

Leveraging the NBN

The opportunity is now

Radio Comms 2011

Gravity, Laws of Motion, Calculus, Telescope, Spectrum Prism

That one body may act upon another at a distance, through a vacuum, without the mediation of anything else, is to me so great an absurdity, that I believe no man who has any competent faculty of thinking can ever fall into it.

Isaac Newton

Physicist, Mathematician, Astronomer, Natural
Philosopher, Alchemist, Theologian.

January 1643 to March 1727



Magnetism, Laws of Induction, Benzene

The view which I am so bold to put forth considers therefore, radiation as a high species of vibration in the lines of force which are known to connect particles and also masses together. It endeavours to dismiss the aether, but not the vibrations.

Michael Faraday
Chemist, Natural Philosopher, Physicist.
September 1791 to August 1867

Electromagnetic Theory



I have strong reason to conclude that light itself is an electromagnetic disturbance in the forms of waves propagated through the electromagnetic field according to electromagnetic laws

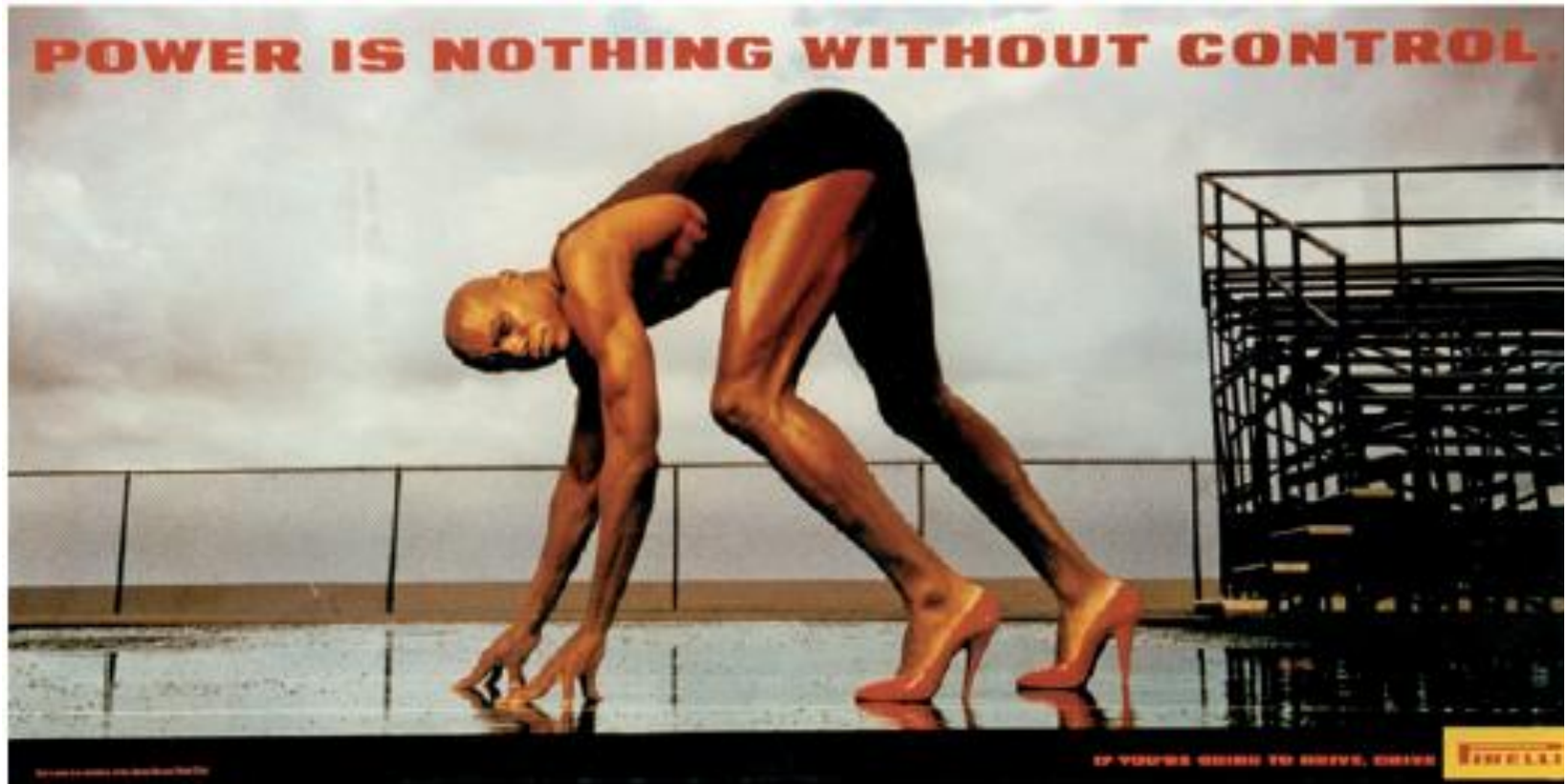
James Maxwell
Physicist, Mathematician.
June 1831 to November 1879

Next Generation Networks

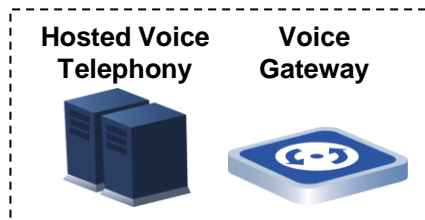
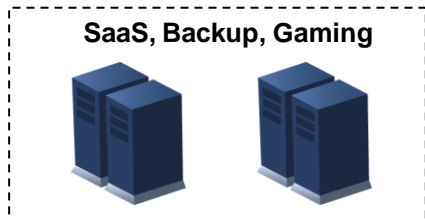
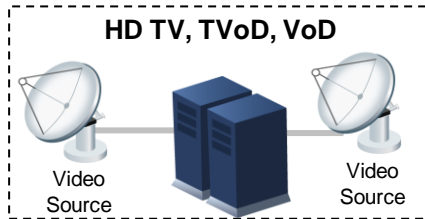
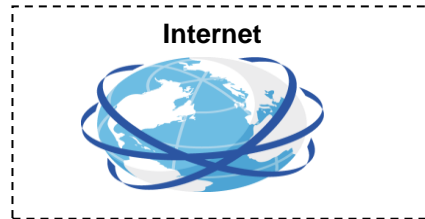
‘A Next Generation Network (NGN) is a **packet based** network able to provide services including Telecommunication Services and able to make use of multiple broadband, **QoS enabled** transport technologies and in which service related functions are independent from underlying transport related technologies. It offers **unrestricted access by users to different service providers**. It supports generalized mobility which will allow **consistent and ubiquitous provision of services** to users.’

ITU – T (ITU – Telecommunication Standardization Sector)

Next Generation Networks



National Broadband Network



Collaborating Networks

Network Core

Collaborating Networks

Backhaul



Voice

Data



Video



National Broadband Network

Consumer



High-speed internet

- asymmetrical
- bursty



IPTV

- asymmetrical
- streaming
- constant
(committed rates)



VOIP

- constant
(committed rates)

Business

Symmetrical



Backup of data



Software-as-a-Service



High-definition voice and video conferencing



Online collaboration with remote workers

Industry

Eg. Health



Online consultations



Remote diagnosis of electronic medical images



In-home monitoring of elderly and chronic disease sufferers

National Broadband Network

Product Release One – High Speed Broadband and Telephony

Product Release Two – Emerging Entertainment Capability

Product Release Three – High Speed Business Services

Product Release Four – High Speed Enterprise Services

Product Release Five – Enhance Reliability for Mission Critical

Carrier Ethernet

Standard Services

- E-Line (P2P), E-LAN (M2M) and E-Tree (P2M)
- Well defined service types and performance

Scalability

- 2Mbps to 1Gbps plus in granular steps
- Remote and dynamic bandwidth

Reliability

- Carrier grade performance with hard SLA
- 50ms recovery and ring protection

Quality of Service

- End to end - loss, latency and jitter
- Suited to mission critical applications / uses

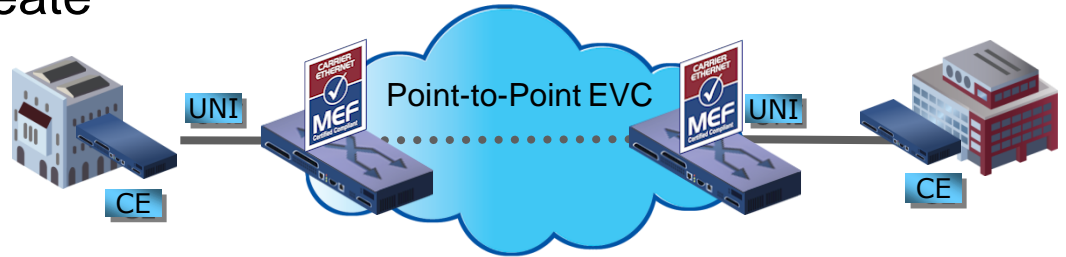
Service Management

- OAM tools - service management
- Simplified reporting and troubleshooting

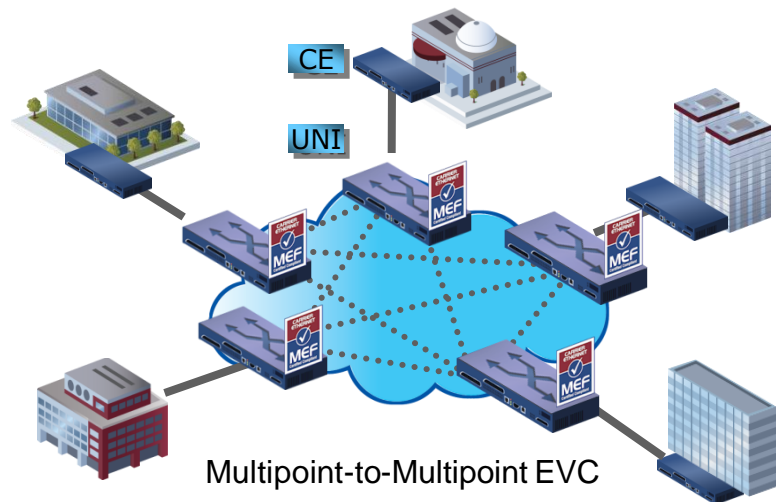


Carrier Ethernet

- E-Line Service used to create
 - Private Lines
 - Virtual Private Lines
 - Ethernet Internet Access



- E-LAN Service used to create
 - Multipoint L2 VPNs
 - Transparent LAN Service
 - Foundation for IPTV and Multicast networks etc.



Carrier Ethernet

- Bridging LAN Environments
- Access High Speed Internet and Cloud Computing
 - Data Centre and SAN Connectivity
 - Create L2 VPN
 - Create and extend L3 VPN
- Backhaul for Mobile Networks and DSLAM MTU
 - Migrate Legacy Networks and Services
 - Build Redundancy

Carrier Ethernet

Standards Based

- Standardised services – best of class / global acceptance
- NBN compliant – L2 Carrier Ethernet is NBN foundation
- Interconnect standard – connect to any service provider
- IEEE Ethernet standard – consistent Ethernet platform

Quality of Service

- End to end performance – promise of MEF for Ethernet / SLA
- Service grades – types of traffic / clarity of performance
- Scalability of services – optimise spend and pay as you grow
- MEF standards – globally understood / guarantees services

Carrier Ethernet

Operations, Administration and Maintenance

- Simplicity – simple for you to manage and control
- Scalable – start with what you need and grow
- Clear service levels – get what you pay for
- Control – you control the bandwidth

Platform for Service Growth

- Internet / IP VPN – facilitates use of / move to L3
- VoIP / UC / Skype – handles any IP service in the future
- Cloud Computing – guaranteed access and connectivity
- Choice – you choose who you buy additional services from

Carrier Ethernet over Wireless

Hybrid TDM / Ethernet Microwave

Native Packet Microwave

Millimetrewave Technologies

Ring and Mesh Configuration

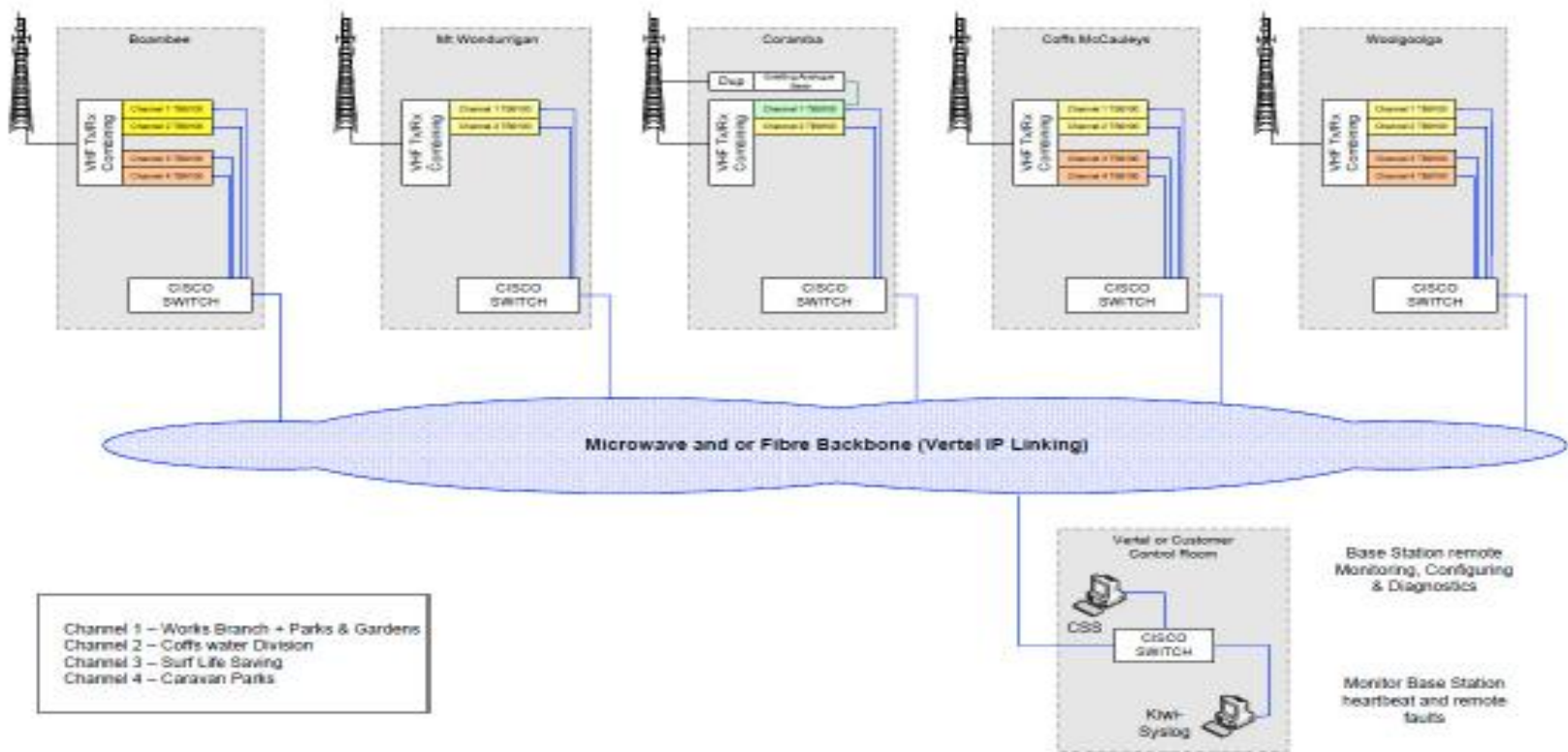


Government

- Access shared services
- Secure / scalable / flexible L2
 - Network interconnects
- Backhaul legacy / IP services

NSW Police Force
Coffs Harbour Council

Coffs Harbour Council



Channel 1 – Works Branch + Parks & Gardens
 Channel 2 – Coffs water Division
 Channel 3 – Surf Life Saving
 Channel 4 – Carravan Parks

REV.	DESCRIPTION	DATE	BY
1	Initial Proposal	05-01-09	AE

NOTES: — Ethernet IP connection — Analogue 4W ESM — RF Cabling	Channel 1 (Standalone Base) Channel 2 (Linked Base) Channel 3 (Linked Base & Analogue Line) Channel 4 (Linked Base Centralized Water)
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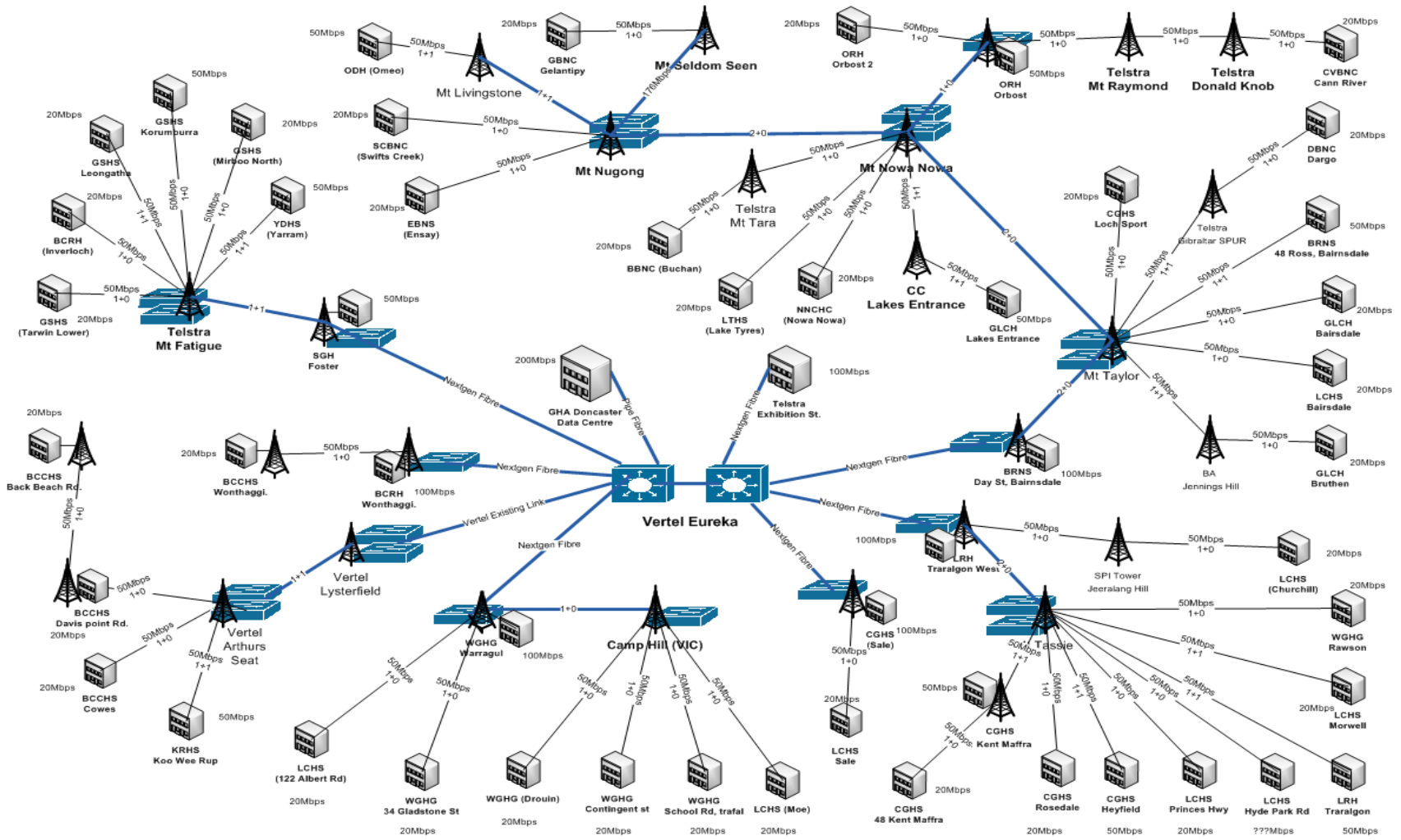
vertel Converging Wireless Networks <small>147 Dandenong Rd, Dandenong Vic 3175 PO Box 100, Dandenong Tel: 03 9452 1000 Fax: 03 9452 1001</small>		COFFS HARBOUR CITY COUNCIL APCO P25 Conventional Radio System Rev: A2 Project No: [blank] Drawing No: [blank] Date: 05/01/09 Rev: 1.0 Date: 05/01/09
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Enterprise

- Internet and Cloud services
- Migrate legacy to IP services
 - MAN / WAN L2 VPN
- Create and extend L3 VPN

Diocese of Broken Bay / AIS
SWARH

Victorian Health Alliance



Service Provider

- First mile primary / redundancy
- Deliver L2 / L3 VPN services
 - Application enablement
 - Network interconnects
 - Network backhaul

Nextgen Networks

Opticom

AARNet

Service Provider

- Education – Schools (ISNet), Universities (AARNet / VERNet), Vocational Training
- Government – Councils (MAV), VIC Panel (TPAMS), Regional Development Victoria, Regional Development Australia (Grampians)
- Service Providers – Carriers (Optus / VHA / NBN), System Integrators, Utilities
- Transport – Various existing PACC
- Enterprise – 20 seat and above, large data users
- Health – Health service providers
- Security – Emergency Services, general security
- Construction / Infrastructure – Various projects

What – Our Vision

Enabling Smarter, Healthier and Safer Australian communities through the provision of wireless infrastructure and services.

Changing Landscape



	1km	2km	5km	10km	20km	40km
20Mbps	\$75k	\$150k	\$300k	\$600k	\$1.2m	\$2.4m
40Mbps	\$75k	\$150k	\$300k	\$600k	\$1.2m	\$2.4m
100Mbps	\$75k	\$150k	\$300k	\$600k	\$1.2m	\$2.4m



	1km	2km	5km	10km	20km	40km
20Mbps	\$65k	\$65k	\$65k	\$65k	\$65k	\$65k
40Mbps	\$65k	\$65k	\$65k	\$65k	\$65k	\$85k
100Mbps	\$65k	\$65k	\$65k	\$65k	\$85k	\$85k

Access

Site

Equipment

Frequency

Commissioning

Maintenance

Hybrid Network

