



Communications Law Centre, UTS

Submission to the Senate Select Committee on the
National Broadband Network

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Introduction

The Communications Law Centre, UTS, welcomes this opportunity to provide comments in response to the exposure draft legislation released on 24 February 2010 and the Committee's Third Report. The Communications Law Centre, UTS ("CLC") is an independent, non-profit, public interest centre specialising in communications, media and online law and policy.

The CLC would like to address the following topics from the Committee's Third report: the promise of pricing equivalence as addressed in section 6.136, the spectrum issues as addressed in section 2.74, and demand for high-speed broadband as addressed in section 6.80.

In addition, we would also like to address the possibility of market distortion with respect to exclusive quota-free downloads and traffic shaping and the ownership limitations in Part 3, Division 3 of the exposure draft of the National Broadband Network Companies Bill (2010).

1 Price equivalence in broadband access

The Minister for Broadband, Communications and the Digital Economy, the Hon. Stephen Conroy has stated that there may be wholesale pricing equivalence for broadband products across wireline, satellite and wireless networks.¹ This is an important goal because the cost of broadband access in rural and regional areas should not preclude people in those areas from broadband access. The reasons for this are two-fold. Firstly, in order to promote equality among all Australians, broadband access should not be prohibitively expensive. It should not be only urban and suburban Australians that can easily afford to take advantage of broadband. The national broadband network is a national project that is for the benefit of every Australian. Secondly, there are economic reasons in favour of pricing equivalence.

1(a) A social equality rationale for pricing equivalence

Endorsing an economic model that will create unequal access to broadband Internet would only serve to deepen existing socio-economic and cultural divides between Australians. The Internet provides tools for communication and education unparalleled in any other societal forum. A fast Internet connection lends

¹ See discussion *Communications Day*, 23 September 2009, p. 2; Minister for Broadband, Communications and the Digital Economy, the Hon. Stephen Conroy, Senate Estimates, Environment, Communications and the Arts, *Committee Hansard*, Canberra, 19 October 2009, p. 67

itself to a host of Internet based services such as voice over IP, the online purchase of music and film, telecommuting, distance learning, social networking and academic research.

Students utilising online databases for research highlights the benefits of a fast Internet connection. Students must often wade through large numbers of PDF files to complete research for assignments. The slower the connection, the slower the research process. At current broadband speeds in urban areas, a 700 kilobyte file just takes a few seconds to download. With dial-up Internet access it takes up to four minutes for the same download. In this time the urban student with a high speed connection has downloaded, skimmed the document and moved on, the rural student on a dialup connection will still be waiting for the first file to finish downloading.

Social networking sites are a fast growing portal for news and information sharing. Anyone can, for example, disseminate a link to friends via twitter, or on a discussion board. This opens up a social conversation where friends and members of the wider public can respond by similarly posting links citing relevant information. However, only those with broadband can easily watch the videos and listen to the songs and interact in these forums without a substantial time investment for each video or song. The demands on time are likely to deter those with slower connections from engaging with these networking tools from the outset, and regardless of one's opinion on social networking, it excludes these people from a growing part of our digital society.

These examples of social exclusion are just a microcosm of a much larger problem that society will face as communications, media and commerce migrate to the online sphere. Ensuring affordable broadband across the board can not only alleviate existing social inequality but will also mitigate the threat of deepening social inequality.

1(b) An economic rationale for pricing equivalence

Distinct from the equality argument for pricing equivalence is the economic argument. On this theory, greater investment in broadband spurs consumer demand which in turn spurs greater commercial investment in broadband and online endeavours, which again spurs more commercial demand. As the authors of *Digital Crossroads* note:

By subsidising [broadband] development as South Korea and other countries have done, the government would accelerate the "virtuous cycle" needed for widespread broadband deployment: a dynamic in which greater consumer demand (prompted by lower prices) spurs greater broadband investment, which in turn spurs more broadband "killer applications," which in turn spurs more consumer demand. The benefits of this dynamic would extend beyond immediate consumer satisfaction to greater long term growth in the economy as a whole.²

In part it is these network effects that make the NBN so valuable. As more people connect to the NBN and can do things such as high quality video conferencing, it will become more and more worthwhile for their friends and family to do the same. Similarly, it will become more and more worthwhile for services that

² Jonathan E. Nuechterlein and Philip J. Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, (2005), p. 353.

might appeal only to a small segment of the population to open for business, as there will be more potential customers. Further, as the subscription base grows the overall cost of the network will drop as more people join it and begin to realise its benefits, and the network itself will be more profitable. The key is to make it worthwhile for people to join the network in the first place, and part of that will centre on cost.

Finally, there are the economic benefits that, while difficult to observe, exist in a high speed networked environment. As Telstra has pointed out, high speed broadband makes telework possible, and telework initiatives have the potential to reduce greenhouse gas emissions by nearly 5 per cent by 2015.³

2 How to obtain price-equivalence

The CLC is more concerned with consumers' out of pocket costs with respect to the NBN access than it is to the particular mechanism by which price equivalence is obtained. Whether it is a regional cross-subsidy where urban users subsidise rural users or a mean-tested rebate based on wholesale price, what matters is that rural and regional users should not be precluded from using the NBN because of cost.

Although the CLC does appreciate the incentives that Community Service Obligations ("CSO") create, we are not convinced that CSOs are by themselves sufficient to guarantee price equivalence, though they could be used to guarantee quality of service. As such, if CSOs are adopted to ensure quality NBN service, they should be adopted in together with a mechanism to ensure that consumers benefit from price equivalence.

However, if price equivalence proves infeasible across all levels of available service in an area, at least the 'introductory' level of service, say, the '2Mb down/1Mb up' package, should be priced equivalently across regions. In this way, all Australians will have a comparable opportunity to participate in the full spectrum of Australian society, and this is important for both social and economic reasons.

3 Spectrum issues

The CLC believes that the CSIRO's call for a wireless broadband set-aside of 35 MHz in the 400-800 MHz frequency should be actively investigated. If this solution has not been included in the government's Implementation Study, we believe the government should do a further study dedicated to investigating the solution's feasibility and cost-effectiveness.

4 Demand for high-speed broadband

In section 6.85 of the Third Report, the Committee expresses scepticism about the need for FTTP connections for 90 per cent of Australian premises. Part of the reason for this doubt can be seen in section 6.87 where the U.K.'s national broadband goal is said to be 2 megabits per second, and further doubt is raised as to whether there would be demand in Australia for even 12 megabits per second. The CLC believes that the target bandwidth of the NBN must not be lowered. Target estimates from 2 megabits to 12 megabits appear based on the assumption that other similarly situated countries are setting their sights

³ Towards a high-bandwidth, low-carbon future: telecommunications-based opportunities to reduce greenhouse gas emissions, available at http://www.climaterisk.com.au/wp-content/uploads/2007/CR_Telstra_ClimateReport.pdf (last visited 29 March 2010).

lower than Australia and that bandwidth consumption will not increase much, let alone increase exponentially. Both of these assumptions are incorrect.

4(a) National broadband goals in an international context

Although it is true that the Digital Economy Bill under debate in the British parliament calls for 2 megabit per second connections to all British homes, this is merely the goal for 2012.⁴ The Digital Economy Bill also calls for the delivery of “super-fast broadband,” defined as greater than 24 megabits per second, to “most of the homes in the country by 2017.”⁵ Similarly, the Conservative party calls for having 100 megabit connections to the majority of British homes by 2017.⁶ The British, then, are setting their sights high as well.

Although the United States is not aiming as quite as high as the U.K. or Australia with respect to penetration, the recently released National Broadband Plan's number one goal is to have actual download speeds of 100 megabits per second and actual upload speeds of 50 megabits per second to 100 million American homes by 2020.⁷

Of particular note in the American plan is the requirement of a 50 megabit per second upload speed. The CLC is concerned by the dearth of discussion about upload speeds on the NBN. To fully participate in the digital world, Australians' upload speeds must scale appropriately with download speeds. As a tentative suggestion, we recommend that the upload speed of any particular wholesale broadband package on the NBN be half of the download speed.⁸

This will, for example, allow individuals to originate high quality video so they can send, rather than merely receive, high quality streaming video for video phone calls and teleconferencing. This is important because *both* parties must have adequate upload speeds for high quality video conferencing or phone calls, and this is something that appeals to even casual users. Higher upload speeds would also free software and hardware developers to create applications with the knowledge that their customers can upload quickly in addition to downloading quickly, and this opens up new paths for development. As a result both end users and developers will utilise the resource in interesting and unforeseen ways. It is crucial that the interactive potential of the NBN be enabled to engage creativity, productivity and value-adding contributions by online participants.

Australia's plan of 100 megabits per second to 90 per cent of Australian homes and 12 megabits per second to the remaining 10 per cent by 2018 fits within the trends in the U.K. and the U.S.A., so Australia is not out of step with its peers on this point. The target speed for the NBN should remain at 100 megabits per second, and the upload speed should be at least 50 megabits per second.

⁴ Ofcom, Super-fast broadband: Context and summary for Ofcom's consultations on the wholesale access and wholesale broadband access markets, s. 2.25.

⁵ *Id.*

⁶ *Id.*

⁷ Connecting America: The National Broadband Plan, p. xiv.

⁸ This means that if the download speed were 2 megabits per second, then the upload speed would be 1 megabit per second, and if the download speed were 100 megabits per second, then the upload speed would be 50 megabits per second. This would ensure people's ability to contribute to online culture, as opposed to merely consuming it.

4(b) 12 megabits per second connections are an insufficient eight-year goal

The NBN was announced as an eight year plan, so it should encompass eight years of technological growth. Eight years ago YouTube did not exist⁹, nor did the iTunes Store¹⁰ and the monthly total bandwidth consumption in Australia was 0.6 petabytes; it is now over 33 petabytes.¹¹

The bandwidth required to transfer material online constantly increases as more people around the world adopt ever faster broadband connections, and content producers feel free to increase the visual quality, audio fidelity or other features of their products. The NBN must take account of this development.

To take high-definition (“HD”) streaming video as an example, a company like Netflix, which offers HD content on demand streamed over the Internet, currently encodes their 720p¹² HD content at 3800kbps.¹³ Ignoring the additional 4 to 14 per cent overhead (depending on the layer 2 protocol used) of a gigabit passive optical network (“GPON”), one needs a 3.71 megabit connection to stream a video encoded at 3800kbps.¹⁴ The current speed of most residential connections appears to preclude this sort of service in Australia, which is unfortunate, as a legal streaming option for instant multimedia access may be more attractive to consumers than illegal overnight downloads.

Although a 12 megabit connection would allow streaming of a 3800kbps movie, Netflix notes that within a few years residential broadband connections will enable encoding at 1080p, which is the resolution used by Blu-ray and which will increase bandwidth requirements further.¹⁵ The Apple movie trailers website currently offers movie trailers in 1080p, however, and these videos can only just be streamed by a 12 megabit connection. To take the forthcoming Robin Hood movie as an example, the first trailer for the movie runs for 1 minute and 32 seconds.¹⁶ At 480p the trailer weighs in at 29 megabytes, at 720p it weighs in at 70 megabytes and at 1080p the trailer is 119 megabytes. At the lower end of the spectrum, streaming the 29 megabyte 480p video would require a 2.52 megabit connection¹⁷ and at the high end of the spectrum the 1080p trailer would require a 10.34 megabit connection to stream.¹⁸ Again, this does not include GPON overhead, and if the NBN adopts ATM as the layer 2 protocol, then the bandwidth

⁹ YouTube was founded in February 2005, <http://www.youtube.com/t/about>

¹⁰ iTunes Store opened 28/4/2003, http://en.wikipedia.org/wiki/iTunes_Store

¹¹ Australian Internet Traffic, <http://www.dtc.umn.edu/mints/govstats.html>

¹² “720p” is shorthand for an high-definition television mode using 720 horizontal scan lines of display resolution using progressive scan. See <http://en.wikipedia.org/w/index.php?title=720p&oldid=352316325> (last visited 27 March 2010).

¹³ See *Encoding for streaming*, <http://blog.netflix.com/2008/11/encoding-for-streaming.html> (last visited 27 March 2010).

¹⁴ 1 kilobit = 0.0009765625 megabits. 3800 kilobits * 0.0009765625 = ~3.71 megabits.

¹⁵ http://en.wikipedia.org/w/index.php?title=1080p&oldid=351901613#Blu-ray.2FHD_DVD_Movies (last visited 27 March 2010).

¹⁶ Robin Hood movie trailers, <http://trailers.apple.com/trailers/universal/robinhood/> (last visited 27 March, 2010).

¹⁷ 29 megabytes = 232 megabits. 232 megabits / 92 seconds = 2.52 megabits per second.

¹⁸ 119 megabytes = 952 megabits. 952 megabits / 92 seconds = 10.34 megabits per second.

requirements will increase by roughly 14%, making the 1080p video require 11.78 megabits of bandwidth for smooth streaming.¹⁹

A 12 megabit connection will allow an individual to stream *today's* high quality streaming content, but only for a single user. Currently, one person could exhaust the household's entire 12 megabit connection by streaming a movie online. As more and more services are transitioned to delivery over IP, and as more people access multimedia from their home over IP (such as television over IP), it becomes increasingly unlikely that only one person at a time will be engaging in a bandwidth intensive activity in a multi-person household. Consequently, the government should retain its 100 megabit goal in order to accommodate both increased file sizes and an increased amount of IP content.

5 Competition concerns about quotas, exclusive quota-free downloads and traffic shaping

A point not frequently mentioned in the debate over the future of the NBN is that the combination of quotas and exclusive quota-free downloads may represent a concern to competition and innovation.

5(a) Quotas and quota-free downloads can threaten consumer choice and competition

That many ISPs have monthly transfer quotas is not intrinsically a competitive concern. However, a competitive concern may arise when a quota-utilising ISP partners with a content-providing service (e.g., an online video or music service) to offer downloads from that service without it counting against the quota. To take a simple example, a hypothetical ISP might enter a business arrangement with YouTube whereby the ISP's subscribers do not consume any of their monthly quota for their transfers to and from YouTube. However, some subscribers may prefer Yahoo! Video for some reason or another, and but for the quota-free agreement between their ISP and YouTube, these subscribers would use Yahoo! Video. However, to preserve their quota they use their second preference instead. In this circumstance, the consumer's preferences have been distorted by the structure of the market.

When switching costs are low such agreements are not a competitive concern, as customers can easily switch providers to find an ISP-content provider partnership with which they are happy. However, because ISP customers routinely sign 1 to 2 year service contracts, they will incur financial penalties if they switch their providers in order to find an ISP that offers quota-free downloads with the services they prefer.

Further, such agreements raise barriers to entry for new entrants unaligned with an ISP. Low monthly transfer quotas in conjunction with quota-free downloads can make an unpartnered service, however robust and appealing, appear unattractive to consumers concerned about their quotas. As such, new entrants—particularly those trying something unique or unproven and thus less likely to be aligned with an ISP—might fail solely because consumers see them as unattractive next to their quota-free alternatives, and not because any aspect of their offering was less appealing to a customer than the competitors.

There may be a loss to competition and consumer welfare that result from such partnerships. The issue merits further consideration to ensure competition is maintained.

5(b) Traffic shaping can also pose a threat to consumer choice and competition

¹⁹ Connection speeds compared, <http://www.pixelbeat.org/speeds.html> (last visited 28 March 2010).

Traffic shaping, although sometimes necessary for network management, used in a protocol or end-point specific way may harm competition or consumer choice by distorting consumer preference. For example, giving priority speeds to packets from one online video provider rather than another may lead consumers to view a particular service as 'slow' and another as 'fast' even when they would be the same speed but for traffic shaping.

All other things being equal, consumers may then choose the seemingly faster service on terms of perceived network performance alone, even though the apparently superior network performance is due to the effects of traffic shaping. Such performance may be particularly noticeable in the realm of voice over IP ("VoIP") where it would be possible to prioritise a particular VoIP provider's packets while treating the VoIP packets of other providers the same as all other traffic. In times of network congestion, the prioritised provider would have the appearance of better performance, and so consumers would presumably prefer it, but only because of traffic shaping.

Competition law may ultimately preclude these outcomes, but the CLC believes the issues are not clear cut and that discussion on these topics is in the consumers' interest.

6 The current ownership limitations are insufficient to protect consumers

The ownership limitations in Part 3, Division 3 of the exposure draft of the National Broadband Network Companies Bill (2010) do not shed light on the way in which NBN Co will have incentive to maintain and upgrade its network once the government sells down its shares. In a worst-case scenario, this would result in Australia's telecommunications infrastructure being controlled by a monopoly immune from market pressure.

To avoid this outcome, it is imperative that there should be a discussion about the proper regulatory structure for NBN Co once the government sells down its shares. If this does not happen, NBN Co may not have adequate incentive to continue to upgrade and maintain its network under conditions of inadequate competition in the wholesale access market.

Yours Sincerely

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