

The National Broadband Network

A blueprint for the 5th Utility

TransACT's Broadband Regulatory Submission



June 2008


TransACT
Everytime.

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The broadband network should "be as open as possible, with capacity being made available to a range of providers offering telephony, video and data communications services. The architecture of the network should be independent of particular services and service providers so that new services can be introduced as and when appropriate".

[Clause 3.13 of ACTEW RFP for TransACT network, 1996]

The NBN is a significant nation building infrastructure project.

Let's make the ACT a showcase for what the NBN can do.

Executive Summary

TransACT Communications Pty Ltd (TransACT) is pleased to make this submission to help the Commonwealth ascertain what changes to policy, legislation and regulation might be required to facilitate the introduction of a National Broadband Network (NBN) in Australia. The NBN is a significant national infrastructure development upon which TransACT can offer a unique perspective.

TransACT is keen to facilitate the early development of the Digital Economy in the Australian Capital Territory (ACT) so that people and businesses will be able to “connect” in ever richer ways over digital networks.

TransACT's original vision was to be a genuine wholesale provider of broadband connectivity. The NBN initiative provides the opportunity to fulfil this vision, first by extending high speed connectivity to homes and businesses of the ACT, but also (as a Retail provider) by encouraging the development of a rich array of products and services over this open access infrastructure.

TransACT is keen to work with others in the areas of health, education, public access and community engagement to accelerate the achievement of the Digital Economy. TransACT aims to make the ACT a national showcase for the NBN and the Digital Economy and a benchmark Broadband Network (NBN) for the rest of Australia.

TransACT proposes in this submission that the following changes will be required to enable viable proposals for NBN investment and to promote the Digital Economy.

Change Item	Recommendation	Rationale	Discussion
Access to existing infrastructure	“One pillar – one provider” policy	Economies of scale and streetscape	Chapter 3
Overbuild	“No going backwards” policy	Protect superior broadband technologies from inferior FTTN investments	Chapter 3
Access products	Regulate only bitstream	Unbundling bitstream not necessary and gives more end user choice	Chapter 4
Resale	Deregulate resold PSTN services	Resold services are a retail function	Chapter 4
Access prices	Regulate to recover fixed costs efficiently	Make a commercial return on investment	Chapter 4
USO	Make the NBN provider the USO carrier	Simpler to administer	Chapter 4
DDSO (Digital Data Service Obligation)	Repeal	Overtaken by NBN	Chapter 4
STS (Standard Telephone Service)	No change	NBN compatible	Chapter 4
Network Boundary	Unchanged for POTS only but will move for the NBN	Technology and equipment considerations	Chapter 4
Regulation	Clean slate review of future requirements	Existing regulation is out-dated	Chapter 5
Industry codes	Develop NBN product set and performance standards	To ensure operability across NBN networks	Chapter 5

Outline of the Submission and Key messages

TransACT believes that the NBN marks a water-shed in Australian economic development and will fundamentally re-shape the communications industry.

As with all major transformations, it will challenge some players who will need to respond to the opportunities provided by the emerging industry structures enabled by the NBN. And, it will need to be facilitated and regulated by Government.

Chapter 1 notes that TransACT is well positioned to comment on and participate in building the NBN. It is Australia's broadband pioneer and is a true believer in open access and the national benefits of the NBN. It has a clear vision to make broadband the next major utility – the 5th Pipe™. It already has major broadband networks independent of Telstra in the ACT and in rural Victoria. TransACT believes that it too will have to undertake transformational change, including a greater separation of its retail and wholesale businesses.

Chapter 2 argues that because of revolutionary technological changes that go beyond the NBN, the competitive playing field will shift from access to services. This is because carriage and content have become unbundled and broadband access (bitstream carriage) will become the next utility; the 5th Pipe™. Next generation broadband access is much simpler than even the “Plain Old Telephone Service” so we believe that regulation can be simplified for this fundamental and permanent change.

Chapter 3 is about the regulatory changes needed to make NBN investment happen. To understand the road blocks, we first have to understand that the different broadband technologies deployed in the ACT may make it a special case. For most non-Telstra Proponents, the first road block is about getting all the copper at any pillar used for the Fibre to the Node (FTTN). This road block can be fixed with a mandated “one pillar – one provider” policy. TransACT needs access both to this copper for FTTN and also to Telstra ducts for its other technology options. The second road block is about ensuring that non-FTTN broadband investments (ie FTTC and FTTH) are protected from FTTN over-build. The Government needs a “No going backwards” policy to support a road map to better broadband than FTTN.

Chapter 4 assumes that the NBN is built and looks at some of the implications of the NBN for the current regulation. It notes that the 5th Pipe™ model should not be taken too literally. Rather than a physical analogue to the Unconditional Local Loop Service (ULLS), differentiated bitstream services tailored to access seekers requirements is envisaged. This model facilitates the recovery of the large fixed costs of the NBN and also provides more choice to end users. Access pricing is proposed to follow other utility pricing models with a monthly fee plus usage. Making the NBN provider the Universal Service Obligation (USO) carrier will simplify administrative arrangements and support geographically averaged pricing. The Digital Data Service Obligation (DDSO)

can be repealed where the NBN is provided while the Standard Telephone Service (STS) obligation does not need change. The network boundary is subject to final network architecture solutions and is being examined further by TransACT.

Chapter 5 suggests that the NBN and related industry changes mean that a more fundamental review of regulation is appropriate. It discusses some examples of new regulatory concepts that will need further attention with the deployment of NBNs and evolving industry technology. TransACT believes that a much simpler regulatory regime could be devised around the converged industry structures that are emerging. We recommend a more thorough clean slate review be undertaken.

Chapter 6 concludes that utility regulation is straight forward – it has been done for years in other network industries. The real issues are getting the investment in the NBN, dealing with the pain of industry transformation and developing consistency of regulation across converged industries that share utility broadband access in a Digital Economy.

This submission is not an exhaustive dissection of the current regulatory framework. Its focus is on key aspects of regulation and the major obstacles to the deployment of NBNs. It does not pretend to offer all the answers.

TransACT assumes that it will have the opportunity to contribute again to this process (eg in workshops, supplementary submissions or questions of clarification) as the next level of detail becomes clearer.

TransACT looks forward to working with the government, TERRiA, Telstra and other NBN providers in this work of national importance. There are many areas where cooperation can reduce costs and uncertainty to promote the long term interests of our end users.

TransACT hopes that this submission will be seen to make a positive contribution to the debate and resolution of the issues that attend the introduction of the NBN which is so desperately needed in Australia.

1 TransACT's unique perspective

This chapter notes that TransACT is well positioned to comment on and participate in building the NBN. It is Australia's broadband pioneer and is a true believer in open access and the national benefits of the NBN. It has a clear vision to make broadband the next major utility – the 5th Pipe™. It already has major broadband networks independent of Telstra in the ACT and Victoria. TransACT believes that it will have to undertake transformational change, including a greater separation of its retail and wholesale businesses.

TransACT has a unique perspective and believes that its views will be of particular interest to all parties because:

TransACT is a **pioneer** in the NBN concept. At its launch in 2000, TransACT was an open access network. There were two main reasons for this:

- First, TransACT originated from a utility company, ACT Electricity and Water (ACTEW), so it had no experience in running telephony, video or data-related services. But it had demonstrated the ability to create large-scale distribution networks, run customer service facilities and undertake complex engineering projects. ACTEW also had access to physical assets such as power poles, substations, ducts and rights of way which were all useful for building a broadband network.
- Second, TransACT had no existing communications network and could, therefore, invite multiple service providers and multiple services (ie. data, voice and video) to use the network without compromising its existing business. Establishing TransACT as an open access wholesale company, therefore, made sense to its originators¹.

TransACT is a “**true believer**” in open access. As mentioned above, its original mission was to be a wholesale-only broadband access network provider. The NBN provides the opportunity to reclaim this vision which TransACT also believes is consistent with the way the industry is evolving (See Chapter 2 below).

TransACT's vision is that the NBN will be a utility; **the 5th Pipe™** into the home. Figure 1 below states this most succinctly suggesting that TransACT sees its NBN as another piped utility. Unlike other utility pipes into the home, it will support a broader range of services. It is the “pipe of pipes” for all fixed communication services.

¹ TransACT only bought a switch to offer telephony services because none of the three main carriers at the time could provide the service on mutually acceptable terms (Kelso, Ross “Open Access to Next Generation Broadband”, QUT Doctoral Thesis, February 2008)

TransACT is Australia's broadband “Pioneer”.

TransACT is a “true believer” in open access.

The NBN is the “5th Pipe” – the “pipe of pipes”.

Figure 1 – The 5th Pipe is the “Pipe of Pipes”



Broadband is just another piped utility into the home.

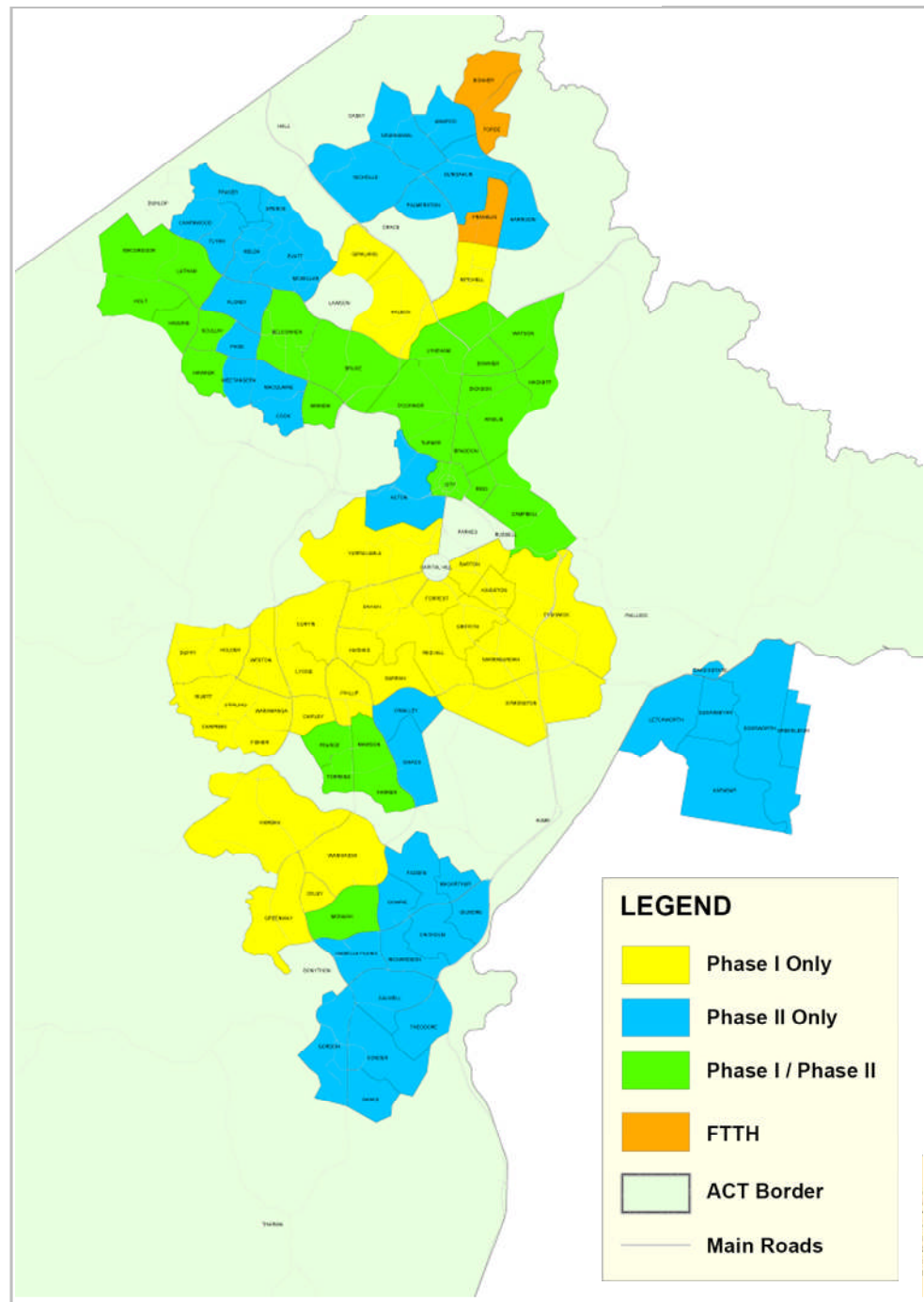
TransACT shares the Government’s passion for enabling the Digital Economy.

TransACT has won all four FTTH tenders in the ACT on “value for money.”

TransACT is a **passionate Proponent** for the NBN with respect to the ACT. TransACT believes that the Digital Economy will flourish only when many businesses contribute to the delivery of services – when business processes are not constrained to a single company and its physical premises. Communications, IT, and payment services are just some of the common components of the new “Web 2.0” and “Web Services” business models.

TransACT has about **one in five ACT homes and businesses already connected** to fibre rich broadband networks. And most of these customers are directly connected to TransACT’s Fibre to the Curb (FTTC) network that is independent of Telstra. The yellow and green areas in Figure 2 below show the footprint of the FTTC network. The blue and green areas show where TransACT is using Telstra’s ULLS. TransACT is also deploying Fibre to the Home (FTTH) networks in new (green field) estates as shown in orange.

Figure 2 – TransACT Indicative network coverage



Around one in five broadband ACT households are connected to TransACT – most on its own networks.

It should be no surprise that TransACT is exercising the option under the NBN RFP to bid for a State-based proposal². It has its own existing broadband networks, locally employed and skilled resources. And it has a “my town” commitment to connecting people. We want to complete its original vision!

² Technically, Queanbeyan is not part of the ACT and will therefore be excluded from our bid. But, after the allocation of NBN licences, TransACT imagines that NBN providers will negotiate where network boundaries make more sense than political boundaries.

TransACT understands the perspectives of both access seekers (and end users) as well as access providers (builders).

TransACT speaks as both an **access-provider and an access-seeker**:

- As an access provider, TransACT provides originating and terminating access to customers on its own networks and wholesales services to ten Internet Service Providers (ISPs). TransACT has customers in the ACT and on its Neighbourhood Cable, Hybrid Fibre Coax (HFC), networks in Geelong, Mildura and Ballarat. TransACT recognises that its Victorian HFC networks might be overbuilt – although it would welcome the opportunity to integrate these into the NBN build in Victoria.
- As an access-seeker, TransACT's interests differ from those of its role as an access-provider. And as an access-seeker it must vigorously pursue its current ULLS dispute with Telstra to defend its retail business (and wholesale customers' retail business) to remain competitive.

TransACT believes in **clear separation of retail and wholesale operations** although this is not a requirement of the NBN RFP. Cave identifies six degrees of separation between accounting separation and structural separation³.

The following table consolidates Cave's analysis with descriptions used by Ofcom (for British Telecom) and the ICRC (for ring-fencing ACTEW in the ACT)⁴. The costs and benefits of these separation levels need further examination to understand what is most appropriate for NBN providers.

³ M Cave: *Six degrees of separation: operational separation as a remedy in European telecommunications regulation*; Communications and Strategies, No. 3, 2006, (2006)

⁴ Independent Competition and Regulatory Commission Ring Fencing guidelines for Gas and Electricity Network Operators in the ACT, November 2002

Source	Six Degrees of Separation
1. Creation of a Wholesale Division	
Cave/Ofcom	Wholesale unit with a dedicated management.
Cave	Systems and business processes fully integrated with access products grafted on
2. Virtual Separation	
Cave/Ofcom	Reengineering of transactions boundary to achieve equivalence, but no underlying change in production processes.
3. Business Separation	
Cave/Ofcom/ICRC	Physical business separation of particular assets but using identical processes for internal and external customers
Cave/Ofcom/ICRC	Staff are physically separated and must not work in conjunction with any of the company's other affiliates
Cave/Ofcom/ICRC	Separation of Information: (Chinese walls)
Cave/Ofcom/ICRC	Separate profit and loss statements and balance sheets.
Ofcom	Separation of operation support systems (OSS)
Cave/Ofcom/ICRC	Separation of the brand from rest of company
4. Business Separation with Local Incentives	
Cave/Ofcom	Managerial remuneration tied to divisional performance rather maximising group shareholder value.
Cave	Restrictions imposed on the movement of senior staff from the separated unit to the group.
5. Business Separation with Separate Governance	
Cave	Board with non-executive directors independent of the group.
Ofcom/ICRC	Separate Management board, independent of the group (but still able to report to group CEO)
Ofcom	Independent compliance handling committee
Ofcom	Performance indicators published by independent party
6. Legal Separation with Common Owner	
ICRC	It must not cross-subsidise a related business
Cave	Separate board with separate statutory accounts

2 Services have separated from access

Because of technological changes that go beyond the NBN, the competitive playing field will shift from access to services. TransACT believes that this trend should be reflected in future oriented regulation.

This chapter argues that because of revolutionary technological changes that go beyond the NBN, the competitive playing field will shift from access to services. This is because carriage and content have become unbundled and broadband access (bitstream carriage) will become the next utility; the 5th Pipe™. Next generation broadband access is much simpler than even the “Plain Old Telephone Service” so we believe that regulation can be simplified for this fundamental and permanent change.

The communications industry is now entering into a third stage of competitive development. It will pose major challenges for regulation and for the business models of both access providers and access seekers.

A new era for competition.

	Calls	Access	Services
Period	1990	2000+	2010+
Technology drivers	PSTN	PSTN and Internet	Ubiquitous Broadband – Fixed and Wireless
Regulatory drivers	Originating access	ULLS	Open access Network neutrality
Business models	Resale and calls	Bundled PSTN and Internet	Advertising and subscription
Typical players	Optus	iiNet	Google

Source: TransACT team analysis

► Stage 1 – Call competition

In June and November 1992, mobile and fixed network competition respectively began in Australia. On the fixed network, the key regulatory concepts were originating and terminating access so that Optus could transmit calls between customers directly connected by Telstra. This was aided by interconnection prices being set before Optus bid for its carrier licence and by the “preselection ballots” which allowed customers to choose which carrier should carry all their calls without having to dial extra digits.

In 1997 the fixed carrier duopoly was terminated and new entrants entered the carrier market. The margins on international calls were competed away and the emphasis shifted to local calls.

The main disruptors to this business model were the erosion of margins on long-distance calls and the ULLS.

Current fixed network business models and access regime are reaching their use-by date...

... But new services that excite and empower users will blossom.

▶ Stage 2 – Access competition

In July 1999 the ULLS was declared. This shifted control of the customer’s call revenues to control of the access line. At the same time, ADSL services started to be provided over telephone lines. With broadband internet expected to grow fast, there was even more reason to capture customer revenues at source – with the ULLS line.

The main disruptors to this model are the unbundling of the network layers associated with the emergence of the Next Generation Network (NGN) and the replacement of regulated access prices for ULLS with (probably) higher access prices associated with building the advanced NBN.

▶ Stage 3 – Service competition

This phase of competition is emerging as the current business models are replaced. While many ISPs as we know them today may disappear⁵, the NGNs that are emerging will allow many different service providers to provide innovative products and services to customers. The NBN is the NGN access network that will enable the new broadband applications to be delivered to customers and to connect them in new ways. Network neutrality will ensure all manner of applications are available, even when they compete with the infrastructure provider’s own service (e.g. Skype).

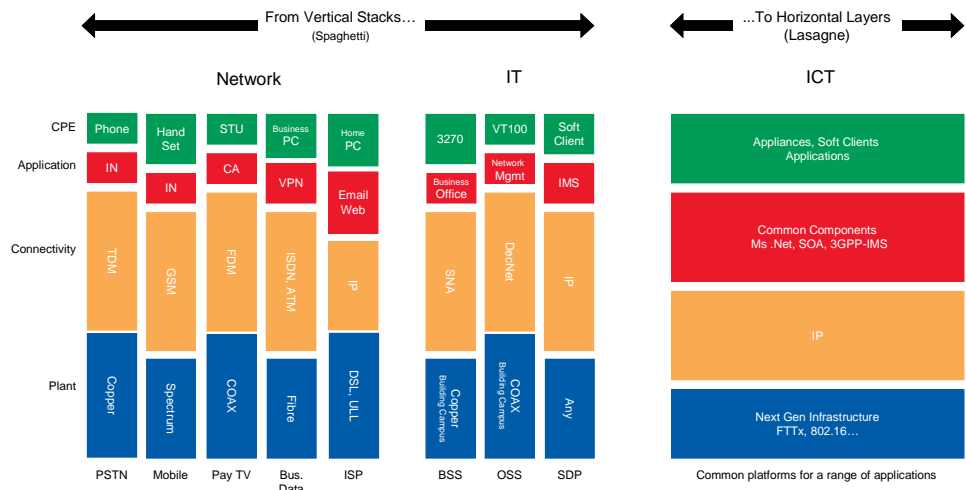
Competition between fixed and mobile broadband is also providing end users with alternatives that are direct substitutes – for example mobile calls and access displace fixed calls and access. Whether the end user is making calls, listening to music, watching TV or participating in MySpace, mobile networks offer an alternative to fixed networks.

▶ Technology unbundling

Technology is separating services from transport for services such as TV and Telephony. This is illustrated in Figure 3 below. In the past, every service used tailor-made connectivity protocols and equipment to deliver products and services to customers. Now, this “spaghetti” is being replaced with a “lasagne” technology model in which all services that can be digitised will be provided over common protocols and interfaces.

⁵ Originally, ISPs provided the interface between telephony and the internet; often from back-yard or even back-bedroom operations. This connectivity function is embedded in broadband access as a utility.

Figure 3: From Purpose Built Networks to Networks for Any Purpose



From: Alcatel – Lucent Telecommunications Review, Renaissance in the Art of Networking , 2007

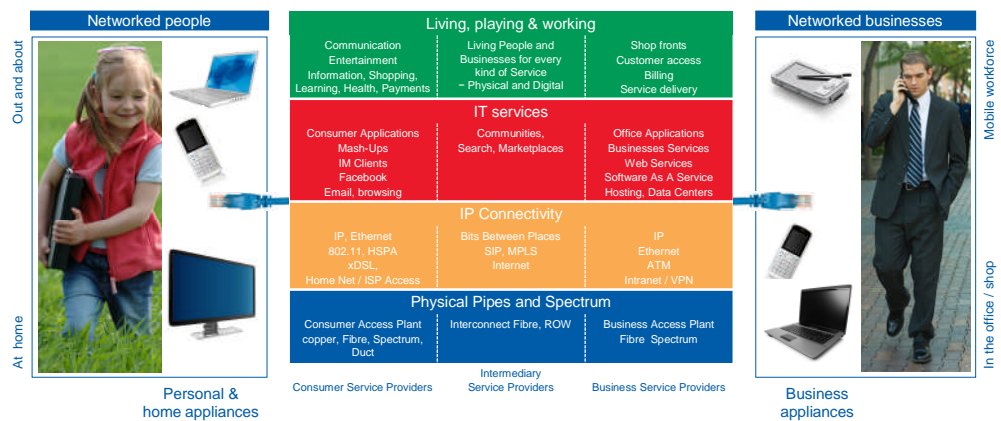
Source: Alcatel – Lucent Telecommunications Review, Renaissance in the Art of Networking, 2007

This new technology model is being built into all communications networks now with the NBN providing next generation access for next generation networks.

This new technology model will promote any-to-any connectivity and allow new services to be deployed fast. In short, it is the infrastructure for the Digital Economy.

Figure 4 shows how the “lasagne” technology model provides the platform for people and appliances to connect to each other in the Digital Economy.

Figure 4: The Digital Economy



Source: Derived from Telstra's Future Network Evolution announcement. www.charlton.com.au/events/telstra/presentations/005_Johnson.ppt

End users will come to consider the NBN as a commodity like electricity and water. They value commodities only for the exciting things you can do with them. The means will be perceived to have less value than applications.

► **Broadband access is a utility – the 5th Pipe™**

Recognising these trends, TransACT's approach is to establish the broadband pipe into each house as a utility; the "5th Pipe"™. The utility model is well known to everybody – it works for the other utility pipes and can work for broadband. Our retail customers are telling us that their key requirements are: affordable access, simplicity, reliability, to pay for only what they use and choice of retailer – just like other utility services.

Utility broadband is the final stage of evolution of the wired network – everyone will be able to connect to anybody and anything for any purpose with little constraint – there isn't much more after that⁶.

⁶ Of course, the success of the NBN investment nationally depends on supporting developments (eg security and authentication) and above all on how it is used to transform business models (eg telework).

3 Removing investment roadblocks

There are some major road blocks to NBN investment. Previous (Metro only) NBN offers by Telstra and the G9 (now TERRiA) said that regulatory change is required before investments would be made in NBN networks. TransACT's perspective is different to others because it has already deployed FTTC and FTTH broadband networks with superior features to FTTN which could only be used if suitably protected.

This chapter is about the regulatory changes needed to make NBN investment happen. To understand the road blocks, we first have to understand that the different broadband technologies deployed in the ACT may make it a special case.

For most non-Telstra Proponents, the first road block is about getting all the copper at any pillar used for the FTTN. This can be fixed with a mandated "one pillar – one provider" policy. TransACT needs access both to this copper for FTTN and also to Telstra ducts for its other technology options.

The second road block is about ensuring that non-FTTN broadband investments are protected from FTTN over-build. The Government needs a "No going backwards" policy to support a road map to better broadband than FTTN with no reversing.

Any non-Telstra Proponent intent on being an NBN access builder and access provider faces two potential show-stoppers. The first concerns access to existing Telstra infrastructure. The second concerns Telstra's continued use of existing infrastructure (ie overbuild). Both of these might be resolved with help from the Commonwealth by a judicious combination of carrots (negotiation) and sticks (regulation).

► Technology options for the NBN

Potential show-stoppers can be understood in the context of the three potential technology options available to TransACT as an NBN provider (Figure 5).

The conventional wisdom is that the FTTN will be the primary technology to provide the NBN; but with an eye to the future on how FTTH will be reached eventually. But, as noted in Figure 2 of Chapter 1, TransACT started deploying its FTTC broadband network eight years ago. The FTTC is considered better than the FTTN because it extends fibre deeper into the network and closer to the home. It uses shorter copper loop lengths for the final drop (typically less than 350 metres) and it uses better quality copper (Cat5 rather than the voice grade twisted pair from the pillar) which all allows for greater speeds and reliability.

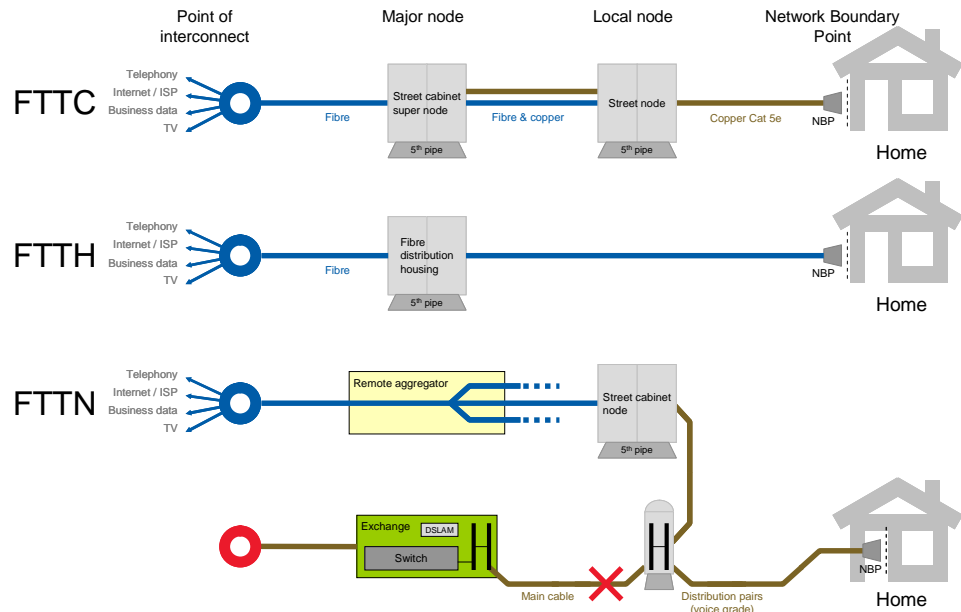
We need a "One Pillar – One Provider" policy to remove the first road block.

And we need a "No going backwards" policy to protect superior broadband technologies from overbuild by inferior FTTN investments.

TransACT has better options than FTTN.

FTTC has more fibre, shorter lead-ins and better copper than the FTTN to give greater speed and greater reliability.

Figure 5: TransACT's Technology Options



The default option is the FTTN which can be deployed almost anywhere in the ACT that is supplied with a Telstra sub-loop. But, it may be economic in some places to leap-frog FTTN and go now for FTTH in brown-field areas (households with copper) not covered by the existing FTTC network. The brown-field deployment of FTTH is discussed below in the context of overbuild.

With the assistance of developer contributions (for which TransACT competes), FTTH is already employed in greenfield areas (new estates). The ACT has about 120,000 households now with 21,600 dwelling sites expected within five years⁷ and over 40,000 in the ten years beyond that. Consequently, FTTH will become very important in the mix of access technologies used.

For completeness, we note that for some (less than 2 percent) households in the ACT it may not be economic to provide fixed services using any of the three technologies above. While these households are not within the reach of the NBN build, TransACT will become the default wholesale provider⁸ of the standard telephone service (STS) as it is likely to become the USO carrier at the same time as becoming the NBN provider (see Chapter 4). In such cases, a telephony service is likely to be provided by some wireless access service; or even continued use of copper.

⁷ Just under half of the growth is private sector infill with the rest being new estates resulting from Government land sales (ACT Indicative Residential Land Release program: 2008-09 to 2012-13, Chief Minister's Department, April 2008)

⁸ That is, if the customer's own retail provider did not have its own access solution, that retail provider might seek a wholesale solution from TransACT (or other access-providers).

► **First Road Block – All the copper at any pillar**

The **sub-loop** is the first critical issue for any non-Telstra NBN builder relying on FTTN architecture. But, with its more diverse technology options, TransACT also needs access to Telstra’s **ducts and conduits** (for which Telstra would eventually have no further use if TransACT is the NBN provider)⁹.

In terms of the sub-loop, TransACT proposes that there is no sharing of pillars¹⁰ and no sharing of cabinets¹¹. The NBN is a natural monopoly (ie cheaper to have one fixed network provider). In our view, there should be a “one pillar – one provider” policy with sharing achieved by interconnection at a central point (ie bitstream access). This should be seen as the *quid pro quo* for building the NBN.

While regulators like to have the sub-loop option available, they also recognise that duplication is unlikely because the economies of scale do not support the collection of traffic at the pillar for most – but not all – access seekers. Based on a number of case studies (Analysys, Arcep, JP Morgan, Ovum and WIK), the European Regulators Group (ERG) concluded that:

“Given that next generation access networks may be more likely to reinforce rather than fundamentally change the economics of local access networks, NGA may be likely to, at least, provide the same competition challenges to regulators as current generation wireline access networks”

[p20, ERG Consultation Document on Regulatory Principles of NGA, 2007]

The exception is Telstra which is probably the only retail provider with sufficient scale to make a “race to the node” (duplicated VDSL cabinet at the node) economic for its own investment. But, there is also a real risk that duplication of fixed broadband networks leads to mutually assured financial destruction of their respective viability because neither will achieve full economies of scale. So, we need a “one pillar – one provider” policy.

TransACT prefers not to rely on technical factors¹² or Telstra’s good sense but needs a guarantee that if it builds, Telstra will come on board. This could be achieved through an appropriate facilities access regime and/or by declaring the NBN under legislation and setting prices with a Ministerial Determination.

A “race to the node” risks mutually assured financial destruction.

⁹ TransACT also has access to ACTEW’s poles and ducts and special privileges on rights of way.

¹⁰ Pillars should be understood to include all equipment providing similar functionality (eg RIM, CMUX, ISAM and RCM) which affect about one in five household connections.

¹¹ Having one node also avoids duplication of street furniture (cabinets), which is an important consideration.

¹² While one node can have two fibres technically without any visual impact, this may introduce technical issues to do with charging and managing the cabinet – eg new records systems demands on fibre and copper sides.

The unbundled local loop is a declared service. But, the sub-loop component of it is not. G9's Special Access Undertaking (SAU) last year suggested that a Ministerial Direction could short-circuit the declaration process for the sub-loop:

Pillar migration is not feasible within Part XIC because of the manner in which certain restrictions operate under that access regime. However, an amendment could be made to allow specific modifications to these restrictions for broadband services provided over an HFTP Network. This could be done by Ministerial determination without financial risk to the Commonwealth.

[FANOC SAU, Schedule 5, Section 5.2, May 2007]

There is a precedent for such action in the Ministerial Direction which allowed access prices to be set ahead of bids for the second fixed licence in 1991/92¹³.

▶ **Second Road Block – Overbuild by FTTN**

TransACT's concern is not so much the "race to the pillar" (because this can be fixed with the "one pillar – one provider" policy) but that Telstra (or other carriers) use the pillars by-passed by TransACT's FTTC or FTTH networks.

This concern is illustrated in Figure 6 below. The first vertical arrow (Choice 1) notes three potential technology choices for TransACT in urban areas where its initial FTTC network passes half ACT households (Phase 1 in Figure 2). If by-passed pillars can be used by other carriers, TransACT would have to abandon its superior FTTC network (and the possibility of brown-field FTTH) technology because it would not achieve the economies of scale required to make them viable. That is, for defensive reasons it would have to junk its superior and already built FTTC network and deploy FTTN under the protection of a "one pillar –one provider" policy.

This concern is shared by the Government because it has said that bids for the NBN must "demonstrate a clear upgrade path for the network to meet future consumer demand and service developments to at least 2020 and preferably beyond" (NBN RFP, clause 1.1.11). Without a "No going backwards" policy, we could see technology deployment go backwards. Removing this road block is easier to achieve than removing the first road block because it is harder to legislate what carriers must do (eg provide access to sub loop) than to prevent them doing something (eg over build)¹⁴.

¹³ Other options to provide certainty of access to sub-loop and ducts may be: compulsory undertakings, similar to undertakings under section 87B of the TPA ;some form of facilities declaration; carrier licence conditions and/or compulsory acquisition of property on "just terms".

¹⁴ A precedent is section 94 of the *Telecommunications Act 1975* (Cth)

Stopping duplication of FTTN investments protects the Government's investment in the NBN.

In some cases FTTN might be used as a defensive strategy unless FTTC and FTTH investments can be protected.

The Government needs a "No going backwards" policy.

Figure 6: Technology Options by Area of ACT

		Area of the ACT			
		FTTC footprint	Other urban	New estates	Last 2% of ACT
Technology option	FTTC		x	x	x
	FTTN			x	x
	FTTH			✓	x
	Other	x	x	x	✓

Choice made will vary by area driven by:

- Development Status - Existing Plant or New Estate
- Capital expenditure, Cost to Convert, Operations
- Performance Needs and Available Subsidy

Choices would change without regulatory protections

Similarly, the Choice 2 vertical arrow for areas outside the FTTC footprint shows that TransACT is considering the deployment of FTTH in brown-field areas instead of the default FTTN technology – a bit more capital now could save a lot more capital later. But, it could not contemplate an accelerated investment in FTTH if the redundant pillars are used by others.

TransACT is examining the business case for bringing forward the implementation of FTTH in brown-field sites because it sees a number of benefits to the end user, the provider of the network and the Commonwealth. The higher initial cost relative to FTTN would be partially off-set by:

- Better performance
- Network sustainability
- Reduced carbon footprint
- Lower ongoing operations costs
- Significantly reduced and deferred upgrade costs
- Reduced power consumption (FTTH is a passive network)

The current process is about the competitive allocation of licences to build the NBN. These licences have to be strong enough not only to provide control of all the copper at any pillar but also control over all pillars in the NBN licence area. Only a “No going backwards” policy will ensure that network development moves forward and not backwards.

Superficially, competition between FTTN and either FTTC or FTTH networks may seem like a good thing. Infrastructure competition between different technology platforms has long been seen as an ideal by those casting envious eyes at the USA which has enjoyed vigorous competition between copper and

cable networks. But, once we realise that broadband access is now a utility and that it is competition at the higher network layers that generates the user benefits, we can leap-frog the ultimately wasteful and obsolete ideal of network duplication.

The NBN will provide a pipe like earlier network utilities. Its provision, operation and upgrading can be handled through the well established approaches used in other network utilities.

4 Impact of the NBN on current regulation

In the previous chapter, we identified the major road blocks to NBN investment from TransACT's perspective. This chapter assumes the NBN is built and explores the consequences of NBNs on existing regulation.

This chapter assumes that the NBN is built and looks at some of the implications of the NBN for the current regulation.

The 5th Pipe™ model should not be taken too literally. Rather than a physical analogue to the ULLS, differentiated bitstream services tailored to access seekers requirements is envisaged. This model facilitates the recovery of the large fixed costs of the NBN and also provides more choice to end users

Access pricing is proposed to follow other utility pricing models with a monthly fee plus usage.

Making the NBN provider the USO carrier will simplify administrative arrangements and support geographically averaged pricing.

The Digital Data Service Obligation can be repealed where the NBN is provided while the Standard Telephone Service obligation does not need change.

The network boundary is subject to network and equipment limitations and is subject to final network architecture solutions being examined by TransACT.

The details of TransACT's 5th Pipe™ wholesale model are currently being finalised. Consequently, TransACT expects to be able to provide more details about changes that may be required to the legislative and regulatory regime ahead of its response to the RFP for the NBN.

► Access products

As noted in Chapter 1, the ULLS service has been seen as the mainstay of competition by regulators on the basis that it promotes innovation:

“The Commission considers that an approach to regulation that encourages competitors to invest in their own infrastructure, where it is economically efficient, is likely to promote the LTIE. Facilities-based competitors do not rely on gaining access to an incumbent’s network (or to a lesser extent than under resale competition). As a result, they have a greater ability to:

- *control their own costs and supply chain;*
- *differentiate service offerings; and*
- *improve service quality.*

Facilities-based competition is more likely to lead to sustainable competition, spur dynamic innovation and encourage the diffusion of new technologies over time; ultimately providing greater prospects for the relaxation or removal of access regulation”.

[ACCC, Fixed Services Review, April 2007, p21]

However, the NBN will result in ubiquitous fixed broadband within 5 years and this will fundamentally change the game¹⁵. This together with the technology changes discussed earlier means that current regulatory paradigms (and Australia is not alone) will have to shift their current focus from infrastructure competition as the end goal. Since there is a clear natural monopoly on fixed services with the NBN, the Long Term Interests of End Users (LTIE) are better served by encouraging open access on the transport layer (NBN) and stimulating the development and provision of innovative services.

TransACT’s proposed utility model for the NBN pipe suggests that we should now look to the kind of retail competition that is seen around other utilities – not the kind of access competition seen now around ISPs and mobiles.

Intense innovation and competition will occur at the highest layers - simplicity in the pipe (transport layer) creates the platform for the level of competition that is possible at each layer above the pipe. As is often the case for network utilities, competition at the pipe level destroys incentives to invest.

The 5th Pipe model is not intended to be quite as literal as it sounds. It will not provide dark fibre or wavelengths as the analogue of the ULLS service. Bitstream services will provide more options in cost recovery and provide more choice to end users. The details of the wholesale product set are still under consideration but TransACT’s thinking is to offer different speeds and grades of

¹⁵ DSLAM s will become redundant as access seekers move to the NBN but our estimates suggest that these investments will have been recovered many times over before they become obsolete.

Bitstream access provides more choice to end users and more flexibility in cost recovery.

Resold PSTN services are should be re-sold by Retail Providers.

service so that the access seeker pays only for what is needed to meet their end user's requirement. The model is also expected to allow end users the opportunity to select different retail service providers for different services.

The bitstream pipe can extend beyond the point of interconnection (POI) to wherever the access-seeker chooses to connect. The interfaces at each end of the connection depend upon the service (eg telephony or TV) and technology (eg FTTN or FTTH); and are currently being examined.

There are some other consequences of looking at broadband access as a simple pipe offering:

- Wholesale line rental (WLR) and local call resale (LCS) are end-to-end services that cannot be provided by an access provider of pipe capacity. They could be supplied on a commercial basis by retail providers but are not within the scope of the 5th Pipe™ service.
- PSTN originating and terminating access are wholesale services that do not apply to the NBN access provider operating as the 5th Pipe™; it has no telephony switch¹⁶.

▶ Access pricing

Bitstream access is not currently regulated in Australia. But, as a utility service, TransACT anticipates that its 5th Pipe™ access prices will be regulated.

It is not possible to spend billions of dollars on the NBN and maintain access prices at their current levels. The returns to access seekers and access providers have to be rebalanced. The return on investment (ROI) for network builders needs to be fair and equitable. We need to embrace the utility nature of the NBN infrastructure and the business models that go with it.

¹⁶ TransACT may choose to offer wholesale switching, as it does now, but that is not a necessary part of being the NBN provider.

TransACT believes it can provide affordable access pricing while recovering fixed costs efficiently¹⁷. The approach builds on the ACCC's willingness to be flexible about what access pricing it would approve in relation to NBN pricing:

"In the ACCC's view, the appropriateness of TSLRIC+ as a cost-based pricing methodology depends on a combination of factors..... there is no reason to rule out proposals for different pricing approaches, especially for new networks where efficient and prudently incurred actual costs can be known.

"The APP [Access Pricing Principles] guide recognises in the introduction that the pricing principles, pricing guides and specific cost-based methodology is not static and that access pricing in telecommunications services is a developing issue. Further, the special access undertaking [SAU] provisions of the TPA allow potential investors to propose other approaches. The ACCC is required to assess whether the terms and conditions proposed are reasonable not whether they are optimal or the 'most reasonable' terms and conditions. Nor could the ACCC refuse to accept an SAU which had reasonable terms and conditions on the grounds that it preferred some other access arrangement."

[ACCC, Assessment of FANOC's SAU in relation to the Broadband Access Service: Draft Decision, December 2007, p85]

Although the ACCC rejected the FANOC SAU, it appeared to accept the proposal that the efficient way to recover fixed costs is to price discriminate using differentiators that are not themselves cost-based (eg discrimination based on speed in FANOC's SAU).

TransACT proposes an access pricing model for consumer broadband that meets the Government's objectives. It should be no surprise that as a promoter of the 5th Pipe™ vision it shares much in common with other models of utility pricing. It consists of a two-part tariff where the fixed price per month is set low enough to make it attractive for access-seekers to offer entry-level broadband retail prices together with a volume based charge applied at the wholesale customer level – leaving the access seeker discretion over how to set data caps and usage fees by customer segment. The unit of volume will be the Gigabyte, as used in most consumer broadband pricing. It is a better measure of value and usage than any other.

Of course, as average consumer usage is likely to grow over time it is possible and desirable to reduce the unit fee for throughput – the higher the volumes, the lower the variable access price; for all access seekers. Having a volume related charge adds some certainty to the financial viability of the access provider.

¹⁷ The forward-looking efficient costs of an NBN access provider should not be subject to challenge as NBN investments are not historic costs and the builder was chosen in a competitive tender.

Utility pricing for a utility model will help ensure affordable pricing.

► Universal Service Obligation (USO)

In our view, this obligation should now fall on the NBN operator in NBN areas.

The compact with the Commonwealth to provide the NBN will require the Proponent(s) to reach at least 98% of the population with an access speed of at least 12Mbps. This is different from the blanket coverage required by the USO carrier's obligation¹⁸ to provide a standard telephone service on demand. But, it raises a few issues:

- **USO cost increases:** The USO is now estimated from comparing the avoidable revenues and costs of Telstra. The Government's requirement to provide 12Mbps to 98% of the population raises the cost of providing a Standard Telephone Service (STS) in NBN areas. Consequently, it will increase the number of USO customers and increase the cost of the USO (although this may be partially off-set by capital grants for the NBN).
- Worse, with the unbundling of industry layers discussed earlier and increased substitution by wireless networks, Telstra can no longer be sure of securing the revenues it now enjoys; which will cause the net avoidable cost to blow-out on the other (revenue) side of the equation.
- **Should the NBN and USO provider be the same?** The Minister can impose a USO contribution obligation on any access provider,¹⁹ but to date has not chosen to do so. Despite the contestability for the USO, Telstra is still the only universal service provider (for both the STS and the DDSO). The second of the two options below seems better:
- If Telstra remains the USO carrier but the NBN network provider is, say, TransACT, the full cost of connection and continuing provision could be passed to Telstra. While Telstra can be compensated for the USO, other retail providers in the same area cannot pass on costs imposed by the NBN provider; which would make them uncompetitive – reducing service competition.
- But, if the USO becomes the responsibility of the NBN provider and a geographically uniform access price is charged to facilitate geographically uniform retail pricing (as required by the Commonwealth), USO deficits can be estimated for each NBN operator following current practice using access revenues instead of avoidable retail revenues.

This approach is actually a lot simpler than the current calculation of avoidable revenues and the costs are more easily identified because they can be audited from actual roll-out costs rather than hypothetical costs.²⁰ Nationally, the USO

¹⁸ Telecommunications (Consumer Protection and Service Standards) Act 1999

¹⁹ See Telecommunications (*Consumer Protection and Service Standards*) Act 1999 (Cth), paragraph 20A (1) (b).

²⁰ One approach might be to look at the cost of connection versus the NPV of cash flows. As a back-of-the-envelope calculation, if wholesale ARPU is, say, \$50pm and opex is \$15pm and the average

We need a "One NBN and USO carrier in any area" policy, with geographic averaging of access prices.

Costing the USO is no longer a thought experiment.

deficits will net to zero if the access price (wholesale access revenue per line, treating STS and broadband lines equally) is set to ensure this. This will mean that some areas (ie the metro areas) will effectively be taxed to provide a cross-subsidy to high cost areas. The amount of the cross-subsidy can be reduced if the \$4.7bn²¹ committed by the Commonwealth is treated as a grant.

Another virtue of this approach is the simplicity of the funding being collected at source (in access price surcharges) rather than from an invoice based on retailer revenues.

The current USO regime requires a thought experiment in which the USO is estimated as the net loss that could be avoided if Telstra had not had to serve some customers. However, the NBN roll-out provides a clean slate. It involves real money and can be audited (unlike the USO model).

► The Digital Data Service Obligation

In our view, this obligation can be repealed.

The DDSO is an obligation to provide a 64kbps (ISDN) service. Once the NBN is complete, this obligation is redundant. There are some (2% or more) customers not on the NBN, but these customers are to be provided with faster broadband services anyway following the current review operating in parallel with the NBN process (Section 1.1.17 of the NBN RFP).

► The Standard Telephone Service

In our view, no change is required.

For many people, the standard telephone service will be all they want and on which they depend. This service will continue to be provided over NBNs. The most important aspect of the STS is that it does not rely on mains power (ie for life-line service). Currently, lifeline service is maintained by batteries at the local telephone exchange. In future, after copper connectivity in the customer access network is removed, it will come either from batteries at the FTTN street cabinet (the node) or from batteries at the customer's termination unit (as with current deployments of FTTH in the ACT).

► Network boundary

TransACT believes that the Network Boundary Point should remain at the first telephone socket for POTS only implementations. It would be the modem for

connection cost is \$1,000 then over 15 years the NPV is \$964. Or, to put it another way, an installation cost of \$2,000 or more would define a USO customer.

²¹ The \$4.7bn figure comes from Telstra's Aug 2005 pack (slide 9) which said it would be uneconomic for Telstra to provide the NBN to 95,000 urban customers and to 993,000 customers on rural exchanges (ie with less than 2,500 lines each). That is, to extend the NBN to around 1m non-commercial customers (4.5% of a population of 22m people; or 10% of 10m lines), a capital contribution of up to \$4.7bn would be required from the Commonwealth.

Network boundaries depend upon network technologies and equipment limitations.

FTTN and FTTC but would shift to the Optical Network Terminator (ONT) for FTTH implementations.

TransACT proposes that Telstra will remain responsible for the lead-in and wiring to the first socket under FTTN scenarios, but Telstra might transfer responsibility for both under some scenarios where TransACT wholesale negotiated taking over all responsibilities for entire Distribution Areas.

In FTTH and FTTC scenarios, the existing Telstra lead-in would be abandoned once the basic telephone service is cutover – assuming exclusive use of the pillar and no legacy copper-based services (e.g. alarms). The wiring to the first telephone socket might be reused subject to the house telephony entry point being close to the natural point of placement for the fibre or cat5e twisted pair termination block and the rules allowing TransACT to use the Telstra-provided wiring to the first socket.

TransACT assumes that the wiring inside the house (other than to the first telephone socket) would be treated as being owned by the home owner and the provision of any further wiring, whether telephone, cat 5 or coaxial would be the responsibility of either the end user or the retailer.

5 New regulatory concepts are needed

The third chapter looked at the changes required to facilitate investment in the NBN. The fourth chapter looked at some of the consequences of NBN deployment for the existing regulatory framework. In this chapter, we introduce some new regulatory concepts that will need further attention not only because of deployment of NBNs but also because of evolving industry technology.

We need to take a fresh look at regulation for converged industries.

This chapter suggests that the NBN and related industry changes mean that a more fundamental review of regulation is appropriate. It discusses some examples of new regulatory concepts that will need further attention with the deployment of NBNs and evolving industry technology. TransACT believes that a much simpler regulatory regime could be devised around the new industry structures that are emerging. We recommend a more thorough review be undertaken.

What follows are some examples of new or revised regulatory concepts that might form part of a wider review of what regulatory framework is appropriate for the convergence of industries and technologies in the Digital Economy.

▶ Any to any

Any-to-any provisions in the current legislation are taken to mean person-person communications. But, consideration should be given to whether it should include machine-machine and person-machine; both of which have meaning in the IP world.

▶ End to End Performance

Our customers value simplicity and reliability because the Internet is important to nearly every aspect of their daily life and this will become universally true with ubiquitous deployment of the NBN. Like other utilities, minimum standards are needed for the end to end performance of the service – or at least the elements of service that are controlled in Australia.

The retail ISP, the broadband access network provider, the backhaul provider, the interconnect/peering arrangements and the distant networks and servers all contribute to the overall performance experienced by end users. Today, unlike in the telephony world, there is no NBN product set agreed across each member of the value chain. TransACT suggests work could begin in industry associations (eg the Communications Alliance – formerly known as ACIF) to agree performance of public networks in Australia – as mandatory or voluntary codes – and so ensure consistency of experience for users of the NBN.

▶ **Anti competitive behaviour**

The NBN changes everything. All houses and businesses will have a range of standard services with known levels of performance available and utility pricing. Regulatory approaches from the utilities industries suggest appropriate safeguards. Where traditional networks could only support a very limited number of service providers, the much greater capacity of the NBN will greatly reduce the challenges associated with competition for use of scarce resources.

A TransACT retail requirement is that it should be able to retail its services across NBNs operated by access-providers anywhere in Australia.

▶ **Network neutrality**

TransACT is committed to the principles of “network neutrality”²². This is of vital interest to those who deliver applications over networks independently of the network owner or ISP. TransACT proposes to treat all services that use the network equally. Where services receive expedited delivery (guaranteed Quality of Services) it will be explicit in customer contracts; as will any shaping of traffic to ensure availability of service to all users. TransACT proposes to publish its policies and report monthly on interventions to network delivery (e.g. where traffic shaping has been applied to file sharing traffic).

The reason this debate is so important is that the ISP service is the general purpose connection for all services and, subject to adequate capacity, can displace most other specialised forms of connectivity. It is important for consumers as it will reduce the overall connectivity/communications bill over time. It is important for merchants as it will increasingly be the primary means of reaching consumers. And lastly, it is vitally important to the providers of network connectivity as it is becoming the primary form of connection and displacing other forms and associated revenues.

The interaction between pricing, service model, and usage must be faced. Without incremental cost for usage, demand will exceed capacity – some end users will download vast collections of videos (more than any one person could watch), others will have permanent video feeds from favourite cities, beach houses etc whether watched or not. Charging is the first measure to manage demand. The second is to “shape” the traffic according to the needs of the particular stream:

- Few would argue with the proposition that suppliers of connectivity services should be able to charge for quality of service or be able to allow either A or B Party pricing (calling or called party pays in telephony terms). Allowing more charging options would be in the long term

²² See Wikipedia: http://en.wikipedia.org/wiki/Network_neutrality

interests of the end user as many services on the Internet are appropriately supported by merchant, B Party or advertising fees and there is no reason why the same parties would not be prepared to fund some or all of the costs of the user's connection.

- As a practical approach to traffic shaping, TransACT proposes “Neutrality with Disclosure of Policies and Actions” as mandatory for all providers of services over the NBN. Retailers would implement this at the retail layer while wholesalers would need to provide the option for implementing such an approach where it has infrastructure implications. Key features of this approach²³ are:
 - All applications of a class (VoIP, video streaming, file sharing) are treated equally regardless of supplier (subject only to equivalent resource demands)
 - Shaping policies are disclosed in service agreements
 - Actions related to this policy are reported monthly.

▶ **Property levy**

If the NBN is considered as a utility, some novel funding options become important to consider. The NBN will add value to all the houses it passes. Like the water supply in the ACT, it is proposed that a charge be levied by the NBN wholesaler on each property which is passed by the NBN even if it does not take the service. This reflects the improved property value and partially offsets the cost of building the NBN.

▶ **FTTH levy**

It is proposed that Government(s) should mandate that all new estates are wired for the NBN with developers continuing to pay a fixed contribution for each new property developed with FTTH infrastructure. The charge might be different where developers choose to develop estates with unique challenges which require negotiation. The provision of the NBN using FTTH for developers should be exclusive to the NBN builder.

²³ More sophisticated models may emerge in response to user demands, but for now, “Network neutrality is the New Common Carriage” according to Christian Sandvig. The Journal of Policy, Regulation, and Strategy. Author's prepublication draft, version 2: July 2006. http://www.spcomm.uiuc.edu/csandvig/research/Network_Neutrality_is_the_New_Common_Carriage.pdf

If a pass-by levy is good for water, why not for the bit pipe?

6 The way forward

We are going through a paradigm shift. Once we see that broadband access can and should be considered as the next utility, regulation is not such a difficult question – we have been regulating utilities a very long time.

Utility regulation is straight forward – it has been done for years in other network industries. The real issues are getting the investment in the NBN, dealing with the pain of industry transformation and developing consistency of regulation across converged industries that share utility broadband access in a Digital Economy.

In this submission we have approached these issues with triage:

- The first priority is facilitating investment in NBN networks. To get this underway, we must have two policy commitments:
 - “One pillar – one provider” to avoid a “race to the node”, but not forgetting that the more general requirement is access to other existing infrastructure like conduit that is needed for networks that have greater capabilities than FTTN.
 - “No going backwards” to avoid the upgrade path to the future being de-railed by FTTN over-building networks with greater capacity.
- The second priority is to anticipate and develop revisions to existing regulation that are required because of the NBN.
- The third priority, which should start sooner rather than later, is to develop regulation for the converged industry structures that emerge in the Digital Economy.

TransACT looks forward to working with the Government, TERRiA, Telstra and other NBN providers in this work of national importance.



TransACT
Everytime.