

# Brief History Western Australian Telecommunications

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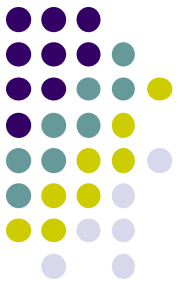
John Paskulich  
Western Australian Historic  
Telecommunications Society



# Australian Telecomm's

## # Some key technical events

- 1854: First electrical communications. Morse telegraph line (Melbourne)
- #1872: Overland telegraph; Adelaide – Darwin. Eastern Australia international connection
- 1877-78: First colonial telephone experiments
- #1880: First manual (telephonist) telephone exchange (Melbourne)
- 1901: Federation - PMG (Australian Post Office) – Gov't monopoly public telecomm's
- #1912: First public automatic (dial) exchange - Geelong Vic.
- #1930: First international radio-telephony
- 1950: First mobile phones (in cars) - switched via telephonist
- 1975: Telecom Australia splits from Post Office
- #1981: First automatic mobile car-phones
- 1987: First handheld mobile phone
- #1989: First (dial up) **global** internet connection via Melb. Uni. Public access early 1990s
- 1991: Duopoly Optus/Telecom Australia
- 1995: Telecom Australia renamed Telstra – progressively privatised from 1997
- #2000: First internet ADSL (Max. 1500/256 kb/s) & internet telephony (VoIP)
- 2009: NBN Co created.....
- #2019: 5G mobile & progressively shutting down landline 'phone network



# Some key events. WA history



- 1869: First telegraph line Perth – Fremantle
- 1877: East-west telegraph completed - international connectivity
- 1878: First telephone experiments in WA
- 1887: First (manual) telephone exchange - Wellington St Perth
- 1914: First dial telephone exchange – Central: Murray St Perth
- 1930: First east - west telephony
- 1962 – 1970: Major broadband telephony projects (1. Bunbury coax cable, 2. SW microwave radio, 3. Cvon - Pt Hed. Coax, 4. E-W microwave radio)
- 1966: First subscriber trunk dialling in WA
- 1985: Last manual telephone exchange closes
- 1989: First east - west optical fibre
- 2011: NBN project commences (Mandurah)
- 2019 Start of 5G rollout

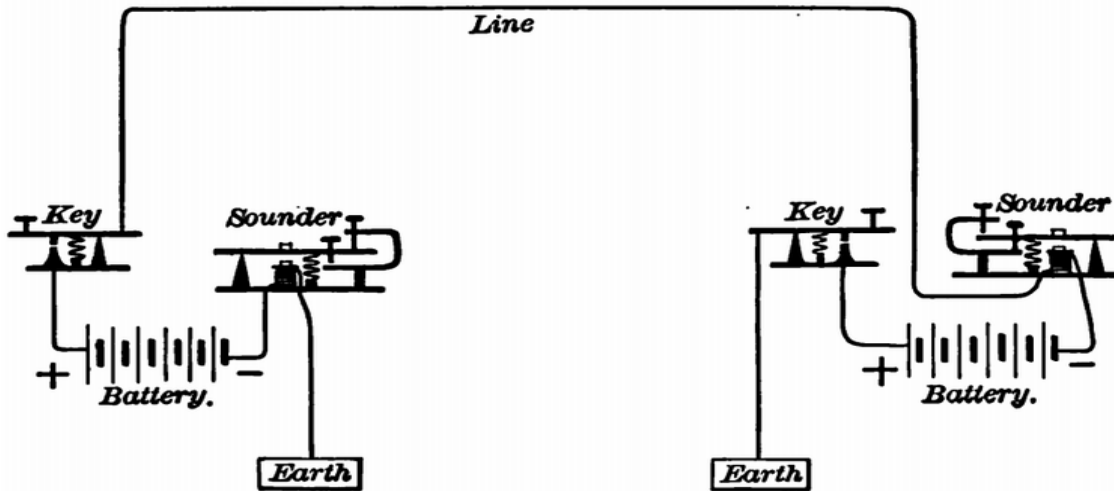
# Before telephones - Morse telegraphy



## International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A	• —	U	• • —
B	— • • •	V	• • • —
C	— • — •	W	— • —
D	— • •	X	— • • —
E	•	Y	— • — —
F	• • — •	Z	— — • •
G	— — •		
H	• • • •		
I	• •		
J	• — — —		
K	— • •		
L	— • • •		
M	— —		
N	— •		
O	— — —		
P	• — — •		
Q	— • • •		
R	• — • •		
S	• • •		
T	—		
		1	• — — — —
		2	• • — — —
		3	• • • — —
		4	• • • • —
		5	• • • • •
		6	— • • • •
		7	— — • • •
		8	— — — • •
		9	— — — — •
		0	— — — — —

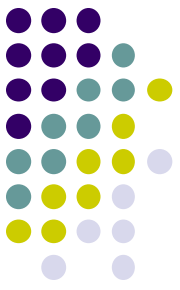


# Telegraph line Fremantle Rd

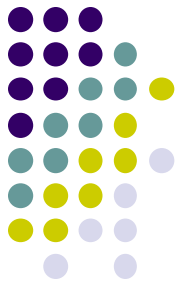
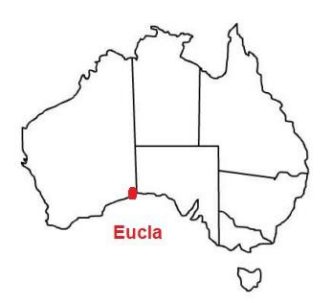
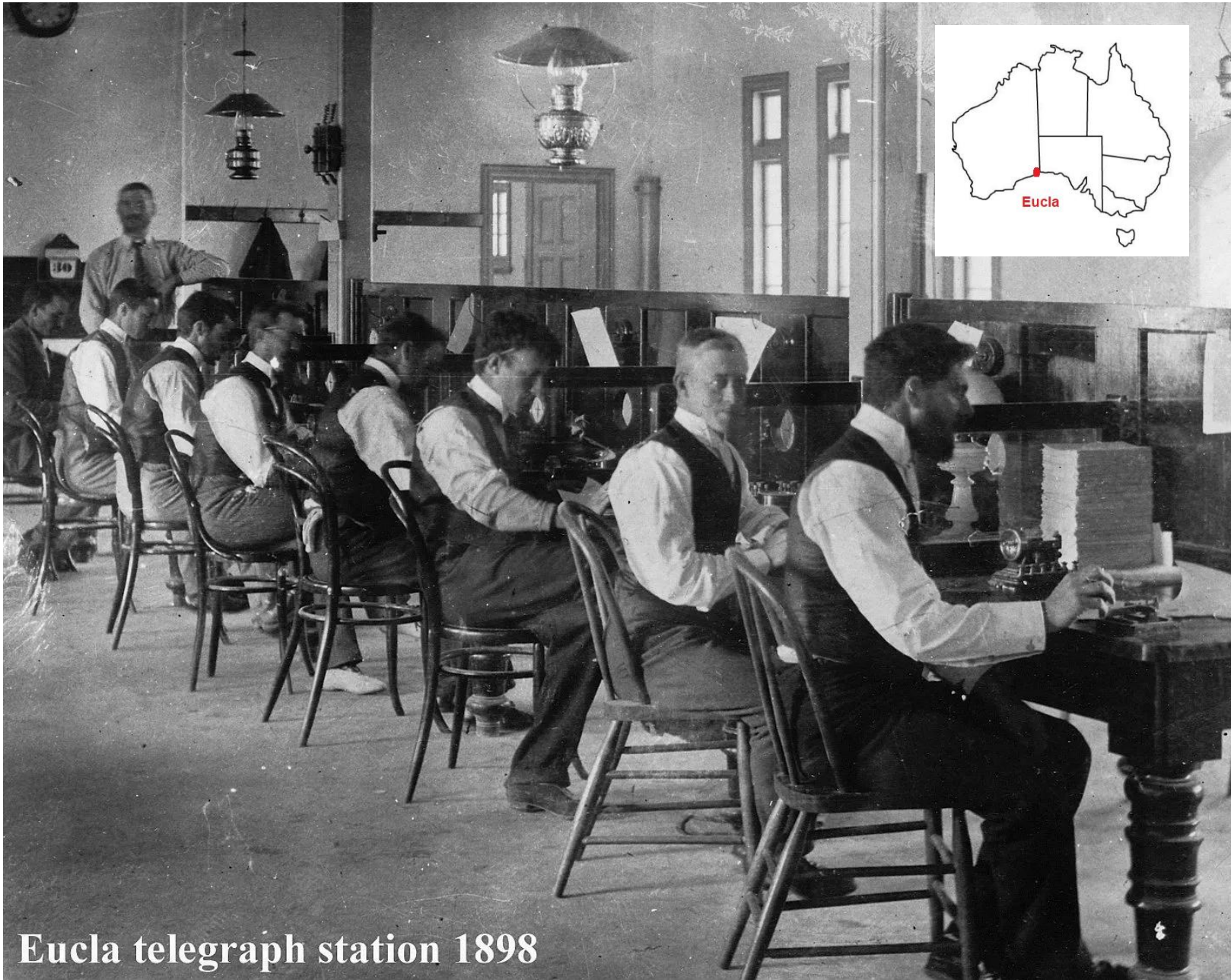
First Telegram Perth – Fremantle June 1869. First experimental phone call March 1878 (Image ca 1880)



# Supt. JC Fleming E-W telegraph ca 1877



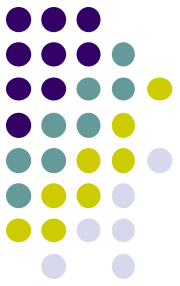




Eucla telegraph station 1898

# Mail/Telegram delivery boy

(Fremantle: Bon Scott AC-DC ca 1965)





# Data transmission systems



- 1900 **Morse telegraphy** 25 wpm+
- 1930s **Machine telegraphy** 50b/s (66wpm)
- 1969: **Datel** (data over telephone line). Typical speed 1200 b/s
- 2011: **NBN** Typical NBN data speeds offered by Telstra 50Mb/s
- 2021: **5G** Telstra averaged > 220 Mb/s

# Telex (Sagem 2000, ca 1980)



# Who invented the telephone?



- **Alexander Graham Bell** (Scottish-Canadian-American 1847 – 1922) *granted patent* in the USA 7 Mar 1876
- Bell produced his first practical telephone in 1877
- Many others contributed to the development of a practical telephone before and after A G Bell. Reis, Meucci, Gray, Edison, Berliner etc. etc.

# History - Australian “landline” phone technology



- 1878 Bell type - sound powered (electromagnetic) phones
- 1879 - 1991 Local battery/hand magneto generator phones
- 1880 -1991 Manual exchanges: Telephonist connected
- 1900s some manual exch’s became central battery (CB)
- From 1912 SxS Auto exch’s Switched by phone dial signals
- Technology evolved from SxS electro-mechanical to digital electronics over next 80 yrs - “landline” PSTN\*
- **Manual and automatic exchanges concurrent through 20<sup>th</sup> C**
- By 2022 PSTN functions absorbed into NBN/Internet
- VoIP (digital) telephony, over the internet, replaces original analogue telephony. PSTN “Landline” phone now a computer peripheral  
**(PSTN Public Switched Telephone Network)**



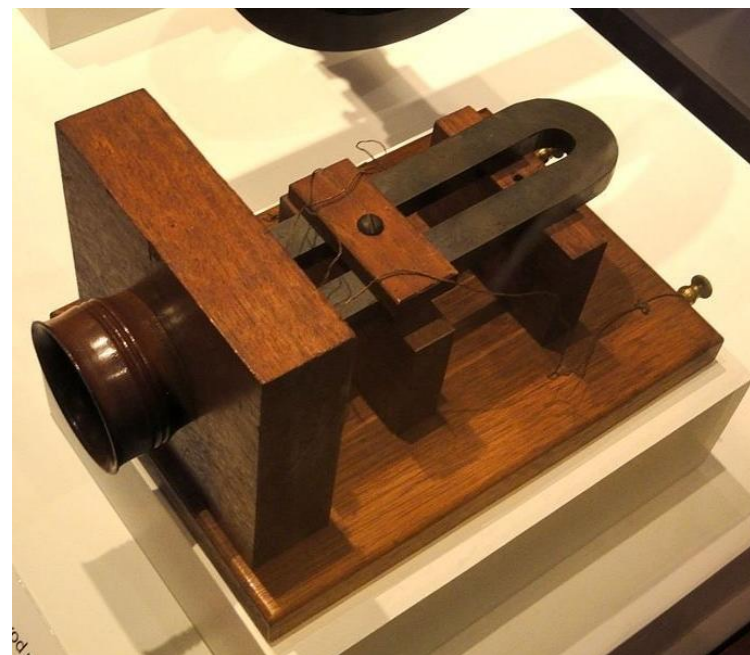
# WA's first telephones of 1878 looked something like this



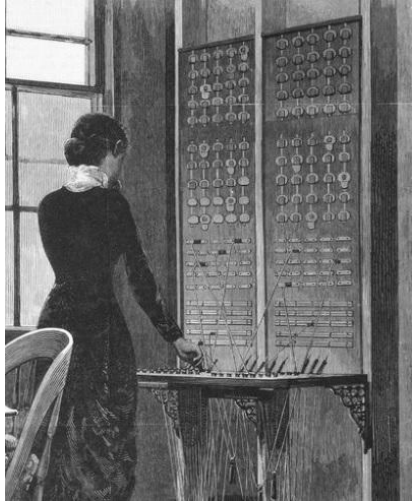
**“Cased” 1877 Bell phone**



**Cover off**



# Perth: First (manual) telephone exchange opened Dec. 1887



**Connie (Letch) Carter 1887 -1955**

# Telephone lines cnr Hay and Barrack Sts Perth ca 1892-3





# 1914; PMG telephonists, waiting for the Perth Central automatic exchange



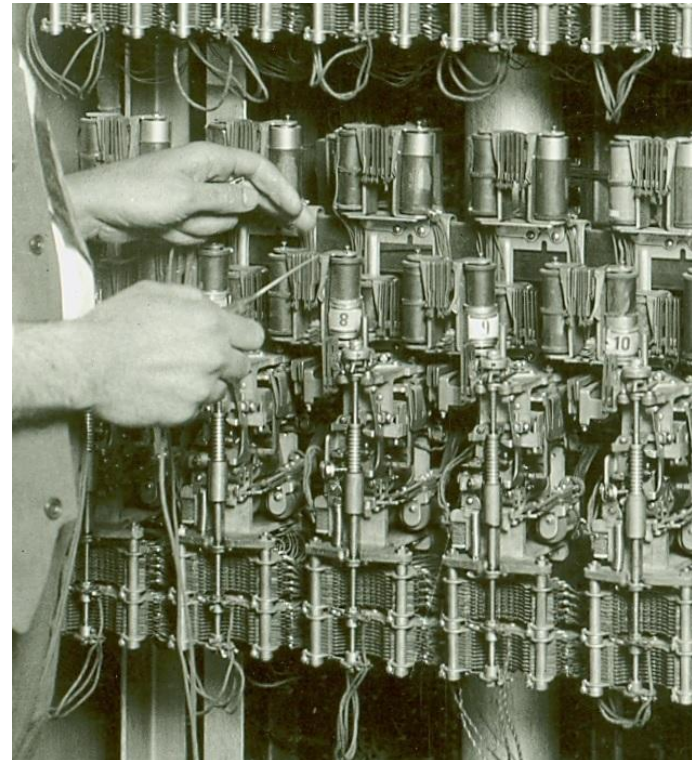
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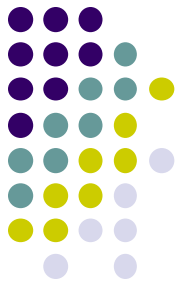


# 1914; Central Auto. Exch.

(410 Murray St Perth)

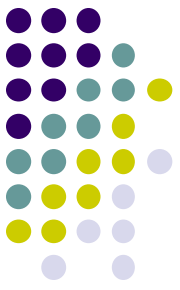






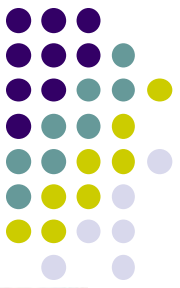
TECHNICIANS MAKING FINAL ADJUSTMENTS TO SELECTORS  
IN AN AUTOMATIC EXCHANGE PRIOR TO THE "CUT-OVER".

# Automatic electromechanical telephone exchanges 1920s-70s





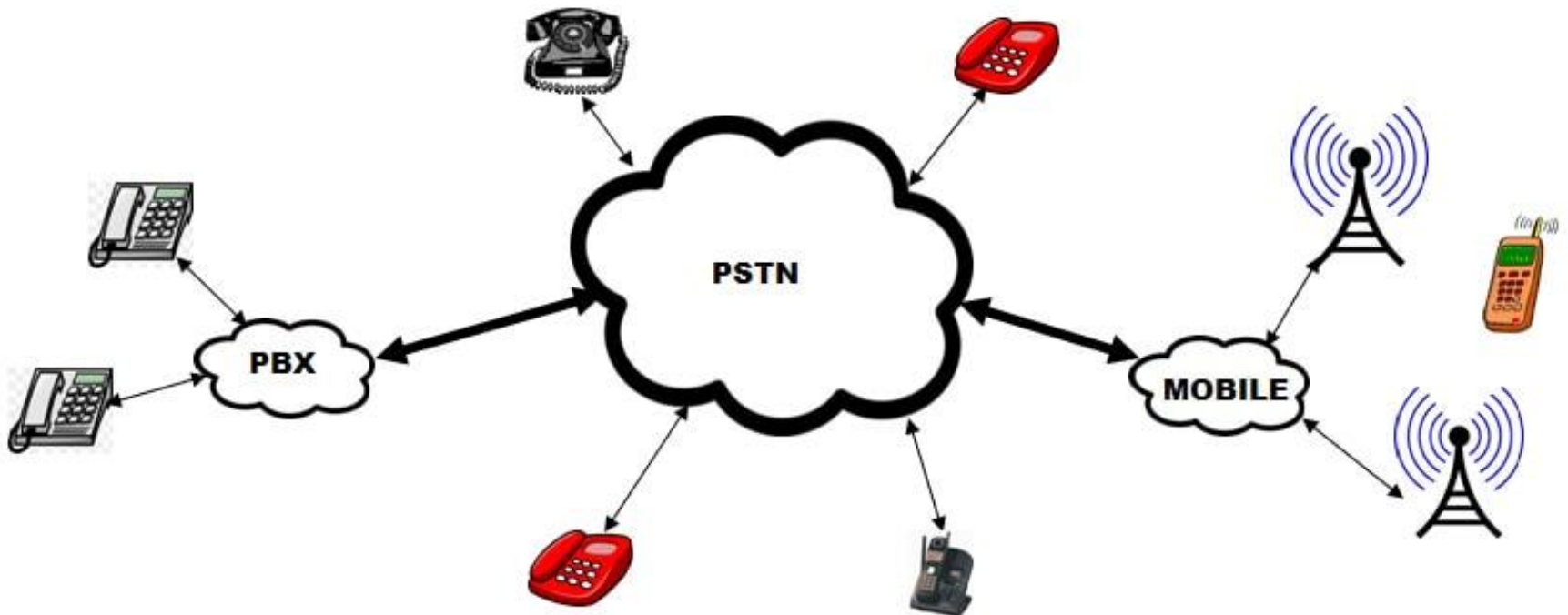
# Late 20<sup>th</sup> C. digital electronic exchange (Ericsson AXE10)



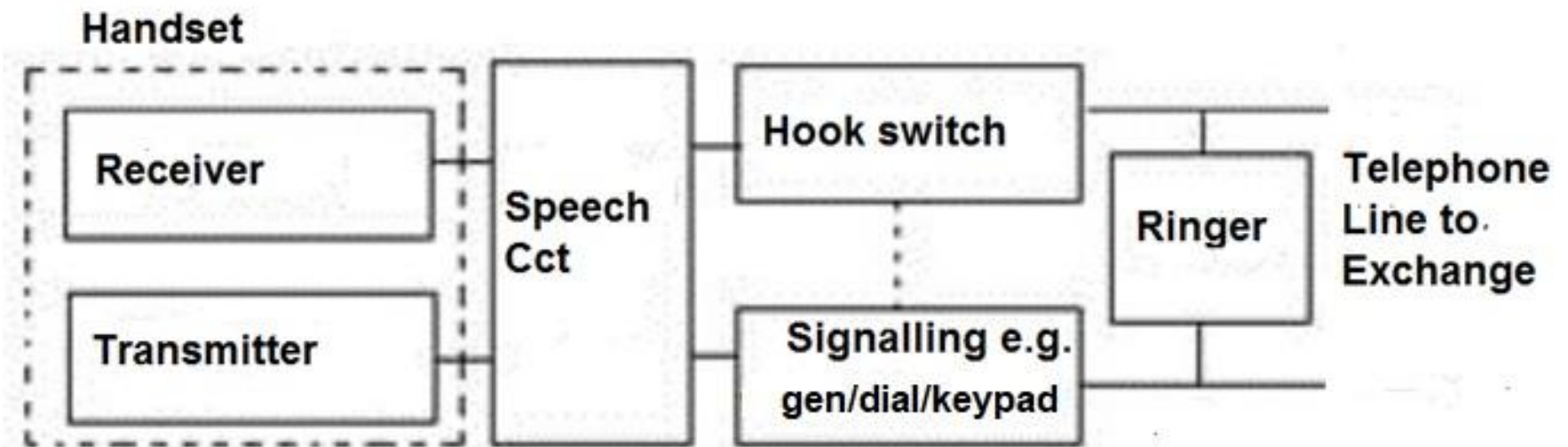
# Late 20<sup>th</sup> C: Public Switched Telephone Network



(In parallel were the Telex, data and private networks)



# Principle: Analogue corded telephones





# WA Colonial/Federation Telephones (magneto technology)



W.E



Berthon-Ader  
phone



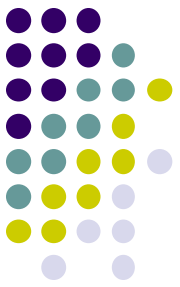
Ericsson wall and table phones



# 1912: Australia's first dial phones

(The "Geelong phones")

Most phones were rented from PMG to Telstra



# 1920s – 1980s Rural magneto telephones





# 1930s - 1960s: Bakelite; The first plastic telephones



# 1960s – 1980s: ABS Plastic “800 style” rental phones



# 1988 -2019: Standard Telecom/ Telstra rental phones



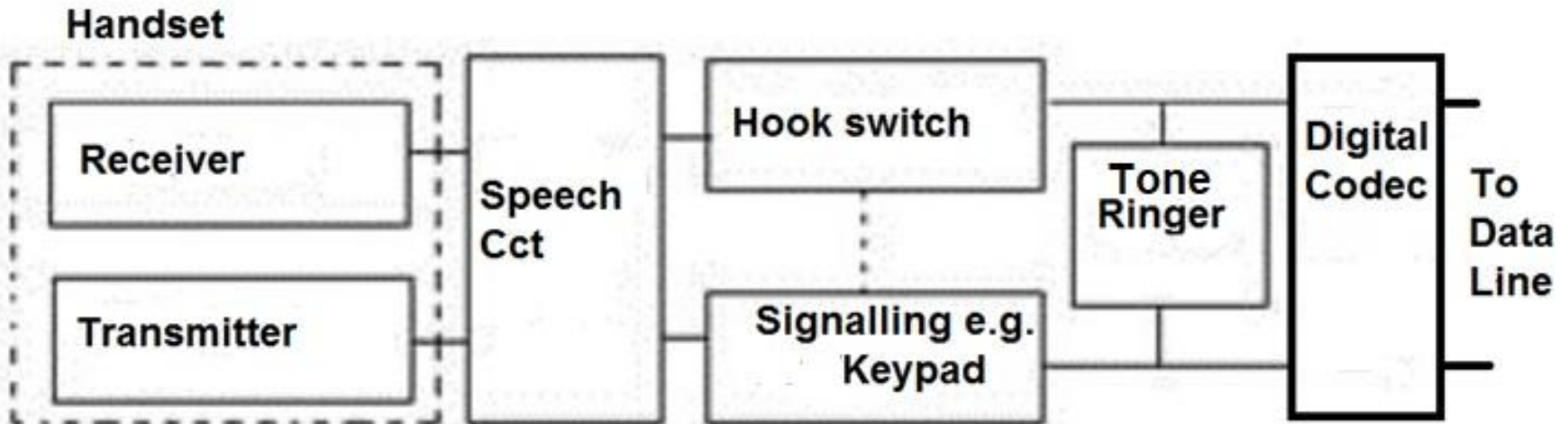
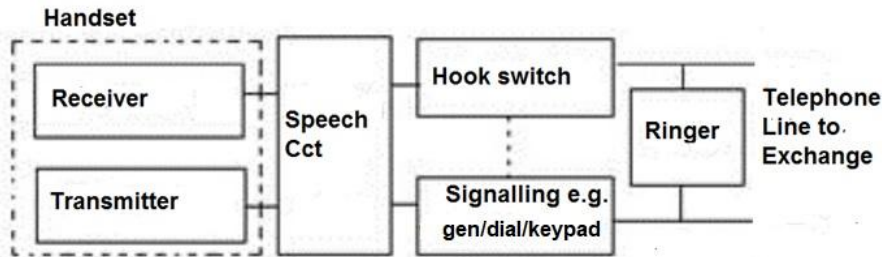
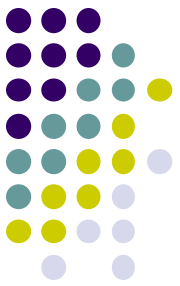


# Typical sale phones 1980s - 2000s (Corded and cordless telephones)



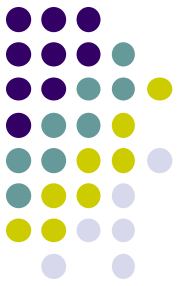
# Principle: 21<sup>st</sup> C digital telephones

## Analogue circuitry but with inclusion of Codec



# Typical 21<sup>st</sup> C. VoIP/SIP

(Voice over Internetworking protocol – Session Initiation Protocol)







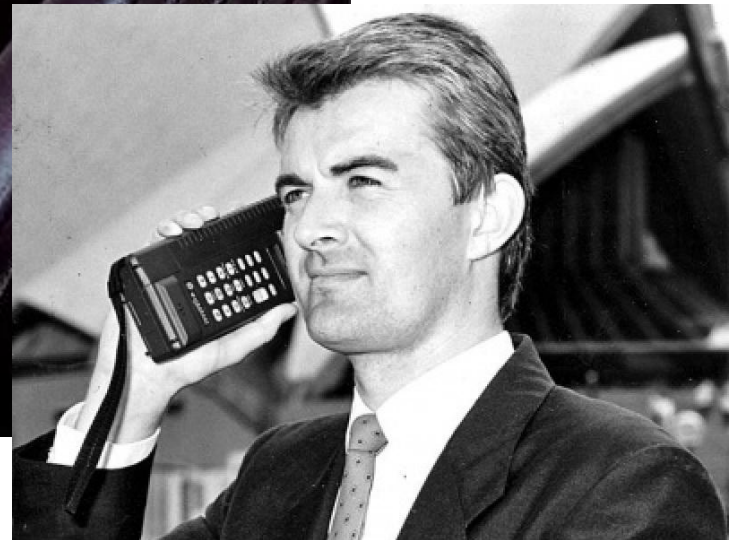
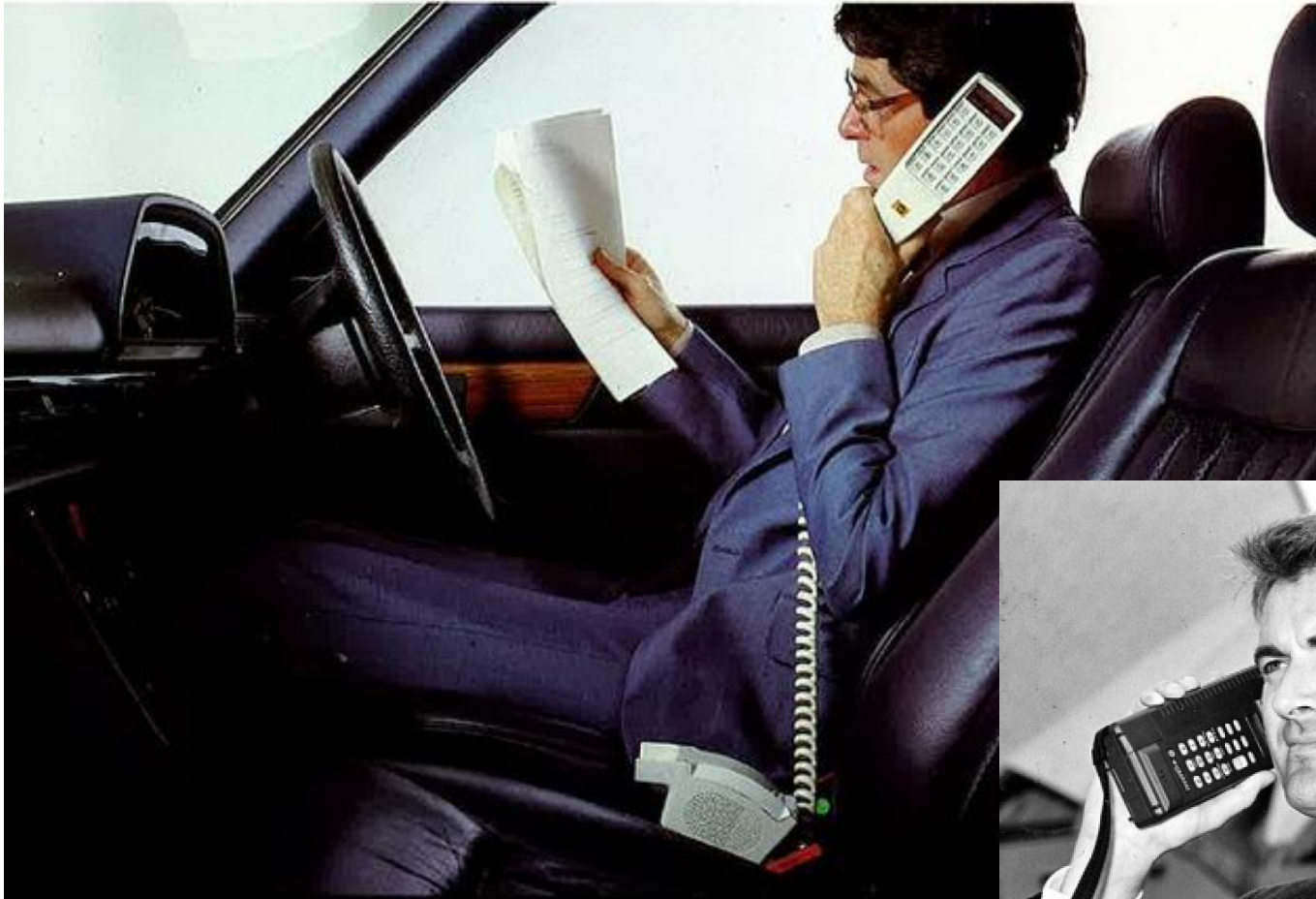
# AWA car telephone ca 1950-60

Operator connected. H/set and transceiver shown



# Australia. Automatic mobile phones

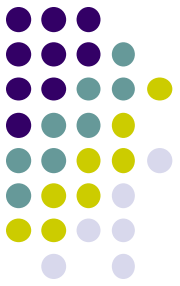
1981 the “Carphone”, 1987 first handheld “Brick”





# Typical handheld mobile phones

From portable analogue telephones to handheld computers



1984



1992 - 1998



2010



2018



5G 2021

# The internet and the WWW

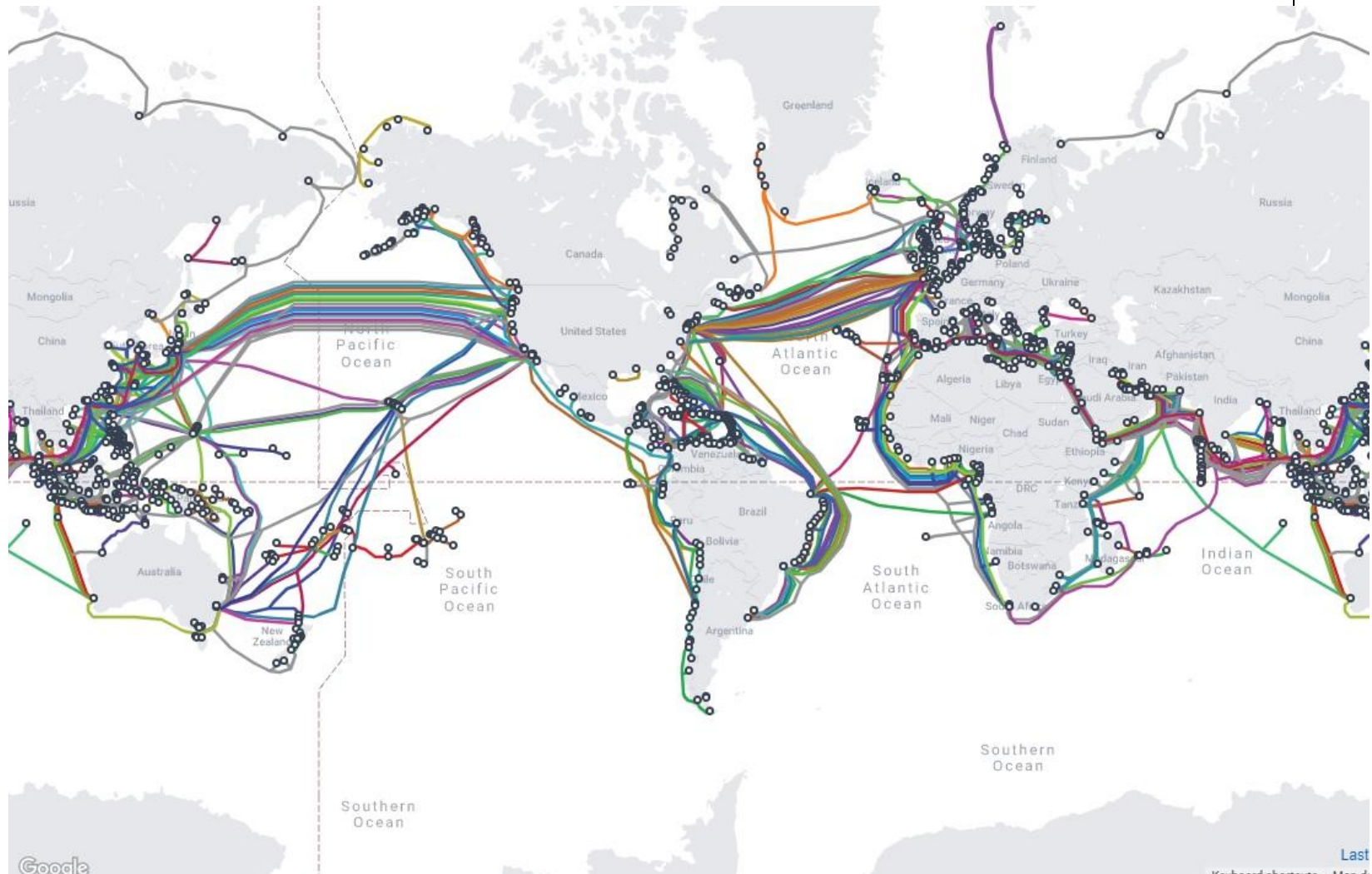
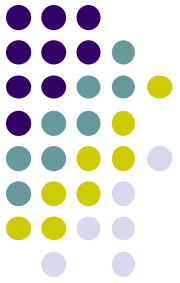


- The **Internet** is a **global network** of billions of computers and other digital electronic devices mostly connected by fibre optic cables. Local connections may also be by metallic wire cable or radio (e.g. WiFi, some satellite etc)
- A **website** is a set of pages of information on a particular subject published by a person or organisation. Can comprise text, images, sounds, movies etc. It is stored on a dedicated web **server** (a bit like a large computer and hard drive)
- The **World Wide Web (WWW)** is, collectively, all the websites accessible through the Internet
- When you visit a website, your computer sends a digital request over the internet to a web server, which has a **unique IP address**. The server retrieves the website and sends the correct data back to your computer, which also has a unique IP address
- ***The internet carries the data for the WWW and other systems such as email, digital telephony etc.***

# 21<sup>st</sup> C. typical Telstra server room



# World Optic Fibre Network

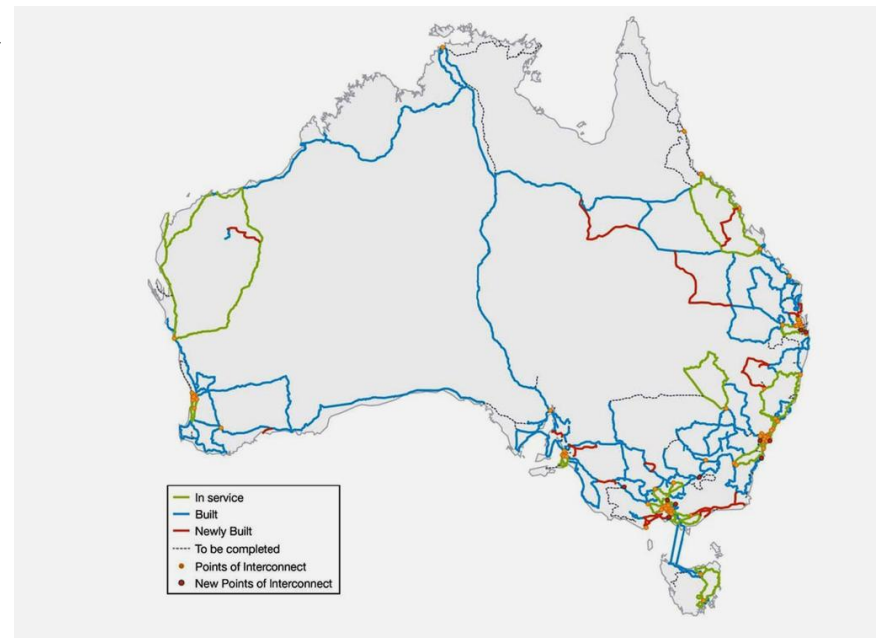


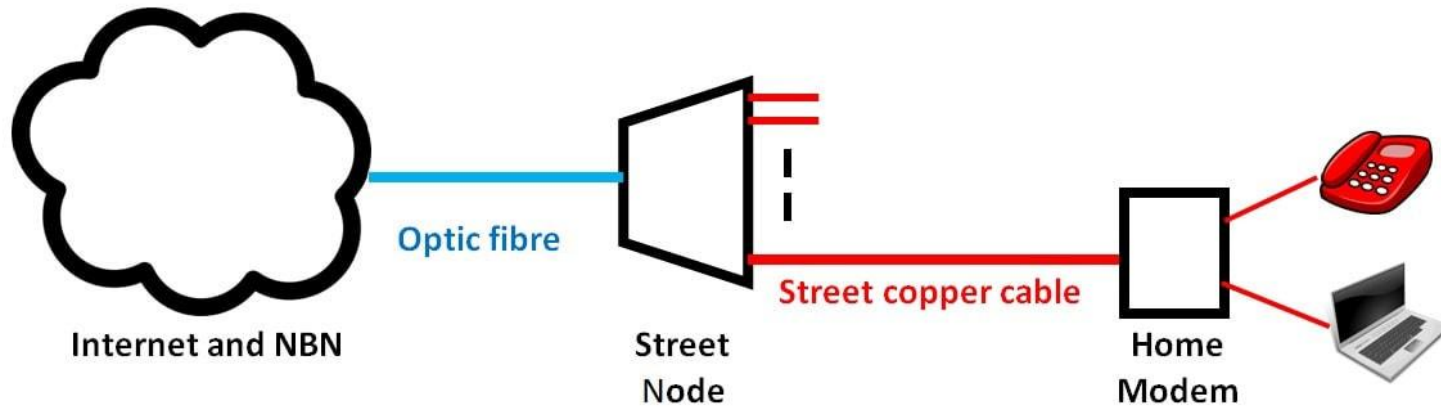


# What is the NBN?

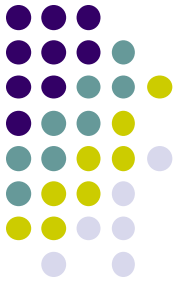


- The Australian ***National Broadband Network*** is our “high speed” digital data network integrated into the internet
- Connects customers to the internet.
- Carried mostly over optical fibre. Minor links also over copper wires and radio





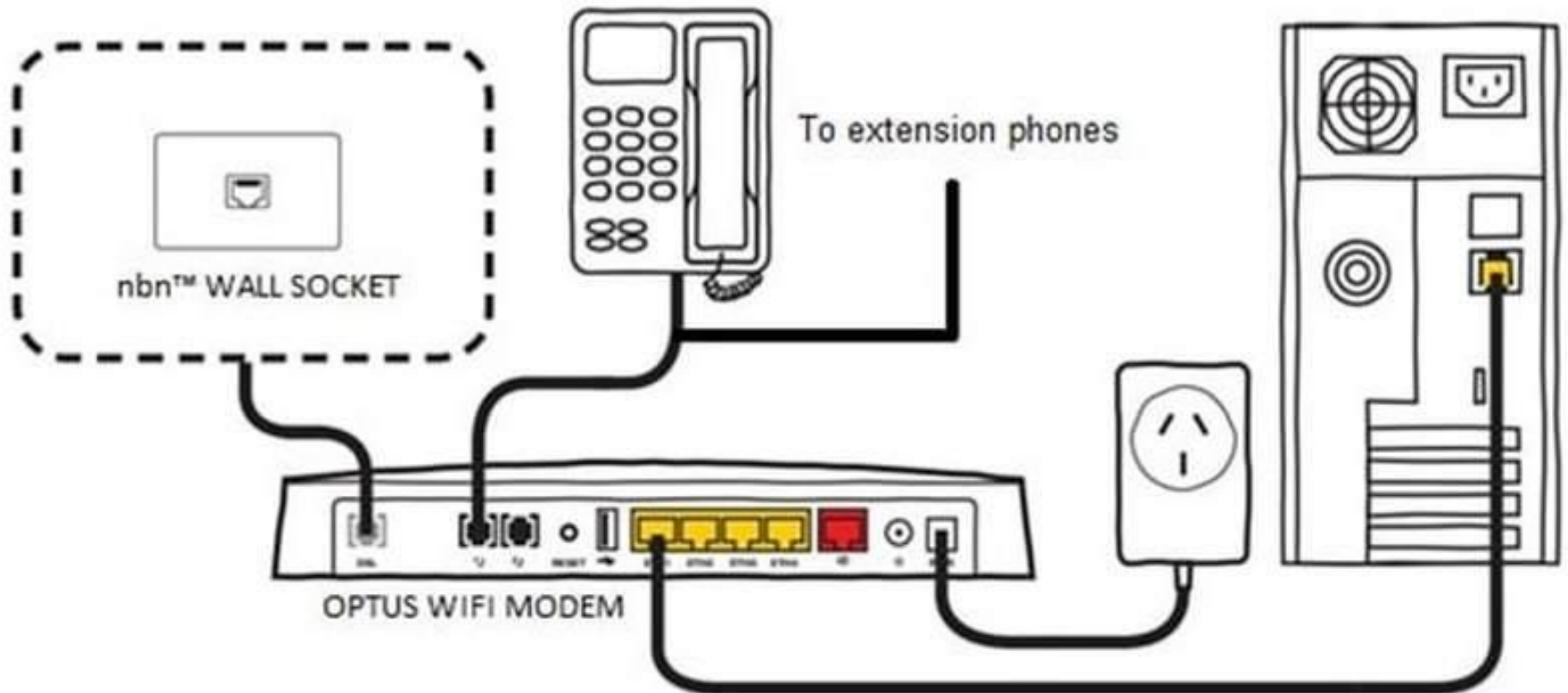
### NBN Fibre to the node (FTTN)



# Typical NBN - customer end technology (FTTN)



- Modem at premises

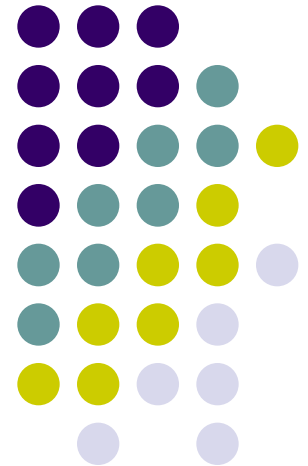


# Thank you

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Any questions?

<http://oldaustralianatelephones.weebly.com/>







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JC Fleming: Image source Battye Library (BA508/3)

Telegraph line Fremantle Rd: Image source: RWAHS

Connie Letch (Carter) Image PMG Dept 1955 but reprinted in the Sunday Times, Feb 15, 1981

(These images above more than 70 years old)

Central exch: <https://www.abc.net.au/news/2014-09-22/perth-first-automatic-telephone-exchange/5756990>

Strowger switch: [https://ethw.org/Electromechanical\\_Telephone-Switching](https://ethw.org/Electromechanical_Telephone-Switching)

Bon Scott: <https://www.facebook.com/AustraliaRememberWhen/> 2 March 2018

Sagem 2000 telex: <https://www.youtube.com/watch?v=5B-t6YGnNkQ>

Tenindewa exchange: <https://tenindewa.com/tenindewa-last-manual-telephone-exchange/>

Analog/digital telephone concept: <https://www.pinterest.ca/pin/566257353121029230/?lp=true>

Modem: Image source <http://www.optus.com.au/>

NBN node: Image source <https://www.itnews.com.au/>

Voip phone: <https://www.plexuscomms.com.au/products/business-phone-handsets/voip-phone-handsets>

Voip/SIP diagram: <https://progressivecabling.com/tag/mobile-dialer/>

Optic fibre map: [www.submarinecablemap.com/](http://www.submarinecablemap.com/)

Telstra server: <https://techau.com.au/telstra-launches-innovation-hub-in-melbourne-to-solve-the-big-problems/>

1980s Mobiles; Telecom Australia publicity articles

tails cartoon: <http://www.classicrotaryphones.com/forum/index.php?topic=982.30>

Telephone images: <https://telecommunicationsandsound.com/>

NBN map: Image source <https://blog.jxeeno.com/nbn-co-reveals-18-month-rollout-plan/>

AXE Exchange: Unknown source