Submission 185
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Andrew McGowan
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House of Representatives
Standing Committee on Infrastructure and Communications
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Dear Mr McGowan,

New Inquiry into the National Broadband Network

Thank you for providing industry with the opportunity to comment on the New Inquiry into the National Broadband Network.

The attached submission has been prepared by industry through the auspices of the Communications Alliance.

Yours sincerely,

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HOUSE OF REPRESENTATIVES INFRASTRUCTURE AND COMMUNICATIONS COMMITTEE

INQUIRY INTO THE NATIONAL BROADBAND NETWORK

COMMUNICATIONS ALLIANCE SUBMISSION

FEBRUARY 2011

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EXECUTIVE SUMMARY

Communications Alliance is pleased to have the opportunity to make a submission to this Inquiry, which we believe has potential to advance the mission of maximising the benefits that can flow from the significant investment our nation is making to create a National Broadband Network.

Communications Alliance has not sought – neither in this submission nor elsewhere - to enter into popular recent arguments around whether the detailed design of the NBN and the legislative, structural and funding model that are being put in place to make the network a reality are necessarily the absolute best, most efficient and cost-effective set of arrangements to deliver a national next-generation communications network for Australia.

There will continue to be debate around regulatory and commercial elements, including such issues as Points-of-Interconnect, tariffing structures and pricing, governance arrangements and others, that feed into the way that the NBN will be rolled out and managed.

Communications Alliance believes strongly, however, that the network and product design of the NBN – a plan that has been heavily influenced by the work undertaken by Communications Alliance Members under our NBN Project over the past 16 months – does represent a credible solution to the challenge of installing a ubiquitous high-speed network in Australia.

As we have sought to illustrate in this submission, there is strong evidence that such a network can make an enormous contribution to the Australian business sector, economy and nation; and to the prosperity and quality of life of all Australians during coming decades – and that without an NBN, Australia will be less competitive, less able to innovate and less prosperous.

The benefits, possibilities and opportunities that will flow to Australia from the activity that the NBN will facilitate cannot all be quantified today – and indeed many are as yet unforeseen or not yet even conceived.

Such benefits are also less likely to be fully realised unless there is concerted action at the applications layer – supported by Government - in areas such as e-commerce, e-Government, e-education, e-health and regionally-focused initiatives,

Key recommendations presented in the body of this submission include:

- Support for the creation of a "digital roadmap" for the development of Australia's digital economy, including:
    - the coordination of policy settings at all levels of Australian government
    - fostering a climate in which Australian innovation can flourish at the applications layer, the economic benefits of the NBN can be strengthened and new export opportunities created for Australian businesses
- Support for a Government-supported broadly-based consumer dialogue and education program to empower consumers to optimise their telecommunications experience in an NBN-based environment.

About Communications Alliance

Communications Alliance is the primary telecommunications industry body in Australia. Its membership is drawn from a wide cross-section of the communications industry, including carriers, carriage and internet service providers, content providers, equipment vendors, IT companies, consultants and business groups.

Its vision is to provide a unified voice for the telecommunications industry and to lead it into the next generation of converging networks, technologies and services. The prime mission of Communications Alliance is to promote the growth of the Australian communications industry and the protection of consumer interests by fostering the highest standards of business ethics and behaviour through industry self governance. For more details about Communications Alliance, see http://www.commsalliance.com.au.

INTRODUCTION

The Committee's terms of reference are to inquire into the capacity of the NBN to contribute to a wide range of economic and social outcomes (ToR (a) to (h)). The Committee is also asked to inquire into the optimal capacity and technological requirements of a network to deliver these outcomes (ToR (i)).

The Communications Alliance position is that the achievement of beneficial outcomes for Australia is likely more difficult to achieve without a high-speed ubiquitous broadband network capability such as the NBN.

In undertaking this inquiry we believe the Committee will discover that the roll-out of the NBN – even though it is designed to be a potent enabler and a solid platform for the development of the Australian Digital Economy - cannot on its own be expected to deliver the full range of transformational outcomes that the Australian economy and Australian society seek to derive from the significant planned investment in the network.

Unless there is concerted action at the applications layer, in areas such as e-commerce, e-Government, e-education and regionally-focused initiatives, Australia will most probably not derive full value from its investment in new-generation communications infrastructure.

The benefits that the Communications Alliance submission, and other submissions, will likely seek to draw to the Committee's attention are typically examples of the application of Information and Communication Technology (or ICT) – the action at the applications layer that we believe will be needed to unlock the true potential of the network.

ICT is an example of a General Purpose Technology; that is, a change in the way things are done that has wide impacts across the economy, usually touching and transforming every aspect of economic and, even social, organisation. Both the steam engine and the internal combustion engine are examples of GPTs. Each changed transportation, the intensity of agricultural production and the capability for industrial production.

The latter of these is very like ICT in that there is a symbiotic relationship between one development and another. The internal combustion engine requires fuel, mostly petrol. The transformation deliverable via the engine was only possible where fuel was available.

There are a number of studies that identify the economic consequences from the adoption of ICTs. The capability of ICTs changes dramatically when fuelled by ubiquitous high-speed broadband.

Many of the benefits of the NBN the Committee will hear about are benefits of ICT developments yet to occur in this country, and which are only feasible with the availability of a network such as the NBN. Aside from the need to ensure availability and take-up of value-adding applications, there are three fundamental characteristics of the NBN that are essential to achieve the full array of benefits. These are ubiquity of access, bandwidth and industry structure.

UBIQUITY

Some of the benefits flowing from the roll-out of the NBN - and other complementary network technologies such as LTE - will only become available once the network has reached and connected the majority of the Australian population, because such benefits rely on ubiquity of access to internet protocol (IP).

We take the customer service call centre as a matter of fact these days, and expect to be able to transact with service organisations by phone, among other channels. It was not always so.

In the late 1980s Telecom Australia built a special unit to encourage businesses to establish "telemarketing" capabilities, both inbound and outbound. Telecom met with well-founded resistance, including to the claim that there were immediate cost savings available to businesses.

Even in the late 1980s telephone penetration in Australia was not yet universal. In addition, many households had phones capable only of "decadic" or "pulse" dialling. Some call centre applications, including automated transactions like bill-paying and even negotiating a menu, relied upon "DTMF" or "tone" signalling.

The reality for large business was that a call centre did not always reduce cost. In some cases it added cost. Without ubiquity of tone phones it could not be assumed that customers could transact other than face-to-face, so the new call centre would not replace other distribution infrastructure.

There have been similar experiences with the use of the web for service provision and transactions; until all (or enough) customers are capable of using it there is no net benefit in investing in it.

The same will be true, in the early years, of many ICT innovations that rely upon the capabilities of the NBN. For example, in health the use of remote monitoring terminals is regularly cited as a benefit deliverable via the NBN. These are devices a patient can take home, use to conduct various tests and automatically report test results back. It can also set up a consultation with a health care worker if a result is unusual. This can save many visits, either of the patient to a centre or a worker to the patient.

However, it only becomes economically effective to provide the devices as "standard" once it is known that all (or significantly large numbers of) patients are able to acquire the device, take it home and plug it in to an appropriately capable network.

Many of the NBN benefits will mirror this feature and as a consequence many of the benefits relying on new applications will become more apparent as the construction program and customer take-up reaches "critical mass" in the latter stages of the roll-out schedule.

This is not an argument to abandon the investment in the NBN – rather, it highlights the desirability of a rapid roll-out.

BANDWIDTH

The key distinguishing feature, other than ubiquity, of the NBN over existing technology is bandwidth, which has a direct impact on the achievable download and upload speeds for internet users, for example. While the throughput available to existing Australian broadband users varies according to the access technology they use and issues such as their distance from the local exchange, the NBN will be capable of providing a consistent 100 Mbps to 93% of the population and 12Mbps to those areas that are currently limited to about 1 Mbps.

It is reasonable to ask whether such high bandwidth is necessary. In answering the question three things are relevant; the technology of computing, the historic trend in speed requirements and the bandwidth need of future applications.

In the field of computing there is a well-known relationship known as Moore's Law (named after the founder of Intel) that the capacity of microprocessors doubles (and the price halves) every eighteen months. This relationship has applied for a very long time now, long before the transistor. Figure 1 shows the exponential growth has occurred over the last one hundred and ten years, while Figure 2 shows the actual relationship for microprocessor performance and Figure 3 shows it for the cost of memory chips.[1]

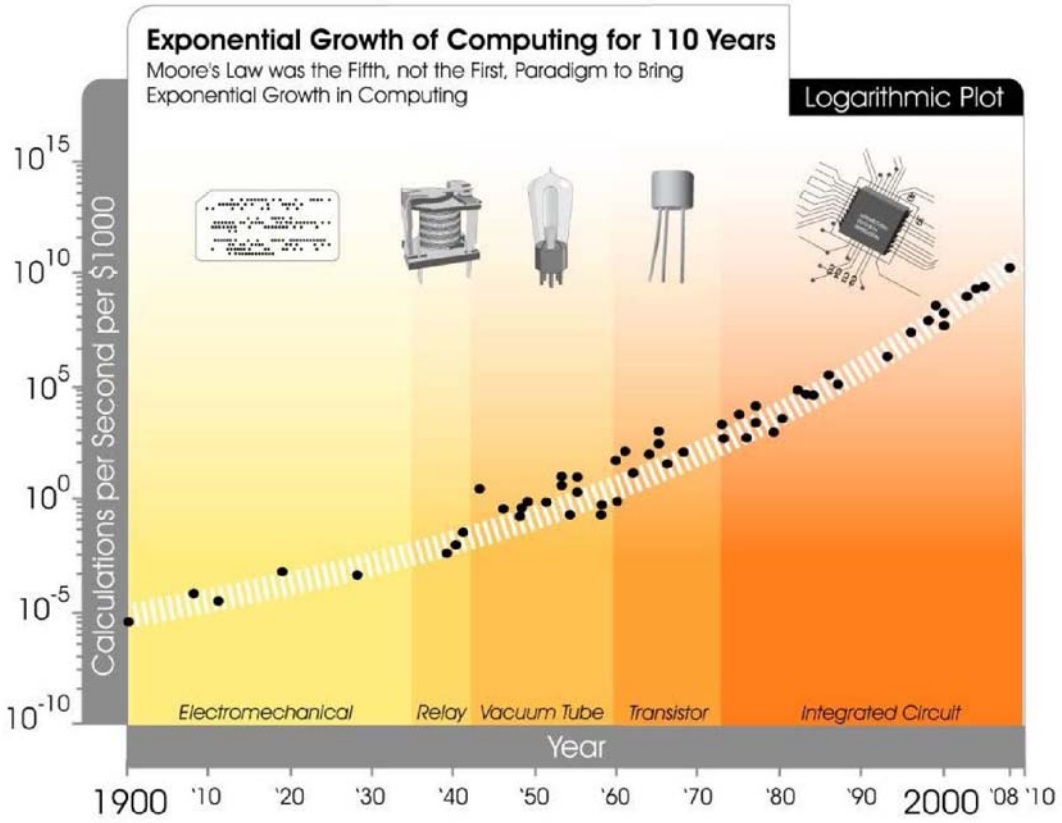

Figure 1: Exponential Growth in Computing over 110 Years

[1] These three diagrams are from *How My Predictions Are Faring by* Ray Kurzweil, October 2010 (available on line at http://www.kurzweilai.net/predictions/download.php) .

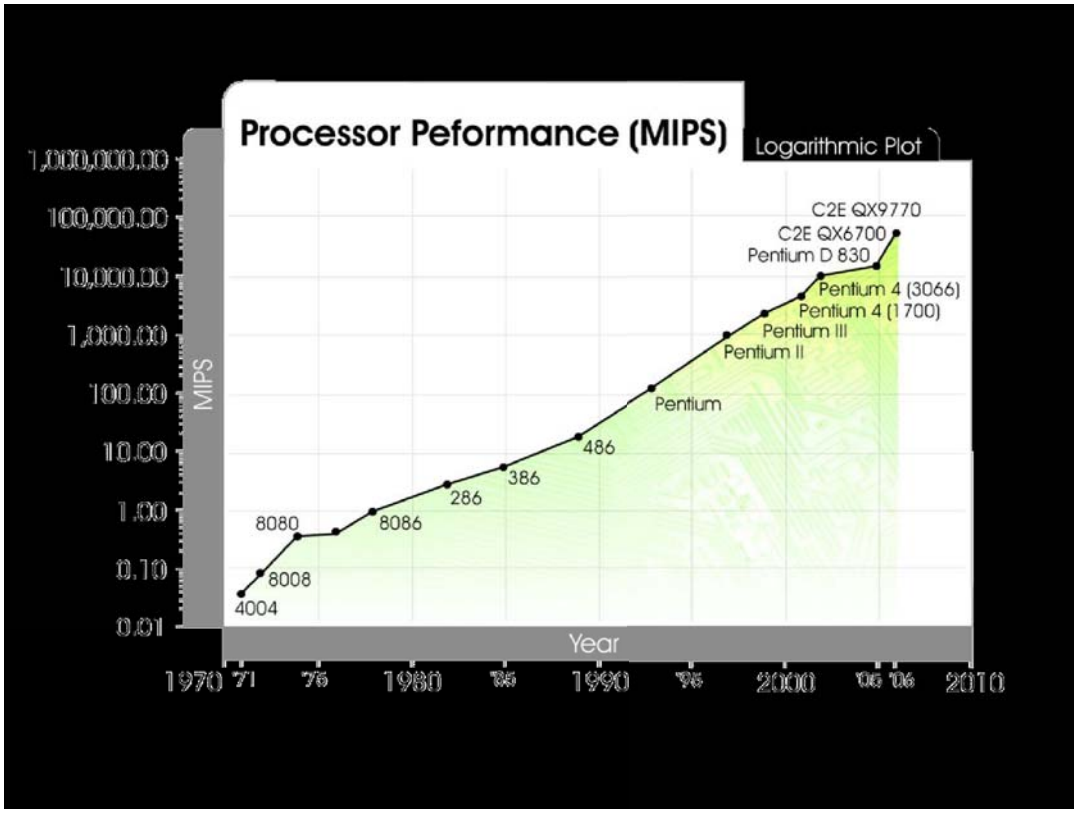

Figure 2: Processor Performance

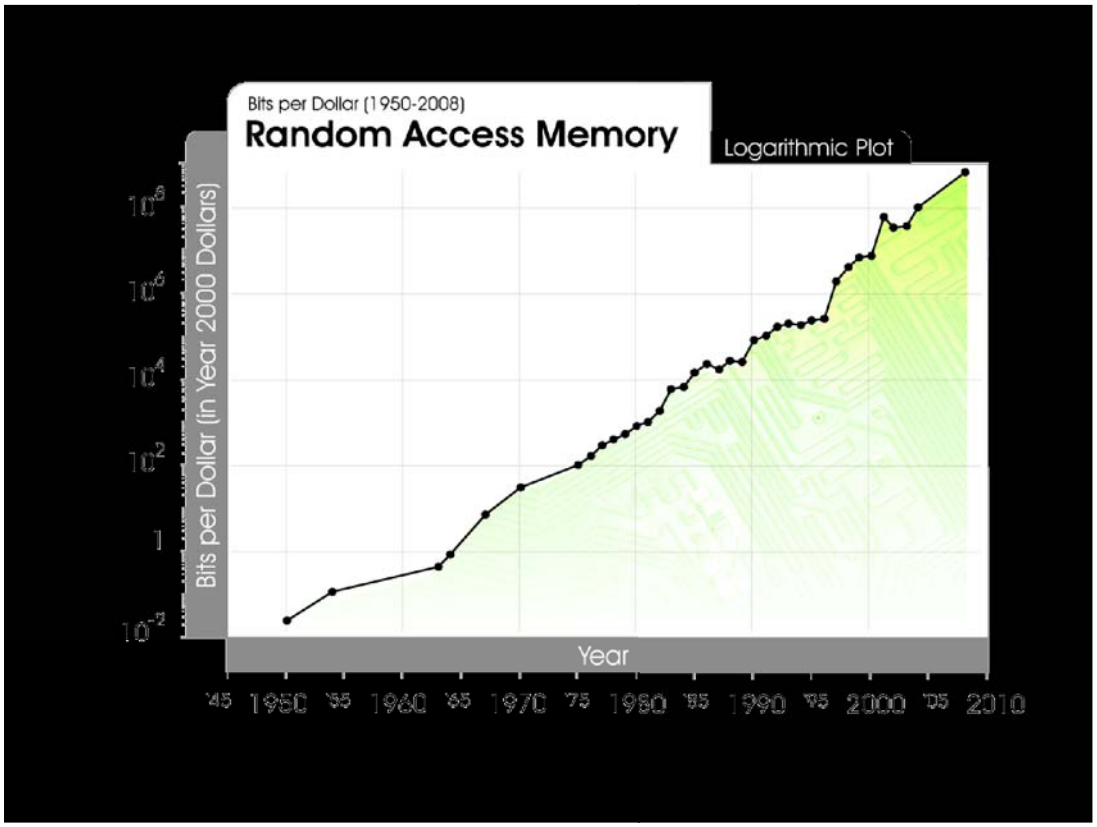

Figure 3: Bit per dollar of storage

These changes in technology have been matched by historic trends in bandwidth requirements of communications links. Figure 4 shows how the typical connection speed of users has changed over the last thirty years, with a projection for the next ten.[2]

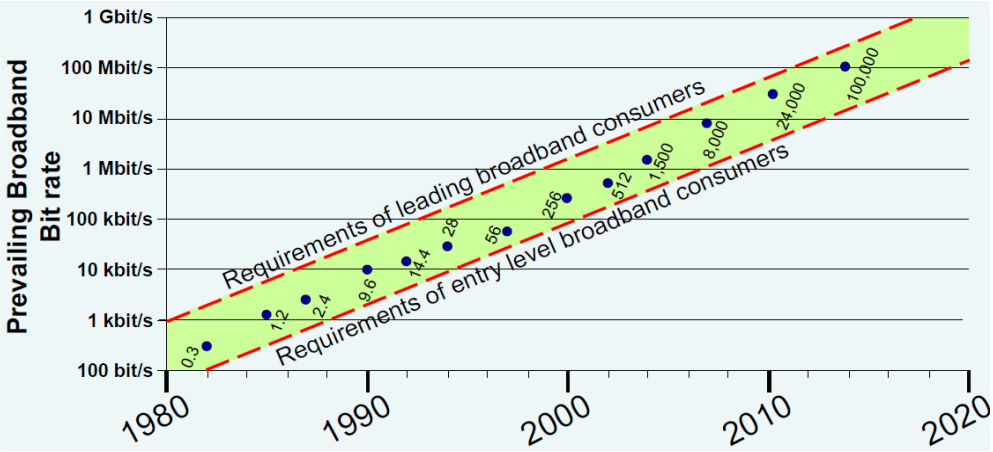

Figure 4: Prevailing Broadband Bit Rate

This shows the same exponential growth as processing speed and is not unsurprising. The increased processing power has firstly changed the nature of content, becoming increasingly graphical, including maps and moving images. The increased processing power also changes the speed with which each transaction can be completed and hence move onto another, or increase the amount of simultaneous applications engaged in.

The ongoing technology trends and the historic bandwidth requirements alone are not enough to convince some people, though, of the forecast future speed requirement increases. They need to have some idea of the uses to which these increased speeds will be put. The first thing to recognise is that the speed requirement needs to be related to peak speed requirements. IP traffic tends to be "bursty": that is, it periodically requires a short duration of high throughput. To deliver a quality mass-market user experience, the peak speed capability of the network must meet the sum of the burst requirements of users online at any one time, not just the base level of demand.

Video traffic, including high-definition and 3D transmissions along with real time conferencing for social, educational, health or work needs, is bandwidth intensive. Historic videoconferencing is not always a satisfactory service for telework as so many of the visual cues used in communication tend to get lost in low-definition transmissions. High definition, real time video significantly changes that relationship. At the same time, more devices in the premises will be connected. Security applications will not be limited to passive alarm, but can include real-time intelligent remote video surveillance. Devices in the home will be communicating independent of the householder, such as energy metering and automatic energy saving programs, intelligent IPTV making decisions on video capture and storage, and services such as an intelligent climate system obtaining a weather forecast and making consequent changes to the in-house environment.

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[2] Source FTTH Council Asia/Pacific submission to the Senate Select Committee on the National Broadband Network, at P.23. (Available online at http://www.aph.gov.au/Senate/committee/broadband_ctte/submissions_from_april_2009/sub67.pdf) This diagram has since been used by NBN Co CEO Mike Quigley in a number of presentations and appears in the NBN Co Business Plan.

In reality the "onus of proof" falls on those who argue we will not need access to higher speeds in the future as mass take-up of new applications occurs. [3]

[3] It is also worth noting that the Cost Benefit Analysis that the Senate Select Committee on the NBN placed sufficient credence on to suggest the Government commission its authors to undertake a CBA for the entire project assumed away most of the benefits of higher speeds by saying;

"The question then is whether the valuation of the incremental speed associated with the NBN outweighs the incremental costs. In considering this, it is important to remember that most currently envisaged applications function reasonably efficiently at speeds well below those contemplated either in the NBN world or in the counterfactual. Thus, over time, advances in compression and coding tend to reduce bit rate requirements, to some extent offsetting the tendency for applications to become ever more 'content rich'." Ergas and Robson submission available at http://www.aph.gov.au/Senate/committee/broadband_ctte/submissions_from_april_2009/sub99.pdf .

INDUSTRY STRUCTURE

The field of Industrial Organisation is the academic economic discipline that considers how economic efficiency is impacted by decisions on how to organise. Key considerations in the field are the extent of horizontal integration in any industry (the extent of monopoly or oligopoly power), and the nature of vertical relationships.

Vertical relationships refer to the practice of one firm operating at two levels in a chain of production. In the literature a famous case is the "Fisher Body" case which covered the case of an automobile manufacturer (General Motors) acquiring a body maker (Fisher Body). Until that point car makers sold chassis and engines and customers acquired the bodywork separately. This built on the idea that the car manufacturer was simply replacing the horses - the carriage maker still made the carriage.

Vertical relationships of this nature are seen to be efficient because they eliminate "transaction costs".

However, vertical relationships can also be used to extend existing market power from one market to another. A firm that has, for example, a monopoly on access to the homes via communication connection - and which can also provide services - has the opportunity and incentive to favour its own operations at the expense of competing firms, and hence over time reduce consumer choice.

While the real impact of a vertical arrangement would then seem to depend on the facts in the particular instance, the reality is that the analysis is often impossible to perform. Hence the discussion is usually based on theoretical, if not outright philosophical, bases.

However in the case of ICTs there has been a wealth of empirical cases that demonstrate that vertical integration usually results in restrictions to efficiency. In particular, the ongoing control of the access network by a service provider has typically acted to restrict competition and growth.

The NBN implementation has chosen an explicitly separated model and a technological choice to stay at the lowest implementation level (the ISO Layers 1 and 2) to facilitate service growth and maximise the potential for competition at the Layer 3 wholesale and retail levels.

RESPONSES TO SPECIFIC TERMS OF REFERENCE

Many of the points and arguments advanced in the body of this submission will rely on examples of successes, or failures, recorded in countries other than Australia. This is somewhat inevitable, given that Australia does not have a body of experience to draw on as to what is possible, nor where the risks lie, when seeking to draw advantage from a ubiquitous, high-speed communications network.

A: The Delivery of Government Services and Programs

Regarding this Term of Reference, there are two lessons to draw on at the outset.

The first is the importance of continuity of purpose over time. Successful strategies to provide for implementation of fundamental changes in the delivery of Government services and programs via a network such as the NBN necessarily require a "long game" approach. A strategy subject to major change each election cycle will surely fail.

The Republic of South Korea stands as a strong example in this regard. The Koreans commenced their strategic plan for an intelligent network transformation in 1987 (partly in recognition that they wanted to demonstrate a forward-looking economic stance in advance of the 1988 Olympics in Seoul). The resultant and sequential plans have survived five changes of national administration basically intact, and this continuity has been a key enabler in the dramatic economic transformation of South Korea over the past 23 years.

The second lesson is the need to have a plan that coordinates the actions of all arms and all layers of Government. Australia presently lacks a "Master Plan" or "digital roadmap" that serves to perform this function. Communications Alliance proposed at the time of the most recent Federal election that the incoming Government – whatever its complexion – should establish a Cabinet Committee, chaired by the Prime Minister, to coordinate the policy settings of all the relevant portfolios – e.g. Transport, Health, Education, Welfare, Communications and others – to ensure that they were aligned and calibrated to deliver a globally competitive Australian Digital Economy, underpinned by the NBN.

We were encouraged by the Digital Productivity initiative announced by the Prime Minister soon after the formation of the present Government, and hope that Cabinet consideration of the detail of this initiative will result in meaningful measures aimed to achieve such a result. Communications Alliance stands ready to contribute constructively to the implementation of such an initiative.

In similar vein, we were disappointed that the recent announcement concerning the restructuring of the COAG Ministerial Councils did not propose to establish a Council dedicated to coordinating all levels of Government in pursuit of the development of the Digital Economy in Australia. If not rectified, this is a major opportunity missed.

Following are some examples of the economic benefits achievable by using a network such as the NBN, overlaid by appropriate ICT applications, to achieve improved efficiencies in the delivery of Government services and programs.

E-Government in South Korea

In 1987 Korea began digitising and networking all the information on its government databases, leading to the first roll-out of e-Government services in the mid 1990s.

By 2001, 11 key e-Government initiatives were undertaken to create platforms including:

- Home Tax Service (on-line income tax returns)
- On-line social insurance services
- National e-Procurement System
- Digital signature and e-seal
- Government Portal
- National Financial Information System
- National Education Information System

Korea ranks first in the various UN indices for e-Government Readiness and e-Government participation, with more than half the population making regular use of e-Government services (projected to top 60% by 2012).

More than 2500 Korean Government services can be applied for on-line, and more than 2000 Government forms can be issued on-line.

More than 81% of all tax filing is processed on-line, with enormous savings in bureaucratic effort.

Officials claim that the transparency inherent in national e-procurement programs has all-but eradicated corruption from the awarding of Government contracts, saves 4.5 trillion Korean won per annum in administration costs and has reduced bidding times from half a day down to one minute.

Similarly, the Korean e-Customs system has cut export declaration processing times from more than a day down to less than 2 minutes and saves 2.5 trillion won per annum.

One of the keys to the success of e-Government programs in Korea has been consistent top-down pressure by successive administrations, via a Committee on Government Information Strategy reporting directly to the President.

The Government decreed that for efficiency and networking capability across Government, all Government departments would centralise their data centres in a single super-centre (with disaster-recovery redundancy, of course). And it happened!

Korea's next targets include an overhaul and simplification of the legal and legislative structure governing ICT and further improvements in coordinated e-Government at the local council level. It also has a major push underway to "green" the ICT sector, including by almost halving the number of Government servers and through widespread adoption of cloud computing.

E-Government in Japan

Present day Japan, on the other hand, provides a lesson in why the presence of high-speed access on its own is not enough to guarantee that the nation will derive full benefit from the required investment. The incumbent Japanese telco, NTT has spent about Aud$40 billion rolling out fibre to the premises networks over the past 10 years.

In Japan, approximately 46% of local governments and public organisations are providing some form of e-Government services today, but this is heavily skewed by the fact that 28% of these have some form of on-line disaster prevention/notification services.

Only 6.6% of local governments, for example, are providing any on-line welfare services, and the corresponding figures are 5.5% for medical services, 4.3% for education services, 5.6% for tourism services and 6.7% for transport services.

While the Japanese Government is now undertaking a concerted effort to lift its performance in e-Government service provision, the lack-lustre performance to date is a core reason why in a nation where virtually 100% of the population has access to broadband speeds of 30Mbps or higher, only about 30% of the Japanese population actually use the internet.

E-Government in Singapore

Singapore is mid-way through a 10 year national Infocomm plan dubbed "iN2015", designed to "Leverage Infocomm for Innovation, Integration and Internationalisation".

The key goals of the program are to:

- Make Singapore the world leader in harnessing Infocomm to add value to the economy and society
- Double the value-add in the Singapore Infocomm industry to $S26 billion
- Triple Singapore Infocomm export revenue to $S60 billion
- Create 80,000 additional jobs
- Achieve 90% broadband usage in all homes; and
- Achieve 100% computer ownership in homes with school-going children (currently 83%)

Of special note in Singapore is the way in which public-facing e-Government services are organised. The national technology regulator, Infocomm Development Authority (iDA) uses a process called "birth to death" analysis. This approach evaluated all citizen interaction types with Government from birth and throughout the course of human life. It then created an implementation plan by which each of those interactions can be facilitated or entirely managed through the e-Government portal. iDA, acting as a national CTO, ensures that all e-Government initiatives are driven through all branches of Government. While this approach might not map exactly to Australian needs, it would appear to be worth investigating further.

Singapore's E-Government initiatives include:

- National Authentication Framework (NAF) which provides uniform authentication verification to multiple devices for accessing government services, financial institutions, educational institutions and e-commerce services
- NGSIP, which provides Government support for organisations developing "innovative and impactful" next generation broadband services
- TradeXChange, a multi-party collaborative platform to integrate trade and logistics processes, to be completed in 2012
- SOEasy, which to date provides online access to 33 of 76 Government agencies
- eCitizen OneinBox, a personal secure inbox for citizens to correspond with Government (to be launched in 2012)
- m-Gov, which is piloting mobile government applications

The Government of Singapore has continued its "Singapore Hub" strategy into Infocomm areas, using incentives to attract the Infocomm regional centres of players such as Equinix and Amazon web services, along with the regional innovation centres of Cisco, Oracle and others.

B: Achieving Health Outcomes.

In the area of e-Medicine, 11% of Japan's 7,714 General Hospitals boast a tele-radiology system, while 2.5% use tele-pathology systems and 0.6% have an on-line based home recuperation support system.

The Japanese Government has established e-Medicine trials in 10 relatively remote regional centres involving the provision of tele-radiology, tele-consultation and home recuperation support, using the resources of medical experts in metropolitan hospitals.

The relevant Ministry, MIC, believes that the program is presently generating savings of 41 billion Yen per annum via reduced travel for patients, shortened hospital stays and increased income to patients who get back to work sooner. It calculates that the remote hospitals involved are receiving 130 billion Yen (about Aud$320 million) per annum in additional receipts through patients being treated locally.

Australia has 162 hospitals that are classified as "remote", so if we gained similar savings in those institutions and similar income boosts to the local populations it would constitute a significant saving to the Federal Budget and a major fillip to regional Australia.

The Singaporean Government also has advanced program in e-Health and e-Education. Hospitals make extensive use of digitised databases and fibre connectivity for patient identification, remote consultation and automated medication ordering and dispensing.

Singapore is in the process of creating a national healthcare network by 2015 with the stated objective of "One Singaporean, One Electronic Medical Record" The network is intended to link all healthcare facilities, regardless of size, to a single network. One target is systemic cost reduction to reduce the burden of private health care expenses on citizens.

C: Improving the Educational Resources and Training Available for Teachers and Students

The Singaporean Government has selected 15% of schools in Singapore ('Future Schools") for a program of intensive focus on e-education, with the aim of rolling successful programs out to all schools. All teachers have undergone IT training and each school has a Tech Assistant on staff. Every student is supplied with a lap-top.

Partnerships have been formed with advanced schools in Europe and elsewhere to create a Virtual Global Learning Facility. The Government gives grants to small businesses to encourage them to develop e-education applications.

The Singaporean **Future Schools@SG** program has teamed industry consortia with selected schools to develop advanced e-Education applications that will be rolled out nationally. Students in one program, for example, have their own personalised avatar that adjusts to the ways in which the individual student learns most effectively, then feeds this back to teachers who use the data to improve their teaching approach.

Students in other programs experience natural history and climatic events in immersive virtual reality environments where 14 high-definition 3D screens combine to let them live and 'feel' what they are studying. These are applications with global export potential. The risk is that Australia will end up buying them from Asia, rather than selling them to the world.

Elsewhere, New Zealand has earmarked some UFBB funding for specific upgrades to school connectivity. Of the original NZD$1.4billion for the UFBB project, $158million is set aside for educational facilities. The NZ Government has further designated education facilities as "priority broadband markets".

Malaysia's HSBB project has designated the specific training objective of creating a "knowledge class" and "creative class" of workers. This addresses training more specific to network construction and operation itself, but also includes the training of 10,000 workers with Telkom Malaysia and related organisations.

D: Management of Australia's Built & Natural Resources and Environmental Sustainability

Communications Alliance has chosen not to respond to the element of this Term of Reference that relates to management of natural resources, believing that other respondents to the Inquiry will be better placed to provide commentary guidance on those issues.

We do wish to make some observations on the other elements of this Term of Reference.

Environmental Sustainability - Battery Back-up

The Federal Government's Statement of Expectations concerning NBN issues, released on 17 December 2010, indicates that the Government will consult with stakeholders on how to ensure access to battery back-up services for NBN users who need them, but that in the interim, the Government expects NBN Co's business plan to allow for all network termination units within the fibre footprint to have the capacity to support a back-up battery.

Communications Alliance strongly supports the adoption of an opt-in approach to battery back-up; not least because of the potential damage to the Australian environment through improper disposal of the sealed-lead acid batteries expected to be used for this purpose.

A Communications Alliance background paper outlining our views on this topic in more detail is provided for information at *Attachment 1.*

Management of Built Resources

One area that should be considered in terms of Australia's built resources is the need to ensure that homeowners – whether they occupy an existing home or are building a new one – are in a position to make intelligent choices about how to distribute NBN-based services within their premises.

These services can include any or all of the following Service Categories:

- Communications
- Entertainment
- Energy management
- Security & Safety
- Digital home Health
- Age and Assisted living
- Intelligent light and power

If the in-premises infrastructure – which can include wired or wireless solutions or a combination of the two – is not fit-for-purpose, then the benefits of the advent of the NBN may be limited or delayed for many Australians.

Communications Alliance is working with a range of stakeholders, including the Copper Development Centre (CDC) on the development of information for consumers to address these issues.

E: Impacting Regional Economic Growth and Employment Opportunities

Many studies have shown a correlation between broadband penetration and economic development. Newer studies are attempting to demonstrate causality – broadband directly causing increases in GDP and employment rates. One of the most comprehensive such studies compared a large number of relatively homogeneous communities across the United States. The results of communities that achieved higher broadband penetration than peer communities were as follows:

Effect on:

- Employment +1 to 1.4%
- Business establishment +0.5% to 1.2%
- Increment to ICT Industry +0.3% to 0.6%

In 2005 the Brookings Institute linked a 1% increase in broadband penetration to a 0.2 to 0.3% increase in employment in the United States.

A Spanish study in 2003 found that a 5% increase in broadband penetration should generate a 0.6% increase in employment. A Korean study the same year contended that a 5% increase in broadband adoption among small-to-medium enterprises should yield a 0.4% increase in job creation.

There are some examples of successful regional e-Commerce projects in Japan. The one-time capital city Kyoto has a project with numerous streams, including centralised credit and debit card processing which speeds the receipt of funds to 1,300 stores, improving their cash flow and making them more competitive than regional neighbours. It also operates a city-wide online shopping mall which boosts sales to consumers in other parts of Japan.

Another project in Tokushima prefecture enables a regional agricultural organisation to receive online orders for perishable items from restaurants and markets nationwide, and distribute the orders on-line to local farmers for immediate fulfilment by the first farmer who responds.

F: Impacting Business Efficiencies & Revenues, particularly for Small & Medium Business, and Australia's Export Market

It is typically difficult to attribute with precision the revenue and business efficiency impacts flowing as a direct result of national ICT/fibre broadband investments, but there are several recent studies which provide some indicators.

A study by Morpace Market Research and Consulting in 2010 highlighted the much stronger performance of the US market in terms of monetising the consumption of Online Video, compared to Australia.

The study found that almost 7% of US entertainment revenues were being derived from online digital platforms, whereas the corresponding number in Australia was only about 2.5%. Commentators have attributed the difference largely to the average higher broadband speeds available to US customers, compared to those in Australia.

The Republic of Korea has cited the following growth effects in the period 2002 to 2005, as the direct result of national ICT / fibre broadband investment:

	2002	**2005**
e-Commerce transactions	USD 49 Bn	USD 391 Bn
Korean game market	--	USD 4 Bn
Growth in IT exports	18%	32.8% (to USD102Bn)
Domestic software production	USD 15 Bn	USD 17Bn

The Japanese Ministry of Internal Affairs and Communications (MIC) has undertaken analysis in conjunction with Goldman Sachs, which concluded that without a competitive FTTH-based communications infrastructure, Japan's global GDP ranking would fall from 3 today (Japan recently lost the global #2 ranking to China) down to 8 by the year 2050 – with countries such as Russia and Mexico overtaking the Japanese.

G: Interaction with Research & Development and related Innovation Investments

Singapore's iDA has one of the most comprehensive programs for linking its Next-Generation NBN project to private and entrepreneurial efforts. Over 20 ICT-promotion programmes are sponsored by iDA. A sample of these programs includes:

- Proof of Concept [POC] Lab. Allows assessment of new technologies "one to two years ahead of adoption". The lab provides a testing environment and equipment that would otherwise be expensive for entrepreneurial development

- Infocomm Investments. Includes multiple government-backed programs for investment in start-up companies related to ICT based in Singapore

- Digital Media and Entertainment. Multiple programs to foster, invest, and enable new media development in Singapore

H: Facilitating Community and Social Benefits

Numerous elements relating to this Term of Reference are provided in the information provided throughout this submission.

In terms of overall economic benefits to the community and the national economy, it is worthwhile noting that one of the few publicly available and credible attempts at a cost-benefit analysis of the economic impact of the introduction of a ubiquitous high speed communication network has been undertaken by the Ministry of Internal Affairs & Communication (MIC) in Japan.

The MIC study concludes that the value to the Japanese economy in the period 2011-2020, arising from them having completed the rollout of FTTH nationally by end FY 2010, totals 73 trillion yen - 33 trillion from benefits to the telco sector and the companies involved in the rollout and 40 trillion in value accruing to other industries who benefit from the effects of the network being in place.

MIC said they looked at also trying to calculate the value of the social benefits generated through improvements in the lives of the Japanese population, but decided that this was too difficult.

Extrapolating crudely to take account of the difference in Japanese and Australian GDPs suggests that the value to the Australian economy could be in the order of Aud$182 billion over the same period, if the same assumptions held.

Consumer Dialogue & Education

For some consumers, the process of migrating their existing copper-based communications services to fibre-based services on the NBN – and then successfully managing their telecommunications experience in an NBN environment - will be an initially daunting task.

Consumers will face choices about which plans and services to use (including new services such as IPTV), which service provider(s) to contract with, whether their existing equipment will work in a fibre-based environment, whether their existing services will all translate seamlessly onto the NBN, how to manage faults and a host of other issues.

The post-migration period will be marked by intense competitive activity at the retail level. On the positive side, this will serve to increase the range of choices available to consumers, but will also likely add to the complexity of the situation from a consumer perspective.

Empowering consumers by giving them the information to assist them to make these choices will be a key success factor for the massive task of moving most of the nation's telecommunications users onto a new and vastly different network.

Conversely, if many consumers are confused, frustrated or make choices they later regret, the transition to the NBN will be a painful one for customers, service providers and government alike.

In mid-2010 Communications Alliance convened a group known as the Consumer Dialogue and Education group, consisting of representatives from NBN Co, DBCDE, the ACMA and ACCC, ATUG, ACCAN, ISOC Au and Communications Alliance. The group has had primarily an information-sharing role to date, and has worked on the development of a Messaging Platform to be used by retail services providers (and other stakeholders) to inform consumers about the process of migrating their services to the NBN and how to make intelligent decisions once connected to fibre.

The Federal Government has instructed NBN Co to undertake a wide-ranging information campaign for consumers around migration issues. This is a positive step, but Communications Alliance believes a much more broadly-based campaign is needed.

Ideally the Federal Government should make a strong commitment to ensuring that consumers are in the best position to make decisions on NBN-related issues.

The Government committed something in the order of $60 million to a national information campaign to assist the ongoing switchover to digital TV.

Communications Alliance believes that a commitment of similar magnitude, to be managed by a coalition of key stakeholders such as is represented within the Consumer Dialogue & Education Group, would be a worthwhile investment in ensuring that all Australian are well-placed to reap the benefits of switching to NBN-based products and services.

I: Optimal Capacity and Technological Requirements of a Network to Deliver these Outcomes

Among Government-sponsored NBN-style projects implemented or underway in Asia, most (including Australia, New Zealand and Singapore) target 100Mbps per subscriber as a bandwidth target for today, while recognising that bandwidth requirements will rise over time at an unspecified rate.

South Korea is considering introducing a new requirement that all new networks should allow for a peak rate of 1Gbps per subscriber.

It is equally important to consider committed information rates (CIR), also known as minimum bandwidths. The CIR is a key determinant of consistent service quality, even though peak rates tend to be more often the focus of public debate. In the United States, some broadband carriers have reported that streaming tv/video providers such as Netflix have doubled their network traffic during the past year since these on-demand

products have become available. This trend appears to be spreading and will likely be a driver for network traffic capacity requirements. This makes minimum guarantees critical, to ensure that large traffic volumes from applications such as streaming HDTV do not constrain users on shared facilities, such as the NBN's shared fibre PON access lines.

We believe that NBN Co's review of near-term and future bandwidth requirements has appropriately considered the issues around minimum bandwidth guarantees.

That said, to attempt to be prescriptive about the long-term optimal capacity of next generation networks is probably an exercise in futility.

History demonstrates that demand and usage projections by the best minds in the telecommunications space have often been proved wrong.

The issue, then, becomes the demand scalability of any new network.

Communications Alliance believes that fixed and wireless technologies are complementary and that both will be important components in meeting consumers' communications needs and desires going forward. Increasingly, the emphasis will not be on which network technology is used, but rather whether the device being used is capable of connecting seamlessly to whichever network is the most effective for the consumer at that time, irrespective of their location.

Fibre-to-the-Premise, using the G-PON architecture being employed by NBN Co, is immensely scalable. The architecture and equipment being used in the initial roll-out effectively shares 2.5Gbps of download capacity between each group of 33 users/premises, giving the capability to provide, in all practical senses, a download speed of 100Mbps to each user and the ability for individuals to burst up to 1Gbps.

End-equipment technology is already available to boost this download-per-user speed by a factor of 4 and is likely to be introduced by NBN Co at some stage during its roll-out program. With the incorporation of Wave-Division-Multiplexing (WDM) technology into the network and with the advent of 40Gbps and 100Gbps interfaces currently being trialled, it is likely that the fibre being laid by NBN Co today could eventually deliver download speeds of up to 100Gbps to Australian consumers – all without any upgrade to the physical fibre link.

Such download speeds are effectively 5000 times or more than the speeds available to even the best-positioned ADSL broadband customer in Australia today.

Of course we cannot know whether speeds of 100Gbps will ever be necessary (and if they prove not to be, the network can be retained at more modest specifications).

But the beauty of a fibre-based network such as the NBN is that we can be assured that the Australian telecommunications consumer can be equipped to manage the demands that are, for now, beyond our imagination – and without the need for a grass-roots upgrade to make this happen.

ATTACHMENT 1

Discussion Paper in Support of an Opt-In Approach to Battery Back-up for ONT's in the Australian National Broadband Network

Prepared by Communications Alliance CEO, John Stanton, November 2010

This paper argues that an opt-in approach to battery back-up for the Optical Network Termination (ONT) unit in householders' premises is a more logical, efficient, forward-looking and environmentally responsible approach than mandating such back-up.

Background

i. Recommendation 27 of the NBN Implementation Study called for NBN Co to be required to provide an ONT power supply unit to all FTTP customers with the potential for a back-up battery to be installed. It further recommended that Government establish a program to subsidise the provision of back-up batteries for customers identified as requiring lifeline services when connected top the NBN. The study suggested that Access Seekers distribute batteries to the lifeline users and be responsible for their maintenance, and that all other users be given a choice on whether to take battery back-up, and accept responsibility for maintaining the battery

ii. The Technical Working Group of the Communications Alliance NBN Project examined the battery back-up question in some detail and noted:

An important consideration is that the use of battery backup on a large-scale (e.g. mandating battery backup on all ONTs) would create considerable extra costs for end-users and operators, and very likely lead to serious environmental problems as end-users carelessly discard batteries into land-fill. The use of batteries also leads to increased energy emissions, as constant trickle-charging is necessary to compensate for their self-discharge. Thus for environmental reasons the use of batteries for backup should be minimised.

iii. Minister Stephen Conroy, speaking on the ABC Insiders Program on 24 October 2010, said that "the Government has instructed the national broadband network that battery back-up will be mandatory".

Arguments in Favour of an Opt-In approach

1. No need for mandated back-up

Mandatory battery back-up does not necessarily solve any problems that could not be otherwise dealt with by a "lifeline & opt-in" process as recommended by the Implementation Study.

The desire to ensure back-up for lifeline customers can be readily accomplished by a selective deployment, and any other customer who believes he or she does require battery back-up can avail themselves of that facility.

2. *ONT Back-Up Not Necessarily a Solution*

In FTTP networks the fibre network cannot power the ONT – hence the suggestion for battery back-up to power the ONT during periods of mains power outage. For this back-up to be effective, however, it is necessary for the end-user equipment to also have battery back-up.

In the case of telephony this means that the telephone, ATA (telephony adapter) and ONT all need back-up. While battery back-up devices can be offered by operators as an option, the batteries themselves are relatively short-lived, and the actual lifespan will be determined by the environment and usage pattern of the batteries.

Whatever the outcome of the battery back-up debate, it will be necessary for those consumers using a back-up battery to understand how many components of their service also require back-up (these may also include some other devices such as health monitors).

3. *Cost & Inefficiency*

The 12 Volt Sealed Lead-Acid (SLA) batteries that are most likely to be used in a large-scale deployment of ONT back up are relatively large and heavy (around 1kg), and typically cost approximately $15 at the wholesale level. Mandatory installation of these units in around 10 million Australian homes could add around $150 million to the rollout costs of the NBN.

Maintenance and/or replacement of the battery units over time by NBN Co will be difficult and costly as NBN Co will have no relationship with the end-user. Maintenance/replacement by Access Seekers will add to their underlying operating expenses (a cost ultimately borne by consumers), and might at times divert Access Seekers from dealing with other operational issues or solving customer problems.

The use of other, smaller battery types such as Lithium-Ion or "Gell" batteries is unlikely in a large-scale deployment because of the additional costs involved.

One other issue is that if battery back-up is used, then the back-up unit arguably needs to be installed inside the premises so that the customer can see the "low battery" alarm. This may limit flexibility in circumstances where it is operationally better to install the back-up unit on the outside of the premises.

4. *Pervasiveness of Mobile Phones*

Mobile telephone penetration in Australia is approximately 112%. The costs of basic handsets and mobile air-time have reduced significantly in recent years Mobile services prices fell by approximately 45% in the decade to 2007-08, according to the ACCC.

Due to the pervasiveness of mobile phones and the likely use of these devices for emergency calls during a local power failure, the application of ONT battery back-up is better suited to more specialised use cases on a user by user basis. Such applications include specific health monitoring services, medi-alert services and security services. Users wanting to subscribe to such services would request or be provided with an appropriate level of battery backup by their service provider in conjunction with NBN Co on an as needs basis.

There is a strong trend towards consumers and business abandoning fixed lines in favour of mobile devices. By the time NBN rollout is complete only a small and declining minority of Australian premises will be using fixed phone lines and most of these will be with cordless phones that need grid power to work.

Further, many of the remaining PSTN fixed services will have migrated over time to VoIP services – meaning that battery-backup of the VoIP device or PC/lap-top will also be required if connectivity is to be preserved during a power outage.

Also, by the time the NBN is completed, communications for security, health monitoring, etc., will have mostly migrated from fixed phone lines to the mobile phone networks. The aging security/monitors devices used today will be obsolete and discarded.

5. Environmental Concerns

Sealed Lead Acid batteries are recyclable, but the reality is that many batteries are disposed of in household waste before ending up in land-fill, where they pose the threat of significant environmental damage over time.

Other types of batteries are not necessarily recyclable and contain dangerous heavy metals such as cadmium.

The roll-out of the NBN should be achieved in a way that minimises its impact on the Australian environment.

The prospect of some proportion of 10 million SLA batteries leaching acid into the Australian environment and potentially contaminating ground water (and being added to by successive waves of discarded batteries) is an issue the Government should consider carefully before deciding to mandate battery back-up.

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