Samuelson-Glushko Canadian Internet Policy & Public Interest Clinic
University of Ottawa – Faculty of Law, Common Law Section
57 Louis Pasteur Street
Ottawa|ON|K1N 6N5
cippic@uottawa.ca
www.cippic.ca

Telecom Notice of Consultation CRTC 2011-77

Review of Billing Practices for Wholesale Residential High-Speed Access Services

CRTC Reference Nos.: 8661-C12-201102350; 8638-C12-201014620; 8638-C12-201016882; 8740-B2-201018317; 8740-B2-201017426; 8740-R28-2010180606; 8740-C6-201018052; 8740-S9-201017955; 8740-V3-201018201; 8740-B2-201017426; 8740-B54-201017401; 8740-B2-201018317; 8740-B54-201018300; 8740-T66-201011410; 8740-M59-201017921; and 8740-S22-201018474

Reply Comments of OpenMedia.ca

April 29, 2011

Tamir Israel, Staff Lawyer, CIPPIC

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INTRODUCTION

1. CIPPIC/OpenMedia.ca is grateful to the Commission for providing us with the opportunity for providing reply comments in this important proceeding. Our reply comment aims to achieve three important objectives. First and foremost, it attempts to clarify the factual record on many of the assertions and conflicting evidentiary points on the record of this and related proceedings. Regardless of the ultimate outcome of this consultation, it is essential, in CIPPIC's view, that the Commission base its decision on a solid factual foundation.

2. Second, it aims to impress upon the Commission its concerns over the impact of UBB as it is being deployed in Canada. As an ITMP, no longer appears targeted at excessive users, as was, perhaps, once the case, but rather at deterring use of the Internet at all levels and by all users. The Commission has limited this proceeding in scope to the examination of UBB in the wholesale context. However, it has additionally recognized the importance of considering the impact of this proceeding on the broader retail sector, as well as the general effectiveness of UBB as an ITMP:

> The Commission considers that the two principles stated above and in Notice 2011-77 are intended to create a fair wholesale regime that (1) protects the interests of consumers and Small ISPs, and (2) does not create an unintended advantage for any particular service provider or user…The scope of the proceeding also does not preclude comments on the effectiveness of any billing practice as an Internet traffic management practice.[1]

Yet early decisions on the application of UBB onto the wholesale market appeared to accept the policy benefits of encouraging a market where monthly usage caps are endemic. Further, taken within the broader context of the Commission's regulatory objectives, the primary function of the wholesale market is to provide sufficient competitive pressures on an otherwise non-competitive environment in order to achieve public policy objectives and prevent public policy harms that might otherwise require regulatory intervention. As such, it is incumbent upon the Commission to assess wholesale proposals in light of these broader objectives.

[1] Commission Letter, "Re: Review of billing practices for wholesale residential high-speed access services, telecom Notice of Consultation CRTC 2011-77 – Requests to modify the scope and terms of the proceeding", March 11, 2011, <http://www.crtc.gc.ca/eng/archive/2011/lt110311.htm>.

3. The recent public outcry against widespread UBB in the Canadian Internet access retail market has deep historical roots. As noted by Clay Shirky in explaining the failure of predictions of ubiquitous micropayment adoption in early online markets:

> These arguments run aground on the historical record. There have been a number of attempts to implement micropayments, and they have not caught on in even in a modest fashion - a partial list of floundering or failed systems includes FirstVirtual, Cybercoin, Millicent, Digicash, Internet Dollar, Pay2See, MicroMint and Cybercent. If there was going to be broad user support, we would have seen some glimmer of it by now.
>
> Furthermore, businesses like the gas company and the phone company that use micropayments offline share one characteristic: They are all monopolies or cartels. In situations where there is real competition, providers are usually forced to drop "pay as you go" schemes in response to user preference, because if they don't, anyone who can offer flat-rate pricing becomes the market leader. (See sidebar: "Simplicity in pricing.")[2]

Aside from general user disdain, CIPPIC/OpenMedia.ca demonstrates that current implementations of UBB in the wireline access market in Canada as a whole are economically non-optimal, are unfair, and conflict with the policy objectives in that they appear calculated to discourage Internet use by Canadians. Further, current trends suggest that monthly usage allowances are rapidly decreasing at a time when average use is growing at very modest rates. While not ubiquitous (amongst incumbents Telus, alone, has steadily increased monthly allowances over the past few years), this trend is deeply troubling and does not bode well for the future of Internet usage in Canada.

4. While the broader residential UBB issue remains outside the scope of this hearing, CIPPIC/OpenMedia.ca respectfully request that the Commission recognize this is a growing issue and commit to monitoring the retail UBB landscape carefully in the future. Consideration should be given to providing *all* ISPs with guidance on the appropriateness of UBB and the conditions under which such ITMPs may conflict with the *Telecommunications Act*. CIPPIC/OpenMedia.ca recognizes that the most effective means of addressing the harms posed by retail economic ITMPs is likely through competition. However, the ubiquity and uniformity of existing UBB measures is troubling and CIPPIC/OpenMedia.ca believes it is important for the Commission to recognize this and premise its wholesale UBB decision on this recognition. It further asks the Commission to continue monitoring the UBB situation in the future. The

[2] C. Shirky, "The Case Against Micropayments", December 19, 2000, O'Reilly Network, <http://openp2p.com/pub/a/p2p/2000/12/19/micropayments.html>.

prevalence of such measures in the Canadian market suggests that there may not be sufficient competition to address these issues.

5. Finally, the recent wholesale aggregate UBB proposal that the other parties to this proceeding have presented[3] is assessed in light of the clarified factual record as well as of the likelihood that this proposal will meet the objectives articulated below. CIPPIC/OpenMedia.ca believes the current aggregate proposal is a vast improvement over the previous model. However, we remain firmly convinced that this new model should be premised on the following principles:

   - **Cost Based:** Wholesale aggregate UBB should be cost-recovery based, with a reasonable mark-up.
   - **Encourage Competition on Retail UBB Adoption:** Wholesale aggregate UBB should be designed so as to compensate incumbents for their costs, not to facilitate competitor adoption of retail UBB.

   In CIPPIC/OpenMedia.ca's view, CLEC's ability to attract robust Internet users via unlimited access plans is important and should be encouraged as an important competitive pressure point preventing runaway retail usage caps.

6. We suggest the following changes to Bell's proposed aggregate UBB tariff in order to achieve these principles:

   - The usage-based component of the tariff must be based on peak-period CLEC usage;
   - The per-TB cost must be premised on actual incumbent costs with the normal mark-up;
   - A mechanism is required for periodic review to ensure that the per-TB rate remains reflective of costs in light of dropping network provisioning costs; and
   - The current tariff formulation for legacy systems should be reformulated in light of these principles.

[3] Evident in Bell, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; CNOC, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; The Cable Carriers, "Joint Submission to TNC CRTC 2011-77". March 28, 2011; Telus, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; PIAC, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; Primus, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; Distributel, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; BCBA, "Initial Comments to TNC CRTC 2011-77", March 28, 2011; and Shaw, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at para. 43.

CIPPIC/OpenMedia.ca notes in addition that it is difficult to assess the viability of Bell's proposal in full without data which will now be forthcoming through the interrogatory process. Our assessment may vary once this data is received.

7. In order to best articulate the points highlighted above most clearly, CIPPIC/OpenMedia.ca organizes the remainder of its reply comments as follows. Section I examines UBB as implemented by the majority of Canadian incumbents. It demonstrates that current UBB is not addressed at 'excessive usage' but rather aims to dampen Internet use at all levels. It examines the reasons for this, including the perception that phenomenal traffic growth rates are leading to unprecedented levels of network congestion and incumbent costs, and the decision to use monthly usage metrics as a proxy for 'contribution to congestion'. It examines the 'fairness' of such mechanism in light of these conclusions.

8. Section II then examines the economic efficiency of UBB as opposed to a bundled or flat-rate model of pricing. It concludes that existing models of UBB ignore many economic benefits of bundled pricing and fail to account for the specific benefits of non-usage based pricing models with respect to provision of Internet services. It demonstrates how, not only is a bundled, non-usage based approach likely to more optimal pricing and *revenues* for incumbents, but also to more efficient value exchanges as well as broader achievement of public policy telecommunications objectives. Section III places UBB within the broader context of net neutrality harms in order to better analyze such practices as well as to highlight the potential damage that may result from ubiquitous, unchecked UBB. Section IV then concludes by examining the wholesale aggregate UBB tariffs that have been proposed in this proceeding.

I. PROVIDING INCENTIVES TO USE & PROVISION THE INTERNET

9. As argued in our initial comments to this proceeding, it is important to clarify that UBB as it is implemented in Canada is no longer aimed at 'excessive users' or 'bandwidth hogs'. Rather, it is carefully designed to place downward pressure on all Internet users at all levels of usage as a means of managing traffic. In CIPPIC/OpenMedia.ca's view, this implementation runs counter to the underlying principle adopted in Telecom Regulatory Policy CRTC 2009-657, which aimed to provide incentives for ISPs to invest in building larger networks as a primary means

of managing congestion.[4] Instead, what has taken hold is a system that aims to manage congestion by *discouraging* Internet use and hence prevent the need to build more robust networks altogether.

10. It should be noted that it is not CIPPIC/OpenMedia.ca's position that there are no costs associated with network capacity, nor do we argue that ISPs (whether incumbent or otherwise) should be able to profit from their access services. The question facing the CRTC in this proceeding is the mechanism by which pricing is most efficiently and fairly achieved. Historically, Internet access pricing has been accomplished primarily through flat rate mechanisms based on the speed and theoretical capacity of the access service being purchased. Incumbents now point to a number of factors

A. Traffic Growth & Network Costs at All Time Low

11. It is very important, in CIPPIC/OpenMedia.ca's perspective, to acknowledge we are currently in an era characterized by perhaps the slowest sustained rate of traffic growth in the history of the network. At the same time, the per-GB marginal cost of meeting these traffic growth demands is also at a historical low as technological advances have steadily decreased the cost of network equipment. This has direct implications for the level of costs an ISP must incur in order to avoid congestion on its networks.

12. Incumbents repeatedly point to uncontrollable costs based on phenomenal growth rates as justification for the institution of alternative pricing mechanisms such as economic ITMPs. Bell, for example, in its initial comments to this proceeding, points to the following:

> 58. The second prong of the Companies' approach to network management involves the implementation of economic ITMPs. As the Companies noted at paragraph 77 of their 23 February 2009 Comments in the proceeding leading to TRP 2009-657:
>
> > *Nemertes [argued] in its study that North America will require an additional $43 billion in capacity investment by 2010, beyond the $72 billion in existing projected network investment. While continued investments in network capacity must remain at the core of a carrier's network management solution, this type of incremental investment will not be sustainable without changes to existing*

[4] Telecom Regulatory Policy CRTC 2009-657, *Review of the Internet Traffic Management Practices of Internet Service Providers*, October 21, 2009, CRTC Reference No.: 8646-C12-200815400, <http://www.crtc.gc.ca/eng/archive/2009/2009-657.htm>, paras. 35-36.

> *revenue models and the introduction of new business models. Part of the issue is that* ***current revenue models were not designed to handle the dramatic increase in demand due to online video noted above****. [emphasis added]*

59. This remains true two years later.[5]

13. These figures are based on a study by Nemertes Research. The referenced passage from the original Nemertes study, in full, is as follows:

> As noted earlier, much of our capacity predictions are predicated on estimating capacity from investment. Consequently, the gap between desired capacity and available capacity can be expressed as a required investment. When this is done, in the year 2010, just after demand exceeds effective capacity, the investment that would be required then to close the gap in North America amounts to $43 billion—nearly 60% of the projected carrier investment of $72 billion.
>
> The only hope to close the gap permanently is that technology will provide access solutions that are less capital-investment intensive…Of course, another way to address unconstrained demand is to constrain it. As noted previously, access almost certainly limits what users expect to do. If access becomes so limiting, then users may decide not to use the Internet and thus reduce the need for additional investment. In such a situation, the market for innovative new Internet-based services would quickly dry up.[6]

This Nemertes study was released in 2007 and, based on 2006 traffic trend data, projected growth rates of 108% CAGR from 2006 (approximately 2,469 Petabytes per month of measured data use)[7] through to 2012 (approximately 200,000 PB of *projected* monthly usage).[8]

14. However, as carefully documented by a number of sources, including this Commission, actual annual growth rates from 2006 fell far short of 108% CAGR. Actual growth rates in North America over this period were more in the vicinity of 40-50% CAGR, with Canadian figures at the lower end of that range. Assuming

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[5] Bell, "Initial Comments to TNC CRTC 2011-77", *supra* note 3, paras. 58-59. Emphasis in quoted excerpt is not mine.

[6] Nemertes Research, "The Internet Singularity, Delayed: Why Limits in Internet Capacity Will Stifle Innovation on the Web", November 2007, <http://www.nemertes.com/internet_singularity_delayed_why_limits_internet_capacity_will_stifle_innovation_web>, (my underline).

[7] Nemertes, *supra* note 6, p. 48: "That said, that figure places North American Internet traffic at 2469 Petabytes/month in 2006 (the last year for which data is available)."

[8] *Ibid*. at p. 17. See also Bell, "Initial Comments to TPN CRTC 2008-19", ABR, February 23, 2009, at para. 54.

Nemertes' starting point of 2,469 PB was accurate, a comparison of their projections to actual growth rates in North America would look like this:[9]

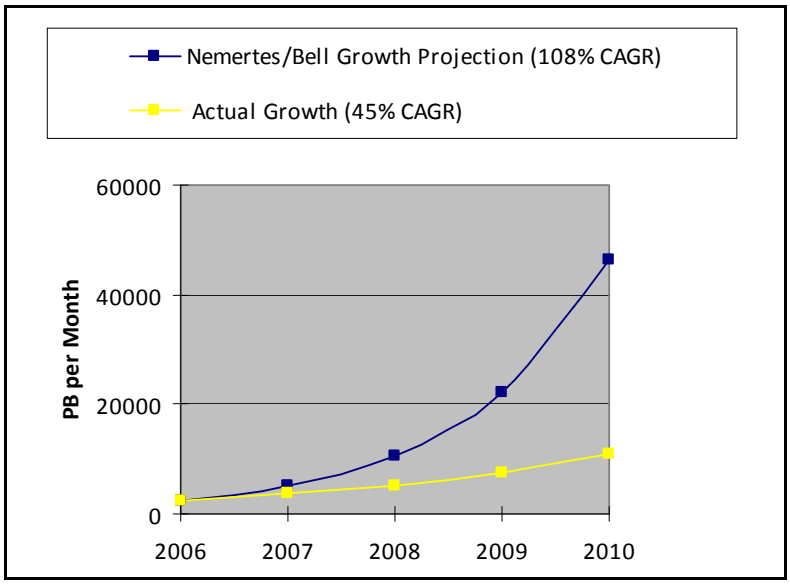

Figure 1: Actual v. Projected Traffic Growth Rates[10]

Based on these figures, *actual* traffic at 2010 would have been less than ¼ of Nemertes' projected 46, 000 PB/month. This would represent a 40% *decrease* in needed North American network investment from the $72 billion cited by Nemertes.[11]

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[9] See Telecom Regulatory Policy CRTC 2009-657 at para. 5: "Data collected in the course of this proceeding indicate that the average growth of Internet traffic on Internet service providers' (ISPs) networks in Canada has been over 43 percent per year for the period from 2005 to 2008." See also Minnesota Internet Traffic Studies (MINTS), "MINTS pages updated, many new reports, further slight slowdown in wireline traffic growth rate", http://www.dtc.umn.edu/mints/news/news_22.html>, which reports annual growth rates of approximately 40-50% in 2009, and CISCO, "Visual Networking Index: Forecast and Methodology, 2009-2014", June 2, 2010, <http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360.pdf>, citing a comparable 45% annual growth rate for 2009. In its initial comments to this proceeding, Bell Canada data suggests even lower annual growth rates of 38% for 2009 and 32% for 2010 on its networks (see Bell, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, para. 33).

[10] Data set: Nemertes: 2006: 2,469 PB; 2007: 5,135.52 PB; 2008: 10,681.88 PB; 2009: 22,218.31 PB; 2010: 46,217.09 PB; 2011: 96,125.31 PB; 2012: 199,940.65 PB [108% CAGR projection based on 2,469 PB 2006 measurement]. Actual traffic growth: 2006: 2,469 PB; 2007: 3,580.05 PB; 2008: 5,191.07 PB; 2009: 7,527.06 PB; 10, 914.23 PB (45% CAGR based on 2,469 PB 2006 measurement. NOTE: most place annual growth rates for this period at between 40%-50% CAGR for North America. Growth rates in Canada appear to have been slightly lower [43% CAGR from 2005-2008]. See *supra* notes 7 and 9. See also CIPPIC/OpenMedia.ca, Initial Comments to TNC CRTC 2011-77, March 28, 2011, paras. 10-15.

[11] The Nemertes study projected a 60% increase over this $72 billion figure based on a projected 46,000 PB/month or $115 billion. One quarter of that is $28.75 billion – a %40 decrease from $72 billion.

15. As noted in CIPPIC/OpenMedia.ca's initial submissions to this proceeding, this current traffic growth is far lower than the 100% annual growth rate that has characterized much of the history of the Internet.[12]

16. This has direct implications on the costs of network provisioning. When technical advances are factored into this equation, the annual costs of provisioning should not be increasing at unmanageable rates, if they are increasing at all. Indeed, it has been argued that the efficiency of network equipment has increased so much, that savings and space and power consumption resulting from an equipment upgrade will cover the costs of that upgrade within two years.[13] It was recently announced that new techniques have facilitated transmission speeds of 100 tbps.[14]

17. Indeed, despite annual traffic growth rates of approximately 43% a year in Canada, wireline capital investment by incumbent TSPs does not appear to have increased since 2006 (1.6% CAGR from 2006-2009).[15] During the same period, Bell Canada has similarly continued to invest at an almost constant rate (1% CAGR from 2006-2010).[16] This means that incumbents have been able to meet 'exponential' traffic growth and avoid congestion with constant rates of investment for at least that past half-decade:

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[12] K.G. Coffman & A. Odlyzko, "Internet Growth: Is there a 'Moore's Law' for data traffic?", July 11, 2000, <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=236108>.

[13] S. Han, "Moore's Law and Energy and Operations Savings in the Evolution of Optical Transport Platforms", (February 2010) *IEEE Communications Magazine* 66, <http://www.fujitsu.com/downloads/TEL/fnc/whitepapers/IEEEComMagPaper.pdf>. See also K.G. Coffman & A. Odlyzko, "Internet Growth: Is there a 'Moore's Law' for data traffic?", July 11, 2000, <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=236108>.

[14] J. Hecht, "Ultrafast Fibre Optics Set New Speed Record", April 29, 2011, NewScientist, <http://www.newscientist.com/article/mg21028095.500-ultrafast-fibre-optics-set-new-speed-record.html>.

[15] CRTC Communications Monitoring Report, 2010, Table 5.1.9, <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2010/cmr51.htm#t519>.

Net incumbent wireline capital investments were $4 billion in 2006, $4.2 billion in 2007, $4.1 billion in 2008, and $4.2 billion in 2009 – a CAGR of about 1.6% from 2006 to 2009.

[16] Bell, Initial Comments, *supra* note 3, Table 1, page 3.

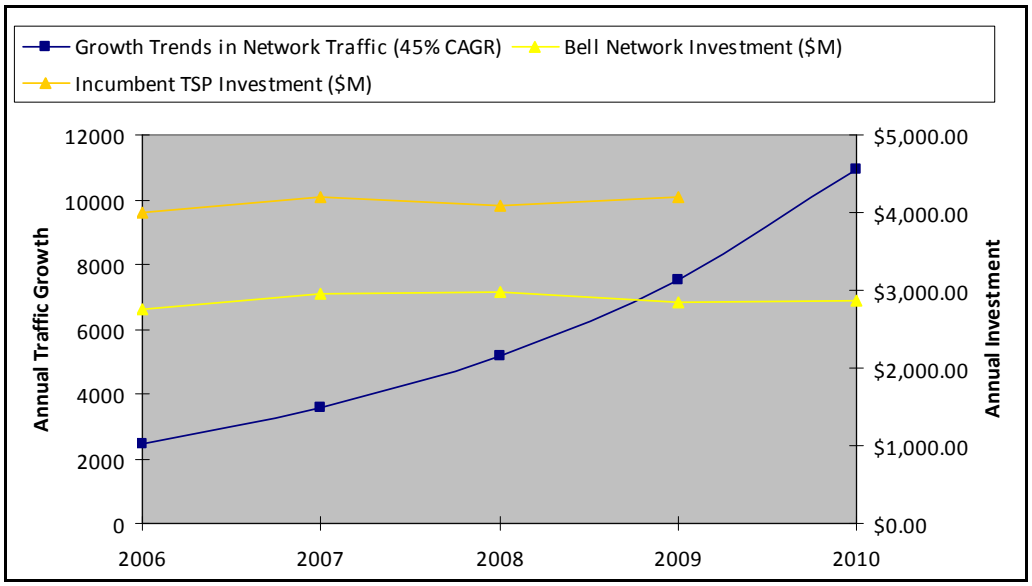

Figure 2: CapEx v. Traffic Growth[17]

Indeed, during this period, all of the incumbent telcos have enhanced their offerings with new higher speed FTTN offerings, meaning that much of the capital investment from the past few years would not have been necessary for congestion-management alone, but rather for new equipment necessary to offer higher access services.

18. Further, it is not clear how much cross-subsidization is occurring as wireline network equipment must be expanded to alleviate congestion caused by an influx of wireliess traffic from incumbent's growing mobile Internet networks as well as to replace traditional wireline voice telephony, which is typically and increasingly shares Internet wireline network equipment through Multiprotocol Label Switching (MPLS) techniques.[18]

19. Regardless, it is not disputed that a.) Internet traffic continues to grow, albeit this is *not* occurring at phenomenal rates; b.) incumbents must continue to invest in their networks in order to avoid congestion; and c.) incumbents should find ways to make a reasonable profit from their endeavours. What *is* at issue is the means by which [c] is best achieved. CIPPIC/OpenMedia.ca submit, and provide support below, that a usage-based model aimed at 'constraining Internet use' is non-optimal, unfair and

[17] Forty-five percent CAGR growth in annual traffic can be demonstrated in a number of ways. For simplicity of comparison, the actual annual traffic growth line in this chart replicates that in Figure 1 above.

[18] See B. St. Arnaud, "Myths and Fallacies about Usage Based Billing (UBB)", March 18, 2011, p. 7.

should be discouraged as a revenue-generating mechanism. As noted by Nemertes Research in their above-cited study:

> Of course, another way to address unconstrained demand is to constrain it...If access becomes so limiting, then users may decide not to use the Internet and thus reduce the need for additional investment. In such a situation, the market for innovative new Internet-based services would quickly dry up.[19]

The Commission should act to encourage Internet use and the creation of innovative Internet-based services, not to constrain them.[20] Indeed, in an era where traffic demands faced by networks are far from onerous – where reasonable and decreasing network investment rates can effectively meet congestion from modest levels of traffic growth – there is no justification for usage constraints.

B. UBB is not fundamentally fair

20. UBB has the appearance of fairness to it as it is purportedly premised on the 'pay for what you use' maxim. One problem with relying on monthly UBB as a congestion-managing mechanism is that it is a blunt instrument. This is because network capacity is not a finite resource, consumed on a byte by byte basis. Yet any UBB ITMP system rests its foundations on the relationship between each user's bytes and ISP costs. For this reason, users are charged 'based on what they use' and this is presumed fair. The reality, however, is that the relationship between each bit of consumption and ISP costs is tenuous. This has serious implications for any UBB model which imposes customer costs on a per-byte basis. It is particularly salient with respect to pricing models based on monthly usage, as off-peak user consumption is very unlikely to contribute to any actual provisioning costs for an ISP. The negative results of this are two-fold: it is economically inefficient and unfair in that it forces off-peak users to subsidize peak users; and it forces overly excessive limits on usage.

NETWORK CAPACITY IS NOT A 'FINITE RESOURCE'

21. First, it is important to understand and recognize the nature of broadband consumption and associated costs. Although this has been stated on the record on numerous occasions, the issue remains unresolved as parties continue to characterize

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[19] Nemertes Research, "The Internet Singularity, Delayed: Why Limits in Internet Capacity Will Stifle Innovation on the Web", November 2007, <http://www.nemertes.com/internet_singularity_delayed_why_limits_internet_capacity_will_stifle_innovation_web>.

[20] This underlies a number of the policy objectives.

broadband as a "finite resource", as Rogers points out in its initial comments to this proceeding:

> As discussed in section 2.3 of the joint cable company submission, capacity available for Internet services is a finite resource. This means that it is possible for all capacity to be consumed at any given point when demand exceeds supply.[21]

While it is certainly true that network capacity can be 'used up' during any given period, the manner in which it is 'used up' is more akin to that of renewable resources than it is to finite ones, at least as that term is typically used in economic discourse.

22. For example, a 'finite' resource such as gas or electricity is diminished by each unit of consumption and regardless of the rate thereof. If there are 100 units of gas available – a finite amount – that amount will inevitably be exhausted even if usage rates decrease over time. Each unit of consumption will contribute to that exhaustion. The same is not true for network capacity. If there are 100 units of network capacity available, a constant usage rate of 80 units will never exhaust this amount subject, of course, to regular upkeep.[22] Further, even with a usage rate of 110 units, the existing 100 units are not 'diminished' in the sense that they need not be replaced, only supplemented with an additional 10 units.

23. The key implication of this is that not every bit of usage correlates to 'consumption' in that it does not necessarily diminish a finite amount of bandwidth. Significantly, a bit (or a Gb) on a relatively empty link does not diminish supply at all with respect to network capacity. As Mr. Bill St. Arnaud points out, due to multiplexing techniques, bandwidth consumption is near the 'non-rivalrous' end of the consumption spectrum.[23] This means that network capacity available at any given moment and at any given link can be shared by multiple users at once, again diffusing the impact that one user's bits have on another user's, as well as the cost associated with any given bit of user-generated traffic.

24. Additionally, it is worth reiterating that an annual traffic growth rate of 0% will lead to zero provisioning costs beyond standard equipment replacement costs. Similarly, an annual growth rate that is so modest that it does not outstrip technological

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[21] Rogers, Initial Comments, *supra* note 3, para. 29.

[22] See for example J. Stiglitz, "Growth with Exhaustible Natural Resources: Efficient and Optimal Growth Paths", (1974) 41 *Review of Economic Studies* 123.

[23] B. St. Arnaud, "Myths and Fallacies about Usage Based Billing (UBB)", March 18, 2011, p. 16.

advances in efficiency/cost of network equipment may lead to similar results with respect to provisioning costs.

USAGE IS A POOR PROXY FOR CONGESTION, GENERALLY

25. Per-byte usage fees are a poor proxy for congestion or network cost, generally, for a number of reasons. It ignores several factors that are critical for a true assessment of the relationship between an individual's consumption and her contribution to network costs. For example, upstream and downstream channels are typically provisioned separately. A large amount of upstream DSL channel is unlikely to impact on downstream traffic. Yet both contribute equally to monthly overage fees. Further, as noted by Mr. St Arnaud, large amounts of network traffic often bypass large segments of a regional network due to content caching techniques, and so do not contribute to congestion on those network segments at all.[24] As examined in the next section, significant and persistent disparities between off-peak and peak usage, ranging from 72% to 200%, measured daily, will exacerbate these existing issues.[25]

FORCED PEAK PERIOD SUBSIDIZATION

26. UBB has been presented by many, including the Commission, as a mechanism for attempting to instil fundamental fairness by forcing excessive users to pay for what they use.[26] In fact, current monthly UBB practices are a means of subsidizing *peak*

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[24] B. St. Arnaud, "Myths and Fallacies about Usage Based Billing (UBB)", March 18, 2011.

[25] Cisco, "Visual Networking: Usage Study – Highlights", October 25, 2010, <http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/Cisco_VNI_Usage_WP.html> places average peak period usage at approximately 72% higher than average non-peak period usage. Sandvine, "2009 Global Broadband Phenomena – Executive Summary", October 2009, <http://www.sandvine.com/downloads/documents/2009%20Global%20Broadband%20Phenomena%20-%20Executive%20Summary.pdf> at p. 3 points to a gradual shift from 30% of peak usage to 100% peak usage over the course of a day while Arbor notes a slightly more gentle shift from 50% of peak usage to 100% peak usage over the course of a day: C. Labovitz, "The Internet After Dark (Part 1)", ["Arbor, Internet at Night"] August 24, 2009, <http://asert.arbornetworks.com/2009/08/the-internet-after-dark/>.

[26] See our initial comments to this proceeding at paras. 21 and 27. Bell, for example, has spoken of "ensuring the heavy users pay rates that are reflective of the relative value they obtain for the service" (Bell, "Associated with Bell Aliant Tariff Notice 242 and Bell Canada Tariff Notice 7181", March 13, 2009, Abridged, <http://www.crtc.gc.ca/public/8740/2009/b2/1043233.zip>, pp. 3-4). See also the CRTC's characterization of the legitimacy of UBB as a ITMP strategy:

> (a) it protects consumers; (b) those who use the Internet heavily pay for their excess use...For us, it's a question of fundamental fairness. Let me reiterate: ordinary users should not be forced to subsidize heavy users.

CRTC Chair K. von Finckenstein, Testimony to House Standing Committee on Industry, Science and Technology, 40th Parliament, 3rd Session, February 3, 2011.

period usage with *off-peak* customer fees (excepting, perhaps, monthly UBB practices truly targeted at excessive users). This is noted by Bell in its initial comments to this proceeding:

> Because congestion is, by definition, at its worst during the peak usage period and investments necessary to relieve congestion must target usage as measured during the peak period, the most important measure from a network provisioning standpoint is that of the peak period.[27]

27. Rogers explains this perhaps most clearly in expert evidence by Professor Church attached to its initial comments to this proceeding (my underline):

> Peak-load pricing eliminates the subsidization of peak period consumption by off peak consumers. As a result inefficient consumption in the peak period (where marginal cost was greater than consumption benefits) is reduced and less peak capacity is required. Second the reduction in the price in the off peak period leads to more intensive utilization of the network in the off peak period, an increase in usage and consumer benefit…[28]
>
> Congestion arises when the demands for bandwidth at a point in time exceed the capacity of a network element. Hence as discussed in the previous section, congestion pricing should be based on the costs of congestion created by a subscriber's instantaneous use of the network. It is the bandwidth demand of a subscriber at the peak times that contributes to congestion and creates congestion costs. Their use at off peak times is unlikely to contribute much to congestion or create congestion costs. It is not their total monthly usage, per se, that creates congestion. However, monthly volume usage might be a reasonable proxy, given the transaction/metering costs associated with real time congestion pricing.
>
> Traffic data for Rogers' network suggest the traffic peak is for a four hour period between 20:00-24:00 or 19:00-23:00 on weeknights, though the shoulder period on weekends indicates substantial use (as a percentage of peak traffic) from 12:00 onwards. Based on this data, it seems reasonable to estimate that between 25% and 30% of total daily usage occurs within the peak hours.[29]

Even though peak period usage accounts for only 25-30% of *net* monthly usage, it accounts for most if not all of net ISP provisioning *costs*. This means the 70-75% of monthly 'usage' is likely unrelated to network congestion. More specifically, it means

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<http://www2.parl.gc.ca/content/hoc/Committee/403/INDU/Evidence/EV4928520/INDUEV54-E.PDF> line 1610.

[27] Bell, Initial Comments, *supra* note 3, para. 33.

[28] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at para. 33.

[29] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at paras. 48-49.

that 70-75% of costs imposed by ISPs under monthly UBB ITMPs are unlikely to bear any direct relationship to any actual ISP costs.

28. Now, it is certainly the case that there might be some correlation between individual usage in the 70-75% off-peak period. As Professor Church explains in his expert evidence, "it must be the case that the top 25% of users are making some contribution to peak hour usage".[30] But these users are being charged by the megabyte, purportedly for their actual contribution to ISP costs. Bell explains its reluctance to institute peak-period retail pricing as such:

> …peak period pricing would require peak charges to occur at the time that customers wanted to use the Internet the most. Peak pricing would therefore require the majority of users, who do not necessarily use the most bandwidth, to stop using the Internet when they want to use it the most, or, in the alternative, they would actually be incurring price increases.[31]

It is critical to recognize that, in a context where peak period usage drives the vast majority of network costs, peak period usage is, as Bell points out elsewhere, "the most important measure from a network provisioning standpoint."[32]

29. Professor Church argues that, for excessive users, it is possible to infer a relationship between monthly usage and peak period usage.[33] Such users, he argues, produce significant proportions of monthly traffic and so, it is safe to assume that they contribute at least in part to peak period usage and, further, to ISP costs. Specifically, Professor Church relies on data relating to so-called 'excessive' monthly usage, but does not present any data on peak period usage or on the correlation between the two.[34] Indeed, given that 70-75% of usage on Rogers networks occurs in 'off-peak' periods, users who are more active in off-peak periods are likely to *appear* as 'excessive' users even though their peak period usage is relatively benign.

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[30] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at para. 53.

[31] Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16.

[32] Bell, Initial Comments, *supra* note 3, para. 33. The full quote is:

> Because congestion is, by definition, at its worst during the peak usage period and investments necessary to relieve congestion must target usage as measured during the peak period, the most important measure from a network provisioning standpoint is that of the peak period.

[33] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011.

[34] *Ibid*.

30. There is little reason to assume that the largest monthly users are also the largest peak-period users, and even less to assume a byte per byte relationship between off-peak usage proportions and peak period usage.

31. In attempting to justify monthly usage pricing as a 'second best' UBB pricing model, Professor Church relies on so-called excessive monthly users. However, as indicated in the following section, most Canadian UBB implementations do not target *excessive* users, but rather all users at all levels of usage. The correlation between monthly usage and peak period usage becomes even less defensible when applied to all levels of usage. For example, a usage cap that approaches the theoretical monthly limit of a connection speed can more safely assume that connection has been in operation at a somewhat constant rate for the entire duration of the month, whether during peak periods or not. The closer a usage cap is to the theoretical monthly limit of a connection speed, the more likely it is that there is a correlation between overall monthly usage and peak period usage and subsequent contribution to ISP costs. Consider a 2.8 Mbps connection with a theoretical monthly limit of 880 GB – it is not clear whether any, let alone most, of the 2 GB monthly limit applied to such a plan occurred during peak period.

32. Further, according to Professor Church, the efficiency gains of a peak period pricing model over a monthly pricing model are dual. The first is efficient pricing, as "[p]eak-load pricing eliminates the subsidization of peak period consumption by off peak consumers."[35] Second, however, is the incentive that peak period pricing provides for users to shift 'inefficient' peak period usage to off-peak times.[36] Instead of reducing peak-period usage, monthly pricing models have the unfortunate impact of reducing off-peak period usage as well, even though such usage imposes minimal costs on ISPs.

33. This trend appears to already be taking hold on Bell Canada's network. Bell has noted in its initial submissions to this proceeding that *net* traffic growth rates on its network is dropping at a fairly rapid pace from 38% in 2009 to 32% in 2010.[37] This in itself is troubling in that network traffic from 2005-2008 in Canada appears to have

[35] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at para. 33.

[36] *Ibid*.

[37] Bell, Initial Submissions to TNC CRTC 2011-77, *supra* note 3, para. 33.

grown at a steady annual rate of 43%[38] and Bell points to the 2009-2010 period as the period where its UBB really became endemic throughout its customer base.[39] This suggests a strong correlation between the drop in traffic growth and Bell's UBB. In the *same* period, however, peak period traffic in fact grew at an *increasing* rate of 55% annual growth in 2009 and 61% in 2010.[40] As noted in the following section, Bell's UBB appears very effective at reducing network usage at all levels. However, it does not appear to be very effective at reducing the type of network usage that actually makes "investments necessary to relieve congestion" – peak period usage.[41] It seems to have almost the opposite effect, by providing users with stronger incentives to reduce *off peak* usage, as that type of usage covers larger periods of time and is likely less valued by the majority of users.[42]

FALSE VALUE CHOICES IMPOSED ON CUSTOMERS

34. Finally, given the loose correlation between monthly usage and actual ISP costs, UBB imposes an unnecessary value judgment onto users. On the demand side of the equation, 'value' does not align with 'usage'. That is, a user may value an email or social networking interaction far more highly than a bandwidth intensive YouTube video. A UBB scheme forces users to align 'value' with 'usage' in ways that distort the value exchange between the user and the ISP. This is exacerbated by the mental transaction costs imposed on users, particularly when aggregated over all transactions and across the entire customer base of a given network. As the correlation between monthly usage and value on the supply side also appears tenuous, it is not ideal to force these types of value judgements onto users, particularly in light of the disproportionate negative impact such decisions will have on high-bandwidth and innovative emerging services. As Odlyzko points out, the true

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[38] See Telecom Regulatory Policy CRTC 2009-657 at para. 5: "Data collected in the course of this proceeding indicate that the average growth of Internet traffic on Internet service providers' (ISPs) networks in Canada has been over 43 percent per year for the period from 2005 to 2008."

[39] Bell, Initial Submissions to TNC CRTC 2011-77, *supra* note 3, para. 61.

[40] Bell, Initial Submissions to TNC CRTC 2011-77, *supra* note 3, para. 34.

[41] Bell, Initial Submissions to TNC CRTC 2011-77, *supra* note 3, para. 33.

[42] Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16:

> ...peak period pricing would require peak charges to occur at the time that customers wanted to use the Internet the most. Peak pricing would therefore require the majority of users, who do not necessarily use the most bandwidth, to stop using the Internet when they want to use it the most, or, in the alternative, they would actually be incurring price increases.

value exchange inherent in Internet access services is, on the one hand, a bundling of downstream services in an environment of low marginal costs of network expansion.

35. In sum, monthly usage is not an effective proxy for ISP cost. It is, in fact, a means of subsidizing peak period usage by imposing unjustified costs on off-peak users. CIPPIC/OpenMedia.ca understands the reluctance of ISPs to impose peak-period retail pricing. Such UBB mechanisms would, as Bell notes, "require the majority of users…to stop using the Internet when they want to use it the most, or, in the alternative, they would actually be incurring price increases."[43] This would be undesirable, as noted below. But it is important to recognize that current retail monthly UBB practices do not appear aimed at correlating customer overage charges to actual ISP costs. They do not implement a system where you 'use what you pay for', in that ISPs have expressly refused to cause peak period users – the ones who actually contribute the most to provisioning costs – to 'pay for what they use'. They are not the vehicles of fairness that they are presented to be.

C. Current UBB: It's not about the bandwidth hogs

36. As noted in CIPPIC/OpenMedia.ca's initial comments to this proceeding, there are a number of indicators that would suggest current monthly caps in Canada are not aimed at controlling excessive usage or 'bandwidth hogs' as has been commonly stated. Rather, they are carefully calibrated to exert downward pressure on all levels of Internet usage. Current UBB implementations for most ISPs aim to place numerous usage disincentives at various levels of usage, ranging from slight to heavy.

37. There are numerous indicators that Canadian UBB schemes aim to exert downward pressure on all users at all levels of usage. One strong indicator of this is that, at a time where Internet traffic is growing at rates of approximately 45% CAGR, average monthly usage allowances have failed to keep pace with this moderate rate of traffic growth. Indeed, as noted in our initial comments, monthly allowances are actually decreasing:

[43] Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16.

Downstream Speed (Avg Upstream)	2008 Cap (Avg GB/Month)	2009 Growth (2008 Cap+45%)	Actual 2009 Cap (Avg)	2009 Shortfall (Actual/Growth)
1.5 – 4 Mbps (809 Mbps)	43.25	62.71	32.20	48.7%
5 – 9 Mbps (744 Mbps)	54.18	78.56	42.80	45.5%
10 – 15 Mbps (862 Mbps)	80.81	117.17	69.53	40.1%
Total Broadband:	178.24	258.44	144.53	44.0%

Table 1: Falling Monthly Caps[44]

The drop in monthly usage allowances is a strong indicator that current UBB is no longer aimed at preventing 'excessive' usage, but rather, at discouraging Internet usage at all levels of usage. Indeed, Professor Odlyzko has long warned that assessments of Internet usage caps with ignore temporal evolution will fail to properly understand the impact of these caps.[45] If this trend persists, it may have very serious detrimental impact on Canadian Internet usage:

[44] CRTC Communications Monitoring Report, 2010, Table 5.3.3, Part 2 of 2, <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2010/cmr51.htm#t533>. I exclude the over 16 Mbps data category as, in 2009 when these figures were compiled, fewer than 1.0% of Canadians were subscribed to such services (*Ibid*., Table 5.3.3 Part 1 of 2: 0.6%, to be precise). 1.5 Mbps – 4 Mbps connection caps fell from 43.25 GB/month to 32.20 GB/month on average; 5 Mbps – 9Mbps connection caps fell from 54.18 GB/month to 42.80 GB/month, and 10 Mbps – 15 Mbps connections fell from 80.81 GB/month to 69.53 GB/month, on average.

[45] See C.V. at appendix B to this submission. See also: A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, p. 77.

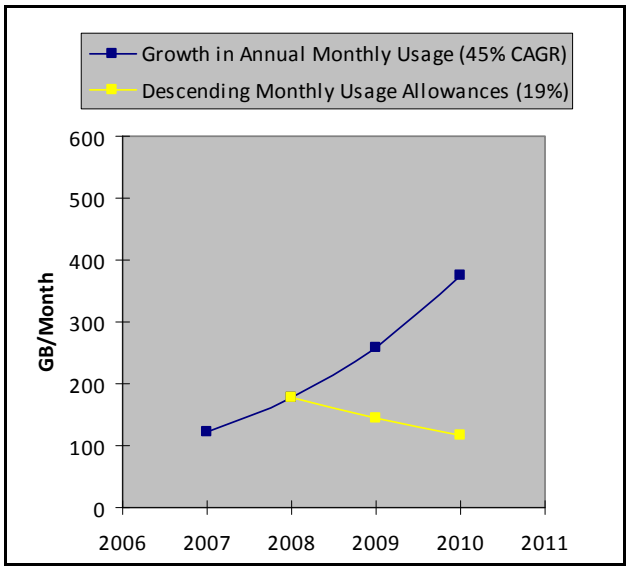

Figure 3: Projected Growth in Annual Traffic v. Descending Usage Allowances (2010 projection)[46]

38. Indeed, data provided by Bell Canada in this proceeding suggests that monthly caps on its network are already having their intended 'constraining' effect. Bell notes that the rate of traffic growth on its network, citing descending annual growth rates of 38% and 32% on its networks for 2009 and 2010, respectively.[47] A worrying drop from the 43% annual rates that have characterized Canadian network traffic growth from 2005-2008.[48]

39. Further, a comparison of typical caps with some common usage scenarios demonstrates quite clearly that these are not aimed at 'excessive users' but rather on placing general constraints on all levels of Internet use. In our initial comments to this proceeding, we examined Bell's 2.8 Mbps Ontario 'Essential Plus' service and the various usage disincentives it places on users at *all* levels of usage, beginning at very low levels, and steadily progressing by various tiers[49]:

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[46] Data based on CRTC Communications Monitoring Report, 2010, Table 5.3.3, Part 2 of 2, <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2010/cmr51.htm#t533>. Data assume 45% annual growth in wireline traffic, represented as annual 45% increase in GB/Month usage allowance, as in Table 1, above.

[47] Bell, Initial Submissions to TNC CRTC 2011-77, *supra* note 3, para. 33.

[48] See Telecom Regulatory Policy CRTC 2009-657 at para. 5: "Data collected in the course of this proceeding indicate that the average growth of Internet traffic on Internet service providers' (ISPs) networks in Canada has been over 43 percent per year for the period from 2005 to 2008."

[49] See CIPPIC/OpenMedia.ca, Initial Comments to TNC CRTC 2011-77, at paras. 32-33. Citations updated.

> We take the example of Bell's current Ontario 2.8 Mbps connection ($29.95/month) offering as generally indicative.[50] An average customer (Alice) subscribing to this service reaches her first monthly usage disincentive at the 2 GB mark. At this point, Alice is faced with overage charges of $0.25/100 MB.[51] This disincentive continues until she reaches the 24 GB mark ($60/month) or roughly double her initial monthly bill. After reaching the 24 GB mark, Alice is given carte blanche to continue using her connection unchecked until she reaches the 300 GB mark. At this stage, a second disincentive begins at a rate of $0.10/100 MB.[52]
>
> This model is not designed to capture 'excessive users' or bandwidth hogs. While the definition of a 'bandwidth hog' may be hotly debated, few would disagree that it requires more than 2 GB/month of usage. This pricing model is intended to deter light users such as Alice from using more than 2 GB/month or, alternatively, to either buy into additional 'insurance' schemes or pay heavy penalties when exceeding monthly limits.

These mechanisms appear carefully calibrated to constrain network usage at all levels. Users are forced to choose, at various incremental steps along the way, whether they wish to pay more or use less.[53] Further, the nature of the insurance schemes and punitive penalties Bell and other ISPs offer as part of this complex tiered disincentive structure are likely to play upon natural hyper-sensitivity to such UBB incentives and result in over-aggressive (and undesirable) reductions in usage. Before analyzing these effects more broadly, it is helpful to examine in brief the impact of a typical Bell plan on a reasonable usage basket to put such usage in perspective.

MEASURING ISP MARK-UPS ON EMERGING ONLINE ACTIVITIES

40. Netflix.ca is a popular online streaming subscription service. Monthly Netflix fees are approximately $7.99/month. Streaming one hour of highest quality video on Netlfix will generate anywhere between 1 to 2.3 GB. Alice will hit her monthly allowance of 2 GB near the beginning of her second film on Netflix. Steam is an online video game store that allows users to purchase games and download them directly to their PCs

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[50] See Bell Canada, "Essential Plus", Home / Shop / Internet / Internet Services, <http://www.bell.ca/shopping/en_CA_ON.Essential-Plus/DSLTIEPlusNCOONNewMass.details>. last accessed March 27, 2011. The service offers speeds of up to 2 Mbps downstream and 800 Kbps upstream. Customers are provided a $5/month discount from the base rate of $34.95 and additional discounts for bundling.

[51] Bell, "Plans", Home / Support / Internet / My Internet Usage / Plans, <http://internet.bell.ca/index.cfm?method=content.view&content_id=17737>. Bell notes that overage is "billed in increments of 100 MB for the Essential Plus plan".

[52] Bell, "Understand Your First Bill", Home / Support / Internet / My Internet Usage / Plans, <http://internet.bell.ca/index.cfm?method=content.view&content_id=17647>.

[53] See Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16.

and Macs. PC games range in size and price. Buying two recent popular games in a month can cost as little as $65 in actual fees and an additional 12 GB in usage (adding $25 to Alice's monthly Internet bill, a 40% markup on her gaming purchase).[54] Amazon Cloud Drive and Cloud Player is a recently launched cloud service that permits users to purchase, store, and stream from any location digital music files. Amazon provides users who purchase a digital music album from it 20 GB of free storage.[55] Amazon's service streams at 256 kbps or 112.5 MB/hour.[56] Alice will not be able to listen to much more than half an hour of music per day without exceeding her 2 GB cap.[57]

41. Yet the usage patterns described above do not appear 'excessive'. Alice will be forced to seriously curb her usage of these services, pay extravagant overage fees, or buy into one of the 'usage insurance' schemes Bell offers. For an extra $5/month (an 18% markup on Alice's initial $29.95 plan), Alice may purchase an additional 40 GB of usage per month for a total of 42 GB/month. It is not clear, however, why such 'insurance' should be required as 2 GB is by no measure 'excessive' usage.

42. Even with the 40 GB insurance package factored in, Bell's UBB cannot be considered as targeting bandwidth hogs. Few would consider the following usage pattern as 'excessive':

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[54] The current 'top seller' on Steam is a game called 'Portal 2'. The game itself costs $49.95 and is over 7 GB (http://store.steampowered.com/app/620/). Topping Steam's 'New Releases' category is a game called 'Dino D-Day', priced at $19.99 and requiring approximately 5 GB of hard drive space (http://store.steampowered.com/app/70000/). An alternative game purchasing scenario: Blizzard.com will sell the digital version of its 'World of Warcraft II' game for $19.99. The game itself is 15 GB, <http://us.blizzard.com/store/details.xml?id=110000034>.

[55] Amazon.com, "Introducing Amazon Cloud Drive, Amazon Cloud Player for Web, and Amazon Cloud Player for Android", News Release, March 29, 2011, < http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-newsArticle&ID=1543596&highlight=>.

[56] Amazon.com, "Amazon MP3 Stores – Digital Music Format", Help > Digital Products > Amazon MP3 Music Downloads > Media Formats, <http://www.amazon.com/gp/help/customer/display.html/ref=hp_left_sib?ie=UTF8&nodeId=200389400>.

[57] 256 kbps * 60 seconds * 60 minutes = 921,600 Kb per hour / 8 kb per KB / 1024 KB per MB = 112.50 MB/hour. Thirty days per month * 0.60 hours per day = 18 hours per month * 112.5 MB per hour / 1024 MB per GB = 2 GB/month.

Alice's Use (GB/month)	Actual Service Charge	ISP Markup
3 x 1.5 hour movies/week (~30 GB/month)[58]	Netflix: $7.99/mth	
6 x 0.5 hour TV shows/week (~20 GB/month)[59]	Netflix: 0 (see above)	40 GB insurance scheme @ 5$/month
30 days x 1.5 hours cloud music (~5 GB/month)[60]	Amazon.com Cloud Drive: $29.95[61]	20 GB overage charges @$0.25/100 MB
One game purchased (~7 GB)[62]	Steam: $49.95	
Total:	**$87.89**	**$50.00 (57% markup)**[63]

Table 2: ISP Service Markups

43. Yet this is not 'excessive usage' of these services. Indeed, this is modest in light of the intended use of such services. The average Canadian, for example, views approximately 26 hours/week of television, far more than the 7 ½ hours per week attributed to Alice in the usage pattern above.[64] This is particularly concerning in light of the trends indicating that monthly usage allowances are actually *decreasing* even as these new services attempt to take hold in Canada.

[58] Four and one half hours of highest quality streaming x an average of 1.65 GB/hour per week x 4 weeks = 29.7 GB/month.

[59] Three hours highest quality streaming x average 1.65 GB/hour per week x 4 weeks = 19.8GB/month.

[60] One and a half hours of streaming per day * 30 days per month * 112.5 MB per hour /1024 MB per GB = 4.94 GB per month.

[61] Amazon.com's 'bestselling' MP3 Albums cover a broad range of price points. Several are 'free', a number are $5.99, and a few weigh in at around $11.99. We assume $5.99 as a median and 5 purchased albums (about 5-6 hours worth of music).

[62] As noted above, the current 'top seller' on Steam is a game called 'Portal 2'. The game itself costs $49.95 and is over 7 GB in size (http://store.steampowered.com/app/620/).

[63] Total usage for scenario is 62 GB. The ISP markup is comprised of a 5$/month 40 GB 'insurance' scheme fee plus an additional 20 GB in overage charges at $0.25/100 MB, or $65.

[64] Not including movies theatre visits, DVD rentals, etc.: CRTC Communications Monitoring Report, 2010, Table 4.3, 'Television at a Glance', <http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2010/cmr41.htm#n24>. In online game vending, there are games that are both cheaper and at the same time larger in size. For example, topping Steam's 'New Releases' category is a game called 'Dino D-Day', priced at $19.99 and requiring approximately 5 GB of hard drive space (http://store.steampowered.com/app/70000/). An alternative game purchasing scenario: Blizzard.com will sell the digital version of its 'World of Warcraft II' game for $19.99. The game itself is 15 GB, <http://us.blizzard.com/store/details.xml?id=110000034>.

PUNITIVE PENALTIES, INSURANCE SCHEMES & MENTAL TRANSACTION COSTS

44. There is significant behavioural economics historical evidence demonstrating the overly aggressive impact that micropayment schemes such as UBB impose on usage. After surveying some of this historical evidence, Odlyzko concludes, with respect to the use of such schemes specifically in the Internet usage context, that:

> The decreases in usage discussed above that are caused by metered rates can in principle be explained in standard economic terms. All that happens is that the transactions with low value to the user are not carried out, which increases aggregate welfare if that value is less than the cost to the network. The problem with this conventional explanation is that many of the observed decreases are considerably larger than one would normally expect. [65]

The mere presence of usage-based fees imposes a disproportionate impact on user behaviour. A user with 12 GB/month of average usage under a flat rate plan is likely to decrease consumption when placed under usage-based restrictions, *even if the cost of 12 GB of usage becomes lower than the cost of the flat usage plan*.[66]

45. A number of factors, primarily behavioural, lead to this result. Users are typically risk averse. In addition, and closely related, is a user tendency to overestimate how much they are using.[67] Finally, the mental transaction costs or cognitive costs associated with the constant need to calculate usage force many users to simply err on the side of caution and under-use rather than constantly and closely monitoring usage so as to maximize value.[68] Where per-transaction marginal costs are low for customers – where each additional unit of usage only incurs a small additional cost – customers

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[65] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, p. 75, my underline. See also a summary of this and other arguments at A. Odlyzko, "The Case Against Micropayments", in R.N. Wright, *ed*., *Financial Cryptography: Lecture Notes in Computer Science*, Springer-Verlag, 2003, pp. 77-83, <http://www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf>.

[66] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, pp. 72-131 generally, and, more specifically, pp. 105-111 for an example on Bell System's early experiments with UBB v. flat rates in the wired voice context, 72-79 and 118-131 with respect to the impact of UBB on utilization of Internet and data networks and more specifically the example at p. 76. See also, A. Odlyzko, "The Case Against Micropayments", in R.N. Wright, *ed*., *Financial Cryptography: Lecture Notes in Computer Science*, Springer-Verlag, 2003, pp. 77-83, <http://www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf>, pp. 4-5.

[67] These effects are summarized in A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, at pp. 71-72.

[68] N. Szabo, "Micropayments and Mental Transaction Costs", in *2nd Berlin Internet Economics Workshop*, <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.23.9779>.

are willing to commit less cognitive effort into determining optimal value.[69] Instead of making these fine-grained calculations the user is likely to defer, when faced with such marginal per-transaction costs, to risk averse behaviour and overestimation of personal use, meaning Alice will curb her usage far below what an optimal value exchange would dictate. Alice will prefer to forgo certain online activity rather than undertake the constant effort that would be required to measure potential marginal cost against value in each transaction. Another way of putting this argument is to say that customers value the peace of mind that accompanies a 'flat rate' higher than they do the potential ability to achieve an optimally lower cost under a usage-based scheme.

46. The availability of insurance tiers may mitigate this harm to some extent. It permits users to expand their scope of usage in advance. However, once within a specific tier, the same behavioural factors apply, and users over depress usage in the knowledge that an added per 100 MB fee looms. Further, the lack of transparency with respect to usage will impose further mental transaction costs on customers, pushing them away from efficient use of available tiers. This lack of transparency encompasses, first and foremost, an inability on the part of users to estimate precisely how much 'usage' the next Internet-based transaction will incur. YouTube videos do not come with clear usage consumption notifications. Nor do most other online services. In addition, video advertisements are becoming prevalent on many text-based sites, making it very difficult for customers to product how much usage the next 'click' may bring.[70] Further, a lack of real time information on net usage as measured by the ISP, the time/effort required to check aggregate usage on a daily basis through available ISP tools, and what appears to be frequent mis-measurements of usage on the part of ISPs are all exacerbating factors.

47. Additionally, one metric that is not commonly measured but may affect this calculus detrimentally, is the degree by which monthly usage fluctuates for a given user. Data from Bell's wholesale services suggest that there are fairly significant fluctuations in average usage amongst top usage tiers on a seasonal and even monthly basis.[71] Yet

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[69] *Ibid*.

[70] ComScore estimates that approximately 16% of all online video views in the US are now advertisements – a figure that is on the rise: ComScore, "U.S. Digital Year in Review, 2010", February 2011, <http://www.comscore.com/Press_Events/Presentations_Whitepapers/2011/2010_US_Digital_Year_in_Review>, p. 24

[71] Bell, "TN242 & TN7181 Interrogatory Responses", October 5, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1281758.zip>, pp. 5-7.

there is little data on fluctuations in the *composition* of those top usage tiers – for example, we hear that the top 0.1% of users on Bell's Wholesale Lite plan generated an average of 352.83 GB/month in Sept 2008.[72] Assuming for the moment that this monthly figure remains consistent for top 0.1% tier users on that plan, there is no indication that the same users comprise that plan on a month by month basis. Put another way, there is little or no data available on the standard deviation of individual users with respect to monthly average usage of their Internet services. If Alice uses 12 GB on average, this could mean, of course, that she uses 2 GB some months and 25 in others. If these sorts of usage patterns are common, it becomes very difficult for users to predict a month in advance what their consumption will be in order to select the proper tier.

48. The choice users will face, then, will be to either incur the *additional* costs of a higher tier, or to flatten out their usage at a lower tier. The result would be to "require the majority of users, who do not necessarily use the most bandwidth, to stop using the Internet when they want to use it the most, or, in the alternative, they would actually be incurring price increases."[73] Even where usage fluctuations are predictable on a month to month basis, the mental transaction costs necessary to re-calibrate insurance plans on a monthly basis to account for fluctuations in monthly usage are likely to further deter their efficient use.

49. Additionally, forcing users to predict usage weeks in advance will prejudice adoption of new services. One of the immense benefits of e-commerce is the instantaneous nature of the online marketplace. If Alice decides she wishes to try Netflix or to purchase a game from Steam, she need only go to the relevant website and complete her purchase. She does not need to go into a store or wait for delivery of goods. However, under the complex insurance schemes described above, she first need to call her ISP and order a new insurance tier, then wait a month for the new 'insurance' to begin operating, *then* complete her transaction if, of course, she still wishes to do so by then.

[72] *Ibid*.

[73] Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16.

50. Finally, while it should be noted that it is well documented that the presence of even a minimal usage based fee will have overly significant impact on usage,[74] the overage costs imposed by ISPs are punitive in light of the low marginal cost of network provisioning. These overage penalties range from $0.50 per GB over to $5.00 or even $7.95 per GB in unforeseen usage.[75] This is high and the likelihood of incurring added fees far in excess of the base monthly access fee is sure to exacerbate the behavioural factors mentioned above and act as an even stronger deterrence against usage. Further, as UBB is presented as a measure to ensure customers 'pay for what they use', it seems difficult to justify these overage fees as reasonable estimates place the per GB provisioning cost for incumbents at no higher than $0.08.[76]

D. Conclusion

51. Current UBB implementations are not attempting to deter 'excessive usage', assuming for the moment that this is something that warrants deterrence. Instead, they appear calculated to constrain usage at *all* levels. Instead of building larger networks to accommodate growing usage, ISPs are imposing complex incentive systems aimed at discouraging usage. Behavioural economics and historical models of such incentive structures suggest that ISPs will be very successful in constraining usage by these means. Yet, in the wireline context, there is no justification to rely on such constraints. Traffic is growing at very modest annual rates and there have not been any dramatic increases in annual CapEx requirements necessary to meet network congestion for at least half a decade. The question to ask, then, is whether this type of usage constraint is something the Commission wishes to encourage as an alternative to network investment, keeping the policy objectives in mind.

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[74] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, pp. 75-76, for example.

[75] See J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, at p. 18 and Bell, "Associated with Bell Aliant Tariff Notice 242 and Bell Canada Tariff Notice 7181", March 13, 2009, Abridged, <http://www.crtc.gc.ca/public/8740/2009/b2/1043233.zip>, ["Bell, Initial Tariff Justification"], para. 14.

[76] See M. Geist, "Canada's Usage Based Billing Controversy: How to Address the Wholesale and Retail Issues", March 2011, <http://www.michaelgeist.ca/component/option,com_docman/task,doc_download/gid,53/>. Others have estimated the per GB cost as significantly lower -- $0.01/GB: See Lemay-Yates Associates, "The Cost of Incremental Internet Transit Bandwidth in the Local Access Cloud", March 28, 2011, in Appendix A to Netflix, "Initial Comments to TNC CRTC 2011-77", March 28, 2011. At most, by Bell Canada's estimation, it appears possible to actually profit from $0.195/GB: Bell, Initial Comments to TNC CRTC 2011-77, March 23, 2011, para. 82.

52. Again, we reiterate that ISPs should profit from the services they provide. The question in this proceeding is the means by which these profits can best be procured. In CIPPIC/OpenMedia.ca's submission, ubiquitous and uniform UBB is an undesirable mechanism for doing so. It wraps itself in the cloak of legitimacy in that it purports to pit make users 'pay for what they use', but in fact this is not the case. It discriminates against off-peak users in favour of subsidizing peak-period usage. It seeks to constraint Internet usage at all levels as an alternative to building larger more robust networks better capable of meeting the consumption requirements of Canadians. It imposes costs on emerging bandwidth-heavy downstream services and innovations. It exacerbates shortcomings recognized in various behavioural economics models and evident in a number of historical micropayment schemes. As demonstrated in the next section, even more traditional economic models militate against the use of UBB in Internet access service provision as flat rate models alone will lead to optimal pricing for both the ISP and the customer.

II. UBB IS ECONOMICALLY INEFFICIENT

53. We reiterate, as above, that it is necessary for ISPs to make reasonable returns on their investments. The issue in this hearing is whether UBB is a desirable pricing model that should be encouraged by the CRTC or whether the Commission should use the regulatory tools at its disposal to discourage such practices. Behavioural economics, fundamental fairness, and public policy aside, economists predict that flat rates will lead to more optimal pricing. Indeed, economic models predict that users will pay higher rates *and* receive higher value from flat Internet access rates than is the case with UBB.

54. The reasons for this are essentially two fold. First, the value of an Internet access service to a customer does not correlate to 'usage'. Rather, it correlates to the myriad online services the customer can enjoy via that access. In this sense, Internet access is essentially a 'bundling' of a variety of online services. Economists predict that, where marginal costs are low, bundling becomes optimal. Further, recent economic models have developed that demonstrate this holds even where varied usage scenarios (read 'bandwidth hogs' and 'low bandwidth consumers', as well as individuals with low disposable income) are factored in. Second, the much discussed network effects which result from the type of increased network usage that accompany flat rates benefit ISPs as much as any other entity in the telecommunications ecosystem.

A. UBB as Non-Optimal & Inefficient Pricing

55. Some economic models predict that peak period UBB pricing will lead to optimal outcomes in Internet service provision.[77] Such models fail to account for the true value that customers gain from Internet use, which is not a usage-based value but rather a far more complex and sophisticated bundle of benefits that varies greatly with each user. It is, to reiterate, the online services that customers value in such transactions, not the number of GB per month that they use.[78] We will assume, for the purposes of this section, that the behavioural impediments outlined in the previous section are a non-factor and that the questionable relationship between per-byte usage and actual ISP costs, also outlined above, is similarly non-existent. However we note that these factors only serve to exacerbate the existing inefficiencies of metered pricing described here.

56. As such, the economic efficiency of Internet access pricing is best analyzed as a 'bundling' service.[79] Nabipay, Odlyzko & Zhang explain:

> Most of this literature [on bundling models] is concerned with just a small number of goods (often with a particular good bought in varying quantities), and aims to explicate the degree to which non-zero marginal costs as well as complementarity or substantiality of the goods affect the gains to be obtained from bundling. In telecommunications, flat rates can be viewed as a form of bundling a very large number of goods, such as access to hundreds of millions of websites or phone calls to potentially billions of people.[80]

The economic literature on bundling demonstrates that, where marginal costs are low, flat rate pricing will, in fact, provide *higher* revenues for ISPs.

57. Nabipay *et. al.* conclude from their mathematical model that selling 'bundles' will permit a seller to "come close to capturing the maximal possible profit…but separate

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[77] J. Church, "Economic Principles and Usage Based Billing", ABRIDGED, March 28, 2011, Appendix A to Rogers, "Initial Comments to TNC CRTC 2011-77", March 28, 2011, is one such example.

[78] The Church model's reliance on per-byte usage as a measurement of customer value is most evident in paras. 23-26. A. Odlyzko confirms that the Church model fails to analyze flat rates as a form of bundling of downstream services (A. Olyzko, in Email on record with author, April 29, 2011). The Church model similarly appears to conflate social cost with usage, ignoring external social costs that occur when ISPs aim to constrain Internet usage through UBB.

[79] See P. Nabipay, A. Odlyzko, & Z. Zhang, "Flat Versus Metered Rates, Bundling, and 'Bandwidth Hogs'", April 2011, Appendix A to this submission.

[80] P. Nabipay, A. Odlyzko, & Z. Zhang, "Flat Versus Metered Rates, Bundling, and 'Bandwidth Hogs'", April 2011, Appendix A to this submission, p. 1.

sales never capture more than half the maximal possible profits."[81] The benefits of their mathematical model over pre-existing attempts to measure the value of flat rates is that it is sufficiently flexible to account for "more elaborate forms for the valuations of goods by consumers" by developing a more sophisticated formula for assessing willingness to pay. Further, this model accounts for variety in usage profiles that include both 'low cost' and 'high cost' users (i.e. 'bandwidth hogs').[82] The model concludes that with low marginal costs, optimal ISP revenues will occur in many scenarios even if high and low cost users are charged the same flat fee. The model suggests that an ISP's capacity to maximize *consumption* is linked to its capacity to maximize revenues. The model also envisions mechanisms for addressing any market exclusion that may result however it demonstrates that from the seller's perspective, revenues can be maximized in spite of any such exclusion.[83]

58. All of this is confirmed in numerous historical examples. As noted by Professor Odlyzko:

> When prices are high, and purchases infrequent, airline-style "yield management" is likely to dominate. On the other hand, when prices are low, and a service is used many times a day, simple pricing and uniformly high quality are likely to be more common.[84]

Internet service provision, characterized as it is by numerous micro-transactions and by low marginal costs, is an ideal medium for optimizing the benefits of flat rates.

MARGINAL COSTS FOR ISPS ARE LOW

59. While the exact per-GB cost for an ISP is rigorously debated and likely changes from ISP to ISP, it is clear that marginal costs are at the low end of the spectrum. Reasonable estimates place this per-GB figure on Bell's networks at approximately

[81] *Ibid*., p. 6.

[82] *Ibid*. pp. 1-2.

[83] *Ibid*., p. 6.

[84] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, p. 1.

$0.08.[85] Some demonstrate that 8 ¢/GB may, in fact, dramatically overestimate the cost, which is likely to be closer to 1 ¢/GB.[86]

60. Given the nature of network investment (where costs are incurred in large, up front and sporadic sunk costs and not in real time), actual ISP costs may be higher than marginal costs as excess capacity must be built into the network to accommodate fluctuations in usage. However, this characteristic has been present in Internet provisioning since its inception. Evidence of steady/flat annual investment rates amongst ISPs suggests that there *is* predictability in provisioning costs, regardless of this characteristic.[87]

61. Further, even where the need for such over provisioning is factored in, the per-GB marginal cost for ISPs remains low. Bell Canada's own aggregate UBB proposal in its initial comments to this proceeding suggests that 19.5 ¢/GB is a reasonable rate to charge wholesale services – one presumably reflective of marginal costs plus a reasonable markup.[88] Applying even that high rate of 19.5 ¢/GB to purported top percentile usage scenarios (124.46 GB/month on Bell's wholesale 'Lite' service)[89] leads to not-extravagant additional costs (an added $24.27 to that customer's monthly costs). At 8 ¢/GB, this drops to an added $9.95 to accommodate top tier 1% users and, of course, at a penny a GB, it will only 'cost' $1.24 for an ISP to accommodate the added usage imposed by users in this top tier of users.

62. While users in higher percentiles than 1% may generate more monthly bandwidth, these higher tiers include increasingly fewer users, so the net costs imposed on the

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[85] M. Geist, "Canada's Usage Based Billing Controversy: How to Address the Wholesale and Retail Issues", March 2011, <http://www.michaelgeist.ca/component/option,com_docman/task,doc_download/gid,53/>.

[86] Lemay-Yates Associates, "The Cost of Incremental Internet Transit Bandwidth in the Local Access Cloud", March 28, 2011, in Appendix A to Netflix, "Initial Comments to TNC CRTC 2011-77", March 28, 2011. At most, by Bell Canada's estimation, it appears possible to actually profit from $0.195/GB: Bell, Initial Comments to TNC CRTC 2011-77, March 23,

[87] Nor is the presence of such fluctuations sufficient justification to push any such uncertainty unto customers by forcing them to predict usage a month in advance.

[88] Bell, "Initial Comments to TNC CRTC 2011-77", March 23, 2011, para. 82.

[89] Bell, "TN242 & TN7181 Interrogatory Responses", October 5, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1281758.zip>, p. 5 of 17 sets out the following wholesale usage information based on 2008 usage: on the wholesale Lite plan: 28% of users are above the 2GB/month limit, averaging 14.06 GB/month; 4% of users are over the 20 GB/month limit, averaging 64.22 GB/month; 1% of users are over the 60GB/month limit, averaging 124.46 GB/month. On Bell's Wholesale Basic plan, 64% are over the 2GB monthly limit, averaging 50.68 GB/month; 26% are over the 20GB/month limit, averaging 114.66 GB/month; and 14% are over the 60GB/month limit, averaging 193.67 GB/month.

ISP decrease in proportion and, as long as marginal costs remain low, likely not have a dramatic impact on the efficiency of flat rates as an optimal pricing scheme. Further, as customers seem to value flat rates higher than micropayment-based rates, a bigger proportion of lower usage-tiered users can be attracted even at a rate that accounts for these higher usage tiers.[90]

B. Network Effects

63. A second factor that must be considered in assessing the economic efficiency of UBB from an ISP's perspective is the dampening effect that constrained usage has on network effects. Network effects are externalities or social goods, but ISPs also benefit directly from network effects as an ISP's overall value to customers increases in proportion to Internet usage (and conversely decreases in similar proportions to constrained Internet use).[91] In this sense, encouraging, rather than discouraging, usage is likely to increase ISP revenues in the long term as broader usage will lead to network effects that increase the value of the service the ISP is offering. Again, there are numerous historical examples where communications service providers opted to adopt flat rates in lieu of micropayment systems for the express purpose of encouraging greater use of the communications medium, with great success.[92]

C. Conclusion

64. In conclusion, putting aside broader public policy objectives such as fairness and the public goods that result from greater use of the Internet, the need to prevent harm to innovative bandwidth intensive services (see next section), and putting aside any economic inefficiencies that result from the user cognitive disadvantages UBB exploits, it appears there is a very strong case that UBB is not even in ISPs' interest, and that flat rates will lead to a.) optimal revenues; *and* b.) optimal value for users.

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[90] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>.

[91] A. Odlyzko, "The Case Against Micropayments", in R.N. Wright, *ed*., *Financial Cryptography: Lecture Notes in Computer Science*, Springer-Verlag, 2003, pp. 77-83, <http://www.dtc.umn.edu/~odlyzko/doc/case.against.micropayments.pdf>, pp. 5-6.

[92] A. Odlyzko, "The History of Communications and its Implications for the Internet", June 16, 2000, <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>, Section 17.

III. NET NEUTRALITY HARMS & UBB

65. We reiterate our goal for this proceeding: to establish that ubiquitous UBB is not desirable as a revenue generating mechanism for Internet access. We again point out our realization that the best regulatory tool for the Commission to use in curbing ubiquitous UBB is through ensuring competitive pressures are sufficient to permit the evident customer preference for flat-rate models to win out in the marketplace. However, as we have noted above, it is important for the Commission to recognize that ubiquitous UBB is undesirable and to do so it is important to set out all the potential harms such a model may have. In this section, we canvas the threat that ubiquitous UBB is posing to net neutrality and place this threat within the context of a broader range of net neutrality harms. We further suggest examine the potential application of TRP CRTC 2009-657 if such harms persist.

A. Understanding Different Net Neutrality Harms

66. In order to properly analyze UBB concerns, it is important to understand the potential harms of such practices within the broader context of net neutrality harms. Broadly speaking, the net neutrality principle can be characterized as a set of attempts to protect the "factors that are at the core of the Internet's economic, social, cultural and political potential."[93] Most often, these concerns are linked in their focus on ISP action that deviates from its traditional role as a neutral intermediary – a mere carrier of messages between entities at different ends of its network. The harm that will at times result from violations of this principle is measured in constraints to the path of communication which, in an online context, can lead to limits on freedom of action, free expression, and innovation of downstream services.[94]

67. This broad set of concerns can be sub-classified, for the purpose of analysis, into three distinct groups, each motivated by different ISP incentives: overt practices aimed at preventing negative externalities that are unrelated to Internet access; ISP decisions aimed at picking winners or losers amongst the services to which they connect users; and ISP conduct aimed at managing traffic on its network. It should be noted that

[93] B. van Schewick, "Network Neutrality: What a Non-Discrimination Rule Should Look Like", *38th Research Conference on Communication, Information and Internet Policy (TPRC 2010)*, <http://ssrn.com/abstract=1684677>.

[94] See Y. Benkler, "The Political Economy of the Commons", (2003) 4(3) *European Journal for the Informatics Professional* 6, <http://www.benkler.org/Upgrade-Novatica%20Commons.pdf> at p. 8, for an articulation of the need to prevent incumbent network operators from "constrain[ing] the path of innovation [and freedom] to fit their own business plans for where technology should go."

within each category of net neutrality concerns, a broad range of activity is possible, only some of which will result in harm and, even then, of varying intensity.

PREVENTING THE UNDESIRABLE:

68. Perhaps the most blatant deviation from a 'neutral' ISP carrier role relates to blocking or prevention of features or services for motives entirely unrelated in any manner to the operation of a network. For example, an oft-cited 2005 dispute with its union prompted Telus to block its 1 million subscribers from accessing the union's website in order to prevent those subscribers from reading content on the website that was critical of Telus.[95] In doing so, it also blocked access to an additional 766 websites hosted on the same server as the pro-union website.[96]

69. Another manifestation of this category of Net Neutrality concerns relates to the increasing public policy role that ISPs and other Internet Intermediaries are being pressured into playing by national and international government entities.[97] In Canada, for example, a majority of Canadian ISPs participate in Project Cleanfeed, which blocks websites identified by the RCMP as child pornography websites.[98]

70. ISPs are under increasing pressure to assist governments or other private entities in achieving a much broader and perhaps more ambiguous range of public policy objectives such as enforcement of intellectual property rights of private parties. For example, in some countries, ISPs have agreed to disconnect customers who have been accused of downloading or viewing content that allegedly infringes copyrights.[99] In

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[95] T. Barrett, "To Censor Pro-Union Web Site, Telus Blocked 766 Others", August 4, 2005, *The Tyee*, <http://thetyee.ca/News/2005/08/04/TelusCensor/>.

[96] *Ibid.*

[97] OECD, "The Role of Internet Intermediaries in Advancing Public Policy Objectives", Experts Workshop on Internet Intermediaries, June 16, 2010, Paris, France, <www.oecd.org/sti/ict/intermediaries>.

[98] M. Geist, "Project Cleanfeed Canada", November 24, 2006, <http://www.michaelgeist.ca/content/view/1548/125/>. The Net Neutrality concerns in this scenario are alleviated to some extent in that it is the RCMP that decides which sites should be blocked, not the ISPs; there is an appeals process; and child pornography raises minimal free expression concerns relative to other types of speech:

> …while some may suggest that this opens the door to other blocking - hate content, defamatory content or copyright infringement to name three - there is a crucial difference with child pornography that should prevent a similar approach. While those forms of content may raise legal issues, in the case of child pornography, it is illegal to even access the content. That is a crucial difference since under current law there are no valid free speech arguments for either disseminating child pornography nor for seeking the right to access it.

[99] C. Doctorow, "Irish ISP Will Disconnect Internet Users after Three Unsubstantiated Copyright Claims", January 29, 2009, BoingBoing.net, <http://www.boingboing.net/2009/01/29/irish-isp-will-disco.html>. Such

such scenarios ISPs are beginning to carry out roles historically reserved for public actors such as the judiciary or the police, and are doing so outside of the democratic and legal incentive system that has historically provided safeguards against such power for individuals.

71. In all these scenarios, the ISP is deviating from its role as a neutral carrier – an entity whose role it is to carry communications from one end of a network to another end. The resulting harm for those relying on the ISP's network – those at the ends – is potentially great, as individual expression is diminished or blocked outright.

PREFERENCE OR PICKING WINNERS & LOSERS:

72. A second category of Net Neutrality concerns involves discriminatory practices that unduly prefer or discriminate against one type of service over another. Preferential treatment of this type can take many forms of a technical nature, an economic nature, or a hybrid of the two. The ISP motivation that links these types of concerns together is economic, but in no manner linked to the building and provisioning of its access networks. It is, rather, economic in the sense that it involves leveraging of the ISP's primary role as a gateway or access provider in order to trade on the goods of downstream web service providers.

73. ISP activity under this category can include, for example, provision of prioritized access to specific web-based services based on an ISP's decision that such services are 'better'. An example of this is Primus' decision to prioritize web services it deems are 'popular' amongst its user base.[100] Other activity that might fall under this category would be the provision of free access to certain services where access to other, comparable services will incur user costs. An example would be the rapidly emerging

practices are considerably more problematic than the Project Cleanfeed example above, in that a.) the copyright infringement claims are unsubstantiated – there is no actual proof of copyright infringement, only a claim by the rights-holder; b.) many argue that the penalty of disconnection from the Internet is far out of proportion to the violation (potential copyright infringement); and c.) while Project Cleanfeed is aimed at preventing activity that is criminal in character, some question whether ISP customers should shoulder the financial costs of enforcing what is a private wrong against a copyright holder. Traditionally, those wronged in this manner must sue infringers in court to vindicate their rights.

[100] See M. Stein, "Testimony of Primus", TPN 2008-19, July 9, 2009, <http://www.crtc.gc.ca/eng/transcripts/2009/tt0709.htm>, at line 3793:

> Very popular applications and protocols, such as web browsing, e-mail, instant messaging and streaming media are given an elevated priority.

Although, it should be noted that Primus only operates this prioritization in the presence of congestion, making this a hybrid practice (see *ibid.* lines 3986-3996).

practice of providing unlimited free access to specific social networking websites such as Facebook, Twitter and MySpace on mobile platforms. This is to the exclusion of competitors of these services – a mobile customer wishing to access competing website services will incur a per MB fee.[101] Preference of such services is allotted on the basis of perceived popularity amongst customers.[102]

74. The danger with this form of arrangement is that it places added burdens on new market entrants and serves to entrench existing services.[103] In addition, it strongly disfavours services popular with a minority subset of users. Further, it is not always clear that ISPs are capable of accurately assessing what online services their customers prefer as they are not the marketers of these downstream services, but merely provide access to them. The power of the Internet as an innovative peitry dish is that anyone can compete for our attention without having to pay exorbitant fees to gatekeepers. This is diminished the moment the gatekeeper is permitted to decide priorities on behalf of its users. All of these discriminatory actions are motivated by basic, but strong market incentives, and can have serious detrimental impact on an innovative web.

75. A related example is that ISPs will begin to discriminate in favour of online services that are willing to pay for faster service. So, for example, if YouTube were to pay Bell a monthly fee, Bell could ensure that YouTube would load faster on all Bell Mobility smartphones. This is great for YouTube, but raises Net Neutrality concerns in that it

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[101] Bell Mobility, for example, offers 'unlimited social networking' on all non-BlackBerry/Palm data plans. Unlimited Social Networking is described as such:

> With select HSPA devices (excludes BlackBerry) within network coverage areas available from Bell Mobility in Canada. Includes basic features of select applications (included at time of purchase), browsing and use of content and services hosted directly by Facebook.com, Twitter.com and Myspace.com. Use of other sites, applications and links (including games, pictures and videos hosted on other sites, other than sites included) are not included. Excludes premium and short code text messages.

Usage of any competing social networking service will incur per MB costs whenever such access exceeds plan monthly usage allowance at a rate of $1/MB. See Bell Mobility, "Smartphone Plans + Bundles: All Smartphones: 'All Plans Include", <http://www.bell.ca/shopping/PrsShpWls_SmartphoneCombo.page>, accessed April 29, 2011.

[102] Facebook, Twitter and MySpace are currently among the most 'popular' social networking sites in the world as ranked by number of global users. See RiaNovosti, "The World Map of Social Networks", February 2011, <http://en.rian.ru/infographics/20110228/162792394.html>. But see ComScore, "2010 Canada Digital Year in Review", March 2011, <http://www.comscore.com/Press_Events/Presentations_Whitepapers/2011/2010_Canada_Digital_Year_in_Review>, p. 19 for a different picture.

[103] See Commissioner Lamarre, "Testimony of Primus", TPN 2008-19, July 9, 2009, <http://www.crtc.gc.ca/eng/transcripts/2009/tt0709.htm>, at lines 3987-3989.

will prevent any new video streaming site that is just emerging on the edges of the network from effectively competing with an established giant like YouTube.[104]

76. Finally, a host of convergence-related concerns fall in this category. There are strong incentives for ISPs to either privilege their own content-based services or alternatively to stifle any services in direct competition with these. For example, the incentives for mobile Internet service providers to block VoIP applications are strong as such applications compete directly with voice mobile plans.[105] This was the case where T-Mobile blocked access to TruPhone (a VoIP application) numbers intended for a competing commercial voice service.[106] Similar concerns would be raised if Rogers, a cable provider, were to block Netflix, a direct competitor delivering competing content over IP.

TRAFFIC MANAGEMENT

77. The final set of net neutrality concerns are driven by seemingly legitimate 'traffic management' ISP concerns. A typical scenario involves ISPs claiming they need to manage traffic on their networks in new ways in order to prevent congestion. Congestion-management is not inherently problematic from a net neutrality perspective – indeed, ISPs have an obligation to ensure their networks remain congestion-free.

78. Historically, congestion-management techniques have not been problematic as they primarily involved investment in network capacity or reliance on application/protocol agnostic techniques developed in then-neutral environments such as the IETF. More recently, ISPs have taken to developing their own congestion

[104] Although, it should be noted that to a certain extent this may already occur on wireline. Google, for example, has become one of the largest sources of inter-domain traffic due to its extensive network of data centres and peering arrangements. See: C. Labovitz, S. Iekel-Johnson, D. McPherson, J. Oberheide, & F. Jahanian, "Internet Inter-Domain Traffic", (2010) *SIGCOMM'10* 75, <http://ccr.sigcomm.org/online/files/p75_0.pdf>. This means that Google content will have an advantage over competitor content, in that it will load significantly faster.

[105] P. Judge, "T-Mobile Blocks VoIP Rival's Calls in the UK", June 19, 2007, PCWorld, <http://www.pcworld.com/article/133067/tmobile_blocks_voip_rivals_calls_in_the_uk.html>. See also B. Betts, "T-Mobile in Court over Truphone Call Blocks", July 13, 2007, The Register, <http://www.theregister.co.uk/2007/07/13/truphone_asks_injunction/>

[106] *Ibid*.

management practices. As ISPs are driven by different incentive systems than neutral standards-making bodies, the results have been at times problematic.[107]

79. Congestion management techniques or ITMPs are, as noted above, not inherently bad as they are aimed at achieving a perceived good. Issues arise where market incentives lead ISPs to develop ITMPs that have negative impacts on downstream innovators and users.[108]

80. The first wave of problematic ITMPs were primarily technical ITMPs predominantly aimed at peer-to-peer (P2P) file-sharing applications. P2P was a compelling target for ISPs, in that it was an emerging protocol initially used by a minority of customers and thus easily degraded without angering too large a customer base. Additionally, due to the non-transparency of technical throttling techniques, it was unclear whether user outcry was a salient concern for ISPs at the time. Targeting of P2P applications was also motivated by ISP perceptions of the value P2P users attached to such applications – primarily, that they are not time-sensitive and as such delaying P2P file transfers or attempting to push such transfers to off-peak periods will not have significant impact on the enjoyment of such services.

81. These perceptions appear to have been mistaken. In the past 2-3 years, since P2P throttling has become endemic, P2P usage has declined dramatically.[109] Many,

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[107] The IETF's mission statement, for example, is "to produce high quality, relevant technical and engineering documents that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better." It also purports a commitment to technical competence as the overriding standard in its cardinal principles of operation: IETF Network Working Group, "RFC 3935: A Mission Statement for the IETF", October 2004, <http://www.ietf.org/rfc/rfc3935.txt>.

[108] See Y. Benkler, "The Political Economy of the Commons", (2003) 4(3) *European Journal for the Informatics Professional* 6, <http://www.benkler.org/Upgrade-Novatica%20Commons.pdf> at p. 8, for an articulation of the need to prevent incumbent network operators from "constrain[ing] the path of innovation [and freedom] to fit their own business plans for where technology should go."

[109] In perhaps a recent and comprehensive two year study of inter-domain traffic, Arbor Networks estimates that P2P usage is down to about 18% of net traffic. See C. Labovitz, S. Iekel-Johnson, D. McPherson, J. Oberheide, & F. Jahanian, "ATLAS Internet Observatory: 2009 Annual Report", (2009) *NANOG'47*, <http://www.nanog.org/meetings/nanog47/presentations/Monday/Labovitz_ObserveReport_N47_Mon.pdf>, slide 22. Sandvine notes a 25% drop in P2P usage, down to about 20% of all traffic. Sandvine attributes this drop to "a dramatic shift in consumer behavior towards real-time "experience now" applications and away from bulk download "experience later" behavior - Sandvine, *2009 Global Broadband Phenomena – Executive Summary*, October 2009, <http://www.sandvine.com/downloads/documents/2009%20Global%20Broadband%20Phenomena%20-%20Executive%20Summary.pdf> at p. 2. CISCO's Visual Networking Index also points to a dramatic decrease in P2P file sharing - 38% of global broadband visual and file-sharing traffic, down from over 60% two years ago. While still growing in absolute terms, P2P is growing more slowly than visual networking and other advanced

including Craig Labovitz of Arbor Networks, note that this decline in traffic share is not attributable directly to decreases in traffic caused by throttling. Rather, Labovitz attributes the decrease to shifting user preferences, stating that users now prefer streaming video to P2P downloads which often force users to wait 5-6 hours prior to viewing desired content.[110] It is worth noting that an unthrottled P2P download need take no longer than an hour. Regardless, the ubiquitous throttling of P2P appears to have driven users away from the protocol as a means of content delivery and towards new mechanisms.[111]

82. The second wave of problematic ITMPs are economic and take the form of usage based billing and other cost-driven mechanisms. Such mechanisms purport to be neutral, usage-based attempts at managing traffic but can, in fact, have negative results for downstream innovation and can lead to unjust discrimination where they impose arbitrary costs on subsets of users in ways unrelated to actual ISP costs.

83. The harmful effect to downstream innovation that such ITMPs can have is more subtle than direct throttling or blocking of specific services. This indirectness means that economic ITMPs as a class are at once less egregious than technical ITMPs aimed at blocking or throttling specific applications, but also that their detrimental impact is more difficult to track and quantify. Economic ITMPs become *most* problematic from a net neutrality perspective when they become ubiquitous and impose high or punitive costs on top of emerging downstream innovative services. See Table 2: ISP Service Markups, above, for an example of how ubiquitous economic ITMPs can impose added costs on downstream innovations.[112]

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applications. Cisco Visual Networking: Usage Study – Highlights, October 21, 2009, online: CISCO <http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/Cisco_VNI_Usage_WP.html>.

[110] See C. Labovitz, "2009 Internet Observatory Report", October 19, 2009, *NANOG'47*, <http://www.nanog.org/meetings/nanog47/presentations/2009_inet_obsv_rpt.wmv>, [WMV].

[111] BitTorrent, Final Comments to Telecom Public Notice CRTC 2008-19, July 28, 2009, available online at: <http://www.crtc.gc.ca/public/partvii/2008/8646/c12_200815400/1249945.PDF>, summarizes the impacts that Canadian ISP throttling practices were having on its attempts to market its protocol as a legitimate content delivery tool in Canada.

[112] Another potential indication of these harms may be the 28% year over year decrease in net video views and 32% decrease in multimedia (i.e. YouTube) video views that ComScore registered in 2010 Q4 (net = 8,014,744,000 views; multimedia = 6,642,727,000 views) over 2009 Q4 (net = 11,206,265,000views; multimedia = 9,818,795,000 views): See ComScore, "Canada: Digital Year in Review, 2010", March 2011, <http://www.comscore.com/Press_Events/Presentations_Whitepapers/2011/2010_Canada_Digital_Year_in_Review>, p. 31.

B. TRP CRTC 2009-657: The Net Neutrality Framework & UBB

84. In TRP CRTC 2009-657, the Commission recognized that ISPs are subject to strong incentives to adopt overly aggressive 'traffic management' mechanisms that are discriminatory and unjustly so. The framework put in place by TRP CRTC 2009-657 was intended to act as a means of analyzing ISP activity aimed at managing traffic to a.) ensure that provisioning remained the primary means of addressing congestion on networks; b.) ensure that ITMPs are narrowly tailored solutions to specific congestion management problems; and c.) prevent the adoption of unjustly discriminatory ITMP responses to traffic growth issues.

85. TRP CRTC 2009-657 expressed a preference for economic ITMPs as opposed to technical, as such ITMPs do not fully remove 'choice' from customer action. So, for example, while the throttling or blocking of a bandwidth intensive service such as YouTube or Netflix would prevent users from enjoying the service altogether, the imposition of usage fees will merely act as a more subtle deterrence against its use. TRP CRTC 2009-657 recognized, but did not explore, that while some economic ITMPs may be acceptable, others will not.

86. Depending on the implementation of economic ITMPs, their harm might be diffused. In such circumstances, while economic ITMPs would remain *undesirable* as a means of addressing traffic growth (they still act to deter network usage), they may not warrant direct regulatory action by the Commission. However, where such ITMPs, in effect, impose discriminatory costs on downstream services or retail users, they may warrant Commission intervention.

87. Professor Geist suggests the following Internet Billing Usage Management Practices (IBUMPs) framework, based on the Commission's TRP CRTC 2009-657 framework but tailored to economic ITMPs, as a means of assessing the reasonableness of such practices in the retail sector:

> First, CRTC approval for UBB has long been focused on addressing network congestion. Indeed, incumbent ISPs now argue that the use of UBB is related to congestion concerns and the need for fairness among all subscribers. In the case of a complaint about UBB retail practices, ISPs should be required to demonstrate that the UBB approach is designed to address specific network congestion concerns.
>
> Second, the UBB model should be the least restrictive possible to achieve its intended goals. Much like ITMPs, this may mean giving consumers the option for accounts that are rate-limited after a certain monthly cap is reached instead of

> imposing overage charges (as noted above, many ISPs around the world have adopted this approach).
>
> Third, if the ISP has implemented traffic shaping or other technical measures, it should be required to demonstrate why those approaches alone would not reasonably address the same network congestion concerns. This requirement is a mirror image of the ITMP requirement that envisions ISPs relying on network investment or economic ITMPs (ie. UBB) rather than technical ITMPs such as traffic shaping. If traffic shaping is in place, ISPs should be required to explain why that has not adequately addressed the network congestion concerns.
>
> Fourth, while the CRTC should not engage in reviews of the retail pricing or size of monthly data caps, it should, under certain circumstances, be entitled to examine overage charges should ISPs use this economic model (as noted above, many ISPs around the world rate limit rather than impose overage charges). The review of overage charges would only occur in local markets where both the cable and DSL provider employ UBB, thus leaving consumers with limited non-UBB alternatives. In such instances, the CRTC should review overage charges to allow for a reasonable profit but establish safeguards against price gouging in light of actual ISP costs.[113]

While we do not comment at this point as to whether current ISP practices can survive this framework, or if not, what measures would be required to do so, we ask the that Commission continue to monitor the retail UBB sector with this framework in mind.

88. As an immediate step, the current ubiquitous UBB scenario in Canada warrants, in our submission, the imposition of wholesale tariffs aimed at placing competitive pressures and pricing discipline on incumbent implementation of these types of economic ITMPs. We outline how this can be achieved in the following section.

IV. WHOLESALE UBB

89. There appears to be wide consensus surrounding the adoption of an aggregate UBB model for wholesale services. In its submissions to this proceeding, Bell has outlined its view of what an aggregate UBB wholesale tariff will look like. CNOC has proposed a gloss on this proposal that employs a distinct pricing structure which limits all usage-driven costs to wholesale traffic traversing the aggregation network.

90. CIPPIC/OpenMedia.ca believe that, in the circumstances, it is appropriate to include aggregate usage-based fees into wholesale tariffs. Such tariffs, as opposed to retail

[113] M. Geist, "Canada's Usage Based Billing Controversy: How to Address the Wholesale and Retail Issues", March 2011, <http://www.michaelgeist.ca/component/option,com_docman/task,doc_download/gid,53/>, pp. 18-19.

pricing packages, have always included a cost-based component and aggregate UBB can be an appropriate extension of this, as long as it adheres to the following principles:

- **Cost Based:** Wholesale aggregate UBB must remain stringently cost-recovery based, reflecting actual ILEC costs with a reasonable mark-up.
- **Encourage Continued Competition on UBB:** Wholesale aggregate UBB must *not* be designed in a manner that will facilitate CLEC adoption of retail UBB, but only as a means of recovering actual costs imposed on ILECs by CLEC customers.

91. Strict adherence to these two interrelated principles are essential, in our view, to any effective wholesale aggregate UBB tariff. CIPPIC/OpenMedia.ca view the presence of CLEC unlimited plans and the attraction of 'higher users' by CLECs the mark of a healthier marketplace. In attracting such customers and providing such plans, CLECs are playing the competitive role they are intended to play within the structure of the *Telecommunications Act* ecosystem. A departure form a cost-based UBB tariff will act more as a deterrent on CLEC traffic generation than as a mechanism for permitting ILEC cost recovery +reasonable markup. It will make it difficult for CLECs to continue to provide competitive pricing and, specifically, to continue to provide competitive flat rate pricing plans.

92. With this in mind, the Bell and CNOC proposal appear reasonable. The CNOC gloss on the proposal appears aimed at ensuring measurement of usage and subsequent ILEC costs is accurate and limited to traffic exchanges between the ILEC and the CLEC. The Bell proposal posits an aggregate tariff where usage is sold in TB blocks at a rate of $0.195/GB. It also proposes an overage fee of $0.295/GB.

93. In general, and assuming the per GB rates proposed reflect actual Bell costs plus a reasonable markup and no more, this proposal is reasonable and far superior to the previous per-customer UBB wholesale tariff. The previous tariffs included two usage components: one fixed and based on estimates of costs resulting from average usage;[114] the other variable and adding a per GB cost for each wholesale customer who exceeded her allotted monthly usage allowance. The new aggregate UBB model permits CLECs the flexibility to keep providing customers with unlimited flat rate

[114] Bell, "TN242 & TN7181 Interrogatory Responses", October 5, 2009, The Companies(CRTC)20Aug09-8, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1281758.zip>.

access options, while allowing ILECs to recover costs on a more dynamic measurement basis that accounts for fluctuation in usage. The aggregate size and nature of the usage blocks and reasonable per GB rate allows the risks of varying usage by wholesale customers to be split between ILECs and CLECs, as is reasonable given the business dynamic between such entities.

94. It is also reasonable given that the detrimental impacts and inefficiencies that arise from the application of micropayments in a retail context (see section I.C above) are attenuated or non-existent in a wholesale context. That is, under an aggregate usage model, CLECs are not forced to make the micro usage assessments that were described as imposing unreasonable 'mental transaction costs' on individual retail users. Further, CLECs are businesses with resources to conduct these 'mental transactions', for which an individual wishing only to watch a YouTube video may not have the cognitive surplus to assess efficiently. While subject to risk adversity, CLECs will be able to translate their aggregate usage based costs into optimal revenues using flat rates in the same manner as ILECs can now potentially do (see II.A above). This was not possible under the previous tariff, which imposed penalties on CLECs for customer overages that were far out of proportion to actual ILEC costs.

95. Finally, to the extent that such aggregate UBB permits CLECs to provide competitive pressures on incumbents by continuing to offer unlimited service options, such a pricing mechanism will not impose significant costs on downstream innovative services.

96. However, there are certain deficiencies in the current proposal that demand, in our view, tweaking if they are to succeed in achieving the principles we set out above. As such we suggest the following changes to the Bell's existing aggregate UBB proposal:

- The usage-based component of the tariff must be based on peak-period CLEC usage;
- The per-TB cost must be premised on actual incumbent costs with the normal mark-up;
- A mechanism is required for periodic review to ensure that the per-TB rate remains reflective of costs in light of dropping network provisioning costs; and
- The current tariff formulation for legacy systems should be reformulated in light of these principles.

We briefly explain on our rationales for these requirements below.

PEAK PERIOD PRICING

97. As noted in far greater detail above, ISP provisioning costs are driven primarily by peak period usage. Off-peak CLEC traffic is not likely to contribute substantially to ILEC costs as the aggregate network must be large enough to accommodate all CLEC peak period traffic. As such, adherence to the principle that wholesale aggregate UBB remain stringently cost-based, as opposed to a 'deterrent on usage', would require a peak-period pricing model.

98. Further, none of the objections that apply to peak period retail pricing apply in the wholesale context. These costs will not be passed to CLEC customers as peak period pricing, so there will be no detrimental on innovation or on user preferences. Bell summarizes its concerns regarding peak period retail pricing as such:

> First, peak pricing would require a greater education of the customer base than simple UBB. The base would have to understand bandwidth usage, what different applications pull in terms of bandwidth as well as the different pricing periods of the day (peak versus non peak).
>
> Second, peak pricing would require peak charges to occur at the time that customers wanted to use the Internet the most. Peak pricing would therefore require the majority of users, who do not necessarily use the most bandwidth, to stop using the Internet when they want to use it the most, or, in the alternative, they would actually be incurring price increases.
>
> Finally, peak pricing would bring further complexity into the billing system and therefore would be more costly to implement.

Once again, none of these concerns apply with respect to CLECs.[115] CLEC usage estimates will remain in aggregate for all their users, and so should not be more challenging or complex than estimates of monthly usage. Further, and particularly if the CNOC proposal is followed and usage is measured at the point of interaction between the ILEC's aggregate network and the CLEC, a peak period aggregate wholesale UBB tariff will not add any complexity to measuring or billing.

99. Use of peak-period pricing is integral if the tariff is to emulate ILEC costs (plus a reasonable mark-up) and permit CLECs to continue to compete on equal footing.

[115] Bell, "Disclosure of Confidential Information Provided in Confidence to the Commission", November 13, 2009, The Companies(CRTC)20Aug09-1, Abridged, Supplemental, File Nos.: 8740-B2-200904989 & 8740-B54-200904971, <http://www.crtc.gc.ca/public/8740/2009/b2/1315236.zip>, p. 16.

Further, there is no reason why peak period pricing should *not* be used in the wholesale context.

ACCURATE PER GB COSTING

100. Only accurate per GB or TB pricing (+reasonable markup) will achieve the objectives set out above. Punitive or prohibitively costly per TB pricing, whether aggregate or otherwise, will not permit wholesale ISPs to effectively compete on pricing in general, or on pricing models as it will artificially drive up marginal costs, making flat rate pricing less optimal (see II.A above).

101. There is evidence on the record suggesting that the $0.195/GB and $0.295/GB rates offered by Bell in its proposal, while significantly lower than retail overage fees and previous wholesale proposals, remain significantly high. Other estimates have placed the actual per GB cost at $0.08 or even $0.01. A markup of 1950%-2950% is not reasonable, if this is the case. This will be easier to assess after interrogatory rounds have been completed.

PERIODIC REVIEW OF UBB PRICING

102. As noted above (see section I.A above), the per-GB provisioning cost for an ISP is not a static number. Rather, it appears to conform to a Moore's law of sorts and drops consistently over time with technological advances.

103. In order to account for this and to adhere to the principle that wholesale UBB must remain cost-based, period reviews of the dropping per-GB rate be included in the tariff. Alternatively, incumbents can alter the tariff to account for annual or bi-annual reductions in per-GB provisioning costs.

ALIGN THE LEGACY TARIFF WITH THE FTTN TARIFF

104. Existing legacy GAS tariffs currently include the following monthly caps per access speed tier:

- 512 Kbps connection: 5.4 GB/month
- 2 Mbps connections: 16.6 GB/month
- 5 Mbps connections: 42.1 GB/month

Bell proposes, reasonably, that these caps be maintained as an aggregate credit that CLECs will be permitted to apply against the monthly aggregate usage costs their legacy services will produce. Bell projects that, based on current usage scenarios, it is unlikely that legacy GAS usage will even exceed this aggregate credit.

105. While there may be benefits to adopting Bell's legacy GAS proposal in the short term, so as not to delay implementation, CIPPIC/OpenMedia.ca respectfully requests that legacy and FTTN aggregate UBB tariffs be brought into alignment. Our rationale for this is that the current legacy GAS tariff provides strong incentives for CLECs to keep their legacy customers below the 'credited' usage allowances as these blocks, though credited in aggregate, scale on a per-user basis. Perhaps this is not an issue at the moment, but it may become one in the near future and it would be preferable to address at the outset.

106. Aligning the two GAS tariffs will additionally increase simplicity of billing, as there will be no need to differentiate between traffic generated by legacy and FTTN customers. Indeed, as far as CIPPIC/OpenMedia.ca is aware, ILECs do not currently have the capacity to identify distinct CLEC customers at the point of measurement suggested by CNOC, which is at the far end of the aggregation network.[116] It would be unfortunate if this process required increased surveillance of non-Bell customers.

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[116] See Office of the Privacy Commissioner of Canada, PIPEDA Case Summary #2009-010, *Report of Findings, Assistant Commissioner Recommends Bell Canada Inform Customers About Deep Packet Inspection*, September 2009, <http://www.priv.gc.ca/cf-dc/2009/2009_010_rep_0813_e.cfm>, at para. 49.