+ **Wireless Broadband Enquiry Submission**

- **Introduction**

My name is George Bray and I've been travelling around Australia for the last eight months investigating the road blocks to broadband technology adoption, particularly in rural and regional Australia. Part of my mission as Ambassador for the Internet Industry Association was to look at the issues surrounding the "Digital Divide", while demonstrating some of the latest technologies to bridge it with broadband. My final report to the IIA, NOIE and Cisco, along with many comments from Australians, is on my Tech Trek website: http://www.techtrek.tv

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- **The current rollout of wireless broadband technologies in Australia and overseas including wireless LAN (using the 802.11 standard), 3G (eg UMTS, W-CDMA), bluetooth, LMDS, MMDS, wireless local loop (WLL) and satellite;**

There is a huge grass-roots interest in 802.11 wireless LAN technologies, especially in the capital cities. There are some 700 people in Sydney alone deploying home-grown base stations to facilitate fast, free community networking. Much of this activity is due to the charges and restrictions introduced on the wired broadband services.

In smaller cities, for example Dubbo, I found the council using WLAN for distributing high speed connections throughout the town. Their local library uses 802.11b to connect back to the council chambers where their wide-area connections are located. They find it a reliable technology for short-haul, high speed traffic and intend to use it to connect more remote council offices and depots. The overriding reason for going wireless was to obviate expensive timed ISDN fees and internet traffic charges.

Some technology enthusiasts I met knew about the possibilities of using WLAN but were incorrect in their assumptions about the range of the technology. Many considered a single access point suitable for an entire town, whereas the reality is that metropolitan networks are possible with this technology but require careful planning and capacity monitoring.

In my own tests I had a 12dbi omni-directional antenna on the top of my bus, connected to the internet with a 2-way satellite service. My laptop had a standard internal antenna and was able to maintain a broadband connection to the internet from a distance of 800m. Using a 13.5dbi directional antenna I was able to roam more than 10km from the bus and still be on the net. During my travels I showed communities this equipment and compared it to their current dilapidated modem connections. To be sure, they were excited that broadband services could be delivered to a remote community anywhere in Australia.

In the USA, WLAN networks are very popular. The equipment is now very cheap and there are many solutions to extending range and enhancing security. Many pioneers of the internet are hailing wireless LAN technologies as a distruptive technology, one that will change the nature of how internet services are spread throughout society.

There are many people in regional areas using satellite technology to receive television. Their dishes point to Optus B3 where there are a number of one-way internet service providers beaming their signal. All these users can quickly become enabled with a fast(er) internet connection by using their existing dish and modem connection. There are about six suppliers of one-way satellite internet services using Optus B3 as the downlink.

- **The inter-relationship between the various types of wireless broadband technologies;**

From my experiences, the combination of two-way satellite distributed by 802.11 WLAN is a very affordable solution for a small, remote community.

Similarly, delivering internet services using VHF spectrum is also a solution for areas unable to get wired broadband services. The ANU has done exemplary research in this area. Their VHF internet technology travels distances of 100km at speeds towards 100Kbps.

- **The benefits and limitations on the use of wireless broadband technologies compared with cable and copper based broadband delivery platforms;**

The benefits are pretty clear for 802.11. It's a global standard and being taken up rapidly in many markets. The equipment is cheap and the spectrum is free. Poor community organisations can bring high-speed services to their regions without the buildout necessary for cables.

Satellite services can be delivered anywhere in Australia. No return channel (phone line and modem) is required.

The limitations come from interference in the 2.4Ghz spectrum. As unmanaged use of this space increases, conjestion will occur degrading performance for all.

- **The potential for wireless broadband technologies to provide a 'last mile' broadband solution, particularly in rural and regional areas, and to encourage the development and use of broadband content applications;**

Wireless broadband, specifically LMDS-style technologies, can deliver reliable services today. This can be seen in Bendigo and Mildura today.

Every last mile is different and may require a different combination of technologies to achieve connectivity. We need to ensure the regulatory regime does not stifle innovative uses of evolving wireless technologies (eg VHF). It is the interconnection with existing wireline and satellite connections that introduce complexity and cost for our poor cousins in the bush.

I have commented in detail on the use and development of broadband applications in my Tech Trek Final Report. Specifically, encouraging a flat-fee broadband service will see greater use of high-speed applications and more development of innovative services using audio and video technologies. Australia's current broadband billing model stems from Telstra and filters down through all internet service providers. Making traffic within Australia more affordable will create a market for local content developers to fill with their creativity. Currently, these developers are moving overseas where the content charging models are sensible.

- **The effect of the telecommunications regulatory regime, including spectrum regulation, on the development and use of wireless broadband technologies, in particular the Radiocommunications Act (1992) the Telecommunications Act (1997), and Parts XIB and XIC of the Trade Practices Act:**

The requirement for a carrier license to interconnect a community wireless network with the public internet is a show-stopper for nearly all communities wanting to take advantage of the WLAN explosion. I'm sure you have many submissions on this subject.

The power limitation on 802.11a/g transceivers limits Australia's ability to take advantage of second generation WLAN equipment. We need to ensure spectrum, equipment and regulatory compatibility with other nations deploying wireless internet throughout their societies.

- **Whether Government should make any changes to the telecommunications regulatory regime to ensure that Australia extracts the maximum economic and social benefits from the use of wireless broadband technologies; and**

Encourage free community networks, and provide a regulatory regime whereby they can interconnect with each other over the public network.

Make it simple. If necessary, provide a detailed handbook for the setup and interconnection of wireless networks. Make it cheap.

Encourage the mixing and matching of current and future technologies to achieving an end goal of connectivity for any Australian, wherever they are. Limit technology/spectrum specific regulations wherever possible.

Provide an accreditation scheme for all types of devices used to enable wide-area internet connectivity.

- **Likely future national and international trends in the development and use of wireless broadband technologies.**

Wireless broadband technologies will subsume many of the services used on wireline networks today. Already, voice-over-IP is receiving a technological impetus from the rapid deployment of WLAN networks. Monolithic carriers see this as a threat and will actively manipulate the market to limit the damage these technologies can cause.

Videoconferencing will evolve quickly now that wireless high bandwidth services are cheap and reliable. Carriers will attempt to cling to the revenues of volume-charged and time-charged connections.

There will be a strong internet-based community of people dedicated to implementing cheap, wireless community networks - taking advantage of the free spectrum to deliver isolated communities these new services. Traditional bandwidth providers will make life difficult for these innovators by dictating expensive interconnection charges.

My speculation is that 3G will be a dead duck, completely overtaken by the 802.11 technologies with enhanced roaming, security and range.

Pay television operators will one day realise they will have more customers if they let buyers choose the channels for subscription. Community backlash at advertising on pay television will deliver a reduced market to these operators.

National bandwidth providers will see the folly of their ways when local neighbourhood bandwidth exchanges show increased innovations and use of high-speed applications, all due to the presence of a flat-rate or no-rate billing model.