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The Broadband Futures Forum

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Regional and Rural Broadband Access — City standards in 10 years?

Abstract

On 24 March 2021, TelSoc hosted the sixth Broadband Futures Forum, held online, with a focus on regional and rural broadband access. Mr Gavin Williams from NBN Co, the developer of Australia's National Broadband Network (NBN), spoke about developments in Fixed Wireless and Satellite services and described NBN Co's commitment to ongoing enhancement of broadband access in regional and rural Australia. A question-and-answer session followed the presentation in which Mr Williams fielded a variety of questions on broadband access and technological developments.

Introduction

The NBN Futures Project (Holmes & Campbell, 2019 [5]), now renamed the Broadband Futures Project, has been organizing a series of public forums under the title Broadband Futures (formerly NBN Futures) to encourage debate, and potentially to build consensus, about the future of Australia's National Broadband Network (NBN) and a national broadband strategy (Holmes *et al.*, 2020 [6]) for Australia. The forums are hosted by TelSoc (the Telecommunications Association Inc, publisher of this *Journal*). The first forum was held in July 2019 (Campbell & Milner, 2019 [7]), the second in October 2019 (Campbell, 2019 [8]), the third in February 2020 (Campbell, 2020a [9]), the fourth in August 2020 (Campbell, Smith & Brooks, 2020 [10]), and the fifth in November 2020 (Campbell, 2020b [11]). The latter forum was to launch a report, *Towards a National Broadband Strategy for Australia* (Holmes *et al.*, 2020 [6]), from the Broadband Futures Group that argues for an overarching National Broadband Strategy for the decade to 2030.

The sixth forum, held online on 24 March 2021, was to provide further insight into the potential for development of more capable broadband access in regional and rural areas. Specifically, NBN Co's annual reports had not provided much insight into the development of Fixed Wireless and Satellite access. The Broadband Futures Group had suggested the following test questions:

> What are the prospects of broadband speeds in the order of 100 Mbps/50 Mbps (that is, 100 Mbps downstream to end users; 50 Mbps upstream) and 1 Gbps/500 Mbps being provided to regional and rural Australia over the next 5 to 10 years?
> What are NBN Co's plans to bring rural access progressively up to city quality?
> What are the barriers to higher performance of fixed wireless access?
> To what extent will provision of enhanced fixed-line capabilities for business extend to consumers?

Gavin Williams, Chief Development Officer Regional & Remote in NBN Co, agreed to speak at the Forum.

The remainder of this paper summarizes the content of the Forum.

The NBN Futures Forum

The Forum was conducted online via Zoom. There were more than 100 people registered to attend and at least 87 of them were online at one time.

Introduction

Dr Jim Holmes, President of TelSoc and member of the Broadband Futures Group, chaired the Forum. He remarked that the activities of the Broadband Futures Group now flow from the issues identified in the Group's major report (Holmes *et al.*, 2020 [6]).

He introduced the speaker, Mr Gavin Williams, Chief Development Officer Regional & Remote in NBN Co.

Gavin Williams, NBN Co

By way of introduction, Mr Williams indicated a long association with TelSoc and its predecessor organizations. He had, for example, co-authored a paper in the *Telecommunication Journal of Australia* (a predecessor of this *Journal*) in 1992 (Williams & Altamore, 1992 [12]).

He noted that he was speaking at a time when severe weather and flooding were affecting parts of eastern Australia. The latest reports to hand indicated that about 6,000 NBN services were currently not working, mostly due to power outages, while 20,000 services had been restored. The infrastructure was holding up well with no major transmission assets affected.

Mr Williams said that the quality, reliability and speed of services in regional and rural areas is a core part of NBN Co's mission to lift the digital capabilities available to businesses and consumers across Australia. This is necessary, he maintained, for all stakeholders to capture the social and economic benefits flowing from broadband. He recognized that the Retail Service Providers (RSPs) had the same mission.

Partly in response to the government's regional telecommunications reviews (the latest in 2018) (RTIRC, 2018 [13]), NBN Co had established, in 2019, a Regional & Remote business unit, which Mr Williams heads, to give greater emphasis to development in regional areas. The unit includes "NBN local", a team working with communities and stakeholders to understand community needs and to build digital literacy and digital capabilities. There are also industry specialists targeting the needs of specific segments: agricultural technology, digital health, small business, tourism, education, the arts, and Indigenous inclusion. The emphasis is broader than connectivity, supporting digital transformation in each sector.

The understanding of needs helps to tune NBN Co's offerings. Mr Williams described how the Sky Muster (satellite) service had been evolved to Sky Muster Plus after community consultation as a means of delivering the best service to the 120,000 premises connected to satellite access, while recognizing the finite resources of the satellites.

Mr Williams noted that the Minister had declared the network "built and fully operational" in 2020, providing essentially ubiquitous broadband access across the Australian continent and many islands. The NBN had been rolled out past 12 million homes and businesses and had connected 8 million premises (covering about 17 million people). The lockdowns of 202o had shown that NBN broadband could support working from home and schooling at home, which would not have been possible with the pre-NBN position of widespread ADSL or no Internet access at all.

The NBN, he suggested, had come through its biggest test well. He noted that average monthly downloads had increased from 40 GB in 2013 to 300 GB today, while average uploads had risen from 8 GB per month in 2013 to 30 GB per month now. He expected that these figures would continue to rise, with new use cases, such as video surveillance, raising greater expectations for uploads.

NBN Co's investment acceleration plans would continue to deliver greater capabilities, he contended, not just to metropolitan areas. Across the country, 75% of premises are passed by fixed-line technologies. The last corporate plan had described a $4.5B program to ensure that 75% of these accesses would be capable of the highest speed tier, NBN Ultrafast (with near Gigabit per second speeds). In that program, $2.9B will be spent to push fibre deeper into the Fibre to the Node (FTTN) footprint, which passes 4.5 million premises (of which 3.1 million are connected). This will permit about 2 million premises to upgrade on demand to Fibre to the Premises (FTTP). The current estimate is that at least half of this investment will be outside the capital cities, thereby helping to deliver "city-like" quality in regional areas.

There is also a $300M co-investment fund for joint investments with states, territories and local governments to push fibre deeper into the NBN and, potentially, convert some accesses from Satellite or Fixed Wireless to a fixed-line option. In addition, there are business fibre zones, 85 of which are in regional areas, which will promote Gigabit-per-second speeds and symmetric services for businesses. Total investment is $700M, of which about $230M will be in regional areas. There is also an additional $50M co-investment fund to expand the business fibre zones or create new ones.

NBN Co spends about $200M each year on upgrades for Fixed Wireless or Satellite services, mainly for capacity expansion or optimization of Fixed Wireless. In the Fixed Wireless areas, there are 2,200 towers and about 19,000 cells. According to the latest monthly performance reports, only one cell is failing to deliver the performance threshold of 6 Mbps in the busy hour. In the Fixed Wireless network as a whole, the average daily download speed is above 60 Mbps, with a busy-hour average of 40 Mbps. In total, NBN Co plans to invest $2B over the next three years in regional areas.

Mr Williams described how NBN Co, by changing the frame structure of the wireless transmission, had created "Fixed Wireless Plus", which can deliver 75 Mbps downstream and 10 Mbps upstream. Looking to the future, NBN Co has secured spectrum in the 28 GHz band and has begun experimenting with mmWave transmission. In a proof-of-concept experiment near Mortlake, Victoria, 1 Gbps was delivered over 7.3 km, an apparent world record. Mr Williams noted that, of the 620,000 premises served by Fixed Wireless, 90% are within 7.3 km of a cell site. The full effect of 5G/mmWave will only become clear when there is cost-effective equipment available for all parts of the Fixed Wireless system.

Mr Williams outlined the continuing drive to lower the cost per bit for Fixed Wireless. Currently, the spectral efficiency achieved is 4 bits/Hz downstream and 1.6 bits/Hz upstream. This is at the upper levels of 4G/LTE performance and can be achieved because of the managed environment, including professional installation of antennas on end-user premises, operated by NBN Co. Further performance improvements are being pursued through carrier aggregation for load balancing and advanced antenna techniques (such as multibeam and massive MIMO).

Returning to business fibre zones, 85 of which out of 240 are in regional areas, Mr Williams outlined the offer: enterprise-grade Ethernet service at up to 1 Gbps symmetrical; no build cost charged to the customer; and, for the first 3 years, no wholesale installation charge. In addition, wholesale prices are the same as in central business districts. This, Mr Williams believed, would be a "game changer" for business in regional areas, supporting advanced manufacturing and integrated supply chains.

For the Sky Muster satellite services, Mr Williams noted that the satellites were launched 5 years ago with a nominal life of 15 years, meaning that they have a residual life of 10 years, and perhaps a few years more with efficient conservation of fuel. Total available bandwidth from the two satellites is about 182 Gbps. The current access service is at 25 Mbps. The business satellite service can provide bursts of 50 Mbps down and 10 Mbps up. New equipment may enable services above 100 Mbps.

In closing, Mr Williams outlined a vision for the revitalization of regional life through the infrastructure provided by NBN Co. A survey, he noted, had found that 35% of Australians are considering relocating to their ideal location, which will be outside the main cities. The "new normal" will entail flexible working, with remote access to healthcare and other services. NBN Co, he contended, will continue to support the population and economy of regional areas.

Questions and Answers

Question: Are there opportunities to expand the fibre footprint in regional areas, for example, by demand aggregation or by expanding the fibre rollout around business areas?

Mr Williams noted that fibre access was already being installed in regional areas when new broadacre housing estates are developed and in business fibre zones. When fibre is pushed deeper into the network, it becomes incrementally cheaper to expand the fibre footprint into neighbouring areas. The $300M co-investment fund may be used for some of this expansion, depending on the priorities of local councils. Similarly, demand aggregation may be facilitated by local councils or state or territory governments, leading potentially to co-investment projects.

Question: The satellite service, with 120,000 connections out of the 400,000 planned, appears not to be popular. ACCAN has identified examples (Corbin, 2019 [14], p. 14) where people are preferring to keep their DSL connections rather than switch to satellite service. Are there possibilities for expanding fixed services (or Fixed Wireless) in these areas to meet the perceived demand?

Mr Williams answered that he would always support a consumer's informed decision to remain with an ADSL service instead of taking up a satellite solution. His and his team's direct experience, however, is that often those with less than favourable opinions about the satellite service have not used it.

He characterized the main negative feedback about satellite service as falling into two categories: reliability and data allowances. On reliability, he noted that there had been some teething problems with the core network, but they were now resolved. He conceded that the satellite service would be degraded during monsoonal conditions but would come back up, while, in contrast, he had heard of landlines being out for weeks after monsoons.

After feedback from stakeholders, NBN Co introduced Sky Muster Plus, which provides unmetered data for all but streaming video and VPN traffic. This makes the service comparable to the older ADSL unmetered services. Mr Williams' own experience during the Covid lockdown was that Sky Muster Plus worked well for working from home, supporting all the necessary information, communication and collaboration tools.

In addition, the co-investment fund could be used to support moving communities from Sky Muster to Fixed Wireless or fixed-line services.

Question: There appears to be a difference in perceived performance of Fixed Wireless Access between Australia and New Zealand. The quoted performance of the NBN Fixed Wireless seems to be comparable to that attained in New Zealand, where there is a satisfied base of customers. What is the reason for the difference in perception in Australia?

Mr Williams suggested that there can be long memories of service impacts. He conceded that the early Fixed Wireless installations were not up to standard, but a significant upgrade program has been undertaken and customer satisfaction, as surveyed, is now good.

Some upgrade activities that negatively affected services may also have been perceived as reliability issues. When the Covid lockdowns occurred and people were working from home, NBN Co was able to move most service-affecting upgrade activities to the period from midnight to 6 am, thereby avoiding disruption during business hours.

Question: The experiments with 5G and mmWave are very encouraging. In New Zealand, there is concern about foliage attenuation with mmWave. What has NBN Co considered about foliage attenuation?

Mr Williams answered that NBN Co's models do take account of terrain and foliage but there will need to be further extensions for mmWave. The professional installation approach for antennas on customers' premises does provide for optimizing the initial radio link but ongoing monitoring is necessary to identify links with low signal-to-noise ratios. The sophistication of the tools to identify individual services with problems is increasing.

Mr Williams also noted that the current spectrum holdings in the 2.3 and 3.4 MHz bands would remain. The mmWave spectrum could be used for premises close to a cell site, thereby freeing up radio resources at lower frequencies for use with premises that are further away.

Question: What can NBN Co do to support the expansion of mobile coverage in marginal, non-commercial areas?

Mr Williams firstly acknowledged the positive contribution of the questioner, Robin Eckermann, to thought leadership on regional and rural communications.

He then noted that NBN Co has a cell-site access product for co-location, but this has not been much taken up. In some cases, there has been co-investment in a tower site with mobile operators. NBN Co is considering the backhaul capabilities of the Sky Muster business service to support services to very remote communities.

The solution, he suggested, was to work cooperatively, as NBN Co has been doing, with other providers to support co-location and facility sharing.

Question: What will be the impact of Low Earth Orbit satellites (LEOs) on NBN Co's regional business?

Mr Williams considered that there was still much uncertainty about the commercial success of LEO-delivered broadband services. He noted that the vertically integrated operation being trialled by Starlink is a very different model from that delivered by NBN Co. He suggested that the LEO operators face three main challenges: a sufficient number of satellites; the regulatory rights to spectrum; and cost-effective flat-panel arrays.

Regarding NBN Co's stance, he reiterated that there are 10 years or more of operating life left in the Sky Muster satellites. NBN Co will evaluate alternative options closer to the end of life of the satellites, when the uncertainties may be less. He indicated that NBN Co is not committed to being an asset owner and could become a capacity buyer from other satellite operators.

Question: What commitment by government to regional economic development can be expected to follow the broadband expansion?

Mr Williams considered that economic and infrastructure developments were bedfellows and best advanced in an integrated manner. He noted that the $300 million co-development fund would be aligned with the priorities of local jurisdictions through local consultation.

He described two recent developments. In New South Wales, which has designated "corridor towns" and "special activation precincts", the Bomen estate near Wagga has been converted from Fixed Wireless access to FTTP as a business fibre zone, to support other business development in the area. In Jabiru in the Northern Territory, NBN Co is building out fibre to support the developing industries in cultural tourism, as the region moves away from mining.

Question: In the Shoalhaven region of New South Wales, the council has reported difficulties with Fixed Wireless service in outlying rural areas. The service cannot support working from home or rural businesses in some cases. How can the council work with NBN Co on these issues?

Mr Williams noted that the NBN Co regional teams, including one in the Shoalhaven, are now better able to work with local communities to resolve problems with Fixed Wireless access. They are finding that, in some cases, the difficulties arise because of growing foliage or an antenna that has gone out of alignment. Tuning the Fixed Wireless service is also possible to improve performance.

Mr Williams reported that NBN Co is fully aware that it does not offer a business-grade Fixed Wireless service at present, only a business-grade Satellite service, and is reflecting on future developments of the service.

Question: The questioner was in Umuwa in the Anangu Pitjantjatjara Yankunytjatjara (APY) lands in South Australia. He considered that business opportunity was being stifled by the lack of suitable broadband access. What can NBN Co do to support business growth in these remote communities?

Mr Williams noted that Sky Muster service is available but VPNs would need to be tuned to take account of the unavoidable 500 ms delay in the satellite hops. He recognized the business opportunities in remote areas and indicated that it is a priority for NBN Co to connect First Nations communities.

[The questioner intervened to describe some of the business opportunities, including remote management of assets by pastoralists and mining companies. He described how Telstra had installed fibre to the administration building in Umuwa, enabling the change-over to full Cloud computing, which was not possible with the satellite service.]

Question: What kinds of use in regional and rural areas has been unexpected? Has NBN Co been able to support these unexpected uses?

Mr Williams pointed to a comment in the chat window that indicated that a power user in a regional area had used 600 GB on the Sky Muster Plus service and a neighbour had used 1 TB (1000 GB).

He noted that opening up capability through Sky Muster Plus had revealed new demands such as Zoom conferences, access to city facilities from remote locations, and telehealth in remote areas ("GP in a box"). Distance, he said, creates innovations through necessity. He felt it was gratifying to be a part of this development.

In closing and thanking Gavin Williams, the chair noted that a future Broadband Futures Forum is planned on satellite services, particularly the possibilities from LEOs.

Conclusion

This was the sixth of a planned series of forums related to the future of the NBN and a broadband strategy for Australia. It was notable that a speaker from NBN Co had been available and willing to make a presentation.

Mr Gavin Williams, head of the relevant business unit within NBN Co, painted a picture of continuing development of broadband access in regional and rural areas. He was frank about deficiencies that had been identified in earlier services and described how further improvement had unlocked new possibilities for business in regional areas. He described how new funding initiatives, specifically the business fibre zones and the $300M co-investment fund, would lead to new developments, including the expansion of the FTTP footprint.

Mr Williams indicated that the creation of his business unit in 2019 had given renewed emphasis to developments in regional and rural areas. As well as better focussed monitoring and enhancement of services, the deployment of personnel in regional areas through NBN local had improved liaison with local authorities and local communities. This had helped to identify priorities and coordinate activities for economic and community development.

Mr Williams' presentation should instil some confidence that NBN Co will continue to improve broadband access in regional areas through technology developments and enhanced operations. No commitment to ubiquitous "city standards" has been made, but the availability of "city-like" services will continue to expand.

Fixed Wireless and Satellite will remain the main vehicles for delivery of broadband access in regional Australia for many years to come. It is in the interests of all Australians, if no-one is to be "left behind", that NBN Co continues to exploit technological and operational advances in these technologies to meet the evolving telecommunication needs of regional and rural businesses and communities.

References

Campbell, L. H. (2019). The NBN Futures Forum: Realising the User Potential of the NBN, *Journal of Telecommunications and the Digital Economy*, *7*(4), 1–11. https://doi.org/10.18080/jtde.v7n4.228 [15]

Campbell, L. H. (2020a). The NBN Futures Forum: Learning from International Experience, *Journal of Telecommunications and the Digital Economy*, *8*(1), 49–57. https://doi.org/10.18080/jtde.v8n1.251 [16]

Campbell, L. H. (2020b). The NBN Futures Forum: Towards a National Broadband Strategy for Australia, 2020-2030, *Journal of Telecommunications and the Digital Economy*, *8*(4), 180–191. https://doi.org/10.18080/jtde.v8n4.372 [17]

Campbell, L. H., & Milner, M. (2019). The NBN Futures Forum: Discussing the future ownership of Australia's National Broadband Network, *Journal of Telecommunications and the Digital Economy*, *7*(3), 1–9. https://doi.org/10.18080/jtde.v7n3.202 [18]

Campbell, L. H., Smith, A. C., & Brooks, P. (2020). The NBN Futures Forum: Social and Economic Benefits of Broadband for Digital Inclusion and Telehealth, *Journal of Telecommunications and the Digital Economy*, *8*(3), 18–32. https://doi.org/10.18080/jtde.v8n3.346 [19]

Corbin, T. (2019). Promoting Digital Inclusion Through the NBN, *Journal of Telecommunications and the Digital Economy*, *7*(4), 12–16. https://doi.org/10.18080/jtde.v7n4.236 [20]

Holmes, J., Burke, J., Campbell, L. H., & Hamilton, A. (2020). Towards a National Broadband Strategy for Australia, 2020-2030, *Journal of Telecommunications and the Digital Economy*, *8*(4), 192–269. https://doi.org/10.18080/jtde.v8n4.371 [21]

Holmes, J., & Campbell, L. H. (2019). The NBN Futures Project, *Journal of Telecommunications and the Digital Economy*, *7*(4), 33–44. https://doi.org/10.18080/jtde.v7n4.238 [22]

RTIRC [Regional Telecommunications Independent Review Committee]. (2018). 2018 Regional Telecommunications Review: Getting it right out there. Australian Government. Available at https://www.communications.gov.au/publications/australian-government-response-2018-regional-telecommunications-independent-committee-report-2018 [23] (accessed 31 March 2021).

Williams, G., & Altamore, M. (1992), Applications in an Intelligent Networking Environment, *Telecommunication Journal of Australia, 42*(1), 32–38.

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