# Michael S Cox

# Response to:

## ACCC/NBN Co Discussion Paper on: National Broadband Network Points of Interconnect

## November, 2010

I am pleased to be able to provide this submission in response to the ACCC Discussion Paper on points of interconnect to the National Broadband Network. This response aims to represent the combined best interests of:

- **first** the Long-term interests of Australian residential and business users (consumers);
- **second** the evolution of an open, competitive and efficient marketplace for retail service providers (producers); and
- **third** the long-term economic viability of NBN Co as a national wholesale access provider (enabler).

It is hoped that this hierarchy of consideration is aligned with the Governments vision for the NBN as well as the remaining stakeholders (end-users, regulators, NBN Co, other carriers, businesses, vendors and suppliers).

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We must not allow the proverbial tail (NBN Co and their business case) to wag the dog (the Elected Government of Australia). NBN Co was not established as an investment vehicle for public monies based on an assurance of economic returns. Rather, it was established as a means of effectively addressing the telecommunications market failure in a fiscally responsible manner. Based on this understanding, NBN Co must cease selectively interpreting policy and prioritising its business case at the expense of prioritising the original intended outcomes.

Using transport as an analogy for communications, '*our job is to enable the transport future for the nation, not to buy everyone a Porsche (and only a Porsche); oh, and then mandate a single supplier of fuel and establish fixed tolls on all the roads ...—but it's ok because you still get to choose where you want to drive to and how fast ...*'. This approach, really is, unacceptable.

# Introduction

## 1.1 Nationwide Broadband is a Noble Target

Providing all Australian's with available, accessible and affordable broadband, regardless of their geographical location or their socio-economic status will not only help to improve the quality of life for all citizens, it will also reduce costs and improve efficiencies throughout the whole economy. In order to achieve this outcome though, it is crucial that the NBN successfully eliminate the existing digital divide in Australia such that all citizens have access to high performance broadband services regardless of location and it is crucial that the NBN also successfully eliminate the socio-economic divide such that all citizens, regardless of income or location, can afford at least a basic broadband service and its associated benefits of access to advanced health, informational, entertainment, business and government services.

Proposed NBN Map (Image appropriated from http://www.nbn.gov.au)

In economics, this combination of affordability, coverage and performance is achieved through a combination of addressing social welfare (making basic services affordable to all), ensuring increased output efficiency (making premium services available to those who demand and are willing to pay for them) and supporting a free, open and competitive marketplace where providers can actively innovate services for consumers (making services available to everyone at every price-point). Throughout this submission, the focus will be on ensuring that the NBN support innovation, support the evolution of a free, open and competitive marketplace and support affordability through social welfare without compromising the long term viability of the market or itself.

There is also a need to better communicate the various drivers, opportunities and the benefits that Australian communities, businesses, citizens and the even whole economy can expect. Up to now, the justifications and uses for a National Broadband Network have not been very effectively communicated to end-users. Many reasonable questions are being asked publicly and are only receiving poorly formed and generic responses. This needs to change. Questions such as "how much broadband is needed?", "is fibre the right choice or will some new technology come along?" and "why can't we just solve it all with wireless mobile?" are excellent examples. We need to provide more concrete answers to these sorts of questions instead of waving our arms in the air and saying "if we build it, they will come". For instance, see Appendix A.1 for quick sample list of real applications that can leverage a ubiquitous broadband network, operating at both a minimum of 12Mbps and beyond. Of primary interest are the second group of applications, which really require service capabilities in excess of 20Mbps in order to function optimally (long-term) as they will drive the need for next generation access. Despite their high requirements, they can still be designed to degrade gracefully (i.e. still function) at the restricted 12Mbps service rate that will affect roughly 7% of the population.

## 1.2 NBN Governance model needs to be policy focused not profit focused

On the front page of this response is a **mantra**. This mantra will be repeated throughout this submission in order to continuously remind all stakeholders of the primary purpose of the Government's National Broadband Network initiative. It is vitally important to highlight this, as it appears that the overall governance model already adopted by NBN Co, is not necessarily aligned. This misalignment is reflected in almost all of NBN Co's analysis, actions, publications and engagements to date.

From the outside, NBN Co appear to have made a very early assumption that simply "investing AUD$43billion in building a National Broadband Network to 100% of the population" will naturally deliver the "long-term interests of the end-user". With naïve assumptions[1] like this in mind, NBN Co proceed to develop an advanced business case around the simple assumption that they will be spending AUD$43billion to build a 100% coverage network. As part of this business case, NBN Co also assume a requirement to provide a utility level of return to their shareholders. Now, as NBN Co are confronted with choices, they are making the fundamental mistake of exclusively protecting their business case model by adapting their interpretation and operational models, instead of re-evaluating the impacts on the long-term interests of end-users. This is the wrong governance model.

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This is not to say that NBN Co should operate at a loss. Rather, it is to highlight that when decision options are being analysed, *they should always be analysed against the delivery of the long-term interests of end-users first* and then an economic feasibility sieve (sort) can be applied second. Analysing all decisions against the long-term interests of end-users, and then choosing the most economically efficient and feasible approach to deliver that benefit, will result in the best possible outcomes. This means that NBN Co should be constantly revisiting and revising its internal business case and modifying that to match any changes and/or discoveries that are being found within its operational environment.

This is very different to what appears to be NBN Co's current governance approach of deliberately adapting their interpretations or operational models in order to protect their business case assumptions. In fact, this practice appears is endemic in almost everything NBN Co has done over the past year. NBN Co adopt, interpret or enact in a manner intended to primarily protect their operating models and business case rather than serve the long-term interest of end-users. Unfortunately this is the naturally evolved behaviour of the vast majority of NBN Co's senior staff, being mostly ex-carrier, ex-vendor or ex-private company. Telecommunications carriers do not have a very good history or reputation for acting in the best interests of consumers rather, they are conditioned to act in the best interests of themselves and their business. So too with the vendor suppliers and practically all private organisations. The expertise of their staff are not typically focused on public service matters or delivering in the public interest. They are typically focused on driving the success of their own business models—exactly what NBN Co are doing. It will require a very strong and very capable governance process over the NBN Co, in order to temper and control these finely honed, innate behaviours. This risk was was discussed and highlighted in the KPMG/McKinsey Implementation Study. This is an area of focus for this submission.

## 1.3 Innovation doesn't just happen, it needs to be fostered

Innovation by definition occurs only when people use products or services in entirely unanticipated and often unexpected ways! Innovation is fostered by increasing control, choice and flexibility around how product and service components can be acquired and then utilised; if products and services are constrained to say single performance characteristics or forced tie-in/bundle combinations--then innovation around those products and services will also be constrained and even at times completely prevented. At an extreme level, if only a single product is available at a single price from a single supplier, then everyone simply becomes a reseller of that product and there is very little scope for any true innovation or competition to exist.

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[1] Admittedly the assumptions and analysis made by NBN Co, which are also reflected within the KPMG/McKinsey Implementation Study, are not exactly this trivial. However this abstraction is illustrative of the risks associated with the project governance model currently adopted. Further details and examples of situations where both NBN Co and KPMG/McKinsey have seriously invalidated their analysis due to poor interpretations of target outcomes, can be found in Appendix A.2.

With this definition in mind, it is noted that NBN Co is being directed and seeks to "occupy as small a footprint as possible in the overall value chain, leaving retail service providers (RSPs) with significant ability to innovate …". The challenge here of course, is knowing exactly where to balance the proverbial Occam's razor[2] with the colloquial Einstein's razor[3]. The NBN Implementation Study and NBN Co independently have often confronted various challenges by analysing the options and then making a specific decision or choice. In some cases, these choices are made in an exclusive manner, i.e. to the exclusion of other options—I contend that in many of these cases the more correct approach is to offer multiple choices into the market and then let natural market dynamics converge upon and determine the optimal balance. This is an area of focus for this submission.

## 1.4 Local communities and metropolitan living are both efficient and should be supported

Several environmental economics studies have demonstrated the efficiency benefits associated with medium-high density metropolitan living as well as low density local communities so long as they exhibit a strong community identity, have good support for local service businesses and enjoy access to reasonable transport infrastructure. Unfortunately, it's very difficult to balance supporting these two economically valuable and efficient communities using common policy, as they are very different from each other in both their requirements and operation. An important litmus test for any policy must be to ensure that it does not impede or damage either of these two types of efficient communities. Policy should actively foster local community business, services and identity as their efficiency benefits do carry over into other aspects of the national economy.

This is one area where a cost-benefit analysis could be very valuable. Instead of analysing the cost/benefits of the NBN as a whole; we could instead analyse various policy approaches to ensure that the cost savings associated with implementing a particular policy are not outweighed by any long-term loss of benefits that may be associated with that particular policy approach. Numerous economic studies around the world have identified many instances where policy specifically targeted at levelling or normalising prices, has lead to long-term inefficient markets evolving. These policies are usually in the form of duties or are implemented through the taxation system, but the end result is the same. Efficient players are penalised for being efficient and inefficient market players are subsidised thus permitting to survive despite being uncompetitive. These uncompetitive inefficiencies are ultimately passed as overhead onto consumers.

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It is very important to ensure that the various policies and legislation enacted against the NBN do not result in actions that override the natural efficiencies of local community and general market competition. On the topic of using a cost/benefit analysis as a tool for evaluating various policy options against forecast market outcomes, then another important test would be the natural evolution of efficient infrastructure competition where appropriate. We owe it to ourselves to analyse much more carefully the potential impact of various implementation options before we proceed down the potentially slippery slope of increasing monopolistic ownership, increasing monopolistic control and increasing regulatory overrides which may result in the complete loss of open, fair and healthy market competition. This is an area of focus for this submission.

## 1.5 The Response

This submission is broken up into the following parts:

**Section 1:** (this section) introduces the response and provides an overview of the structure for the rest of the document.

**Section 2:** Addresses the questions posed by the ACCC and NBN Co directly

**Section 3:** Intended to address the discussion paper itself, however time constraints prevented this.

**Appendices:** Complex discussion, scenario examples and justification references can all be found in the appendices. The appendices are referenced by the main document.
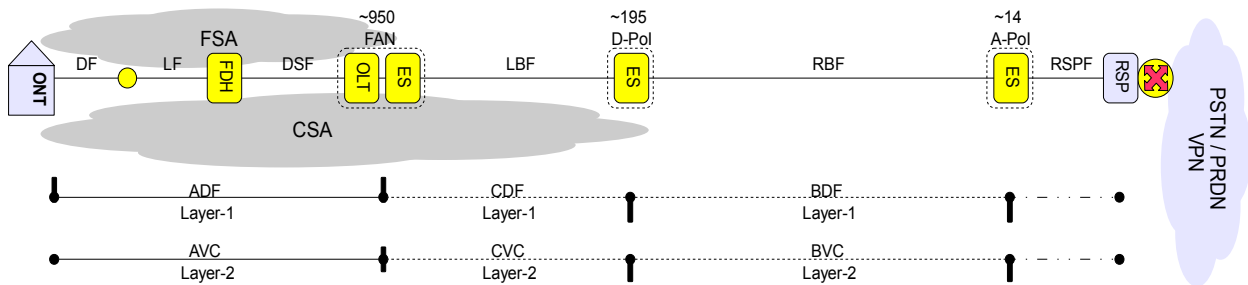
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[2]Occam's razor can be paraphrased in this context as aiming to achieve some measure of perfection in a solution by removing complexity and simplifying to such a point that it precisely and only solves the problem at hand.
[3]Einstein's razor can be paraphrased in this context as aiming to achieve some measure of perfection in a solution by simplifying but not over-simplifying; noting that some problems are actually better addressed by a slightly more complex, generalised approach. The challenge is recognising when, where and why to stop simplifying.

# Response to Sec 7. Issues for Discussion

This section aims to address and answer the various discussion questions raised in section 7 of the ACCC and NBN Co Discussion Paper. This section is broken up to reflect the same structure and question numbering as the original.
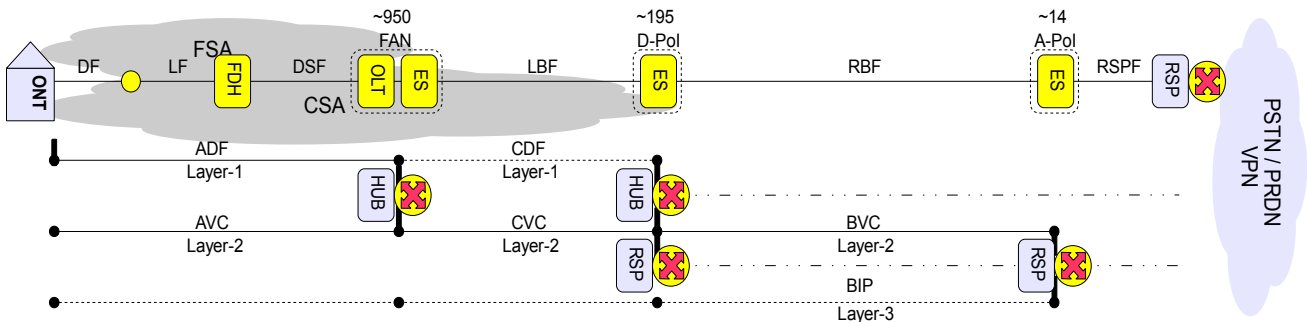
A common theme amongst these responses is continuing reference to a number of abstract network, product or service components. These components are illustrated and described below:

ONT    DF    LF    FSA    FDH    DSF    ~950 FAN    OLT  ES    LBF    ~195 D-Pol    ES    RBF    ~14 A-Pol    ES    RSPF    RSP    PSTN / PRDN VPN

CSA

ADF Layer-1        CDF Layer-1        BDF Layer-1

AVC Layer-2        CVC Layer-2        BVC Layer-2

- FSA - Fibre Serving Area and CSA -Connectivity Serving Area (both NBN Co terms).

- DF – Drop Fibre, LF – Local Fibre, DSF – Distribution Fibre, LBF – Local Backhaul Fibre, RBF – Regional Backhaul Fibre, RSPF – Retail Service Provider Fibre.

- AVC – Access Virtual Circuit, CVC – Connectivity Virtual Circuit, BVC – Backhaul Virtual Circuit.

- ADF – Access Dark Fibre, CDF – Connectivity Dark Fibre, BDF – Backhaul Dark Fibre.

- PSTN – Public Switched Telephony Network, PRDN – Public Routed Data Network (Internet), VPN – Virtual Private Network.

- ONT – Optical Network Termination, FDH – Fibre Distribution Hub, OLT – Optical Line Termination, ES – Ethernet Switch, RSP – Retail Service Provider.

Another common theme amongst these responses is continuing reference to a number of service and business scenarios. These scenarios are illustrated and summarised below, however greater detail about each of them can be found in Appendix A.3. These scenarios illustrate many options for connectivity across more layers than NBN Co currently plan to support (not all are required, they are however desired).
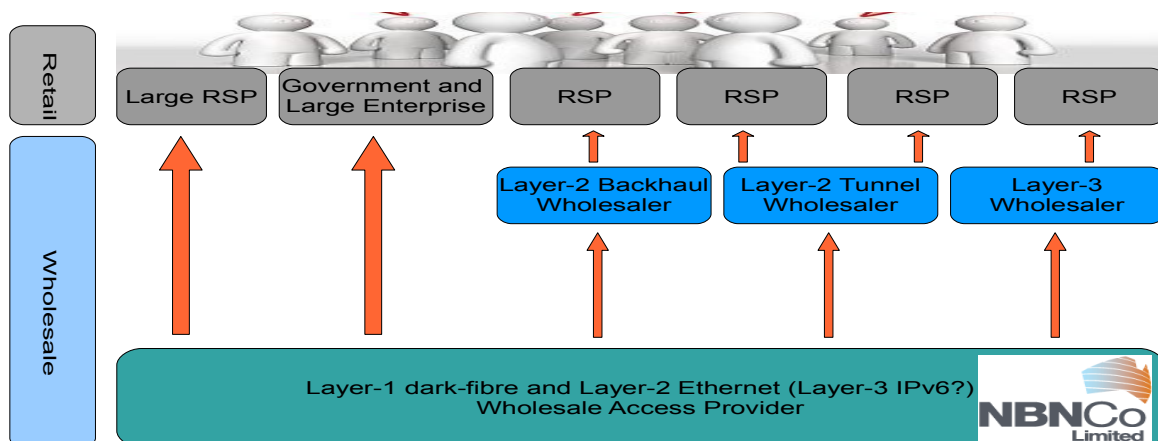
Locally connected service scenarios:

ONT    DF    LF    FSA    FDH    DSF    ~950 FAN    OLT  ES    LBF    ~195 D-Pol    ES    RBF    ~14 A-Pol    ES    RSPF    RSP    PSTN / PRDN VPN

CSA

ADF Layer-1        CDF Layer-1

HUB        HUB

AVC Layer-2        CVC Layer-2        BVC Layer-2

RSP        RSP        BIP Layer-3

- Local Community Broadband Hub (HUB): Most likely implemented by a national consultancy (also potentially even a registered carrier). Focused purely on providing local community connectivity, support and services. The local community HUB would support local council (through support for telepresence meetings with local community members, support for local community health centres and services, support for general council communication and business to consumer services). Community Hubs would also provide support for local community online social activities including gaming and support for local application services of local businesses (a pure local layer-3 aggregation service).

- Local Community Consultancy: For example the local Vet or Doctor for instance. Local experts could leverage local connectivity to offer local community services in competition with more centrally located equivalents. The ability to have a local community member perform remote visual diagnostics quickly, easily and efficiently and if necessary to be able to physically respond in person, again quickly, easily and efficiently should not be undervalued.

- Local Community Network Service Provider (RSP): There are plenty of examples of active local community network and Internet service providers who have both invested significantly in local access and possibly backhaul infrastructure assets or services. These businesses maintain active local relationships and providing local service and support. They often enjoy certain local efficiencies of operation but lack the benefit of economies of scale. This also covers opportunities for supporting local Content Caching Services, and existing Competitive Backhaul providers.

- Local Community Business: There is substantial opportunity for local business to dematerialise (change from physical form to digital communications form) various types of media and entertainment without needing to defer to more central providers. This would include local video, newsagencies as well as local radio and video broadcast providers. The advantage these players have, albeit a small one (but again, let natural market competition dynamics decide, not legislation), is the local community relationships and ability to provide local in-person support.

- Locally Situated National Service Provider: There are several national call centres which operate out of regional locations on the basis of access to reduced cost land, buildings, labour etc. locally located National Call Centre,

- Other Local Community Services: Such as other Utilities (gas, electricity, water) and Emergency Services who would enjoy significantly increased network reliability from leveraging highly distributed and co-located emergency service platforms, rather than being forced to centrally locate capability.

Finally, it is worth highlighting a minor extension to NBN Co published connectivity scenario models that recognise potential for Layer-1 wholesale and opportunities to support distributed government services HUBs, a central government dedicated layer-2/3 wholesale provider and even large enterprise customers directly (all are desirable).

## 2.1 Effect on relevant markets

**Q1.** *To what extent will the number and location of POIs impact competition in the backhaul market in the short term and in the long term?*

**A.** ...

A small number of PoIs offered only in highly centralised locations will almost completely destroy any short-term backhaul competition. Any existing backhaul between the distributed access networks and the centralised Points of Interconnect will be stranded. Such an approach also establishes an environment whereby the only way competition could evolve over the longer term is when two or more (supposedly) independent backhaul providers come forward at the same time and offer to establish competitive backhaul services on the same route. In any rational market environment, such a co-ordinated approach to offering (supposedly competitive) services is usually deemed a '**cartel**'. Under EC law, cartels are appropriately and absolutely banned[4]. Not only should the action of forming or operating as a cartel be banned here, so too should any policies that only permit cartel style approaches to market investment being adopted.

The fewer number of PoIs also significantly disadvantages local service providers for a number of reasons. Namely, they are forced to locate infrastructure assets such as routers, servers and buildings etc outside of their local community at the more centralised PoI location. This increases their overall cost base (due to additional acquisition of storage space, cooling, power, security etc at remote site), decreases their service reliability and availability (due to potential increases in mean time to repair), decreases their service performance (due to increased transmission distance), decreases their service flexibility (due to decreased accessibility to non-co-located infrastructure assets) and ultimately decreases their efficiency (through no fault of their own).

A large number of PoIs would certainly foster increased backhaul infrastructure competition in general (short-term and long-term), however there will still be a significant number of backhaul routes that are simply not economically viable. Some degree of price cap regulation will be required in order to ensure affordability over those routes. Also, a larger number of diverse interconnect points provides greater opportunity for local service provider competition as it lessens to some degree the otherwise overwhelming benefits that large national players enjoy as a result of their economies of scale. There would need to be an appropriate level of discount applied at the distributed Points of Interconnect to allow the operationally more efficient local service providers to offset the economies of scale benefits enjoyed by the larger national service providers.

**Q2.** *To what extent (if any) do you anticipate that any of your transmission assets (or other relevant assets) will become stranded under any of the proposed approaches to POIs on the NBN? What is the value of and location of those assets?*

**A.** ...

N/A (I do not own any relevant transmission or other impacted assets).

**Q3.** *What is the current state of competition in the relevant backhaul markets? To what extent are backhaul services priced competitively in CBD, metro, regional and remote areas?*

**A.** ...

N/A (I do not currently purchase any existing backhaul services).

**Q4.** *How would investment in backhaul infrastructure used for other networks, such as mobile and non-NBN fixed networks, be affected by the number and location of NBN POIs?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE AN ANSWER.

**Q5.** *To what extent will the number and location of NBN POIs impact competition at the retail level in the short term and in the long term?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE A FULL ANSWER.

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[4]European Community Treaty Article 81.

Restricting the number and access to PoI facilities as well as forcefully bundling the backhaul component:

1.  Will unfairly discriminate against local community service providers and possible local community hubs.

2.  Will create an environment where the new monopoly provider can only be replaced as the result of a cartel of operators forming.

3.  Will create the risk of an inefficient, poorly regulated, monopolistic provider of backhaul services for the foreseeable future.

4.  Will cause unfair, unnecessary and direct harm to the existing market backhaul provider.

5.  Will place Australia in breach of prior commitments it has made to the World Trade Organisation with respect to Telecommunications Services.

On the contrary, if NBN Co are required to offer open and free connectivity to both the local and aggregated PoI facilities then:

1.  Both the existing backhaul provider and NBN Co can offer marginal-cost backhaul services to any wholesale service seeker, thus ensuring each others price structures are market realistic,

2.  Future competitive backhaul providers can choose to freely enter the market whenever and however they choose,

3.  NBN Co can tender for a competitive backhaul provider to enter the market by acquiring its assets and assuring support for existing customer service contracts once the market becomes competitive (2-4 players),

4.  Local community service providers and local community service hubs are able to interconnect locally to ensure most efficient service delivery,

5.  New market opportunities for localised content distribution and caching service providers, local network hand-off and roaming providers and utility smart-grid hand-off are supported efficiently,

all of which will benefit the service pricing and performance available to end-users both in the short-term and long-term.

**Q6.** *Is the emergence of a Layer 3 wholesale sector likely under the NBN? If so, how will the location of NBN Co's POIs affect this market in the short and long term?*

**A.** ...

This is an excellent question. Mike Quigley has assured the public arena many times that he is aware of "numerous" (number has not been defined) private organisations who wish to enter the competitive wholesale layer-3 market on a national basis. What hasn't been made clear is whether or not these private companies are themselves also vertically integrated and thus would intend to compete in the retail market segment (like Telstra and Optus) as well. This would be a clear conflict of interest that would prevent efficient competition. There is definitely a need for several (meaning three or more), independent and competitive (meaning no player controls greater than ~50% of the market) network wholesalers (such as Nextgen) who have no competing interest in offering retail or application services. Interestingly enough, the likelihood of this competitive market evolving naturally, is increased with fewer and more centrally located PoIs. The greater the distribution and quantity of Points of Interconnect, the greater the necessary investment for a National Layer-3 wholesaler and hence the greater the risk that a naturally competitive market would evolve. With fewer PoIs, this investment overhead is minimised and hence the risk reduces.

The same is not true for local community hubs and local service providers. Local community services are often more efficient than their larger, national counterparts, however they lack their economies of scale. Having discounted access to the larger number of local PoIs would provide the necessary counter-balance and ensure that sufficiently efficient local operations would not only survive, but would potentially thrive. As per the answer to question 1, fewer and more centrally located PoIs would significantly disadvantage local service providers for the following reasons. They are forced to locate infrastructure assets such as routers, servers and buildings etc outside of their local community at the more centralised PoI location. Thus increasing their overall cost base (due to additional acquisition of storage space, cooling, power, security etc at remote site), decreasing their service reliability and availability (due to potential increases in mean time to repair), decreasing their service performance (due to increased transmission distance), decreasing their service flexibility (due to decreased

accessibility to non-co-located infrastructure assets) and ultimately decreasing their efficiency advantages (through no fault of their own).

As can be seen, this provides further strong support for concurrently offering both centralised and decentralised PoI facilities without prejudice or penalty. Without prejudice means PoI facilities should be offered without delay and without unnecessary restriction. Without penalty means that PoI facilities should be priced in a manner consistent with their inherent cost (i.e. do not discriminate against local service connectivity by refusing to unbundle the backhaul charge component to offer a discounted price).

## 2.2 Location of PoIs on the NBN and provision of related services

***Q7.*** *What is the preferred number and location of initial NBN POIs and why? How would this be different in the short term and the long term?*

**A.** ...

This is a very easy question to answer. In the first instance, NBN Co should offer PoI services at each and every CSA facility (the roughly 195 locations). Further, any location deemed to be "uncontested" (see below) should additionally (not as an alternative, in addition) offer PoI at the geographically nearest CSA facility that is considered to have "contested" backhaul. Lastly, if NBN Co also decide to offer PoI facilities at highly aggregated locations (for instance the 14 locations specified in their submission) then again this should be done in addition to offering local CSA PoI and nearest local "contested" PoI. As per other comments in this submission, such an offer for PoI with a backhaul component should NOT be at the same cost as a local PoI offered without the backhaul component. This is vital to ensure natural competition dynamics evolve.

What is a good "contested" backhaul test? Macquarie Telecom defined an excellent set of test criteria in their submission to NBN Co as part of the December-2009 to February-2010 Industry Engagement process and I repeat it here:

| # of Suppliers | Smallest Suppliers % share of total Capacity Assessment | Competitive or not |
|---|---|---|
| 4 or more | n/a | Competitive |
| 3 | >= 20% | Not Competitive |
| 3 | < 20% | Competitive |
| 2 | >= 30% | Not Competitive |
| 2 | < 30% | Not Competitive |
| 1 | n/a | Not Competitive |

In my submission to the same NBN Co engagement, I also listed various criteria by which NBN Co could gracefully exit a non-competitive backhaul route as and if it become competitive. That material still applies here. The summarised version is: as a non-local PoI becomes considered "contested", NBN Co can seek through a number of approaches to migrate customers away from its AVC+CVC PoI facility to a corresponding equivalent AVC + competitive backhaul CVC facility with little to no technical or financial change (only contractual).

In short, NBN Co should aim to offer the following (concurrently):

1. Offer a Uniformly priced Nationwide AVC (Access Virtual Circuit) PoI at the approximately 195 CSA locations.

2. Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Capped priced Nationwide CVC (Connectivity Virtual Circuit) bundle at the nearest "contested backhaul" CSA locations for CSA locations that are considered "uncontested".

3. Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Regulated priced nationwide BVC (backhauled virtual circuit which incorporates and hides the capped CVC if applicable) at the 14 central locations specified.

Such an approach offers maximum modularity, choice, control and flexibility to ensure efficient market competition. This best serves the long-term interests of end-users. Further, NBN Co can withdraw elegantly

from some of the CVC markets as various backhaul routes become naturally "contested" without having to resort to forced cartel's or immortal monopolies.

> **Q8.** *What are the strengths and weaknesses of NBN Co's preferred 'composite model' outlined in its Public Position Paper?*

**A.** ...

The ACCC notes on page 12 that "NBN Co has indicated to the ACCC that it has been guided by its understanding of the policy objectives established by the government for the NBN in order to identify the option that is most likely to promote the achievement of those objectives". Herein lies a number of issues. NBN Co are a commercial company being driven internally by commercially savvy people. They are neither politicians, nor are they public servants. Choosing policy that serves the best interests of the public is not their area of typical expertise. There are a few exceptions, but these statements hold for the majority. NBN Co will select understandings and options that maximise the likelihood of them successfully building and operating a National Broadband Network for roughly AUD$43 billion, whilst providing a utility level of return on the Government investment.

The 'composite model' put forward by NBN Co clearly reflects this thinking process. Also, the number of times they 'defend' their position on the basis of their understanding and interpretation of a "Uniform National Wholesale Price", leads me to think that maybe they are somewhat aware of the damage such an approach will have on the market and the end-users. Especially the 75% who live in dense metropolitan areas and the 15% who form the regional local communities, both of which will ultimately will be overcharged for and even denied economically efficient services. The most concerning issue regarding the options offered by NBN Co is an assumption that they can only offer one or other of the choices. As I've highlighted in my responses so far, it is not only possible, it is also highly desirable, for NBN Co to offer multiple, concurrent choices. This is the principal weakness in NBN Co recommendation.

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So let's take a look at the policy again and see how it can be interpreted for the good of the people.

Quoting from page 24 of the agreement struck by the Independents with the Government regarding the National Broadband Network:

> 3. New Regional Commitments
>
> 3.1 National Broadband Network
>
> A Labor minority Government will ensure that every community in regional Australia gets fair and equal access to affordable high-speed broadband through the National Broadband Network. This includes:
>
> - for the first time, broadband prices will be the same for households and businesses regardless of where they are located – in the city, in regional Australia or in more remote parts of the country.
>
>   - For the first time, the Government will put in place a cross subsidy to achieve a uniform national wholesale price so that regional areas can pay the same price as people in the city.
>
>   - A uniform national price for broadband will mean that unlike a phone call between Tamworth and Sydney or Mt Isa to Brisbane that costs more than a phone call within a capital city, prices for communicating through the NBN will be the same regardless of where you live.
>
>   - High-speed broadband services in Tasmania are available for around $60 a month currently based on wholesale prices, which will now be applied on a national basis.

Recalling that NBN Co is to meant to occupy as small a footprint as possible (namely it was just meant to be an access network, the proverbial 'last-mile'); then it is very concerning to see this interpretation stretching the monopoly NBN Co network (on the back of the UNWP), all the way back to our major cities. The above

agreement can be interpreted and implemented in many ways, all of them preserving the intent but not all of them destroying any potential for a naturally competitive marketplace. Adopting the modular approach as described and recommended in the previous question will also address this policy and the market in a better fashion.

In short, NBN Co should aim to offer the following (concurrently):

1.  Offer a Uniformly priced Nationwide AVC (Access Virtual Circuit) PoI at the approximately 195 CSA locations.

2.  Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Capped priced Nationwide CVC (Connectivity Virtual Circuit) bundle at the nearest "contested backhaul" CSA locations for CSA locations that are considered "uncontested".

3.  Additionally offer the same Uniformly priced Nationwide AVC and a Uniformally Regulated priced nationwide BVC (backhauled virtual circuit which incorporates and hides the capped CVC if applicable) at the 14 central locations specified.

Such an approach offers maximum modularity, choice, control and flexibility to ensure efficient market competition. This best serves the long-term interests of end-users. Further, NBN Co can withdraw elegantly from some of the CVC markets as various backhaul routes become naturally "contested" without having to resort to forced cartel's or immortal monopolies.

| **Q9.** | *Where a composite or low-medium consolidation approach is adopted for NBN Co's POI location, what factors should be taken into account in determining the location of the distributed POIs? For example, is the number of available backhaul routes relevant? If so, what should be the threshold?* |

**A.** ...

Yes the number of backhaul routes and providers is important. Macquarie Telecom defined an excellent set of test criteria in their submission to NBN Co as part of the original December-2009 to February-2010 Industry Engagement process and I repeat it here:

| # of Suppliers | Smallest Suppliers % share of total Capacity Assessment | Competitive or not |
|---|---|---|
| 4 or more | n/a | Competitive |
| 3 | >= 20% | Not Competitive |
| 3 | < 20% | Competitive |
| 2 | >= 30% | Not Competitive |
| 2 | < 30% | Not Competitive |
| 1 | n/a | Not Competitive |

In my submission to the same NBN Co engagement, I also listed various criteria by which NBN Co could gracefully exit a non-competitive backhaul route as and if it become competitive. That material still applies here. The summarised version is: as a non-local PoI becomes considered "contested", NBN Co can seek through a number of approaches to migrate customers away from its AVC+CVC PoI facility to a corresponding equivalent AVC + competitive backhaul CVC facility with little to no technical or financial change (only contractual).

It would be preferred that none of the models proposed by NBN Co be adopted as they are all potentially market damaging. Instead NBN Co should aim to offer the following (concurrently):

1.  Offer a Uniformly priced Nationwide AVC (Access Virtual Circuit) PoI at the approximately 195 CSA locations.

2.  Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Capped priced Nationwide CVC (Connectivity Virtual Circuit) bundle at the nearest "contested backhaul" CSA locations for CSA locations that are considered "uncontested".

3. Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Regulated priced nationwide BVC (backhauled virtual circuit which incorporates and hides the capped CVC if applicable) at the 14 central locations specified.

Such an approach offers maximum modularity, choice, control and flexibility to ensure efficient market competition. This best serves the long-term interests of end-users. Further, NBN Co can withdraw elegantly from some of the CVC markets as various backhaul routes become naturally "contested" without having to resort to forced cartel's or immortal monopolies.

**Q10.** *On what terms should NBN Co supply backhaul from the small number of centralised aggregation POIs to the decentralised disaggregated POIs if its 'composite model' is adopted?*

**A.** ...

In an open, timely, efficient manner and on completely non-discriminatory terms. This includes terms that appropriately discount connectivity when it is offered locally without a backhaul component.

Most important is to avoid potential negative monopolistic practices of negotiating contracts, agreements, arrangements, or combinations among competitive economic agents, whose aim or effect are any of the following:

1. To fix, raise, to agree upon or manipulate the purchase or sale price of the goods or services supplied or demanded in the markets, or to exchange information with the same aim or effect;

2. To establish the obligation to produce, process, distribute or market only a restricted or limited amount of goods, or to render a specific volume, number, or frequency of restricted or limited services;

3. To divide, distribute, assign or impose portions or segments of the current or potential market of goods and services, by means of a determinable group of customers, suppliers, time or spaces; or

4. 4. To establish, agree upon or co-ordinate bids or to abstain from bids, tenders, public auctions or bidding.

Either alone or in combination, to improperly displace other agents from the market, substantially hinder their access thereto, or to establish exclusive advantages in favour of one or several entities or individuals, in the following cases:

1. Some of the economic agents that do not compete among themselves are: to set, impose or establish the exclusive distribution of goods and services, by means of the subject, geographical location, or specific periods of time, including the division, distribution or assignment of customers and suppliers; and also the obligation to not manufacture or distribute goods or services for a specific period of time or that may be specified;

2. To set the prices or other conditions that a distributor or supplier has to abide by when marketing or distributing goods or providing services;

3. The conditioned sale or transaction when buying, acquiring, marketing or providing other goods or additional services, normally different or that can be differentiated, or on the basis of reciprocity;

4. The sale or transaction subject to the condition of not using or acquiring, marketing or providing goods or services produced, processed or distributed or sold by a third party;

5. The unilateral action based on refusing to sell or provide to specific individuals, goods or services available and normally offered to third parties;

6. The agreement reached among several economic agents or the invitation extended them to exert pressure against customers or suppliers, in order to discourage them from specific behaviours, to apply retaliations or force them to act in a specific manner; or

7. In general, all the actions that unduly damage or impair the process of competition and free access to production, processing, distribution and marketing of goods and services.

Material shamelessly stolen from "Monopolies and Monopolistic Practices", Federal Law of Economic Competition, Mexico. Australia has similar material within Part IV of the Trades Practices Act 1974 and various publications released by the ACCC. Also see http://www.internationalcompetitionnetwork.org/uploads/library/doc320.pdf for further recommendations specifically relevant for the Telecommunications Sector.

**Q11.** *If NBN Co supplies backhaul, should this be on a Layer 2 Ethernet basis or in the form of dark fibre (or both)?*

**A.** ...

Primarily Layer-2 for their wholesale access product, but they should reserve the possibility of offering both. I do agree with NBN Co's position statement regarding taking a local PoI facility and not being permitted to transport that across a non-bundled backhaul service.

## 2.3 Timing and Business Rules for interconnection under NBN Co's composite approach

**Q12.** *Under NBN Co's 'composite model', what "business rules" should govern when NBN Co will allow interconnection at the distributed POIs?*

**A.** ...

Immediate and automatic access. There should be no delay, no penalties and no conditions beyond that which normally apply to NBN Co PoI. I am very concerned by the lack of 'commitment' implied in NBN Co's business rule conditions.

**Q13.** *What should be the process to coordinate the addition of interconnection at the disaggregated POIs?*

**A.** ...

The process for connecting at a disaggregated PoI should be identical to connecting at an aggregated PoI with the exception being that the CVC component should be discounted from the service.

## 2.4 Changes to the initial PoIs

**Q14.** *What factors should trigger a review of the location of NBN Co's initial POIs?*

**A.** ...

Macquarie Telecom defined an excellent set of test criteria in their submission to NBN Co as part of the original December-2009 to February-2010 Industry Engagement process and I repeat it here:

| # of Suppliers | Smallest Suppliers % share of total Capacity Assessment | Competitive or not |
|---|---|---|
| 4 or more | n/a | Competitive |
| 3 | >= 20% | Not Competitive |
| 3 | < 20% | Competitive |
| 2 | >= 30% | Not Competitive |
| 2 | < 30% | Not Competitive |
| 1 | n/a | Not Competitive |

In my submission to the same NBN Co engagement, I also listed various criteria by which NBN Co could gracefully exit a non-competitive backhaul route as and if it become competitive. That material still applies here. The summarised version is: as a non-local PoI becomes considered "contested", NBN Co can seek through a number of approaches to migrate customers away from its AVC+CVC PoI facility to a corresponding equivalent AVC + competitive backhaul CVC facility with little to no technical or financial change (only contractual).

**Q15.** *What mechanisms should be used to effect a change to the location of NBN Co's POIs? (i.e. consultation requirements and notification periods)*

**A.** ...

This is a very good question, however operating under the assumption that NBN Co offer a more flexible approach for supporting PoI, as recommended throughout this response, then there should be no need to

'relocate' an NBN PoI. If there ever was a need, then yes, some notification period, due consultancy and a method by which appeals can be lodged and managed would need to be defined.

## 2.5 Layer 1 unbundling

**Q16.** *What are the implications of the number and location of POIs for potential Layer 1 unbundling and home-run network topology for the NBN?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE A FULL ANSWER.

A layer-1 dark fibre access service really begins to make sense when offered at the ~950 FSA-FAN (Fibre Serving Area, Fibre Access Node) locations. Here it should be possible for any two fibre-endpoints within a fibre-serving area to be acquired as darkfibre and even additionally spliced such that they form an end-to-end dark fibre service. This situation becomes a little (actually substantially) more complex at the CSA (connectivity serving area) level as the dark-fibre service now requires an access fibre strand as well as a semi-backhaul connectivity fibre strand. ...

## 2.6 Uniform National Wholesale Pricing (UNWP)

**Q17.** *To what extent can UNWP be achieved independently of decisions about the number and location of POIs?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE A FULL ANSWER.

By adopting this preferred model that aims to offer the following (concurrently):

1. Offer a Uniformly priced Nationwide AVC (Access Virtual Circuit) PoI at the approximately 195 CSA locations.

2. Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Capped priced Nationwide CVC (Connectivity Virtual Circuit) bundle at the nearest "contested backhaul" CSA locations for CSA locations that are considered "uncontested".

3. Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Regulated priced nationwide BVC (backhauled virtual circuit which incorporates and hides the capped CVC if applicable) at the 14 central locations specified.

Such an approach offers maximum modularity, choice, control and flexibility to ensure efficient market competition. This best serves the long-term interests of end-users. Further, NBN Co can withdraw elegantly from some of the CVC markets as various backhaul routes become naturally "contested" without having to resort to forced cartel's or immortal monopolies.

Such a model also provides a Nationwide Uniform Wholesale Price for services at the 14 central locations without unduly discriminating against the opportunities for local services and service providers to compete at a local community level. In addition, some exploration of Government cross-subsidy can also be investigated to achieve this same outcome.

**Q18.** *Is NBN Co's definition of UNWP "...that Access Seekers should face the same total wholesale cost from any premises to a designated state capital city point of presence" an appropriate one? If not, what alternative definition would you propose?*

**A.** ...

At a certain level of interpretation yes, at the level of interpretation adopted by NBN Co to defend their right to continue spending AUD$43billion to become the new mega-monopoly telco, then no, it isn't. Please see responses to question 19 below and 8 above for further discussion and recommendation.

**Q19.** *To what extent can it be ensured that Access Seekers face the same total wholesale cost in supplying services to end-users across regions independently of decisions about the number and location of POIs? That is, are there alternative ways to the approach proposed by NBN Co of ensuring that Access Seekers face the same total wholesale cost in supplying services to end-users across regions?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE A FULL ANSWER.

Yes, by adopting this preferred model that aims to offer the following (concurrently):

  *1.* Offer a Uniformly priced Nationwide AVC (Access Virtual Circuit) PoI at the approximately 195 CSA locations.

  *2.* Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Capped priced Nationwide CVC (Connectivity Virtual Circuit) bundle at the nearest "contested backhaul" CSA locations for CSA locations that are considered "uncontested".

  *3.* Additionally offer the same Uniformally priced Nationwide AVC and a Uniformally Regulated priced nationwide BVC (backhauled virtual circuit which incorporates and hides the capped CVC if applicable) at the 14 central locations specified.

Such an approach offers maximum modularity, choice, control and flexibility to ensure efficient market competition. This best serves the long-term interests of end-users. Further, NBN Co can withdraw elegantly from some of the CVC markets as various backhaul routes become naturally "contested" without having to resort to forced cartel's or immortal monopolies.

Such a model also provides a Nationwide Uniform Wholesale Price for services at the 14 central locations without unduly discriminating against the opportunities for local services and service providers to compete at a local community level. In addition, some exploration of Government cross-subsidy can also be investigated to achieve this same outcome.

**Q20.** *If NBN Co's preferred composite model were to have no price differentiation between interconnecting at designated capital cities or at CSA locations, what impact would this proposal have, particularly on regional retail markets and regional backhaul transmission markets?*

**A.** ...

INSUFFICIENT TIME TO PROVIDE A FULL ANSWER.

Restricting the number and access to PoI facilities as well as forcefully bundling the backhaul component:

  *1.* Will unfairly discriminate against local community service providers and possible local community hubs.

  *2.* Will create an environment where the new monopoly provider can only be replaced as the result of a cartel of operators forming.

  *3.* Will create the risk of an inefficient, poorly regulated, monopolistic provider of backhaul services for the foreseeable future.

  *4.* Will cause unfair, unnecessary and direct harm to the existing market backhaul provider.

  *5.* Will place Australia in breach of prior commitments it has made to the World Trade Organisation with respect to Telecommunications Services.

On the contrary, if NBN Co are required to offer open and free connectivity to both the local and aggregated PoI facilities then:

  1. Both the existing backhaul provider and NBN Co can offer marginal-cost backhaul services to any wholesale service seeker, thus ensuring each others price structures are market realistic,

  2. Future competitive backhaul providers can choose to freely enter the market whenever and however they choose,

3. NBN Co can tender for a competitive backhaul provider to enter the market by acquiring its assets and assuring support for existing customer service contracts once the market becomes competitive (2-4 players),

4. Local community service providers and local community service hubs are able to interconnect locally to ensure most efficient service delivery,

5. New market opportunities for localised content distribution and caching service providers, local network hand-off and roaming providers and utility smart-grid hand-off are supported efficiently,

all of which will benefit the service pricing and performance available to end-users both in the short-term and long-term.

## 2.7 Wireless Services

**Q21.** *Should the same approach for the number and location of POIs for NBN Co's fibre services be adopted for wireless and satellite services? Why and/or why not?*

**A.** ...

Absolutely, but not along the lines recommended by NBN Co, instead along the lines recommended in this submission. To support a healthy and competitive market you must provide choice, flexibility and control.

## 2.8 Other

**Q22.** *In relation to the data provided in Appendix A of NBN Co's Public Position Paper, do you believe that NBN Co's input information is accurate, and has NBN Co correctly assessed the current state of the backhaul and competitive DSLAM markets?*

**A.** ...

N/A (I do not presently have access to the various confidential materials needed to accurately assess and respond to this question)

**Q23.** *Are there any other considerations or information that you think are relevant to the selection of NBN Co's POI locations?*

**A.** ...

Not aware of any further considerations or information beyond those already raised in this response.

# Appendix: Additional Materials

## A.1 Potential Future Applications for Broadband

(The following is an adapted version of an online informational post by the author)

The NBN as currently envisioned delivers two fundamentals for supporting future broadband applications: The first is ubiquitous access (upto 12Mbps), which is also intended to be affordable (unlike mobile network data services). The second of course is potential for bandwidth, lots of bandwidth (upto 1Gbps to 93%, although here you get what you pay for).

Also, it's important to distinguish between mass market services (like communication and entertainment) and the bespoke opportunities (like data transfers between research telescopes, hospitals, TV broadcasters etc). I focus on the mass market opportunities, as the NBN is fundamentally about delivering services to Australian households and small business.

The affordable ubiquity aspect of the NBN will support:

- The Internet of Things: The connectivity of a myriad of devices that will want to send and receive (albeit it small) continuous streams of data to simplify (potentially arguable) our lifestyles. These are the smart appliances, the smart houses (and smart-grids), the smart lifestyle systems (smart organisers/agents), the smart messaging systems, security systems (including video monitoring) etc. They want cheap, always-on data. Large scale video security could drive bandwidth requirements beyond 12Mbps in the future.

- Basic Telephony: That plain old telephony service, also called the USO in Australia, will be delivered using the NBN. I'll argue that a basic Internet service should also be considered as part of the USO. I'll also argue that voice telephony in the future really should be a free hitchhiker on the data network (it's that small in comparison (0.3% of global traffic)).

- Backups/Restore: I don't think enough people have lost a big enough data store yet to realise just how much they need this. The reality though, is that the amount of data we generate per day that we need to preserve, is relatively small (ie. measured in 10's of megabytes, not 10's of gigabytes per day currently) ... yet it will grow with time.

- Internet/Information: Having access to the typical Interwebs(sic) as we know today, with decent speeds and decent traffic allowances (bandwidth caps) should be available to all Australian demographics, regardless of income levels. Some aspects of remote learning can be addressed here but not the video ones.

- Remote Working (teleworking): As we focus less on industrial processes and more on informational processes, then the opportunities for remote working become increasingly viable. Again, this is with the proviso that only some aspects of remote working can be supported. Future remote working is likely to require significant bandwidth and connectivity (see telepresence below).

- Basic Television: Basic access to standard definition television content either on-demand or broadcast/multicast. This only just works within the 12Mbps limit as future evolutions of television are already pushing the need for much more bandwidth to the home (see below).

The greatly increased bandwidth (12Mbps-->1Gbps) aspect of the NBN will support:

- Advanced Television: Passive video entertainment bandwidth demand is just going to grow. From the SDTV video broadcasts of today, right through to the 3D UHDTV video on demand and interactive TV of tomorrow. In the US trials and experiments with multi-view (think reality TV or sports with simultaneous broadcasting of all screens instead of cutting between them; although the experiments were soap dramas) and interactive television (will this be significantly different from modern computer gaming) in the future.

- Teleconferencing and Telepresence: This application is a real game-changer as it transitions from the early adopters (enterprise) to mainstream (ma and pa). The applications for teleconferencing and telepresence range from work related, through entertainment, to socialisation and all the way

through to health and well-being. The cost and efficiency savings in this area alone will be significant if a NBN Cost/Benefits Analysis is ever done.

- Virtual presence: I separate virtual presence from telepresence although they are related. This is a huge driver for bandwidth and the commercial opportunities are stratospheric. As the costs and inconvenience of travel increase (we may have forgotten about it, but global warming and sustainability hasn't forgotten about us) then opportunities to offer the following also increase:

  - Virtual Tourism: The ability to visit another part of the world from the comfort of your own home, cost effectively. You could take tours (either group or individual) through historic areas or visit natural wonders. This can be either simulated walkthroughs (aka on-rails) or even done live (personalised and interactive). Imagine joining a live and guided tour of the Great Pyramids in Egypt, taking a 'Lord of the Rings' location tour in New Zealand, maybe the 'Harry Potter' location tour in London or an individualised visit through the Louvre in Paris. How about a scenic River trip up the Amazon in 3D with surround sound or maybe just a quiet stroll through a remote Himalayan village. Not everyone will be able to afford to do all these things for real, it is simply impractical and expensive.

  - Virtual Socialising: The ability to organise a virtual get together for either social, entertainment or business use. Rural and regional communities could use this application to organise local event or council meetings. Families which are increasingly geographically dispersed nowadays could use these applications to enable virtual attendance at major family events such as weddings or even just birthdays remotely.

  - Virtual Concerts: Imagine being able to get front row seats to see the biggest name in entertainment perform live (not pre-recorded) in the comfort of your home, instead of putting up with a ticket that places you at almost telescopic distance away from the stage and god only knows what has been done with the sound balance.

  - Virtual Experiences: And finally the application that is already happening and continuing to improve every year. All of the online virtual worlds, aspects of distance video education, virtual conferences and multi-user online games fall into this category. As available bandwidth and network performance increases, these will only become more realistic, more useful and in some cases much more fanciful and entertaining.

Lastly, Cloud Computing, in particular SaaS/IaaS/PaaS (Software/Infrastructure/Platform as a Service) is not listed above per se. This is because Cloud computing is a rather nebulous term and could almost incorporate anything that is network platform provided. For this purpose I'm going to focus on cloud computing as being abstract "virtual processing capabilities" and not as concrete services like 'search' or 'email'. Although those services may be delivered through cloud computing systems, the user is not concerned with that aspect of their operation. With this definition in mind, cloud-computing is more driven by business needs, rather than end-user needs and hence would typically not drive a full-on residential access network upgrade. The services operated on virtualised platforms may, but the virtualised platforms themselves do not.

## A.2 Examples of poorly aligned guiding principles to target outcomes

From the outset, the Australian Government established the NBN initiative by specifying a number of primary objectives. These objectives, "Coverage, Competition, Customer Care, Cost Effectiveness and Collaboration", were adopted by both the Implementation Study as well as NBN Co. Now obviously, these objectives are very general, so they have been interpreted and broken down into a set of specific guiding principals. Unfortunately, something went amiss during this process and the final results don't always align with the original intent.

On May 14th, 2010 I met with representatives from NBN Co to discuss exactly this issue in relation to their continuing public insistence of forcefully bundling backhaul to aggregated PoI locations wherever local reachability was considered "uncontested". In my submissions to NBN Co and the Senate Select Committee for the National Broadband Network, I recommended offering PoI at both locations concurrently. That material formed the basis of the conversation with NBN Co and is summarised below:

NBN Co and the KPMG/McKinsey Implementation Study have both made the poor assumption that the Point of Interconnect (PoI) model must be implemented as a mutually exclusive one, especially for regional and rural areas. This means that areas that have no "contestable backhaul" will not permit local interconnect. The

justification for this position is based on an operating principal they defined, "leveling the playing field" which was derived from the Australian Government's own "improved competition" objective.

What is meant by a "level playing field"?

> The term "level playing field" is more colloquial than technical. However, what's worse is it has been used in numerous contexts since its inception, each with their own different interpretations ranging from handicaps, subsidies and taxes all the way through to equal opportunities, fair rules and open access policies. It is unfortunate that the term lacks a formal definition and is so heavily and semantically loaded; because it admittedly sounds noble and good. And I suspect that it is because of this, that it has been used widely when discussing the NBN, albeit at times with a very inappropriate interpretation.

> So how does a simple interpretation possibly affect the health and performance of a competitive market? Well, there have been several recent studies aimed at examining exactly the impact on competitive markets that the application of policies and incentives based on differing interpretations of "levelling the playing field" can have. Many of these studies concluded that if the resulting policies are aimed at ensuring "equal opportunity", "fair access" and the removal of any "discriminatory practices" then often a "open, fair, healthy and competitive marketplace" evolves. Thus delivering the benefits of increased consumer welfare and increased output efficiency. However, if the resulting policies are aimed at "leveling the outcomes", by "flattening prices", either removing or masking the ability for market players to differentiate from one another and/or to leverage strategic advantage, then the end result is actually a loss of healthy competition (see references below). Thus failing to deliver increased output efficiency and improved social welfare. This is the interpretation currently adopted by NBN Co and the Implementation Study and this highlights just how dangerous it can be to apply the loose concept of "levelling a playing field" without fully understanding the implications such actions or decisions based on particular interpretations may have on the evolution of a truly competitive market.

Supporting references:

- "Equal rules or equal opportunities? Demystifying level playing field", Marja Appelman, Joeri Gorter, Mark Lijesen, Sandar Onderstal and Richard Venniker, CPB Document, No 34, October 2003.

- "The myth of the level playing field: Knowledge, affect & repetition in public debate", Jeremy N. Sheff, St. Johns University, 2009.

- "The myth of the level playing field", Sam Bostaph, The Future of Freedom Foundation, 2005.

- "Economic effects of 'leveling the playing field' in international trade", Alan V. Deardorff, The Journal of International Trade & Economic Development, Vol 19, Issue 1, March 2010 pp9–32.

Now, to fix this, you simply make the focus of any policy actions towards ensuring an "open, fair, healthy and competitive marketplace" rather than on colloquial interpretations which aim to remove opportunities for players to compete and differentiate.

My preferred alternative to their mandated approach, which is both simpler and better, is to offer both PoIs concurrently. This option is further enhanced if you also leverage my recommendations for addressing the backhaul monopoly situation as well. I argued that such choices are vitally important to support innovation through a healthy and competitive marketplace, which really is the only type of market that we know works.

So how do you promote innovation"?

> Innovation is fostered by enabling choice and control. Because of this, NBN Co should never take any unnecessary actions to exclude or prejudice other market players. Rather, they need to ensure that they allow the market to have choices and control over those choices. Then each player can build their business model around various (hopefully innovative) choices that they can make when acquiring customer connectivity. I explained that if you restrict choice and flexibility, then of course you restrict innovation and hence competition outcomes. I also provided them with evidence that backed up this position, such as:

Supporting references:

- Jeffry Phillips, VP OVO discussing Andy Cohen's book "Follow the other Hand", note that "Evaluating a new product or service based on the choice it offers and control it provides helps improve the success

of a new idea. These factors reduce the risk of adopting the innovation by offering more choice or simplifying choice, and by offering greater control over the solution."

- Scott D. Anthony, Erik A. Roth & Clayton M. Christensen "The Policymaker's Dilemma: The Impact of Government Intervention on Innovation in the Telecommunications Industry", 2002, define one of their key and basic assumptions as "Truly free and fair competitive markets are the best mechanism to encourage and facilitate the process of innovation. These markets provide innovators with the least inhibited access to necessary resources (e.g., capital, raw materials and talent) and the most potential to reach target customers. Additionally, we believe that market incentives for innovators to pursue new growth opportunities are strongest in a competitive market. In fact, we believe the likelihood of disruption, the most dramatic form of innovation, increases substantially within competitive markets."

- Alan Fels, ACCC contribution to OECD "ABUSE OF DOMINANCE AND MONOPOLISATION" (OCDE/GD(96)131) notes a number of mechanisms used in Australia to identify anti-competitive and hence anti-innovative behaviour including testing "whether the conduct adversely affects consumers of the goods or services in terms of price, quality, availability, choice or convenience and whether it has impaired competition in an unnecessarily restrictive way".

I further explained that the position taken by NBN Co to restrict PoI locations to a single fixed location, was unnecessarily damaging. There is no real commercial or technical justification for limiting the choice of PoI in this manner. I emphasised that offering product modularity and choice benefits natural market dynamics, whilst having marginal impact on systems complexity and minor impact on node complexity (where the benefits gained by NBN Co in deploying a simplified cabinet configuration that avoids interconnect is not counter-balanced by the potential damage it causes to the general marketplace).

In closing I recommended that NBN Co change to offer a regulated, uniformly priced PoI service, completely uncoupled, at every Fibre Access Node (FAN) via a co-located Ethernet Aggregation Switch (EAS) for each Connectivity Serving Area (CSA). In addition, if the primary FAN PoI does not have "contestable backhaul" (meaning 3 or more independent backhaul providers), then NBN Co should additionally be required to offer a bundled service, which would include a variable backhaul component and would be delivered as a PoI at the geographically nearest Fibre Service Area (FSA) EAS  that is considered to have "contestable backhaul". I noted that such an approach dovetails nicely into both the Access Provider of Last Resort and Connectivity Provider of Last Resort USO requirement (although it still does not address the complete USO, as more is necessary: namely an additional backhaul and a end-to-end network service component).

It would appear that NBN Co have partially adopted this recommended approach and called it their "composite model". Unfortunately their composite model is a compromised one. It fails to deliver the necessary modularity, choice and flexibility. This is also consistent with NBN Co's continuing failure to define a suitable modular QoS scheme that offers genuine choice, control and utility. This is despite clear guidance and recommendation from the Communications Alliance and the KPMG/McKinsey Implementation Study that recommendeds for instance the following:

Pg 104: "The network needs to be designed in a manner that provides flexibility for future innovation. Without doing so, innovation is likely to be stifled on the network and there is a risk that the network will be unable to support cutting-edge services offered internationally. To support innovation, the design of the NBN should anticipate that innovation can occur along a number of dimensions, including the physical layer of the network, the end-user devices connected to the network and services offered across the network".

Pg 122: "As custodian of Australia's principal broadband platform, NBN Co must consider the needs of consumers, business, public institutions, service providers, suppliers and many adjacent industries. The capacity of the NBN to serve the national interest through the economic and social benefits associated with its services will be correlated with responsiveness to stakeholder needs".

Pg 199: "Price differentiation is an important mechanism for network businesses to optimise revenues and demand. However, upselling on the basis of speed has proven difficult for ISPs in the DSL market, and it is a source of great market uncertainty".

Pg 201: "NBN Co should create a broadband platform which anticipates the greatest range of potential services. … NBN Co will have to enable higher levels of performance through quality of service (QoS) parameters. The challenge lies in anticipating the implementation of standards".

Pg 202: "Recommendation 40: That NBN Co be required to offer wholesale services that support the implementation of carrier-grade QoS functionality, allowing retail service providers to deliver premium grade services from within their network to end users".

Pg 253:"Pricing of NBN services must reflect the needs of numerous stakeholder groups: Government, the ACCC (on behalf of end-users) and customers. These groups have a range of objectives of take-up and long-term commercial viability of NBN Co, amongst others".

Pg 256:" Price architecture refers to the components and features of pricing for NBN services and how they come together. NBN Co must be allowed flexibility to develop this architecture to achieve commercial success. Pricing decisions are dynamic and challenging. They are best left to the company, within its regulatory and policy constraints… Pricing flexibility is important to network and telecommunications companies. It allows them to adapt to market conditions, create new revenue streams, even spur demand. Such pricing decisions are challenging and dynamic".

Pg 257-8:" A considerable body of literature exists regarding price differentiation of services on communications networks. There is broad agreement that some level of price differentiation in telecommunication and other high-fixed-cost industries (e.g. airlines) is appropriate to achieve social benefits, while helping in the pursuit of a commercial return. The alternative to differential pricing—in other words, to price all NBN connections at a single price—would be inefficient. A single price that provides a fair return on investment would be too high for many users, and therefore constrain take-up and usage. On the other hand, a single price that maximised take-up would be unlikely to provide the NBN with any reasonable return".

Pg 261:" Advice. That NBN Co Board ensures general pricing for NBN services is transparent and modular—e.g. bundling services at a discount should be avoided, unless a discount is applied to certain legacy services or an entry-level offer".

Pg 334:" Defining the characteristics of the transit backhaul service The transit backhaul service should have the following features:

■ End-to-end. The transit backhaul product offered by NBN Co should be an end-to-end product for connection from the POI to the fibre exchange including redundancy for backup …

■ Modular. The NBN access service and transit backhaul should be offered as separate services. This will allow access seekers to choose appropriate backhaul products for their required capacity. It will also allow uniformity of pricing on the access products across the country".

Pg 423-4:" A new network such as the NBN should anticipate multiple paths of industry evolution. Industry consultation, debate, and public scrutiny should continue as the initial specifications for NBN services are developed. If poorly defined, these specifications could limit or bias the innovation paths through which new applications are developed, favouring some providers or business models and distorting healthy market competition".

Pg 443:" While NBN Co should be encouraged to use its powerful position to deliver a solution for today, it must not be allowed to become the central obstacle to competition in the future. This is particularly important given the prospect of private ownership, as the unpredictable evolution of the industry will make it more difficult to balance private shareholder interests with public policy goals".

Pg 457:" Therefore, to the extent that a large and sophisticated end user business finds it more efficient to establish such a shell retailer, this would indicate a lack of efficiency or value-add on the part of the major retailers. On balance, there is a strong practical argument that such an outcome would represent enhanced competition at a retail level, rather than being interpreted as an implicit entry of NBN Co into the retail market. Accordingly, the Implementation Study believes there is no need at present to make a special provision in relation to this scenario".

Pg 459:" Equivalence is a more complex principle. The strictest interpretation of equivalence, known as equivalence of inputs, would require all customers to be provided with services at identical prices, on identical terms and using identical technical and business process interfaces with NBN Co. While this would achieve a theoretical equity between retailers, it would provide too little flexibility to recognise the different needs of the diverse range of potential customers of NBN Co. Interfaces that might suit a large retailer with substantial market share around the country are likely to be ill-suited to a boutique ISP operating in a single area. The case for a more flexible interpretation of equivalence is strengthened by

the wholesale-only nature of NBN Co. As NBN Co is not competing against its customers, it has less incentive to discriminate between them in a harmful way than does a vertically-integrated network owner. We therefore believe that equivalence should be implemented principally by means of transparency and common availability".

Pg 462:" As discussed in Section 3.3, some retailers will wish to provide bundled services such as triple-play packages, while others may wish to become niche providers offering individual services. To enable vibrant competition between alternative business models at the retail level, it is important to ensure that NBN Co's service offering and pricing architecture are not prejudiced in favour of a particular model. This will require NBN Co to offer services on a modular basis to avoid conferring a price advantage on large retailers who seek a discount on bundled services that would undermine the competitiveness of single-service retailers. NBN Co should endeavour to offer a range of service and pricing options that maintains neutrality between competing business models".
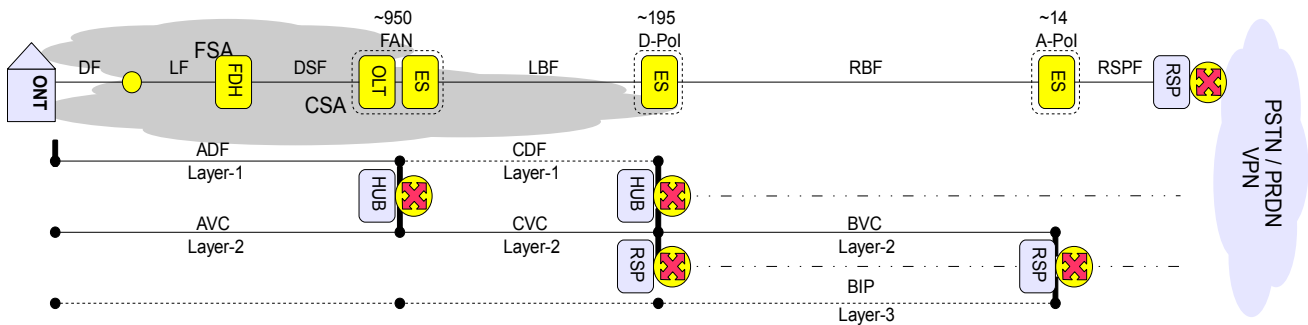
Pg 496:" NBN Co's corporate plan will serve two important purposes:

■ It will assist NBN Co in ensuring that it has a clear roadmap of actions to address implementation challenges and give effect to its objectives;

■ It will provide a mechanism for Government to verify that plans are consistent with Government's objectives and to identify issues that warrant Government intervention".

Together these provide a clear message for NBN Co to support flexible, modular, differentiated service offerings including support for differentiated access and differentiated performance.

## A.3 Example business and service connectivity scenarios

Locally connected service scenarios:



- Local Community Broadband Hub (HUB): Most likely implemented by a national consultancy (also potentially even a registered carrier). Focused purely on providing local community connectivity, support and services. The local community HUB would support local council (through support for telepresence meetings with local community members, support for local community health centres and services, support for general council communication and business to consumer services). Community Hubs would also provide support for local community online social activities including gaming and support for local application services of local businesses (a pure local layer-3 aggregation service).

- Local Community Consultancy: For example the local Vet or Doctor for instance. Local experts could leverage local connectivity to offer local community services in competition with more centrally located equivalents. The ability to have a local community member perform remote visual diagnostics quickly, easily and efficiently and if necessary to be able to physically respond in person, again quickly, easily and efficiently should not be undervalued.

- Local Community Network Service Provider (RSP): There are plenty of examples of active local community network and Internet service providers who have both invested significantly in local access and possibly backhaul infrastructure assets or services. These businesses maintain active local relationships and providing local service and support. They often enjoy certain local efficiencies of operation but lack the benefit of economies of scale. This also covers opportunities for supporting local Content Caching Services, and existing Competitive Backhaul providers.

- Local Community Business: There is substantial opportunity for local business to dematerialise (change from physical form to digital communications form) various types of media and entertainment without needing to defer to more central providers. This would include local video, newsagencies as well as local radio and video broadcast providers. The advantage these players have, albeit a small one (but again, let natural market competition dynamics decide, not legislation), is the local community relationships and ability to provide local in-person support.

- Locally Situated National Service Provider: There are several national call centres which operate out of regional locations on the basis of access to reduced cost land, buildings, labour etc. locally located National Call Centre,

- Other Local Community Services: Such as other Utilities (gas, electricity, water) and Emergency Services who would enjoy significantly increased network reliability from leveraging highly distributed and co-located emergency service platforms, rather than being forced to centrally locate capability.

Finally, it is worth highlighting a minor extension to NBN Co published connectivity scenario models that recognise potential for Layer-1 wholesale and opportunities to support distributed government services HUBs, a central government dedicated layer-2/3 wholesale provider and even large enterprise customers directly (all are desirable).