ECONOMUSE

Price rebalancing to make the NBN affordable

The debate about nbn™ technology choices should be buried. It is not the lack of fibre-to-the-premise (FTTP) that is holding us back. It is what you do with whatever you have. It is the current business model relying on CVCs that is not working, as some are belatedly realising.

It is not generally appreciated that the nbn™ has never claimed that CVC is backhaul. It says it is only a pricing construct. As argued in last week's Economuse, it is time to change it.

According to nbn™, "*Access Seekers can dimension the CVCs differently based on applications and market requirements and as a result, enable the Access Seeker to control and manage the overall service experience to the End-User.*

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"*The diagram below illustrates that the CVCs presented at a common of Interconnect for both residential and business Users. There is no physical difference between the CVCs.* (p12, Product & Pricing Overview for Access Seekers, December 2010)

are Point End- NBN
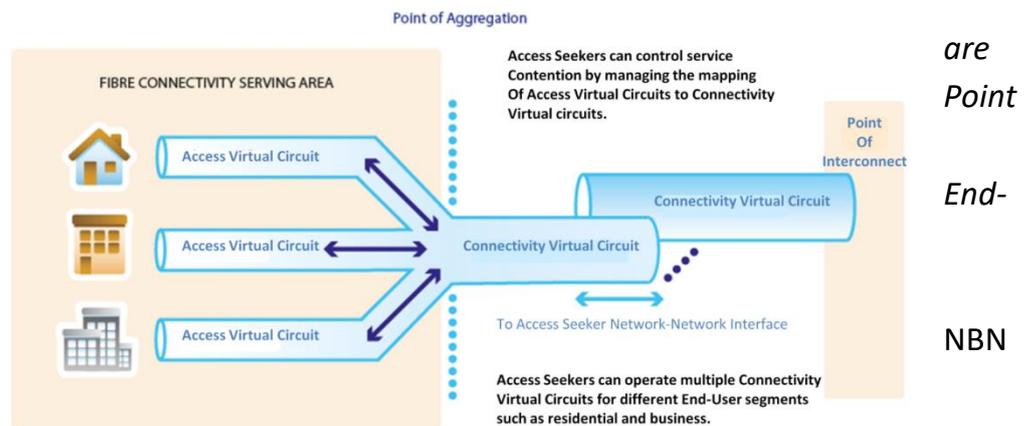
The CVC is used to create congestion

The "*differentiated experience*" referred to above is caused by the artificial and unnecessary imposition of congestion which is manufactured in the billing system.

The NBN uses the "S-Tag" and "C-Tag" Virtual Local Area Network (VLAN) protocol-based separation tagging to direct the traffic to its destination. The tag structure uses an inner C-TAG to indicate an individual AVC. The outer S-TAG indicates a CVC that is specific to a Connectivity Serving Area. The combination of S-VLAN and C-VLAN uniquely describes the Ethernet Virtual Circuit from the Service Provider's network to the User Network Interface at an End User Premises.

Applied as a logical construct in the billing system, it may be that if the combined actual speeds (AS) exceed purchased CVC "bandwidth" then the same rules that would be applied with physical

congestion (i.e. respecting the priorities assigned to the four traffic classes) are used to slow down aggregate speeds to what is permitted by the purchased CVC capacity. That is (where C is for a residential customer segment, r is a particular end user and S is a particular serving area):

If $\sum_r S\, C_r * AS_r > CVC$ then apply rules to slow aggregate speeds to purchased CVC in area S.

Note that there is no physical congestion. The NBN has lots of capacity and in metropolitan areas there may be no physical backhaul at all. Where there is congestion, any extra capacity needed can be funded out of increased usage revenues.

Retail Service Providers (RSPs) plan quality of service by choosing a contention ratio (which, unfortunately, they do not make public). But nbn™ asks RSPs to plan in terms of average Kbps per user. They are two sides of the same coin as illustrated in Table 1 below.

Table 1 – Provisioning and costs on the NBN

	50 Kbps CVC credit per AVC to 2023		**NBN 12/1**	**NBN 25/5**	
Manual input			Residential	Residential	Business
	Customer segment				
A	Speed		12	25	25
B	Contention ratio		50	30	10
=f(A,B)	Max avg GB pm		78	270	810
=f(C,E)	Kbps usage per end user		293	878	2,584
F	CVC price per Mbps ($17.50)		$17.50	$15.00	$9.00
	AVC (TC-4) price		$24	$27	$27
C	Customers (= no. AVCs)		2100	2,100	2,100
D=A*C	x speed		25,200	52,500	52,500
=D/B	Req'd CVC		504	1,750	5,250
E	Purchased CVC capacity		600	1,800	5,300
G=F*E	CVC fees		$10,500	$27,000	$47,700
	CVC credits (until June 2023)		$1,794	$1,538	$923
H	CVC net fees		$8,706	$25,462	$46,777
I	AVC fees		$50,400	$56,700	$56,700
J	AVC+CVC/customer/pm		$28.15	$39.12	$49.27
	CVC/customer/pm		$4.15	$12.12	$22.27
X	TPG retail price		$59.99	$69.99	$89.99
(X-J)/J=Y	Margin over NBN input costs		113.1%	78.9%	82.6%
L	Avg GB/month (Assumed)		50	100	150
C*L=M	Traffic GB pm		105,000	210,000	315,000
G/M=N	CVC fees as $/GB		$0.08	$0.12	$0.15

All rows are formula driven except for those shaded. The pricing is from nbn™ with the CVC price per Mbps at row F reflecting the dimension-based discounts that apply until the end of May 2019.

The contention rates at row B are educated guesses based on the fact that in the UK contention ratios of 50 and 20 for residential and business customers respectively were used by BT. The guesses seem supported by the corresponding provisioning rates (Kbps per user) because Damian

Ivereigh says that his RSP is providing 3,000 kps/user now on FFTN (and 20 Mbps/user on FTTP) while "*Most RSPs are less than 1 Mbps – these are not published figures, so I am just kind of figuring that out from what I know about how the network works*".

We do not know if RSPs are buying multiple CVCs in a single service area to support different customer segments. Table 1 assumes they are and not only for residential versus business customer segmentation but also by speed within the residential segment. Increasing the contention ratio to 50 for the residential 25Mbps to match that for the residential 12 Mbps service (i.e. to distinguish only between residential and business customers) improves the margin on the former.

The average GB pm at row L might look a bit low to some people. But the arithmetic mean downloads reported by the ABS and nbn™ are skewed by a long tail of heavy users. The most common usage (mode average) is very low and the median average (same number of users with more or less usage) is probably only half the arithmetic means that are reported. Row L is used only to translate what the CVC fees mean in cents per GB.

Using TPG's current prices (row X), it is possible to see why selling low speeds plans reflects nbn™ pricing rather than the quality of the fixed network – margins are higher on low speed plans.

Bill Morrow's response is to consider withdrawing the basic speed tier (12/1 Mbps) even though one third of nbn™ customers has it. "*…the 12Mbps product was never designed for broadband. It was designed for a voice-based product in case someone in a home says '… I just want a phone service…. Now it's suddenly being used as 'this is your high speed broadband NBN-enabled product' because it is cheaper than a 25 Mbps product – ISPs are only paying NBN Co $24 a month versus $27 to ratchet it up to a 25Mbps service*."

The key issue

We need to rebalance NBN pricing to encourage the sale of higher speed plans while making the NBN more affordable than it is now and encouraging greater utilisation of the NBN.

We should not abandon both CVCs and usage based pricing. Having a fixed fee plus a usage fee is an economically efficient way of recovering costs. Five AVC/CVC combinations were tested in an nbn™ industry consultation in 2014. Option 1 with a single AVC and no usage fees is equivalent to ARPU and would have been $31pm in 2015 rising to $80 pm by 2028. I estimated that Option 2 with the existing AVC structure and no usage fees would see an immediate 38% hike in the weighted average of AVC prices. Without usage fees, low users would subsidise high users and many would find the NBN unaffordable.

A simpler pricing structure

Replacing the CVC with simpler usage based pricing removes the perverse incentive to degrade the customer experience to cut costs. Rather than cut-off the 12/1 Mbps service, replace the current AVC/CVC scheme with just three wholesale services (which is all that the nbn™'s new education boost thinks customers can understand):

> ➢ An entry plan at $24 per month plus $3 per GB and up to 100 Mbps

- A standard plan at $40 per month plus $0.05 per GB and up to 100 Mbps

- A premium plan at $60 per month plus $0.05 per GB and over 100 Mbps

Here is what a simpler pricing regime means:

Table 2 – Indicative new pricing

Manual input		NBN		
	Wholesale plan	Entry	Standard	Premium
	Speed Mbps down	100	100	Over 100
A	AVC (TC-4) price	$10	$40	$60
B	Cents per GB	300	5	5
C	Avg GB/month	5	150	250
D	No. Users	2,100	2,100	2,100
E=B*C*D	Usage fees $pm	$31,500	$15,750	$26,250
F=A*D	AVC fees	$21,000	$84,000	$126,000
G=(E+F)/D	AVC+ usage/user/pm	$25.00	$47.50	$72.50
H=E/D	Usage/user/pm	$15.00	$7.50	$12.50
I	TPG retail price	$29.99	$69.99	$99.99
J=(I-G)/G	Margin over NBN costs	20.0%	47.3%	37.9%

Note that:

- The entry level service is very cheap ($10 versus $24 before usage) but usage is charged at $3/GB versus $0.05 with the standard and premium services. $3/GB is a lot but currently you can be charged $10/GB for excess usage on mobile networks. And, above 10 GB pm, the RSP will move the end user to a standard plan to save itself – and the customer – money.
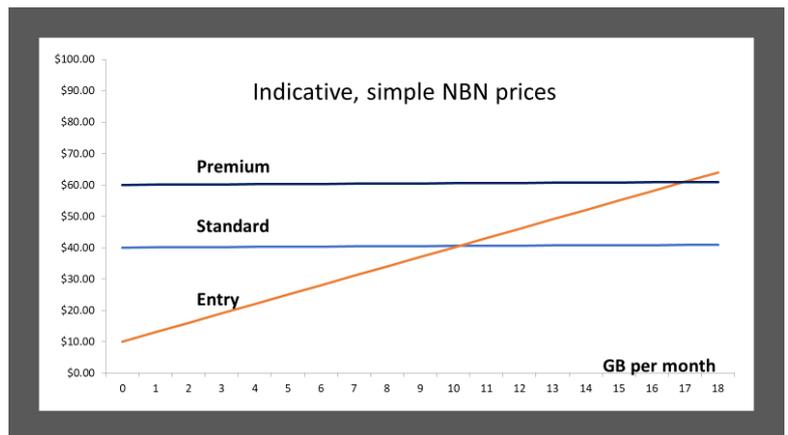
- The column today is only about how changing the pricing structure can improve affordability (amongst other things). The average level of prices affects affordability too and is not discussed here.

- The margin incentive to sell 12Mbps is removed – the margins are higher in the other 2 options. Both the entry level and standard plans allow up to 100 Mbps.
  - This encourages usage and would lift Australia from its current woeful 50th position on the Akamai speed ratings in Q1 2017 where it averaged 11.1 Mbps. And
  - *"the 76% of Australians who don't know what Internet speed they receive, and the 35% who are unaware they have a choice in NBN speed tier"* might notice an improvement after $49 billion investment if nbn™ allows every fixed line to reach towards its potential 100 Mbps.

- Table 2 has neither a provisioning requirement nor a contention ratio decision with respect to the NBN network. Any physical contention issues will be visible to nbn™ which is the natural aggregator and is able and is incented to augment capacity as needed. It gets the CVC congestion monkey off nbn™'s back.
  - If all users could get 100 Mbps on the fixed NBN network, that is not what they will get because there will be physical congestion - not in the NBN but in RSP networks, device limitations etc.

- All the NBN's main costs become variable. With the existing CVC construct, pricing discriminates against smaller RSPs because lumps of capacity have to be bought. That would no longer be the case, making the retail market more competitive.

- The 5 cents/GB usage fee (which would have been around $1/GB back in 2008) is low and falling. Steaming services like Netflix and YouTube use around 3.5 GB per hour for HD and 7 GB per hour for UHD (4k). So, the wholesale usage fee for a two hour HD movie would be under 40 cents.
- I have shown previously that rebalancing in the way suggested can be revenue neutral.

The current and proposed pricing both use the four traffic classes (i.e. data, voice, video and Internet usage) and identify the RSP who owns the end user. The main differences were discussed above: cents/GB replaces CVCs and average provisioning requirements, and the entry/standard/premium wholesale options replace the current AVC and CVC pricing schedules.

Mobiles do not get ARPU growth from increasing fixed fees but from increased usage. This could be true of the NBN too. Bestowing increased speeds, as mobiles do and as taxpayers expect after $50 billion of public investment, will increase usage and be truly transformative.

The current issues with CVCs have nothing to do with technology choice. They arise from the poor pricing model which encourages artificial congestion degrading user experience. It is time for a simpler pricing regime that will make the NBN more affordable, remove the CVC issue by making nbn™ responsible for managing its own network and unleashing the nation-building potential of the NBN that we told to expect.

John de Ridder