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“What may be gained from thinking about disability and technology differently is potentially a great deal more than commonly thought” (Goggin & Newell 2004, 419). Almost all the policy and politics surrounding the NBN to date have been concerned with supply-side issues pertinent to building the network to ensure the universal availability of broadband services. However, there has not been any specific affordability or accessibility policy considerations to address the needs of people with disability as a particularly interested user group. People with disability can showcase and lead consumer demand for the high capacity broadband capabilities of the NBN given their desire and need for immersive multi-media based communications. This paper suggests some options to address these issues utilising current policy levers available to the Australian Government, including the Universal Service Obligation and the National Disability Strategy.

INTRODUCTION

…what has yet to be addressed is the economics of denying or constraining accessibility for people with disabilities, or, the converse, of designing technology for a wide diversity of users – and what this means for national policy (Goggin & Newell 2004, p. 418).

The National Broadband Network (NBN) is a new Australia-wide high capacity broadband infrastructure project initiated by the Rudd Labor Government in 2009, which is intended to bring 100Mbps capable fibre-to-the-premise (FTTP) connectivity to nearly all Australian households, small businesses and schools. Those not receiving fibre connections (about 7%, mainly in regional and remote areas) will be served by 12Mbps terrestrial wireless or satellite connections (Conroy 2009).

There has been considerable contention about the project, including about its cost, its benefits, whether Australians need such a “gold-plated” solution, the new regulated industry structure that comes with the NBN, and the role of the incumbent telecommunications service provider, Telstra Corporation Limited (Telstra).

There has also been a great deal of discussion about the wisdom of mandating a particular type of delivery technology at this time. For example, the rising popularity of wireless broadband and smart-phones, and the potential of 4G wireless technologies such as LTE (Long Term Evolution) to offer high capacity data connections, provide much fuel to heat the debates (see for example Given 2010b).

This paper does not intend to enter into these supply-side economic and technology debates about whether the NBN is a good idea or not. Rather, its starting point is the very likely and
imminent implementation of the proposed FTTP technology, despite some significant hurdles still to be overcome (cf. Telstra Corporation Ltd 2010b).

Back in 2005 Goggin and Milne claimed:

…there is little consideration of consumer or social issues in the formal evaluation of telecommunications policy, especially in relation to structural adjustment. There is a need for greater research and analysis of these issues, particularly using social science and public policy approaches (Goggin & Milne 2005, 29).

There is no doubt that the NBN is a major “structural adjustment”. In fact, “It’s a total rejig of a nation’s communications infrastructure, top to bottom” (Kohler 2010). There is, therefore, a need to consider and evaluate issues for people with disability as expected consumers of NBN delivered services, and to then decide whether telecommunications policy needs to be adjusted accordingly. In the current context, this is a positive undertaking, since it seeks to understand the key factors that will help make the NBN technology successful, including for people with disability.

While previous discussions in the *Telecommunications Journal of Australia* (TJA) about broadband services and people with disability point to the considerable opportunities that high capacity connections can bring (see in particular Slater et al 2010; Wood 2010), in recognition of Christopher Newell we cannot allow disability and the NBN to be “conceptualised as a specialised, technical issue” (Newell 2005). This paper, then, examines key factors that may hinder the success of the NBN for people with disability and proposes some enablers through incremental improvements to current public policy considerations, in particular the Universal Service Obligation (USO) and the proposed National Disability Insurance Scheme (NDIS).

A summary of the paper and its argument is as follows:

- Telecommunications networks create significant social and economic externalities, which may justify government supply-side infrastructure investments. However, these benefits can only be realised if there is significant take-up of the technology, the network effect, which could also justify government demand-side social inclusion investments.

- People with disability are significantly under-represented in the access to and use of the Internet, and there is a lack of government policy discussion on affordability and accessibility that particularly impacts this group. However, people with disability can showcase and lead consumer demand for the high capacity broadband capabilities of the NBN given their desire and need for immersive multi-media based communications.

- USO policy and the role of USO Co needs to be incrementally bolstered and the NDIS needs to be fully utilised to enable people with disability to gain access to the benefits of NBN connectivity.

**GAINING EFFECT FOR THE NEW NATIONAL BROADBAND NETWORK**

A distinguishing characteristic of telecommunications technology is the presence of significant network externalities. For this reason, investment in telecommunications infrastructure might be expected to yield relatively high social returns. This also provides the case for government investment (Williams 2010, 176).

The recent return of government proposals to invest heavily in new telecommunications networks has already been described in some detail (Given 2010a). This changing political-economic context results in “complex forms of ‘public private interplay’” that demonstrate three trends:

First, they represent shifts away from the liberalisation and privatisation policy consensus that dominated the last two decades. Second, they show a shared conviction about the anticipated size of fast broadband’s economic and social
... Third, they reveal the unlikely impact of the global financial and economic crisis in stimulating investment in particular infrastructures seen as critical to the national economies that will emerge from it (Given 2010a, p. 541 emphasis added).

It is not the intention of this paper to further argue this general consensus on the economic and social surplus produced by telecommunications networks (cf. Birke 2009; Endres 2010). However, it is important to note that such benefits only arise when the network is fully extended in a number of ways. For example, Williams goes on to note in regard to economic growth, “high rates of return occurred only when there was close to universal coverage” (Williams 2010, 176). While the NBN will eventually achieve universal availability, this does not guarantee the required levels of take-up and usage by consumers to realise its benefits.

Allen’s analysis of “new telecommunications services” seems particularly pertinent here, “… when network ‘newness’ is fullblown and network externalities and critical mass play their largest role. Full motion videoconferencing is a case in point; so would be an interactive broadband service to the home” (Allen 1988, 258). At issue is the “perceived value” of the new network by consumers, when it is small and/or has very few people connected. Allen notes that such externalities place the emphasis on supplier incentives, such as introductory pricing, to ensure success in reaching critical mass. As we shall see, affordability is a critical issue for people with disability.

Early indications of interest from the NBN pilot sites give a mixed picture, even at the initial physical connection stage. In Tasmania, the low rate of connection requests (“only half”) prompted the State Government there to consider switching to an “opt-in” default for properties passed by the new optical fibre infrastructure (Neales 2010). Initial results from Brunswick, Victoria, are similar (compared, however, to an average of 70% across five pilot sites). This may be due to the high incidence of renters in such an inner-city area (Gannon 2011). Initial evidence from overseas shows lower than hoped for take-up rates for fibre-based broadband networks, though with only “phase 1” type services available (KPN 2009, 20; Morgan 2010, 3).

In some cases it may not be the overall network size that matters but take-up within a person’s local and/or social network that may be more important. This is relevant to people with disability, such as the (capital D) Deaf community who use Auslan (Australian Sign Language) as a preferred mode of communications. Overall critical mass for a network can be achieved through aggregating a number of specific networks of users that are successful in reaching their own suitable usage thresholds. There is then an argument for the “targeting of specific niches as a viable marketing strategy to overcome the disadvantage of smaller network size” (Birke 2009, 788).

Finally, there is the important role of complementary devices, applications and services, and markets that will utilise the NBN technology in specific user environments, such as health and education. “It is impossible to precisely measure the costs and benefits of the NBN. Many of the benefits will depend on complementary investments by the government or private companies” (Gans & King 2010, 183).

In conclusion, while the NBN will eventually provide universal availability of high capacity broadband, there remains the challenge of gaining the critical mass of users that will generate the network effects that maximise the economic and social benefits of this new technology. As we shall see, people with disability who have strong local and/or social networks, and who value rich multi-media modes of communications and engagement, may be able to play an important leading role in giving effect to the new network, especially since “One-in-five Australians report a disability” (Australian Bureau of Statistics 2003).
NBN OPPORTUNITIES FROM AND FOR PEOPLE WITH DISABILITY

The NBN has the potential to greatly improve the communications options available to people with disability and on that basis to greatly improve life-style choices relating to family and community engagement, employment, education, health care and entertainment. For example, evidence provided to the Federal Communications Commission in the USA cites opportunities for telecommuting, running a business from home, tele-rehabilitation, online education and digital books, Video Relay Services (VRS) and even “the development of an independent autistic community and culture” (Lyle 2010, 4-5). Goggin also notes the potential for innovation in “expression and communication” by people with disability using the Internet.

Indeed, the new media has meant that many groups who found it difficult to find the means, and cultural backing, to express their ideas, have found innovative ways using the Internet especially to do so. There is a great tradition, for instance, of Blind people devising their own media forms, from Braille to Radio for the Print Handicapped. Or Deaf people developing a rich cultural tradition based on visual communication and sign language. The multimedia potential of the Internet extends the potential for new, far-reaching forms of expression and communication (Goggin 2010).

More specifically, innovative communications solutions such as audio-description, signing, sub-titling, spoken sub-titles, vide-calling and relay services could be made possible with the convergence of high capacity broadband and the television set (Slater et al. 2010). There is the potential (if accessibility is addressed) for people with disability to participate in an immersive way in online communities of interest, such as Second Life, with their own preferred representations of themselves (Wood 2010).

People with disability often represent distinct user environments with distinctive communications needs and opportunities. The Deaf may particularly utilise text but also seek video-based services that allow communication in Auslan. The Blind may particularly utilise voice and audio-based services, such as downloading talking books, and listening to (Internet) radio stations such as Radio for the Print Handicapped (RPH). People with hearing loss may seek a combination of text, or captioning, together with audio for their media and communications. People with disability who are isolated for long periods of time at home, and their carers, may choose online communities of support, including immersive experiences through video and/or 3D facilities such as Second Life.

It is these types of rich, interactive, multi-media, instantly on services that showcase the benefits of high capacity broadband. It is these types of needs and opportunities that can drive demand for the NBN, particularly in its early stages. However, it appears these benefits are not easily achieved for people with disability given the results with first generation broadband.

INTERNET TAKE-UP AMONG PEOPLE WITH DISABILITY

[I like] to have the Internet and a mobile phone and a house phone, that's a big bill right there. I pay about $90 a fortnight just to keep my computer and the phones running (Merrett 2010, 128).

Information about broadband Internet take-up by people with disability in Australia is limited. For example, 2003 is the most recent Australian Bureau of Statistics (ABS) survey of Household Use of Information Technologies, which reported that 39% of people aged 15 years or over with a disability had accessed the internet (Australian Bureau of Statistics 2004). This compares to 58% of the general population at that time (National Office for the Information Economy 2003, 4).
Benchmark research undertaken at the end of 2002 for Telstra’s Low Income Measures Assessment Committee (LIMAC) found that 23% of people with disability had internet access at home compared to 37% for the general population, with cost being cited as the major factor (Telstra Corporation Ltd 2002).

By the beginning of 2006 the LIMAC research found that take-up of the Internet at home by people with disability had increased only marginally to 27% compared to 67% for the general population (see Chart 1). Cost was still seen as the main barrier: “Disabled respondents [sic] experienced the lowest ratings on Internet affordability” and “Perceived affordability of Internet is lowest of all services” (fixed, mobile, Internet). Significantly, this was in contrast to other low income groups such as older people, people who are unemployed and low income families, where take-up of the internet had increased much more significantly (Telstra Corporation Ltd 2006).

**Chart 1 - Differential increases in home Internet take-up 2002-2006 for Australians on a low income**

![Chart 1](chart.png)

Source (Telstra Corporation Ltd 2002 and Telstra Corporation Ltd 2006)

This Australian data is consistent with more recent findings from Britain, obtained as part of the World Internet Project:

Disability, such as a health-related problem, remained a key source of digital exclusion. The use of the internet by people with a health problem or disability increased, but only marginally, between 2007 and 2009 (Dutton et al 2009, 17).

While not conclusive, this take-up data suggests that people with disability access the internet at significantly lower rates than the general population and that usage over time has been increasing at a much lower rate than for the general population and even for other low-income groups. This may indicate that price-income-affordability is not the only significant barrier to take-up for this group.

Of course, some people with disability have been early adopters of technology. In the USA, surveys have found that “Seventy-two per cent of people with disabilities are likely to upgrade to a product’s latest model” (Hannah 2008). This might even be glimpsed in the take-up statistics that we do have in Australia, where “The majority of Disability Respondents who have access to the Internet are connected to a broadband service” (Telstra Corporation Ltd 2006).
PUBLIC POLICY REGARDING THE NBN AND PEOPLE WITH DISABILITY

“While the NBN’s fibre, wireless and satellite networks may provide universal availability of broadband in a technological sense, this does not automatically mean universal affordability and accessibility of a service” (Australian Communications Consumer Action Network 2010a, 4).

Almost all the policy work surrounding the NBN to date has been concerned with supply-side issues pertinent to building the network. While this will ensure the universal availability of a basic entry-level broadband service, there has not been any specific affordability or accessibility policy considerations that might address the needs of people with disability as a particularly interested user group. What is at stake is a repeat of the situation that dogged the previous universal network, the copper based Public Switched Telephone Network (PSTN), where accessibility policies didn’t come till the mid-1990s and affordability policies until 2002, many decades after telephones had become widespread in Australian homes.

AFFORDABILITY

Affordability has featured from the very beginning in the Australian Government’s general announcements about the NBN: “…every house, school and business in Australia will get access to affordable fast broadband (Conroy 2009, emphasis added); and most recently, the NBN will “deliver significant improvements in broadband services for all Australians at affordable prices” (Australian Government 2010, emphasis added).

The NBN Implementation Study specifically commented on the relationship between affordability and take-up, recommending that “Wholesale prices for NBN services should be set to meet the goals of affordability and take-up” (McKinsey & Company & KPMG 2010, 32). The suggestion was that this could be achieved through the provision of an entry-level plan. The recent Government Statement of Expectations for the NBN explicitly mentions the need for “maintaining affordability to drive take-up rates” (Wong & Conroy 2010, 10) and, indeed, the NBN Co Business Plan makes provision for a basic 12Mbps/1Mbps “entry-level” service across all delivery platforms (fibre, terrestrial wireless and satellite).

However, the actual retail price of this entry-level plan, as offered by a Retail Service Provider (RSP), will depend on a range of factors. NBN Co modelling indicates that $56 per month is a median benchmark figure (NBN Co Limited 2010, 105). The significant issue for people with disability (and other people on a low income) is that this may significantly raise the bar on the minimum price of any service delivered over the NBN, even just a Plain Old Telephone Service (POTS).

Current market offerings for entry-level broadband plans begin at $9.95 per month (albeit in conjunction with other bundled services) and the majority of subscribers are on low-end, cheaper, plans (Australian Bureau of Statistics 2010). The current entry-level telephone service (Telstra’s HomeLine™ Budget) is priced at $20.95 per month. The major reason for the availability of these lower entry-level prices is the greater potential for marginal cost pricing on the established networks because they are a sunk (depreciated) investment and are relatively fully utilised. This will not be the case for the NBN for many years.

Once the NBN is constructed, marginal cost pricing will maximise economic benefits. However, as the NBN is likely to have average costs well above marginal costs, at least until it reaches capacity, marginal cost pricing for wholesale access to the NBN will not cover capital costs or lead to a commercial return (Gans & King 2010, 182).

Also, affordability has a number of dimensions, not just the monthly price. There is the cost of acquiring and maintaining relevant access equipment such as a desktop computer, or a Wi-Fi router with a laptop or tablet device (such as an Apple iPad). Then there is the cost of acquiring and maintaining the required software applications that may provide useful
accessibility features for people with disability, such as screen-reading software (e.g., JAWS 1989) or specialised Augmentative and Alternative Communication (AAC) software based on visual symbols (e.g., Proloquo2go 2009).

Further, even NBN based entry-level plans for broadband may not be adequate for the reasonable requirements of people with disability, for example, who participate daily in immersive online communities such as Second Life, which might require 50GB or more per month. This raises the question of when do the perceived costs of disability become an issue of discrimination, rather than of affordability.

ACCESSIBILITY

Australia was one of the initial signatories to the United Nations Convention on the rights of persons with disabilities (the Convention) on 30 March 2007. Article 9 Accessibility includes specific obligations:

(g) To promote access for persons with disabilities to new information and communications technologies and systems, including the Internet;

(h) To promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost.

Given the significance of the NBN and associated ICTs to all Australians, the applicability of the Convention is very clear. Yet there is little indication that public policy will seriously address the accessibility issues of this new technology for people with disability. For example, the only reference to “disability” at www.nbnco.com.au relates to the accessibility of their website.

The one exception (which proves the rule?) arises in transitioning the USO to the NBN framework. Specifically, reference is made to the disability requirements of the Standard Telephone Service (STS) where a voice service is not practical for a particular end-user with a disability; to Telstra’s Disability Equipment Program (DEP) that supplies the equipment to fulfil that requirement; and to the Disability Discrimination Act 1992 that places responsibilities on service providers in general (Department of Broadband Communications and the Digital Economy 2010).

At the very least, there is an opportunity to make explicit these accessibility requirements for telephone services supplied over the NBN by any RSP, not just Telstra as the USO provider. This issue arises because of a current loophole whereby service providers who are not the USO provider can refuse supply to a person with a disability and take their chances under the DDA, which places a significant onus and liability on the customer to fight their case (cf. Newell 2003).

SOME PUBLIC POLICY OPTIONS

UNIVERSAL SERVICE OBLIGATION

If it is worth considering integrated and comprehensive national responses to technology, such efforts must genuinely incorporate people with disabilities, their needs, desires, and expectations. Incorporation of disability into universal service policy is an obvious place to start … disability can be fruitfully inserted into national policy on innovation systems, technology, and economy (Goggin & Newell 2004, 419).

The NBN will, in and of itself, provide universal availability, in a geographic sense, of a basic broadband data service: “Access to fast broadband … will put distant towns on an equal footing with people in major cities” (Gillard 2010). This will, in effect, extend the current
USO to such a data service, which is a higher level of capability than currently provided under USO or Digital Data Service Obligation (DDSO) requirements.

Of course, the geographical equity focus of USO policy has been documented as far back as 1993 (Consumers' Telecommunications Network 1993) and so the perceived divide between the city and the bush continues to impress itself on Australian telecommunications policy. Has the NBN, then, effectively subsumed the USO? Given argues that the NBN heralds the “eclipse” of USO policy in Australia.

As the political imperative shifted beyond voice telephony and basic digital data capability to higher speed broadband, it was impossible merely to tweak the architecture of universal service and asymmetric obligations on the former monopolist. The cost was simply too large (Given 2008, 98).

However, Given does not consider the adjunct and related issues of universal service accessibility for people with disability and affordability for people on a low income.

Accessibility was addressed after the 1995 disability discrimination complaint ("Geoffrey Scott v Telstra Corporation Limited" 1995) by uplifting the requirements of the DDA into the Telecommunications (Consumer Protection and Service Standards) Act 1999 to ensure that the USO-STS (Universal Service Obligation for the Standard Telephone Service) was an accessible service. This included the funding, by way of an industry levy (similar to the USO levy), of the National Relay Service to provide relay services between voice and text communications users (National Relay Service 1999).

Affordability of the USO-STS was addressed in part by the introduction of the Telstra Carrier Charges–Price Control Arrangements, from 1995, and more specifically by a Carrier Licence Condition (Telstra Corporation Limited), clause 22 Low-income measures, from 2002. Telstra's Access for Everyone package incudes such programs as a pensioner discount, which is applicable to many people with disability, and safety-net services for people experiencing financial hardship.

The USO therefore was extended, if in a piecemeal way, to cover aspects of accessibility and affordability of the STS. Since Telstra was the only nominated USO-STS provider, it has borne most of the regulated responsibility.

With the advent of a new universally available minimum standard broadband service, courtesy of the NBN, history would indicate that much better consideration should be given to the role of USO policy in maximising take-up through affordability and accessibility initiatives. While current USO discourse is dominated by cost calculations and therefore restricted to residual availability issues, there is an opportunity to reframe it as supporting critical take-up thresholds to ensure the success of the NBN, which presumes a different discourse about affordability and accessibility, and so economic and social benefits.

In regard to affordability, discussions need to take place regarding safety-net services that allow people to remain connected in a basic way when the NBN entry-level service is simply seen as unaffordable. USO Co could consider whether some form of InContact® (a Telstra basic phone service) is required, for example, in situations of financial hardship, and whether this could be extended to a basic Internet service that still allows access to government services such as job seeking.

In regard to accessibility, discussions need to take place to ensure that standard telephone services supplied over the NBN, by any RSP, have suitable accessibility options. Required equipment to meet this requirement could be delivered by an Independent Disability Equipment Program, something that has already been the subject of a feasibility study (Department of Broadband Communications and the Digital Economy 2009). Further, now with a new and different entry-level service (a broadband service) supplied everywhere over the NBN, accessibility of end-user equipment might also be usefully considered in this same context. This could include suitable access software and applications.
This second policy lever available to the Australian Government falls under its National Disability Strategy. It is a far-reaching social policy initiative intended to better address the long-term care and support needs of people with disability. In short, it is based on an insurance model that would provide early intervention and resources to improve quality of life and increase social and economic participation to people with disability (Sherry 2010). The Productivity Commission is currently inquiring into the feasibility and form of such a scheme and is due to report to the Government by 30 June 2011 (Productivity Commission 2010). A small number of submissions to the inquiry have mentioned the importance of including communications services in any such scheme, including:

I think there will be a lot of improvements through the Internet and the national broadband network will open up other opportunities, including, for example, interpreting and real-time captioning over the Internet (Lawder 2010, 353).

...access to information, including information and communication technologies, is an essential part of a scheme that giving those – an eligibility regime must take this into account (Salthouse 2010, 359).

A national scheme must provide equipment that will allow all consumers with disability access to voice, voice-equivalent or text-to-speech telephony services, the internet and any future broadband network (Australian Communications Consumer Action Network 2010b, 6).

Such a scheme should enable a comprehensive response to issues of availability, accessibility and affordability of essential services, including communications services (Telstra Corporation Ltd 2010a, 3).

There are two distinct advantages to using a NDIS type scheme to address affordability and accessibility issues surrounding the NBN. Firstly, it could provide a comprehensive solution to these issues combined with the flexibility of addressing individual needs. Secondly, as a driver of demand for suitable ICTs, it can support innovation and the entry of new products and services into the market.

The Australian Government currently provides a Government Telephone Allowance to a range of eligible pension recipients and others, including those who receive the Disability Support Pension. Telstra also provides a Pensioner Discount under its own Access for Everyone package. Given the new wholesale pricing threshold set by the NBN, consideration needs to be given as to whether the current Government Telephone Allowance is adequate to ensure basic affordability of entry-level services at the retail level, for both information and communications access.

CONCLUSION

We as a society must believe … [for people with disability] that having access to broadband is a big deal. We must embrace the cause… (Lyle 2010, 19)

There is a sound economic case, based on the considerable positive externalities of a new communications network, for Government to invest in extending that network in a range of ways. To date, with the NBN, the locus of that investment is restricted almost exclusively to the availability of the infrastructure itself and to allow geographically averaged (wholesale) pricing.

While some small demonstration projects involving specific applications and user environments have been announced (Conroy 2010), there is another important locus required
for such complementary investments to ensure the rapid take-up of NBN connections and services so that the network effects are realised as soon as possible.

This will involve adjustments to the USO policy and incomes policy to ensure a reasonable safety-net of accessibility for all Australians, as well as committing to including communications access and equity in the implementation of a National Disability Insurance Scheme for people with disability. This will stimulate innovation and showcase new and interesting applications made possible by the NBN. Such public investment in the affordability and accessibility of NBN based services will bring forward the beneficial take-up and use of this important infrastructure, given the many high-bandwidth services that will be particularly useful for people with disability.

Five years ago, Gerard Goggin and Christopher Newell sought to imagine “Disability in 2010”, where and when it was hoped that instead of being viewed as deficit and cost it is viewed as contributory and valuable (Goggin & Newell 2005, p. 70). As a technology, a network infrastructure, an institution, with particular public policies surrounding it, we do not want the NBN to be “shaping, creating and perpetuating disability” (Newell 2005). Rather, with the right attendant policies of affordability and accessibility, people with disability can offer “contributory and valuable” support to the success of the NBN as a new network, and in turn allow people with disability to take up the new opportunities that this technology affords, thus making for true universal service.

While Christopher Newell made great use of communications technologies in support of his research and advocacy on behalf of people with disability, and was highly involved in the telecommunications industry with all the right contacts, it was rather ironic that he was unable to obtain a fixed broadband service at his home for “technology” reasons. And yet, he depended on these technologies. At one point, when in hospital for an extended period of time and subject to intensive medical care, he confided to the author that it was his Internet connection – which allowed him to remain connected to his work, his colleagues and family, right from his hospital bed – that had “saved his life”. The need to resolve NBN affordability and accessibility issues for people with disability doesn’t get any more poignant than that.

DISCLAIMER

The views expressed by the author in this research paper are not necessarily those of Telstra Corporation Limited.

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