

## Broadband pricing to achieve net neutrality – Goldilocks revisited

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This is the author's version of the work. The definitive version has been published in *Telecommunications Journal of Australia*

**Volume 59 No 2 July 2009** published by Monash University ePress

### Abstract

This article proposes two-part wholesale access pricing for the proposed Australian National Broadband Network. This not only reconciles broadband investment incentives and affordability but also provides a partial solution to the net neutrality conflict.

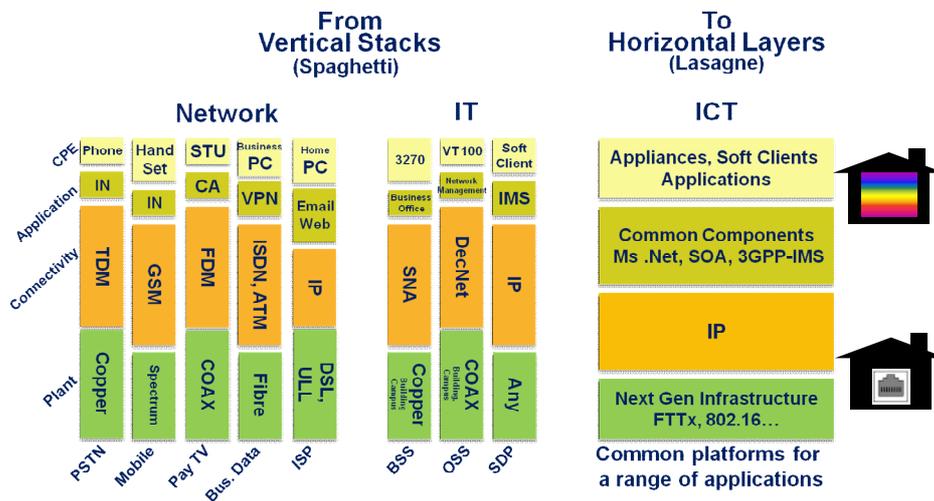
### Access must pay for itself

Traditionally, fixed and mobile telephone networks have relied on cross-subsidies from calls to help fund the cost of providing access. This made access affordable to all users with the heaviest users paying more. But in future, access must fund itself.

Service cross-subsidies worked when calls and access were joined in both supply and demand. On the fixed (but not mobile) network, the cross-subsidy was undermined with carrier pre-selection and over-ride because high-margin call revenue was taken by providers that did not have to provide the loss-making access service.

**Figure 1: De-layering with IP**

### Purpose Built Network vs Network for any Purpose



**True Broadband = One Network for Anything!**

Source: James and de Ridder (2008)

The asymmetric allocation of costs and revenues between access and applications is becoming even more marked with the shift from application specific (eg telephone)

networks to application agnostic (i.e. IP) networks. Fixed networks (and mobiles with LTE<sup>1</sup>) are subject to a de-layering of the industry as network architectures shift from vertical integration to horizontal integration with a single network supporting a multitude of uses (Figure 1). Wholesale access is provided at layers 1 and 2 but high-margin applications and content are delivered over higher levels in the network. This means that network operators may not get the new broadband revenues they were counting on:

*Services like Netflix and Hulu, for example, chip away at money-makers like Video on Demand (VOD) and even basic cable programming. (Morisy, 2009)*

Customers can take services from companies like Skype and Google without either the owner of the access network or the customer's telecoms provider or ISP deriving any revenue benefit. Worse still, these third party applications can impose costs on the ISPs and carriers that have to augment capacity:

*If you want innovation on the Internet, you need better pipes: ones that are faster, less susceptible to hackers and spammers, or smarter in ways that nobody has yet thought of. The lack of incentives for pipe innovation is more pressing than the lack of incentives to create new Web services. (Washington Post, 2006)*

In the early days of the Internet, US web-surfers were not charged for down-loads. All content and applications added utility to the network and increased internet take-up. But broadband applications like video and music file transfers are now creating costs, not spreading them.

The de-layering of communications is coming just when large investments in broadband access networks are needed. There may be new retail revenues, but the prospects of the access provider tapping most of these are dim, even if it were vertically integrated. Apart from de-layering, there is the prospect that access seekers will try to breach any 'walled gardens' of exclusive content by regulation. And, if investment in enhanced access networks is undertaken by a wholesale-only company, it will not have access to any retail revenues to cross-subsidise access.

All this means that access has to pay for itself – and still be affordable after spending billions of dollars on enhanced national broadband access network. This is the "Goldilocks pricing conundrum" – making prices high enough to justify investment but low enough to be affordable.

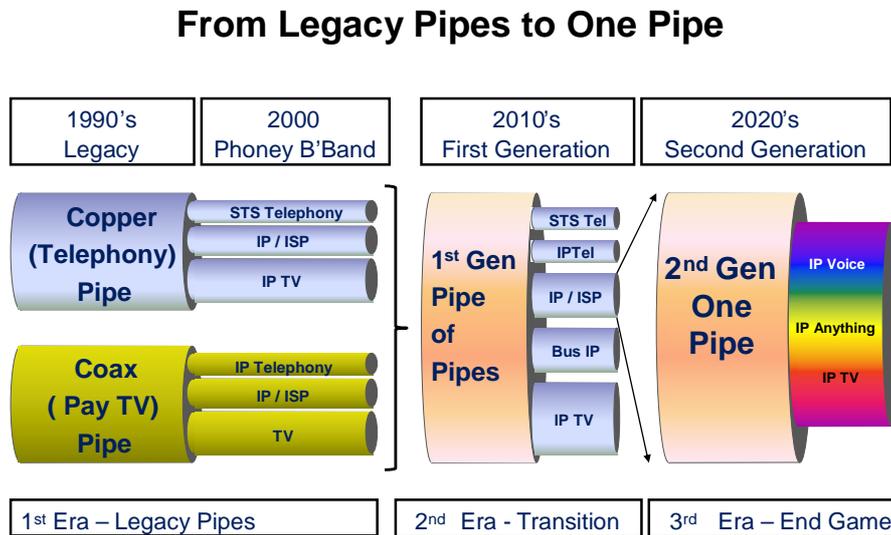
### **Wholesale only access pricing**

A previous review of broadband access pricing in this journal found some options linked to retail prices were promising (de Ridder, 2008). But it did not consider the two-part pricing proposal below which fits a 'wholesale only' model and has a number of other attractive features.

Pricing of telephony and IPTV ports is relatively straightforward. Pricing the port that underpins ISP services is harder. Too high a price discourages adoption, too low ruins the

business case – and as the ISP port grows in capability it may eventually replace other ports (Figure 2).

**Figure 2: Evolution to one broadband pipe**



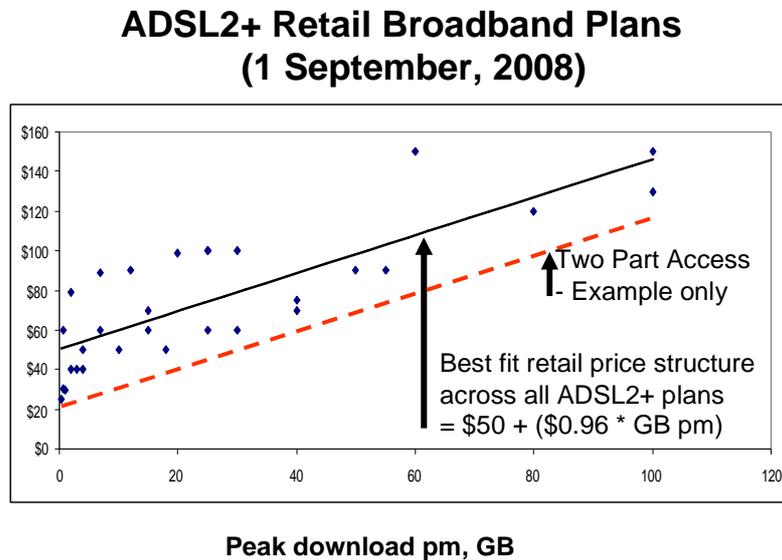
**Source: James and de Ridder (2008)**

The following remarks assume bitstream access, although other possibilities exist for a fibre to the premises which depend upon the topology of the access network. With bitstream, wholesale access pricing for the ISP port has many different parameters to work with: bits, bytes, QOS, session type and speed.

A common assumption is that affordable access should be supported with a low-speed entry-level wholesale access price. Higher speeds could then be charged more. This structure mirrors retail plans. But today most customers with access to higher speeds choose not to upgrade to them. If we provide high-speed, we want people to use it - don't we?

A better and simple approach which is also reflected in retail plans is to set a two-part wholesale tariff. A best-fit regression line through the ADSL2+ retail plans available in September 2008 finds retail broadband priced at \$50 pm plus \$1 per GB (Figure 3). Less than a third of broadband customers enjoy over 8Mbps and the average broadband download is currently only 4GB per month (ABS 2009). A wholesale access price of, say, \$20 pm plus \$1 per GB would support existing retail plans.

**Figure 3: Retail plans and wholesale access two part tariff**



Source: Author from web-sites

### **Affordable and net neutral**

To realise the national benefits of broadband, high take-up of high speed is more important than high coverage. The proposed two-part tariff creates room for cheap, retail entry level plans operating at full speed. Customers are more likely then to migrate to higher retail capped plans or be willing to simply pay more as they use more – as with established utilities.

The proposed two-part wholesale pricing of around \$20 pm plus \$1 per GB does not pre-empt retail plan designs. They can choose to price-discriminate on other parameters such as speed (ie by throttling) or QOS. If large-scale, real-time, deep-packet inspection becomes feasible then more sophisticated retail pricing models may become possible.

The proposed pricing helps to neutralise the net neutrality debate because it addresses the underlying business issue of providing incentives to carry capacity-hogging services:

*Carriers face a core problem: They have been unable to peg long-term profitability onto the Internet services they provide and enable. Even as the demand for bandwidth continues to grow, the revenue-per-bit that they make continues to drop at an alarming rate that could, according to some analysts, discourage future investments” (Morisy, 2009).*

This issue is resolved with two-part pricing which links revenues to growth. With data growing 60% pa (Minnesota Traffic Studies 2009), the price per GB falls to less than 1

cent within 10 years while keeping wholesale traffic revenue constant – as might be required by regulation of a natural monopoly.

This wholesale revenue model enables the network to become self-funding: as data grows with new applications and content, so does the financial capacity to augment the network to meet demand (ie prices fall a little less to fund improvements). There is no price volatility: wholesale access prices can fall as traffic grows. Falling access prices lead to more traffic and further price cuts in a virtuous circle. Another virtue of the pricing model is that network owners have every incentive to encourage use of the network so long as the regulatory parameters are set to allow an adequate return on investment to the network owner.

The model looks a lot like other utilities, doesn't it? It's not coincidental that a utility approach emerges. For an economist, it is now hard to tell the difference between electricity, gas, water and broadband pipes. They all have the same distribution (tree and branch) architecture, the same dominating civil works costs (poles or ditches) and the same economics – two networks double the cost, but not the revenues. Pipes dominate the costs of services like electricity, gas, water and broadband.

We expect every house in our street to be connected to electricity, gas and water because they are useful, affordable and allow users to regulate their bills by using only what they need or can afford. Consumer broadband is not yet in this situation. But it could get there subject to reaching economies of scale and adopting the proposed wholesale access pricing model.

The proposed pricing model will encourage not only maximum take-up but also maximum use of enhanced broadband networks. And it solves both the Goldilock's conundrum and mitigates the net neutrality business issue.

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<sup>i</sup> 'Long Term Evolution'. next-generation 3G technology for both GSM and CDMA cellular carriers, expected in the 2010 time frame, and known within the ITU as 'IMT-Advanced' (PC Magazine Encyclopedia 2009).

Cite this article as: De Ridder, John. 2009. 'Broadband pricing to achieve net neutrality: Goldilocks revisited'. *Telecommunications Journal of Australia*. 59 (2): pp. 31.1 to 31.5. DOI: 10.2104/tja09031.