

Why are data speeds sometimes lower than what consumers were expecting? Is nbn to blame with its infamous CVC charge?



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These questions, along with the views of many, have been the topic of debate in many different circles. The problem of a mismatch between consumer data speed expectations and what is observed is real and needs to be resolved. For any resolution to be effective, however, we need to be sure we are addressing the true root cause(s) of the problem. The paper below is intended to provide context and help the ongoing discussion in the hope of a solution that balances all the issues (or root causes) at hand.



Note: It is important to consider each point below in the context of the entire paper.

1. How Universal broadband access is made possible
2. Why the infamous CVC exists
3. Retail competition
4. How **nbn**[™] powered broadband plans are marketed and the emphasis on price
5. The effects of the 'land-grab' induced margin squeeze
6. The problem summed up
7. Change is needed but it must balance a number of criteria

1 How Universal broadband access is made possible

The transformation of Australia's telecom industry has created a unique opportunity to connect all Australians with high-speed broadband and recast the playing field of the nation's telecommunications retail market. By doing so, the belief is that with an infrastructure that will reach every home and business and a vibrant retail service provider market, the nation will benefit from the enabled lifestyle benefits and a more prosperous digital economy.

Many countries have similar ambitions but most have yet to find a formula that works for them. Australia, on the other hand, has found a way to create an access network infrastructure company (**nbn**) that can stand on its own economic ground – thereby offering a modest return on the original equity investment and avoid the need for ongoing taxpayer monies. Through the combination of **nbn**, new legislation and a robust regulatory framework, we also create a vibrant retail market with 'service providers' connecting their core network infrastructure to **nbn**'s access network and tailoring their products and service levels around consumers' interest and willingness to pay. This should, in turn, serve most segments of consumers and businesses while giving the end-user a choice of service providers who can best meet their needs.

Some have asked what was wrong with the way it was before this industry transformation began. While it is true that Australia has had over 75% of homes and businesses who could access older broadband infrastructure technology, it was not universally available to everyone in the country. The simple reason for this was that it was uneconomical to do so. The price users would be willing to pay would not cover the expected costs or required profit to build and operate a network in these typically remote locations. Furthermore, with uncertainty of government and regulatory intervention, the owners of this legacy network appeared reluctant to invest in the available upgrades that would have increased the speeds.

The **nbn** business model overcomes this issue with the ability to offset the financial losses in the less dense (high cost) remote areas with the profits made in the high density (low cost) areas. Fortunately for us here in Australia, the combined total offers a positive, yet modest internal rate of return (IRR) over an extended period of time. The benefit to being in positive IRR territory is there is no need to pull money from the country's budget for the initial investment and therefore those funds remain available for other public interests. It's



important to note here most investors would not accept the forecasted low rate of return as it is far lower than other investment options available to them – and hence the reason for government intervention. Governments are able to justify the lower returns as this industry transformation provides secondary and tertiary benefits to the country. From its inception, the **nbn** business model was dependent on an assumed price that consumers would be willing to pay (both now and in the future), an estimated cost to build the network, and an estimate of what it would cost to maintain it.

Key takeaway

Universal broadband access is made possible by balancing high profit margins in the low cost areas with the losses in the remote areas to maintain a modest but positive IRR – which in turn allows government budget spending to be allocated to other national interests.

2 Why the infamous CVC exists

There are two key expense items that RSPs pay to use **nbn**'s access network: Access Virtual Circuit (AVC) and the Connectivity Virtual Circuit (CVC).

The AVC is a static monthly access fee for each end-user. The AVC charge is determined by the maximum bit rate requested by the RSP. The most common today is 25Mbps down and 5Mbps up and costs the RSP \$27/month. This is offered as a Peak Information Rate (PIR) and not meant to be a Committed Information Rate (CIR).

The amount of CVC charge, on the other hand, will depend on the collective amount of bits, at a given point of time, which an RSP wants to flow between our two networks—this pass-through is at the point of interconnection (POI). Think of this as the thickness of a pipe that determines the maximum amount of water flowing through – which is why the peak time of day is considered when determining how much flow through an RSP needs to adequately serve its customers.

While the amount of CVC purchased limits the total volume of data being passed between the two networks, the more practical impact of not purchasing enough will constrain the observed speed during busy traffic times. As a reminder, the country is effectively divided in to 121 geographical areas and each of these has a designated POI. If an RSP wants to access the homes in a given area, they will need to build or lease a network to get to the relevant POI. As a result, all of their end-users in that area will have their data aggregated by **nbn** and passed through this point of interconnection. How the RSP size their network capacity and the amount of CVC they purchase can affect the quality of their end-user's service at the peak time of day.

Before I go further, it is important to understand that all network carriers design their networks with portions that have multiple end-users sharing the bandwidth or amount of data that could be

sent at a given time. This is commonly defined as the contended part of the network. They do this because it is cost prohibitive to build a direct dedicated pipe between a home and every other location where data is sent to or retrieved from. As more end-users are added, or as the average speed and consumption increases, the network carrier will need to spend more money to add capacity OR accept the speed offered to the end-user will degrade during the busy period of the day. This trade-off has existed since the industry was established and is not specific to **nbn**'s or the RSPs' networks. There are a lot of statistics involved which form the assumptions of what the quality level of access will be at peak times. If RSPs don't dimension their own network with enough capacity, if they don't purchase enough CVC flow through at peak time, or if **nbn** has not dimensioned its network with enough capacity, service will degrade at peak time.

The CVC unit of charge is measured by average bit rate/per end-user – at that POI for that particular CVC. This average does not mean an end-user can't experience faster speeds at peak time, it is only used as a unit of measure. To illustrate this point, if an RSP had a thousand end-users and purchased 1Mbps/user of CVC, the pipe interconnecting the RSP will support a shared Gbps flow through.

The rate we charge the RSPs for CVC has been reduced from \$20 to the current average across the industry of \$14.40 per megabit per second/end-user. It's entirely up to each of the nation's 45 RSPs as to how much of that bandwidth they choose to allocate among their end-users. With the recently introduced pricing scheme, the more CVC the RSP allocates per end user the more their price/unit decreases and can go as low as \$8/Mbps.

If an RSP purchases enough CVC, all end-user's traffic will be able to flow through this POI without compromising the speeds promised by the plan they're on. But buy too little CVC and traffic flowing to an RSP's network during peak time will be slower.



The clichéd analogy of networks being similar to a system of roads is worth repeating. In this example, imagine parts of the access network (built exclusively by **nbn**) as the on- and off-ramps to a shared multi-lane motorway which converges with other multi-lane motorways down the road. These on/off-ramps are the network cables that run from the inside of your home to the HFC cable in the street, or to the node in FTTN, or to the fibre splitter in FTTP. These on/off-ramps are exclusively used by the end-users. It is not until the first stage of convergence occurs that the lanes are shared among others. This multi-lane motorway will carry shared traffic to our exchanges which then further converges on to another multi-lane motorway (with far more lanes) which is part of our transit network. When data passes through the POI, the amount of shared lanes (or CVC) purchased by a given RSP will determine if, or how much congestion their end-users will experience at heavy traffic periods.

The on/off-ramps and shared multi-lane motorways within **nbn**'s portion of the broadband network are built with a finite level of data capacity. When the number of end-users or the average use approaches this limit, **nbn** will make further investments to meet the RSP's demand for more capacity or higher speeds. The CVC is, in part, the mechanism to recover those incremental costs, which should in turn be recovered by the RSPs through higher retail prices for increased speeds and data allowances being provided to their end-users.

Another reason for the pay-more-as-you-use-more CVC model is to keep the price lower in the early stages of this industry transformation, while average consumer usage is/was at its lowest. Even if we reach our planned 70%+ take up rate, **nbn**'s current revenue per user coming from the RSPs will not generate enough total revenue to produce a positive return on the investment made to build the network as it is planned.

The CVC structure and speed tiers allow **nbn** to offer lower prices today and bear the risk of ultimately getting the higher revenues through the growth in consumer consumption. This allows RSPs to avoid having to pay more early on before the full value of a high data consumption demand is realised. **nbn**'s business model relies on the assumption that data consumption will grow, consumers will value it more, and the average revenue per end-user will increase. If this does not hold true, then the cost recovery and modest profit return will be in jeopardy, creating risks to the universal access or needing budget money to offset the losses.

This is why a usage (or flow) based fee, such as CVC, allows lower costs in the beginning and only costing more when end-users consume more.

The CVC – like the cost of marketing, customer service, labour, their own network and others – is just one of many variables that make up the cost base of RSPs when delivering broadband to their customers. To suggest the CVC affects the quality of service would also be saying the cost of every other expense item does the same. It is a conscious decision to save money in this area versus others. To be fair, the RSPs are between a rock and a hard place. Even though the consumer may be willing to pay more, the RSP can't raise their price on like-for-like offerings when other RSPs are setting their price to maintain and/or capture market share rather than make a reasonable profit.

Key takeaway

The current revenue per end-user will not generate a positive IRR. This was by design to offer more affordable services early on and only when the data demand increased would more revenue be generated. This therefore creates more value (and hence revenue) for **nbn** at a time when more value is given to consumers (and RSPs). This then will move **nbn** to a positive IRR. Furthermore, networks are constructed with shared bandwidth and a finite amount of capacity. As end-users require more data or speed that exceeds this limit, more investment will be needed to expand the network. The CVC charge is a usage based construct that apportions the cost to those who are offering their end-users more – and who therefore have the ability to charge more. It further allows **nbn** to take the risk of assuming higher revenue in the future and allow for lower prices today.



3 Retail competition

The industry transformation was designed to promote a robust and vibrant retail market. Considerations were given to how to lower the barrier to entry and to ensure there is a level playing field. The number of POIs an RSP must build out to, is an example of the cost to enter this market. To ensure a level playing field, the regulatory framework involves transparency and non-discriminatory behaviour, including open consultation on products, pricing, and services.

As of today, with half the nation ready for service, there are over 23 active service providers who are directly providing broadband services over their respective networks with a connection to **nbn**'s. Recently, big name brands have entered in to the competition. We've seen Foxtel, Vodafone, and Kogan announce their entry into this retail market. Equally so, challenger brands like MyRepublic and Amaysim have also recently joined in.

These newcomers and all the existing retailers understand what their costs are and the pricing

structure and fees associated with accessing and using **nbn**'s access network. What is more difficult to ascertain is how many end-users they will sign up, what the consumer usage behaviour will be, how much the consumer would be willing to pay, and how will their products, services and prices differ from those of the competition. These uncertainties are a familiar part of the telecom industry.

Key takeaway

The design of this industry transformation intended there to be competition at the retail and service provider level. Retailers know exactly what the price of **nbn** services are and have entered the market knowing this. The unpredictable nature of future consumer usage versus what the consumer will be willing to pay for it creates a financial risk that is inherent in every telecom company.



4

How nbn™ powered plans are marketed and the emphasis on price

The prices on offer in a heavily competitive market do not necessarily reflect what consumers are willing to pay. There is a temporary 'land grab' phenomena now underway with the retailers. As nbn releases over a hundred thousand new homes each week for the retailers to sell in to, there is aggressive pricing behaviour designed to maintain and/or increase their retail market share.

To date, with a few exceptions, the primary marketing strategy is focused on price with little mention of data speed or quality during the peak of the day. The grab for market share means there is more competition on price, rather than quality, as the primary selling point.

These are clear signs of a price war. Historically, Telstra is the price setter. Over the last six months, they have reduced their retail price by over 20% on our most popular plan. As a result, we have seen their market share jump over 2 percentage points to now be over 50% from 12 months ago. Others have had to follow on price reductions to remain competitive. We see examples of a headline price for "nbn™ super-fast broadband" but in fact it is a 12Mbps down with a 1Mbps up. If a consumer has transitioned from ADSL and getting the national ADSL speed average of 9Mbps, they will observe

hardly any difference on nbn's access network, yet their expectation was far higher given the well-known cost of a \$49 billion super-fast network. Some RSPs are advertising broadband plans for as low as \$29. When you consider the minimum AVC cost them \$24 for a 12/1 speed and they have to apportion a cost of the CVC charge, every expense must be as low as possible to make any kind of profit, if at all. It would appear that while our industry is making this massive transition to a new network and market structure, market share gains are higher priority than profit margin or quality of service, despite end-users willing to pay more for better broadband.

Key takeaway

We have a land-grab environment where retail prices are lower than what consumers are willing to pay. The large number of competitors going after the same customer has driven price to be the key attraction and seldom do you see any clarity around speed options or quality during the peak time of day.



5 The effects of the ‘land-grab’ induced margin squeeze

If an RSP doesn't price their product high enough to recover their costs, they may be forced to cut corners that could affect the quality of the services being offered. If an RSP isn't purchasing enough CVC capacity to offer the quality expected, that is a conscious choice to do so.

Studies have shown, however, that consumers are willing to pay more for quality or a premium service, but need to know what they are paying for and know that it is a fair market price.

Perhaps the reason why retail prices are not higher is all to do with the classic competitive price war phenomenon. There are a few market theories that suggest this will resolve itself in a self-regulated manner. When we consider the size of the economic profit pool associated with Australia's broadband market we know it will have a limit to how many retail competitors it can sustain. The theoretical argument is that too few competitors mean greater profit margins and as long as the barrier to entry is low enough, more competitors will come.

On the other hand, when too many competitors are present, there isn't enough market to share amongst them to earn enough revenue to cover their costs

and make a profit. This usually results in over-the-top price wars where profits turn to losses and the smaller, less efficient companies leave the market. Ultimately we end up with the balance that keeps competition healthy, prices optimal and service levels high.

Of course, we know the regulatory bodies are monitoring this and will use the tools at their disposal to be sure there is an optimal level of competition. The Chair of the ACCC, Rod Sims said in a recent speech that he believes our market can sustain 5 different major broadband providers. In Sydney today, consumers can choose between over 23 direct resellers and over 100 indirect resellers.

Key takeaway

While studies show consumers are willing to pay more than they are today if they understand it will give them a higher quality service, the stiff competition and ‘land grab’ phenomenon are forcing retailers to compete more on price than quality. This is largely the result of an over competitive market.



6 The problem summed up

With over 45 retailers aggressively chasing market share emphasising price as the lead attraction, we are seeing signs of a price war. Compounding the problem is that end-users are consuming more data than before and this adds to the network cost. The resulting margin squeeze is leaving some retailers with a decision, at least in the short term, to either forgo profit, forgo market share, or forgo high service levels, including optimal speed during typical peak traffic times.

So long as a company is operating efficiently, no company, including **nbn**, will stay in business if it can't recover its costs. Studies have shown, fortunately, that consumers are willing pay more for quality – they just need to know what they are getting, be given a choice, and have a fair market price. If the economic profit pool is not big enough for the volume of competitors now selling broadband services, then we should expect to see a recalibration across the competitive landscape which is likely to put the balance of price, cost, quality, and profits back in to their proper place.

7 Change is needed but it must balance a number of criteria

We at **nbn** know we can do more to help. We know we need to provide a good solid end-user and RSP experience where that responsibility is ours. We know we need to keep our costs, and hence our price, as low as possible while pursuing our long term cost recovery, including a modest rate of return.

We also know we need to evolve our pricing structure even further in a way that allows for a triple win solution for **nbn**, RSPs, and end-users. This is a focus for the board and management and we will be working closely with our RSP partners and relevant stakeholders to address these issues and solve for the problem at hand.