InternetNZ

DISCUSSION PAPER
BARRIERS TO UNMETERED DOMESTIC INTERNET TRAFFIC

FOREWORD

Introduction

There has been a lot of discussion for quite some time about monthly limits of Internet usage (data caps) that are typical in New Zealand. This discussion has been both internal within InternetNZ as well as in a number of public forums.

The discussion has been both about the low levels of data caps as well as if the future shift to fibre-based broadband is possible with such low data caps. On the other hand, many Internet Service Providers (ISPs) have supported data caps as effective tools to manage customer demand, keep retail prices low, and contain their investments.

Against this backdrop, InternetNZ commissioned independent consultant Colin Jackson to talk to a wide range of people and organisations to get their views on why New Zealand has data caps. Recording and articulating these views is a first step towards considering what our goals and initiatives should be in this area.

Initial thoughts

We advised Colin to take the following into account when undertaking the project:

1. On average, 85%-90% of New Zealand's Internet traffic originates from overseas.

2. New Zealand's small population means that hosting costs are always likely to be substantially higher than in countries such as USA. Scale economies make it attractive for content and service providers to host overseas, especially in the US.

3. Excluding local caching, overseas hosted content will typically give poorer customer experience due to higher latency. The trade-off between lower hosting costs overseas and poorer customer experience isn't leading to logical decision-making by New Zealand content owners as there is no differentiation at the retail level between domestic and international traffic.

4. There is a mismatch in the structure between ISPs costs and retail pricing. The former is based on capacity (Mb/s or Gb/s) while the latter is on usage (GB).

5. Some ISPs have provided uncapped plans in the past (and some do so now under very specific terms) and their experiences are relevant to understand the issues with data caps.

6. There are likely to be some issues related to data caps that are specific to copper infrastructure and the current market structure that may not exist when fibre broadband is widely rolled out. It is preferable to distinguish between these two categories.

7. New Zealand data caps are very low compared to other countries, including and notably Australia.

Thanks

Our intention was to get the widest range of views rather than do an exhaustive study. We thank the many people and organisations who gave us their views for their time and efforts. We were disappointed that a major content provider, Sky, declined to give their views in light of the demand-side study being conducted by the Commerce Commission.

Subsequent developments

There have been two major developments subsequent to Colin submitting his report:

1. Telecom NZ has increased its monthly data caps from the August 2011 billing cycle. The smaller data caps (up to 20 GB) have been doubled while the bigger ones have increased by 20 GB. Vodafone too has increased data caps on selected fixed-line plans by 50%. Neither of these, in our opinion, changes the substance of Colin's report.

2. A presentation from Southern Cross Cable at the CommsDay Summit in Auckland on 27 July 2011 made some key points:

    a. Their prices for international data are the same in Australia and New Zealand.

    b. The price for tier 1 ISPs (in New Zealand, only Telecom) is the equivalent of about 5 cents/GB.

    c. There is a vibrant, competitive market for re-sold international data in Australia but not New Zealand.

Next Steps

We seek your views on:

1. Comments about Colin's report, including any major areas you think aren't adequately covered or represented.

2. What goals should we set in the area of data caps and the suggested steps to get to those goals?

Thank you for your views. We appreciate getting them by 26 August 2011.

Vikram Kumar
Chief Executive, InternetNZ
Email: vikram@internetnz.net.nz

Barriers to Unmetered Domestic Internet Traffic

Summary

A selection of Internet industry companies and figures were interviewed about why, in their opinion, New Zealand consumer Internet traffic is metered even when it is domestic traffic, i.e. it does not traverse an international cable. They were also asked how the advent of UFB would change this situation.

The New Zealand consumer Internet access market is unusual in that there are low data caps compared to other countries. Two possible reasons for this are the incumbency of Telecom in the copper local loop market and the reliance on a single submarine cable for almost all international transit. The price paid by ISPs for international transit has been dropping significantly; therefore if data caps do not greatly increase as they have in Australia recently it is likely to be incumbency around the copper loop which is keeping them low.

Zero-rating Domestic Internet Traffic

The largest single factor reported against unmetering or zero-rating domestic traffic is that consumers would find it hard to predict which sites would result in international traffic and would likely be frustrated and angry with their provider if traffic were metered differentially by its location. The presence of caching and content distribution networks add to the difficulty of determining in advance whether traffic would be counted as international or not.

The other main reasons given were the cost of providing a domestic network, the technical difficulty for the ISP of determining whether traffic was domestic or not, and the lack of customer demand which leads in turn to a lack of commercial pressure to implement this. While customers undoubtedly want more for less, few people believe that customers specifically want free New Zealand content rather than a general increase in what they can get for their money.

An alternative to zero-rating domestic traffic is to zero-rate selected sites only, as practiced by some ISPs. This works for consumers by providing them with more for their money, but it does not work well for content providers who have to negotiate with many ISPs and potentially pay them to achieve this. It therefore does not provide the same incentive to onshore content hosts as zero-rating domestic traffic.

In conclusion, most respondents do not believe that differential charging for traffic by whether it is on- or offshore is workable or desirable.

Possible changes under UFB

The striking feature of comments about the possible changes to be brought about by UFB are that some ISPs do not appear to have thought about the impact and have not considered that data caps may be forced to rise. This is not universal, but it may lead to a shake-out in the ISP industry where those who have strategies to deal with UFB, and the investment capital to implement them, have an advantage over those who do not.

Many respondents listed access to New Zealand content as a key driver for the success of UFB. Some identified Sky TV as a primary source of content to make UFB business models work, and said that access to this, whether under commercial or regulated terms, might prove necessary to make the business case for UFB stack up at a household level.

No-one said that the advent UFB would make zero-rated domestic traffic any more likely. However, if the reason for our low data caps is due to Telecom incumbency in the copper loop, which is one possible explanation for them in the current environment, we might expect a substantial increase or complete removal of the caps as UFB uptake spreads.

Colin Jackson ITCP
Fellow, InternetNZ
24 July 2011

Contents

1 Introduction

1.1 Brief

This report is the result of collating the responses of 28 Internet industry players to 2 questions:

1) Why is national Internet traffic metered for New Zealand consumers?

2) How will the introduction of UFB change this situation?

1.2 Respondents

Twenty-eight respondents were interviewed in May and June 2011. Interviews were mainly face to face, with a few conducted by telephone, email or Skype. In most cases respondents were invited to check my notes of their interview for accuracy. Subsequently, respondents were invited to comment on a draft of this report.

Respondents included telcos, small and medium ISPs, content providers, CDN (Content Distribution Network) providers and fibre providers. Most respondents' comments are "on the record", and are directly to attributed to them where relevant, but some are not attributed at their request. Of those approached, only Sky TV declined to participate. A list of respondents is provided at Annex A.

1.3 Scope

The scope for these questions was limited to consumer landline Internet. There are plans aimed at the business market that provide unlimited national traffic, but almost no consumer ones. Mobile connectivity was excluded.

1.4 This Report

After this introductory section, this report continues with a brief discussion about the existence of and reason for data caps in New Zealand. This material and other commentary in the report came from background comments given by respondents. Subsequent sections go on to report on the answers given to each of the two main questions above.

2 Background: Pricing Internet Data in New Zealand

This study seeks to understand why domestic traffic is metered in New Zealand. To do this, it is first necessary to understand why any traffic is metered. In other words, why are all or most consumer plans capped? This section also addresses the occasional presence of uncapped plans in the market, and alternatives to the approach of having a single cap with all traffic contributing to it.

2.1 Why are New Zealand Internet plans capped?

Data caps are a feature of markets where international bandwidth has been constrained. Australia, for instance, has had data caps of similar size to New Zealand's, but over the last year the caps have expanded significantly as a result of a "data cap war" among ISPs. Terabyte caps are now common there. (These are typically constrained to be 50% for use off-peak only, but it is still an order of magnitude more than what is available here.) New Zealand's caps remain among the lowest in the world. Some other countries such as the US have never had data caps, and although there are moves by some ISPs to introduce caps the proposed caps are much greater than anything available in New Zealand.

There are 2 specific reasons given by ISPs and others as to why low data caps persist in the New Zealand market:

- To prevent a "tragedy of the commons" – i.e. a few heavy users dominating the use of a fixed, low, level of bandwidth resources to the detriment of other users.

- To segment the market by offering a better product to consumers who are willing to pay more, which maximises ISP income while providing for entry-level plans that are attractive to consumers who might otherwise not have broadband.

Both these reasons apply to various extents in other markets, but in the New Zealand market competitive pressure has until now been unable to significantly increase caps from their current levels or remove them altogether, which implies that a feature of the New Zealand market prevents this. The two most likely features are the dearth of competition to supply international bandwidth and the position of

Telecom as incumbent owner of much of the access network that most ISPs use to reach their customers.

International bandwidth and costs

Respondents reported a recent sharp drop in international transit paid by ISPs. In the last few years, international transit has been 10 times the prices of domestic transit or more. According to some international transit is now around 3-4 times domestic transit, and 1 ISP says it get international transit more cheaply than domestic transit. (This reduction has been variously ascribed to the advent of Pacific Fibre and to Vocus entering the market as a wholesaler.)

The timing when ISPs can take advantage of this downward trend in international pricing depends on when their contracts come up for re-negotiation. ISPs typically buy bandwidth contracts ahead on 1-3 year contracts; the price is fixed until the end of the period they have contracted for. Therefore, ISPs' international bandwidth costs are dropping in random order as their contracts end.

If expensive international transit were the reason for data caps, we might now expect caps to increase in New Zealand as they have in Australia.

Local Loop access

By contrast, access to parts of the local loop has become more constrained recently. Telecom recently took action that had the effect of enforcing a constraint of 45kbps per user for some access products (other speeds may be purchased by the ISP at additional cost). Until recently, some ISPs at least had been able to evade this restriction. The result is increased contention and reduced speeds for the customers of some ISPs. Therefore, if the speed and terms of access to the local loop is the main determinant of data caps we should expect little change in the caps in the short term.

2.2 Uncapped plans on the New Zealand Internet

There have been various attempts to introduce uncapped plans into the New Zealand market. These have mainly failed due to an inability by the ISP to control the behaviour of heavy users. One ISP cited consumer legislation as a contributory factor: it appears not to be possible to create a policy which is both clear enough to pass muster legally, and watertight enough to prevent a few heavy and inventive users from using all the available bandwidth. A particular point to bear in mind is that if one ISP tries an uncapped plan, it immediately attracts all the high users, but if uncapped plans were the norm there would be no reason for the heavy users all to go to the same ISP. ISPs are aware of this risk and some choose not to try uncapped plans for this reason.

There are signs that New Zealand's low data caps may be on the verge of a change. Since the first draft of this report:

- Slingshot has again begun promoting an all-you-can-eat (uncapped) plan
- Snap Internet removed all data metering for a weekend
- Actrix doubled data caps for some of its customers (although the increased cap has to be consumed off peak; i.e. after 2am)

Both Slingshot's and Snap's approaches can be seen as experimental. Slingshot is gaining confidence in managing pools of uncapped customers, while Snap carefully monitored the impact on its bandwidth of allowing temporary uncapped use.

However, these are all relatively minor initiatives when compared with the size of the New Zealand market. It remains to be seen whether consumer pressure will succeed in forcing ISPs into a race to offer larger and larger caps, as happened in Australia.

2.3 Unmetered traffic in capped plans

In the absence of widespread uncapped or highly-capped (say 1TB or above) consumer plans in the New Zealand Internet, we can ask why domestic traffic contributes to the cap. The views of the respondents when asked this question are presented in the next section, however, there is a third position between unmetered domestic and all traffic treated the same, which is to zero-rate some identifiable traffic, usually a list of websites.

Perhaps the best-known example is Orcon's O Zone. This is a list of sites including Trade Me and the New Zealand Herald that do not count toward an Orcon user's data cap. Until recently, the O Zone included TVNZ so Orcon users could watch an unlimited amount of content without paying extra. Several other ISPs zero-rate Trade Me and other New Zealand sites.

From the ISP's perspective, zero-rating a site is a business risk, because it will cause unrestrained use of its local access network if it is popular (and if isn't popular, why bother?) and because the site may include material hosted offshore which will put pressure on the ISP's international bandwidth.

From the perspective of improving access to New Zealand content, and that of incentivising New Zealand content providers to host onshore, the approach of zero-rating specific sites does little. A content provider would need to negotiate with several ISPs to get its content zero-rated for a large number of consumers, and this negotiation would likely cost it money since the larger ISPs at least seem likely to regard this is causing pressure on their domestic networks which they would need to be funded to cover.

An interesting example of this approach is the BBC's iPlayer, only available in the UK. Telecom New Zealand produced figures to show that, by increasing domestic traffic, iPlayer places considerable stress on access networks. iPlayer contains a substantial peer to peer element in its content distribution model which presumably prevents ISPs in the UK from demanding that the BBC pay them for the traffic it generates.

In conclusion, the "zero-rating specific sites" model only works for large ISPs and large providers and will not act to provide an incentive for smaller companies to move their content onshore.

3 Barriers to Unmetered Domestic Internet

In response to the question *What do you think are the barriers preventing unmetered national Internet traffic?* respondents said:

Barrier	Proportion of respondents
Consumer confusion	41%
Cost of domestic network	33%
Technically difficult	30%
Lack of commercial pressure	30%
Local capacity (handover points)	19%
Lack of peering	15%
Lack of investment capital	15%
Most traffic is international	15%

These barriers are summarised from the reasons respondents gave. The barriers are examined in some detail below. Many of the respondents gave more than one answer so percentages do not add to 100. Also, the number of respondents is too low for valid statistical inferences, so it is more useful to consider the barriers given here qualitatively rather than by popularity.

3.1 Barrier 1: Consumer confusion

This was the mostly commonly advanced reason, put forward by nearly half of those interviewed. All but one of the companies who have retail customers identified this barrier.

Broadly, this argument says that consumers can't tell what is domestic and what is not. Web content, for instance, might be hosted in New Zealand or offshore. Having a .nz domain name is no guide. A web page that is hosted locally might have inclusions, such as embedded video, that are hosted elsewhere. Web content that is hosted locally today might not be tomorrow. Caching and content distribution networks (CDNs) act to obscure the real location of content by bringing it physically closer to the consumer, but which material is cached locally varies by item and from hour to hour.

ISPs do not want to be in dispute with their customers about what constitutes zero-rated traffic. Every help desk call costs ISPs money, whether in actual payments to an outsourcer or in opportunity costs, and every call signifies an unhappy customer.

A different approach that is run by some ISPs is so to zero-rate specific sites, as discussed under section *2.3 Unmetered traffic in capped plans* above. Other ISPs avoid this approach in the interests of simplicity. In the words of Telecom:
Consumers want simple plans. Rather than zero-rating some sites, they would rather have bigger data caps.

3.2 Barrier 2: Cost of domestic networks

There is no doubt that backhaul (regional and national) and local access networks cost money to build or rent. Both TelstraClear and Telecom have recently replaced their national and regional networks and need to make a return on investments. Other ISPs mostly purchase access to these networks or buy similar products from FX Networks.

There are 2 opposing arguments about what this should mean for the metering of domestic Internet traffic:

A. The costs of operating these physical networks are fixed regardless of the amount of usage they receive, so access prices should decline with increasing usage, implying that consumers should not pay more for more usage.

B. There are capacity limits to several parts of these networks and data caps are necessary to send a pricing signal to some consumers not to flood these limit points to the detriment of other consumers.

Comment: With the obvious exception of the local loop which is allocated to individual consumers and so not subject to argument B above, it is not clear how many limits exist in the network due to physical constraints and how many are due to the exploitation of commercial opportunity.

A further factor in the use of domestic networks is the stated requirement by the telcos Telecom and TelstraClear to recover costs from content providers such as

TVNZ and from third party ISPs who exchange traffic with the telcos' retail Internet customers. Telecom, for instance, states that its retail customers only pay for part of the costs of its national and regional networks and that the remainder of these costs therefore have to be recovered from content providers. A counter to this position is that ISPs who do not have the commercial ability to enforce payments from content providers nevertheless offer similar or better services for the same cost to retail consumers.

Some respondents said that the cost of national traffic should be covered by Internet access charges, leaving only international traffic to be paid for by the consumer. The counter to this argument is that it would create an opportunity for some customers to use large amounts of domestic traffic, such as by creating an amateur CDN, which would flood bottlenecks such as the handover points to the Telecom-owned DSL. An uncontended Internet connection would, I am assured, be unaffordable by consumers.

3.3 Barrier 3: Difficulty of separate metering

Several ISPs and network builders said that it is technically difficult to put in place a split metering regime. Although some ISPs have clearly done this (those which have unmetered traffic to a list of sites), those that have not do not in general have the technical facilities or expertise. It would require investment in time and equipment to implement and manage separate billing for different classes of traffic. One ISP questioned whether this was a good use of the next dollar to spend on its network.

This is a separate issue from the consumer confusion argument in Barrier 1 above. That was about the difficulty for consumers (impossibility, really) in predicting *ex ante* what traffic will be domestic and what will not be; this point refers to the costs for ISPs in determining *post hoc* which traffic was local and treating it separately for charging purposes.

3.4 Other barriers

Five other barriers to unmetered domestic data were mentioned by more than one respondent:

- *Lack of commercial pressure.* ISPs don't perceive a demand. If some started not to meter domestic traffic and this became a successful selling point, other would be forced to follow suit.

- *UBA Handover throttling* – this is a commercial issue in which Telecom has recently enforced restrictions, i.e. a throttle, on the bandwidth available between ISPs and UBA customers at the handover points. The size of this throttle varies according by what an ISP is prepared to pay for. The lowest size available is 45kbps per user. (The statutory minimum for UBA is 32kbps.) The throttle has always been part of the specification of the UBA product which Telecom sells to ISPs but until recently ISPs had a way to evade its application. Telecom views this as a matter of fairness since some ISPs were avoiding the throttle and some were not. The impact of Telecom's move is to increase the contention for some ISPs' customers. The throttle limit can be considered an average because it is enforced only for the aggregate of any ISP's users at a particular handover point at a particular point in time. However, it would not take many of these customers to be active to hit this limit. At 45kbps per user 5% of users streaming from YouTube would flood the handover point and lead to service degradation. Another way of looking at this restriction is that, if a user were to use 45kbps continually 24 hours per day, they could only consume less than 12GB of traffic per month.

- *Lack of open peering.* Most ISPs peer at 2 (of the 6 operational) Internet exchanges run by Citylink, but Telecom and TelstraClear do not. They peer with each other, but require other ISPs to buy a product from them in order to deliver traffic to "their" (Telecom's or TelstraClear's) customers. Telecom will accept peered traffic if it is delivered by the ISP to the correct 1 of 29 geographically-based handover points. Some ISPs asserted that some domestic Internet traffic "trombones" from New Zealand to the US and back. Some other industry players deny that it happens. I have not been able to demonstrate tromboning so can draw no conclusion one way or the other. Telecom referred to the Internet exchanges as peering points for smaller-scale ISPs. This would seem to be true in fact even if many would regard it as regrettable. Most ISPs and content providers have to enter some kind of commercial arrangement with Telecom, TelstraClear or both which increases their costs in respect of domestic traffic.

- *Lack of investment capital.* This is very much an issue for smaller ISPs, and is related to the "lack of commercial imperative" point above. Given that investment capital is scarce, it is hard for them to see differential metering equipment for which they do not perceive a customer demand to be a priority item.

- *Most traffic is international.* Estimates range from 80-90% for the proportion of New Zealand consumer Internet traffic being international. It could be argued that unmetering New Zealand sites will lead to more of them; this is a "chicken and egg" argument as it stands. Local high-traffic websites take the low capacity of the New Zealand Internet into account. Trade Me, for instance, takes care to minimise the size in bytes of its pages so that it can reduce loading times and deliver a responsive site even to people on dial-up. APN (publisher of the New Zealand Herald) has recently moved the hosting of its main site back onshore, even though this costs it more, in order to deliver lower latency and faster load times.

4 How will UFB change things?

4.1 Data caps under UFB

The most obvious outcome when asking industry players how UFB will change things is the disjoint in expectations between some ISPs and other players. Content providers and network builders, for instance, all say that data caps are going to need to be removed or dramatically increased for UFB to be a viable service. Some ISPs believe that UFB won't change things for them or their customers or have not yet considered what changes might occur, although many of the larger ISPs have stated that they are ready to offer larger caps on UFB as it becomes more widely available

By addressing incumbency in the local loop, UFB may cause a change in data caps. The background section of this report identified Telecom incumbency in the copper loop as a possible explanation for our low data caps, and if this is the case, there could be a substantial increase or complete removal of the caps as UFB uptake spreads.

Even if this is not the case, it seems likely that competitive pressure will force ISPs to increase caps since UFB will provide consumers with the opportunity to use up caps of the current size within hours or even minutes, rendering such a service nearly useless under current caps.

A common comment was that UFB will lead to a shake-out in the ISP industry. My observations back that up in that preparedness to embrace UFB appears to be variable.

No respondent said that the advent of UFB would make zero-rated domestic traffic any more likely.

4.2 Backhaul

Crown Fibre and other respondents identified a need for significantly better backhaul than currently exists in order to serve UFB regions. However, Crown Fibre itself is not providing backhaul; carriers will need to do this for UFB to be functional. It will be essential to the success of UFB for there to be competitively priced backhaul at UFB aggregation points.

4.3 Demand

Several respondents said that there is a need for local demand. A number identified SkyTV as a source of suitable content and noted that, in the UK, the regulator has moved to require BSkyB to provide its content over the Internet for delivery by ISPs.

A related point made by several respondents is that households who already pay for SkyTV and broadband may resist paying more for UFB, and that, were Sky to be delivered via the Internet, the revenues could be rebalanced between them so that Sky customers were not paying for the satellite platform Sky currently uses but rather for the fibre. I have not asked Sky about this since it declined to be interviewed for this project. However, it might well resist such a suggestion since it presumably has long term contracts for satellite capacity.

4.4 Peering

Crown Fibre's view was that better peering will be important to make UFB a success. Other respondents did not identify peering in connection with UFB, although several respondents did identify it as an issue in general.

4.5 International Capacity

Almost everyone said that international capacity will need a considerable improvement in a UFB environment. UFB product CIRs are at least 2.5Mbps, which while achievable on DSL or cable, is not the norm during peak periods.

Annex A – List of Respondents

Responded

Actrix
Akamai
Alcatel Lucent (AJ Thompson)
CityLink
Commerce Commission
Crown Fibre Holdings
Enable
FX Networks
Gaurab Raj Upadhaya
Google
IDC
Inspire
InternetNZ (Hamish MacEwan)
InternetNZ (Nathan Torkington)
InternetNZ (Simon Riley)
Knossos
Marylebone
NZRS
Orcon
Pacific Fibre
Radio New Zealand
REANNZ
Slingshot
Telecom
TelstraClear
Trade Me
Vodafone
Xero

Did not respond

InternetNZ (Jonny Martin)

Declined to participate

Sky TV