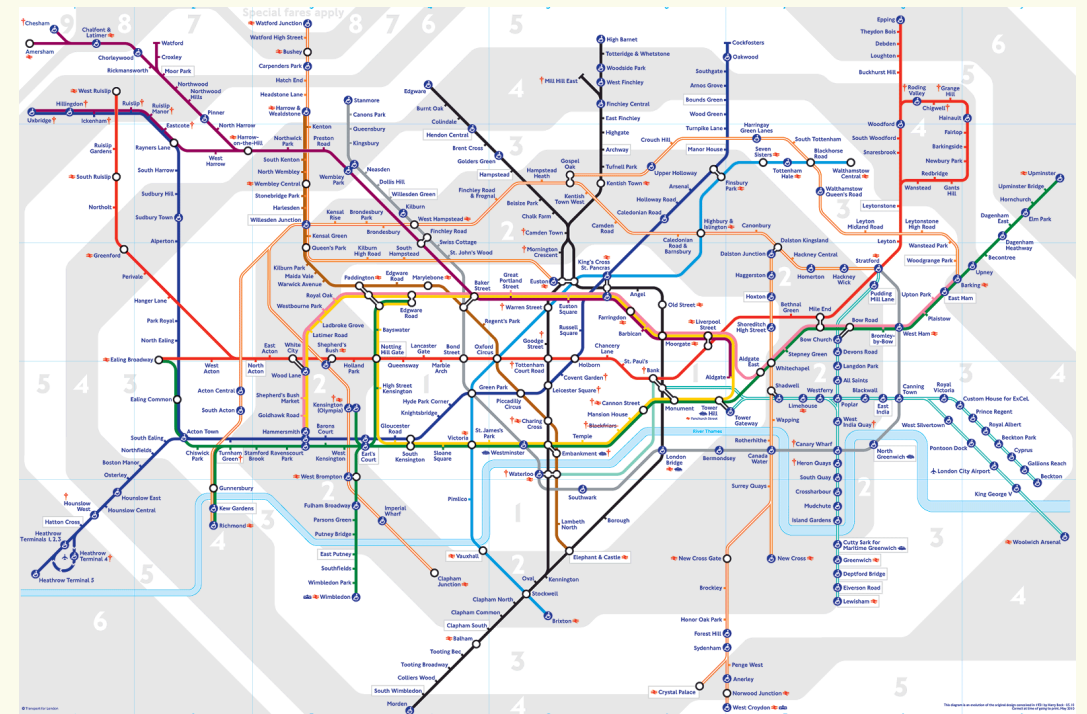
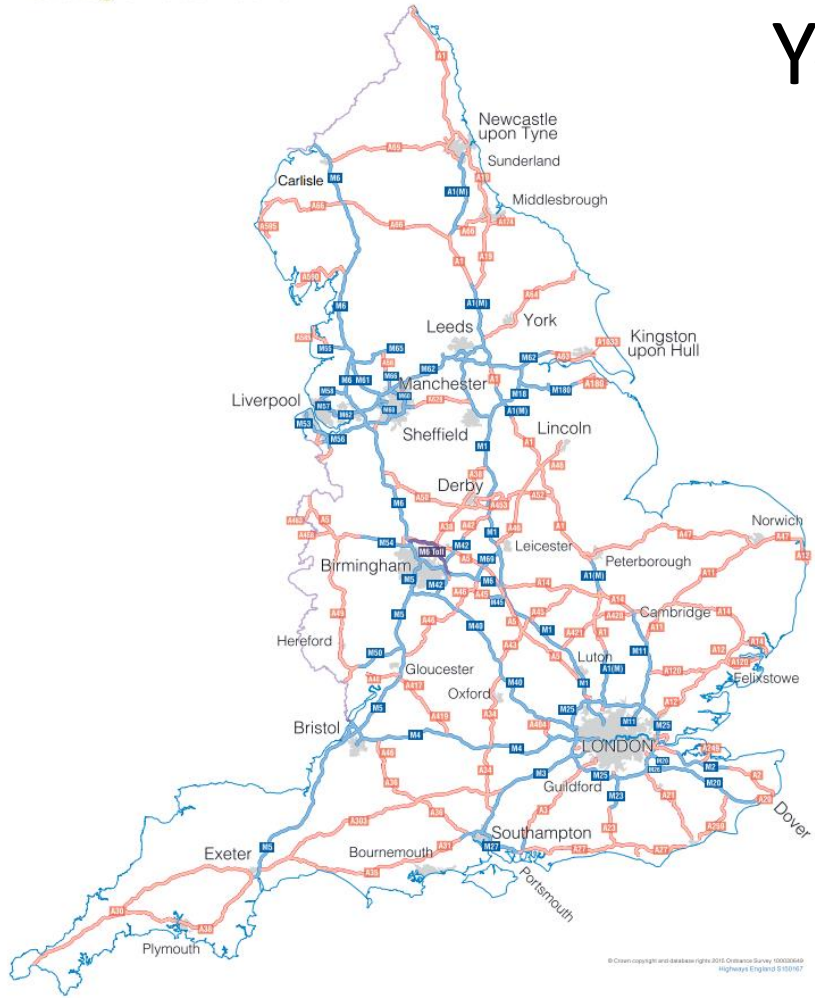
You know somebody – who knows somebody – who knows somebody else – and that person knows you or a member of your family.

Isn't this how the grapevine works? 😊

Every time you leave your house ...

You are on a network of paths, roads, bus routes, railway lines, etc.

Strategic Road Network

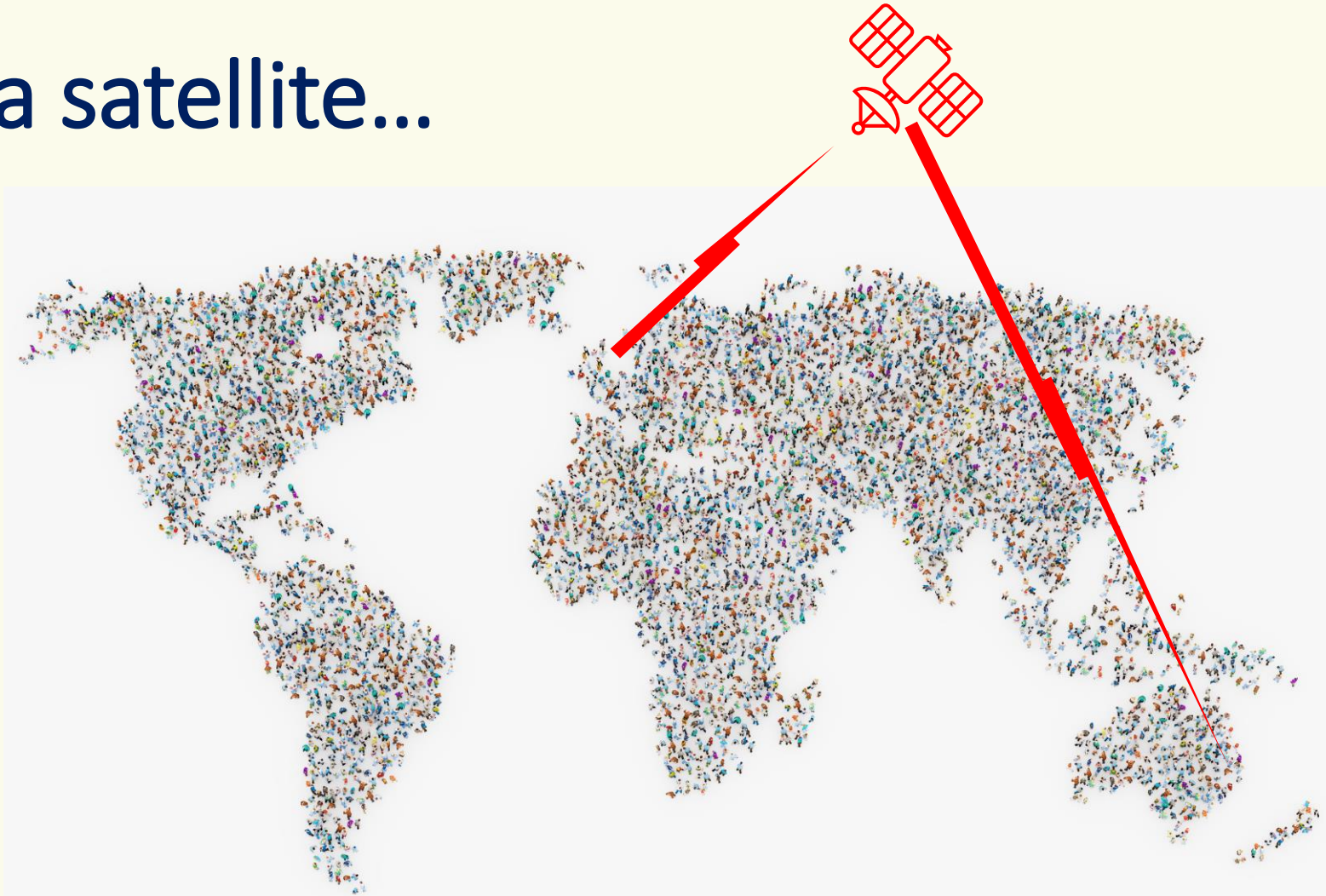


When you make a Smartphone call ...



... you are using a network of phone masts

Or even a satellite...



... to a network of phone masts in another country

There are many different types of network all around us and one of the largest is the Internet

The Internet

- Also called the World Wide Web
Or sometimes just The Net or The Web
- No one person or company created The Internet
- No one person or company owns the Internet
- It contains millions of 'things' that work together
Using Internationally agreed standards to communicate
These rules, called protocols, keep everything working effectively
- Some 'things' are privately owned such as our personal devices
- Some 'things' are commercially owned such as servers or cloud storage
... and we pay for their services via our Internet connection fees
- The Internet has evolved and will continue to evolve

How do things know who they are/what to do?

- The Internet is strictly structured
- Every thing has a unique identifier
- For instance every email address is unique
joesmith@gmail.com is different from joe.smith@gmail.com
- Every website has a unique name – see similar but different as below
<https://u3asites.org.uk/bishop-auckland/home> and <https://u3asites.org.uk/sedgefield/home>
<https://www.tesco.com/> and <https://www.asda.com/>
- Protocols (rules) determine how things communicate

It is these unique names and addresses along with the protocols that enable communication between things to function accurately and incredibly quickly



But when you're new to personal computing devices you just want to know how to use them.

That includes being able access the **4.2 billion** pages of information on the Web today!

The world at your fingertips.

Why use the Internet?

Get instant information, make life easier, save time, listen to music, or just enjoy surfing the net

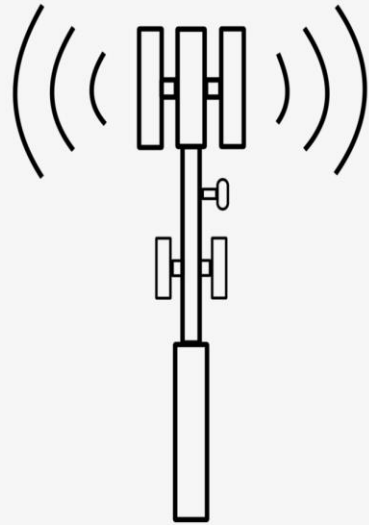
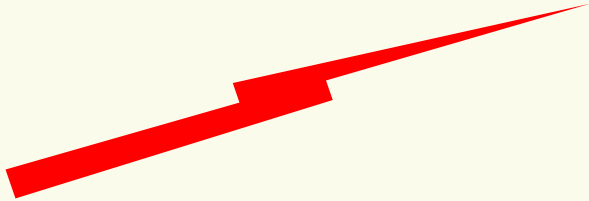
- What time is the next bus/train to Bishop Auckland from Darlington?
- I need a plumber as soon as possible. Can anyone recommend one nearby?
- I'm in town with some free time. Is the Spanish Art Gallery open right now?
- I'm on the A66 and need fuel. Where is the nearest garage?
- I want to go to Spain in June. Where can I go, what hotels or other accommodation is available, when are flights, how much will it cost?
- I'm on holiday and have lost a filling. Where is the nearest dentist?
- My friend and I are having a coffee in a café and are planning to go to the garden centre before the weekend. What's the weather like for the rest of the week so we choose a day when we won't get rained on?
- What's the nearest metro to the Maritime Museum in Barcelona?
- A parcel is being delivered later today. Driver progress shows on the tracking map so where is he now? How soon do I need to be home to be there in time for delivery?
- I don't want to drive to the airport. What other options do I have?
- What's the Test Match score?
- Compare home or car insurance prices
- We want to visit Lindisfarne (Holy Island) in February and drive across the causeway. When are the best tide times?
- What are the lyrics for 'Mr Tambourine Man'?
- I'm in Northallerton and I've lost my bearings. Which direction is the railway station?
- Homebase didn't have the item I wanted. Is it worth trying B&Q? Do they have it in stock?
- How many sonnets did Shakespeare write?
- What's the quickest way to walk from here to the Market Place?
- Is there a Boots at the Arnison Centre? If not then where is the nearest one to there?
- I'm in an hotel on a short break in Paris. Is there a city tourist bus? If so then where does it go and how much does it cost?

Get answers to almost everything... or just pass the time reading the latest news, checking email, chatting on social media

Let's look at how you can
access the Internet

It depends on the device you are using and where you are at the time

Out and About



To the outside world

Your phone (or phablet*) connects to the nearest 3G/4G/5G phone mast via your SIM card. You can ...

Make phone calls

Send and receive Internet data such as reading the news, browsing websites, or watching YouTube

Send and receive emails

Use social media

You pay for this ... pay-as-you-go or a monthly contract

* A phablet is a cross between a phone and a tablet. It is a tablet with one or more SIM cards.

In a coffee shop ... or hotel, service station, airport, spa – many places



To the outside world

Via your phone/tablet/phablet/laptop wireless connection (in settings) you log on to the coffee shop network using the password they supply. Note that your device does not connect directly to the outside world in this scenario. Their router gives you a wireless connection to the Internet. You can ...

Send and receive Internet data such as reading news, browsing websites, or watch YouTube

Send and receive emails

Use social media

This is free but although password accessed it is a **public network**

At home ...



To the outside world

Via your phone/tablet/phablet/laptop/desktop wireless connection (in settings) you log on to your own home router using the password that comes with the router. As in the coffee shop your device does not connect directly to the outside world. Your router gives you a wireless connection to the Internet. You can ...

Send and receive Internet data – read the news, browse websites, or watch YouTube

Send and receive emails

Use social media

You pay a monthly fee that could include landline, cable TV or more

This is a **private network**



How secure is all this?
What's the difference between
public and private networks?

Device security?



Each device comes with built-in security depending on the device and the manufacturer. For instance ...

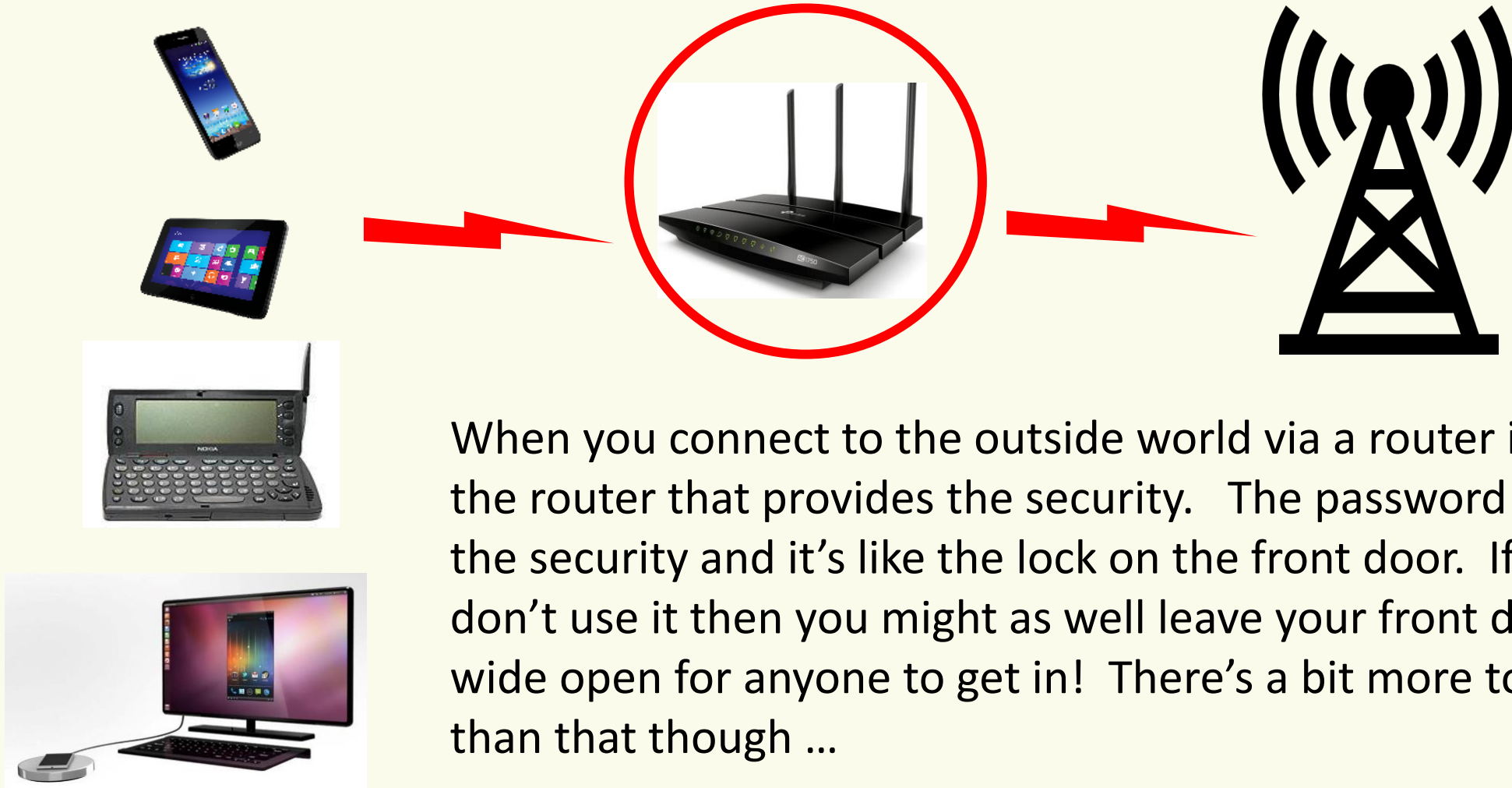
- Windows desktops and laptops have Windows Firewall
- Samsung Android phones and tablets have Secured by Knox
- Apple phones and tablets have propriety hardware and OS security



These provide device level security

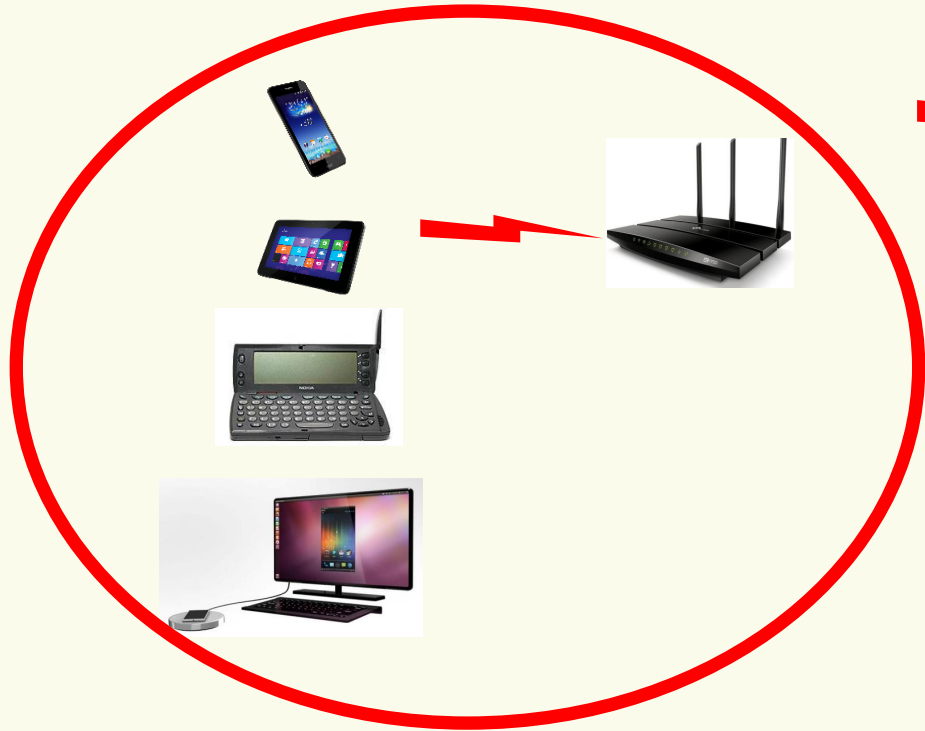


Network Security?



When you connect to the outside world via a router it is the router that provides the security. The password is the security and it's like the lock on the front door. If you don't use it then you might as well leave your front door wide open for anyone to get in! There's a bit more to it than that though ...

Site security?

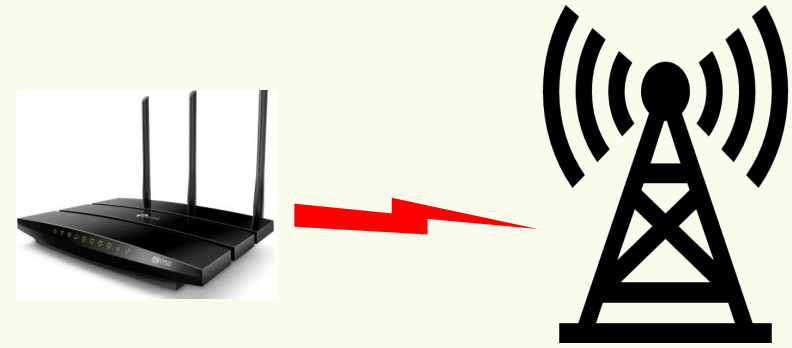


Any device connected to a specific password protected router is in a locally protected network but not all networks are equal.

At home you have a **private** network and you know that all of your network devices are trustworthy

Can the same be said for all devices using the **public** network of a national coffee shop chain? Perhaps not.

The Wireless Router

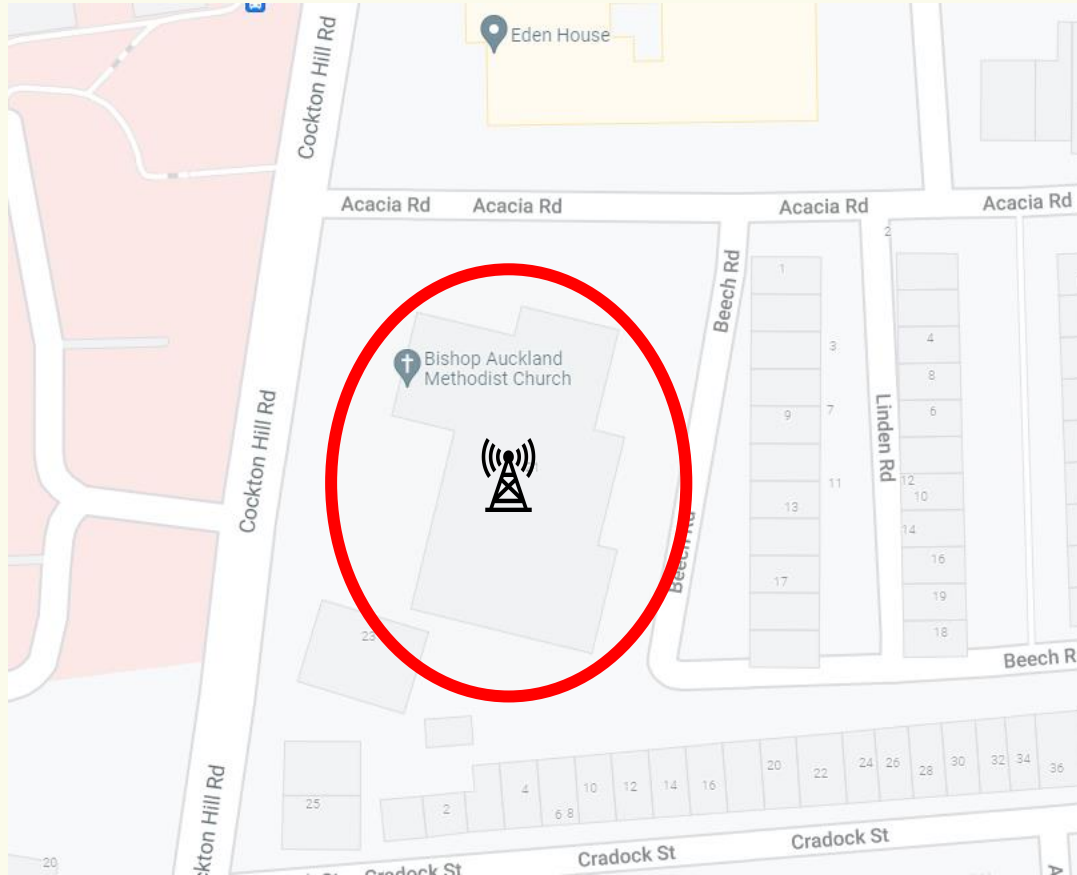


- You can have many wireless connections set up on your device for places such as Costa, Moto, M&S, Starbucks, Tesco, Roadchef, Sainsbury's, your local privately-owned café or pub, and many more places.
- The first time you create a logon to a wireless router you create an account. The larger organisations are required by the government to keep a record of who is using their free Wi-Fi for terrorism prevention purposes.
- You are only logged on to the wireless router when you are near to it. The signal does not extend far and when you leave the signal drops and you are disconnected. The great thing is that next time you go to that place you connect automatically (if you chose that option when creating the logon). If you go to a different Costa or M&S your account will be recognised and you will automatically connect to their network.
- You can send and receive emails, read the news, watch something on YouTube, use social media, make video calls, and much more from almost anywhere these days. Wireless technology makes it so easy.

You also get free Wi-Fi while on the premises but although password accessed it is a **public network**

n.b. Wi-Fi is a term used to describe a family of wireless protocols

Wireless Range



This graphic shows the router in the Methodist Church

Rooms within the Church can access it via password

Houses very close might be able to 'see' the router on the available router list in their settings but would not be able to log on without the password

Houses at the end of the street likely too far away to get a signal

Even places in the car park do not receive a signal due to the thickness of the Church walls

Walk across to the hospital and your signal drops even if you do not specifically log off

Next time you visit you connect automatically (if you chose that option when creating the login).

Having that router password in your device is zero risk. Your device can only connect when very close to the router.

Public versus private network - 1



- Public network – the coffee shop scenario
 - You log on to the site router to access the Internet
 - So do all the strangers in the café
- You're all on the password protected network
 - Protected from any device not on the network
 - Not protected from the strangers around you
- If one of those strangers is a hacker then you could be at risk
 - Note that this is extremely unlikely!
 - Do you really think a hacker could be sitting in Fifteas Vintage Tea Rooms?
- Hacker doesn't care about you checking social mail, reading news, etc.
- Hacker would be interested if you were doing online banking or entering your credit/debit card details for some reason

Solution: Don't do sensitive things on a public network

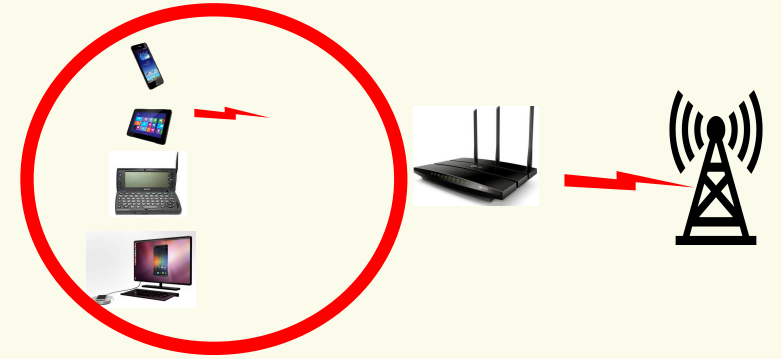
Public versus private network - 2



- Public network – meeting at the Methodist Church in Cockton Hill scenario
 - You log on to the site router to access the Internet
 - So do your u3a friends at the same meeting
 - Usually only your group in the Church – no strangers
- You're all on the password protected network
 - Protected from any device not on the network
- Chances of a u3a friend being a hacker is negligible
- Risk level is also negligible

Advice: you wouldn't leave your bank statements on the table at home for a visiting friend to see so keep that data private when in a public place

Public versus private network - 3



- Private network – at home
 - All your devices are logged on via your password protected router
- The router is your front door to the Internet
 - Your password keeps the door locked to stop strangers coming in
- Any of your devices on your home network are trusted
 - Share information with them without risk

Advice: This is where you perform sensitive tasks that are money related or that involve other sensitive information that you wouldn't wish to share

Today the Internet is much more than
accessing information, sending/receiving
emails, etc..

Here is a taste of the new home network.

The new home network



Router to the outside world

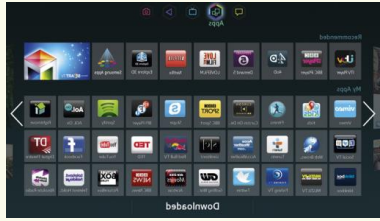
The home network of today can be much more than simply using computers for email, web browsing, social media, watching movies, etc..

There are many Smart devices such as kitchen appliances, central heating programmers, TVs, doorbells, security cameras, watches, and more

These get logged on to your network via your home router

You can view or operate Smart devices when away from home on your Smartphone and do such things as turning on the central heating, lighting, oven, or washing machine before you get home

Some new home network devices



- A Smart TV gives you access to On-Demand viewing and access to streaming services like Netflix
- A Smart doorbell sends your Smartphone a message when someone rings it. It has a camera that lets you see and communicate with that person on your Smartphone screen wherever you are
- A Smart security camera lets you watch the outside of your house even when you are far from home and it can record activity for later viewing
- An internal camera allows you to monitor inside your house or to see and talk to your pet when you are away from home
- A Smart fridge/freezer has an interactive display and keeps track of what's being stored, reminds you when something needs eating, makes a shopping list for you, and more
- Smart dishwashers, heating systems, and other household devices can be operated remotely to automate processes, save energy, and provide increased security

Click on the link below to watch a short
video of A Day in the Life of a Smart Home
(nice house!)

https://www.youtube.com/watch?v=909Nn9_hrlM

n.b. 2 ads start up and you can watch them or skip them when the 'skip ads' button appears bottom right