

8-1-2007

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Network Neutrality: Justifiable Discrimination, Unjustifiable Discrimination, and the Bright Line Between Them

Noel Semple[†]

Abstract

This paper proposes a bright line test to guide the Canadian Radio-television and Telecommunications Commission (“CRTC”) in regulating “network neutrality”. When Internet service providers seek to discriminate between uses and users in administering their networks, the CRTC should ask whether the proposed discrimination is a reasonable effort to make the price paid by each user commensurate to the demands which his or her use places on the network. Discrimination which meets this description should be tolerated if not actively encouraged, because it encourages the economically efficient allocation of scarce bandwidth. All other forms of ISP discrimination — including discrimination based on aesthetic judgments and profit-seeking discrimination in favour of owned or affiliated content — should be restrained by the CRTC, relying on subsection 27(2) of the *Telecommunications Act*. Strong moral and economic arguments support the imposition of this limited neutrality regime, and only a few minor reforms would be required to put it into place.

Introduction

Should the right of Internet service providers (“ISPs”) to discriminate between users and uses in administering their networks be constrained by regulation?¹ Those who answer in the affirmative appeal for “network neutrality”; their opponents lack an alliterative slogan, but have nonetheless managed to resist neutrality-oriented regulatory proposals so far. In the United States, the network neutrality controversy has generated more heat than light, but north of the border, it has scarcely generated either heat or light. The Canadian Radio-television and Telecommunications Commission (“CRTC”) and the *Telecommunications Policy Review* (“TPR”) have taken a cautious, diffident approach to the issue, no cabinet minister has taken a stance,² and little scholarly attention has been paid to the matter.

This essay will suggest a normative framework for the neutrality-oriented regulation of ISP behaviour in Canada. It will begin in Part I by surveying the actual and potential behaviour of Canadian ISPs to which network neutrality advocates object. Part II will identify the efforts of scholars, legislators, and the CRTC to draw a line between justifiable and unjustifiable ISP discrimination. Part III will propose a bright line test which could be used to distinguish the ISP behaviour which should be constrained from that which should not. In short, discrimination that makes the price and quality of ser-

vice experienced by a user proportional to the demands that he or she places on the network is *justifiable*, whereas most other forms of discrimination are *unjustifiable*. I argue that restricting “unjustifiable” discrimination is both ethically and economically justified by the public interest in network neutrality. The fourth and final Part of this paper will briefly describe the policy changes which would be necessary to put this bright line test into effect. Subsection 27(2) of the *Telecommunications Act*, properly interpreted by the CRTC, can do most of the heavy lifting. However, a minor amendment to the *Telecommunications Act* and a public education campaign would also be advantageous.

I. Network Discrimination: Current Practices

Network neutrality’s various proponents have little in common, but they are all concerned about network *discrimination*. Professor Ed Felten defines network discrimination with regard to the way servers treat packets which are seeking to be routed through them.³ Under a “minimal discrimination” policy, servers only discard or delay packets when it is absolutely necessary to do so because there are too many waiting in the queue. All other forms of discrimination (for example, giving priority to some packets even when the server is

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not overloaded) are defined by Felten as “non-minimal”. Minimal discrimination, as defined by Felten, is often inevitable, and not a subject of controversy.⁴

Many other forms of ISP discrimination are also uncontroversial. Most ISPs screen data for spam and viruses, and although this is “non-minimal discrimination” (insofar as packets containing viruses will be discarded regardless of server congestion), it does not provoke protests from users. Many Canadian ISPs offer various speed tiers of broadband Internet service, and this can be understood as a form of discrimination between users. Rogers executive Bill Linton recently speculated that the number of speed tiers offered by his company will grow substantially in the near future.⁵ Network neutrality proponents do not generally protest the use of speed tiers.

It is more aggressive forms of discrimination that have fuelled the controversy. Professor Tim Wu surveyed discriminatory practices by American cable and DSL Internet providers in 2002,⁶ and divided them into two categories. “Contractual” discrimination is imposed via terms in usage agreements. Such discrimination usually forbids users to operate home networks or servers, to use the connection for commercial purposes, or to exceed a certain bandwidth limit.⁷ “Architectural” discrimination, imposed via network administration, primarily consists of “asymmetry” — making more bandwidth available for downloading than for uploading.

Discrimination that is “non-minimal” and “architectural” has become much more pervasive and technologically sophisticated since Wu wrote in 2002. For example, recently published promotional material for traffic-shaping software promises that:

[u]sing eight different levels of traffic shaping, the ... policy settings allow organizations to prioritize network traffic for any IP-based application, including those sensitive to latency and jitter such as Voice-over-IP (“VoIP”), video or real-time conferencing applications. Data from business-critical applications or from specific groups of users can take precedence.⁸

How have these new technologies been used by ISPs, and which uses are most objectionable to the network neutrality advocates? In Canada, three incidents of data discrimination have generated the lion’s share of controversy.

- Rogers acknowledged in late 2005 that it practices “traffic shaping”, a form of discrimination, to restrain the bandwidth consumed by peer-to-peer file sharing programs such as BitTorrent.⁹
- Shaw Communications currently offers its broadband customers a \$10 per month “quality of service (QoS) enhancement ... [to] improve the quality of Internet telephony services offered by third party providers”.¹⁰ Shaw also offers its own VoIP service, for which no QoS enhancement is necessary. Some have suggested that the QoS enhancement is designed to herd customers from the VoIP service of third parties

toward Shaw’s own VoIP service. Vonage Canada (a VoIP provider) filed a complaint with the CRTC and issued a press release denouncing the QoS enhancement option as an “anti-competitive measure aimed at either increasing the perceived cost, or damaging the perceived reliability, of the services of independent Internet telephone service providers when compared to Shaw’s higher-priced phone service”.¹¹

- In July 2005, Telus blocked access to “Voices for Change”, a Web site which supported Telus employees on strike at the time. The site posted images of picket line-crossers, and Telus cited privacy and security concerns in blocking it.¹² The blockade persisted for approximately 16 hours, and collaterally affected at least 600 other sites due to Telus’s technical inability to blockade only Voices for Change.¹³ At least one other Canadian ISP has targeted a user due to the content of the user’s Web site. Host OnFiber.com, an Alberta ISP, terminated its hosting arrangement with slad.net, a site dedicated to vampirism. HostOnFiber CEO Andrew Snood said that, in terminating the arrangement, he was acting pursuant to a “personal, moral stance, based on my own convictions”.¹⁴

Network neutrality advocates see these practices as both objectionable in of themselves *and* as the thin edge of a wedge. They sometimes invoke a “walled gardens” nightmare scenario. In this apocalyptic vision, ISPs will restrict their users to content controlled by or affiliated with the ISP or charge extortionate rates to users who wish to “climb the walls” of the garden to access the rest of the Internet.¹⁵ This would be a throw-back to the era of service providers like CompuServe and America Online, whose users were largely confined to “walled gardens”.

There is no evidence of any such behaviour by Canadian ISPs. However, modern technology is certainly capable of imposing such a system. The fact that major Canadian ISPs such as Bell and Rogers are corporate siblings of media content-providers may make it more tempting for the ISPs to discriminate in favour of content provided by affiliates, in order to keep the profits within the corporate family.

II. Justifiable v. Unjustifiable Discrimination: Attempts to Draw the Line

Network neutrality proponents differ widely both in their diagnoses of objectionable ISP discrimination, and in their policy prescriptions to address the issue. Canada’s TPR argued that “blocking access to applications and content and significant, deliberate degradation of service” should be restrained by the CRTC.¹⁶

The TPR would give the regulator substantial discretion over the issue, while instructing it to “rely] on market forces and customer choice as much as possible”.¹⁷

Michael Powell, former head of the United States Federal Communications Commission (“F.C.C.”), has asked ISPs to respect the right of consumers to (i) “access the lawful Internet content of their choice”; (ii) “run applications and use services of their choice, subject to the needs of law enforcement”; (iii) “connect their choice of legal devices that do not harm the network”; and (iv) have “competition among network providers, application and service providers, and content providers”. The intellectual lineage of these “Four Freedoms” can be traced to the 1956 American *Hush-a-Phone* decision. In that judgment, the D.C. Court of Appeals enshrined a user’s “right reasonably to use his telephone in ways which are privately beneficial without being publicly detrimental”.¹⁸ The Four Freedoms were a non-binding statement of principles, and Powell has made it clear that he does not endorse their legislation or enforcement.

These are relatively modest network neutrality proposals. Neither the TPR nor Powell would seem to object to Rogers’s traffic-shaping policy or Shaw’s VoIP QoS premium. However, Telus’s blockade of Voices for Change would probably fall on the wrong side of these versions of network neutrality regulation.

Others have proposed much more aggressive regulatory intervention. Professor Geist’s submission to the TPR argued that “content neutrality in the provision of network services is an absolutely essential principle that should be firmly established under Canadian law backed by regulatory oversight and significant penalties for compliance failures”.¹⁹ Videotron CEO Robert Despatie also calls for a big gun, albeit pointed in the opposite direction. He suggested that the federal government impose a tariff on high-bandwidth content providers. “If the movie studio were to mail a DVD . . . they would expect to pay postage or courier fees”, he noted in a November 2006 speech. “Why should they not expect a transmission tariff?”²⁰ Despatie’s position is that the government should not only tolerate content discrimination, it should actively enforce it through the tax system.

In the United States Congress, at least four Bills have been introduced to restrain the behaviour of network administrators in the name of network neutrality.²¹ Representative Edward Markey’s proposed *Network Neutrality Act*,²² for example, would have not only forbade broadband network providers to “block, impair, degrade, discriminate against, or interfere with the ability of any person to utilize their broadband service”,²³ but would have also required them to “offer a service such that . . . [other parties] can offer unaffiliated content, applications, or services in a manner that is at least equal to the speed and quality of service that the operator’s content, applications, or service is accessed and offered”.²⁴ It is not entirely clear which forms of network discrimination would have fallen on the wrong side of

Markey’s line in the sand, but the practices of Rogers and Shaw described above could certainly come under scrutiny. Markey’s Bill did not pass in 2006, but the issue remains on the agenda in Washington.

Academics have also sought to draw bright lines between justifiable and unjustifiable network discrimination. In a 2005 article, Professor Tim Wu seeks to “distinguish between classes of restrictions that should generally be allowable, and those that might raise suspicion”.²⁵ Discriminating against viruses is clearly unproblematic, whereas a network decision to ban low-bandwidth “chat” programs on the grounds that they are “just a waste of time” would clearly be illegitimate.²⁶ Between these two extremes, Wu identifies the possibility that ISPs will seek to charge certain users more, not because they impose higher costs on the ISP, but rather because the ISPs believe they can be made to pay more. Wu argues that while this type of price discrimination is not generally anti-competitive, it has a deleterious “dynamic” consequence on the Internet. It impedes the innovation of new applications by tilting a playing field which should be level.²⁷

To Professor Wu, ISPs’ attempt to “manage how users consume bandwidth by discriminating against types of usage” is a “laudable goal”²⁸ which *complements* network neutrality because it allows new applications such as VoIP to have the quality of service they need in order to thrive. However, he argues that it is better to pursue this goal through “technological solutions” or selling categories of service, rather than forbidding certain applications.²⁹ Wu’s general conclusion is that network operators should generally be allowed to “police what they own” (i.e., their local network), but that it might be legitimate to forbid certain types of discrimination against Internet applications.³⁰

These ideas were further developed in a submission to the F.C.C. by Professor Wu and Lawrence Lessig.³¹ The authors emphasize that a discriminatory network not only tilts the playing field between today’s applications, but also introduces uncertainty among future application developers about what forms of discrimination might one day be imposed. Wu and Lessig draw an analogy between the Internet and the electricity system, which works with a common set of standards across North America and works equally well for anything one might choose to connect to it.³² They point to the beneficial effects of this system for innovation in the electronics industry, and argue that the Internet should have the same neutrality.

The CRTC and Network Discrimination

The CRTC is responsible for regulating Canadian ISPs pursuant to the *Telecommunications Act*. Subsection 27(2) of the Act states that

no Canadian carrier shall, in relation to the provision of a telecommunications service or the charging of a rate for it, unjustly discriminate or give an undue or unreasonable

preference toward any person, including itself, or subject any person to an undue or unreasonable disadvantage.³³

The CRTC deals with alleged contraventions of subsection 27(2) in two steps. First, the Commission determines whether discrimination or preference has occurred. If so, it then asks whether or not the discrimination or preference was unjust, undue, or unreasonable.³⁴ In two recent cases, the CRTC was asked to apply subsection 27(2) to network neutrality issues. These decisions suggest a tentative, “wait-and-see” approach to network neutrality on the part of the Commission.

The first decision involved Cybersurf, an ISP which resells access to the Shaw network. The CRTC had previously ordered Shaw to provide this access to Cybersurf. In November of 2005, Cybersurf asked the CRTC to require Shaw to give it access to the \$10/month QoS enhancement and to “PacketCable” technology, which major cable companies employed for their own customers but did not make available to Cybersurf. In September 2006, the CRTC denied the application. With regard to the QoS Enhancement (“QSE”), the Commission found “no evidence that Shaw’s QSE gives its traffic preference over Cybersurf’s or any other competitor’s traffic”.³⁵ While PacketCable could potentially give an advantage to the major cable companies over Cybersurf, the CRTC found that requiring the technology to be shared could allow Cybersurf to monopolize the cable companies’ bandwidth.³⁶

The second relevant CRTC ruling was Telecom Decision 2005-28 (“VoIP decision”).³⁷ Yak Communications, which was in the business of selling VoIP services using Canadian broadband networks, was among the parties participating. Yak argued that the CRTC should make an order forbidding broadband service providers to

- (i) establish contractual terms with their customers restraining their access to third-party VoIP providers;
- (ii) purposefully impair the service quality of third-party VoIP providers; or
- (iii) fail to offer third party VoIP customers the same service quality experienced by their other customers.³⁸

The CRTC declined to impose any of these conditions on the broadband providers.³⁹ The decision noted the submission of the broadband providers that it was not their practice to establish terms of the type described by condition (i). Nor was evidence found of intentional service degradation or discrimination. The Commission also suggested that requiring ISPs to provide third party VoIP businesses with access to all of their service-improving technological innovations might unnecessarily curtail ISPs’ incentive to innovate.⁴⁰ The Commission did, however, put the ISPs on notice that it would in the future “rely on subsection 27(2) of the Act, where appropriate, to prohibit a Canadian carrier from restricting its broadband customers from dealing with an

alternative service provider of the customer’s choice”.⁴¹ Neither the CRTC’s reconsideration of 2005-28⁴² nor the November 9th 2006 Order-in-Council which overruled much of it⁴³ took issue with these findings. While these two rulings do not suggest that a comprehensive network neutrality doctrine is developing at the CRTC, one may emerge in the near future. Among its priorities for the 2007-2008 year, the Commission lists “address potential issues in respect of internet access traffic shaping”.⁴⁴

III. Justifiable Discrimination: Usage and Congestion-Based

What principles should guide the CRTC’s approach to this issue? It goes almost without saying that ISP discrimination against viruses or other content dangerous to users should continue. “Spam” is probably also a legitimate target (although reaching a definition of “spam” acceptable to both senders and recipients might be somewhat challenging). ISPs should also be allowed to do anything that makes the network better, faster, or cheaper for any user without having a negative impact on anyone else. Apart from these elementary cases, what other types of discrimination are “justifiable”?

In economic terms, the Internet is a “club good”, potentially subject to *congestion*.⁴⁵ This means that it can be shared, but at periods of high demand each additional user reduces the quality of service for all other users.⁴⁶ Congestion can, however, be reduced if the pricing system sends the right signals to consumers. The CRTC should encourage the pricing of Internet access in the most efficient and equitable fashion, and ISP price discrimination that brings us closer to this goal is “justifiable” discrimination.

Ideal Internet Pricing (“IIP”)

The scholarly consensus regarding congestible goods is that “competitive markets will reach an efficient equilibrium if each user is charged a usage-sensitive price set equal to their marginal contribution to congestion”.⁴⁷ Thuy Nguyen and Grenville Armitage, applying this insight to the Internet, describe the Holy Grail of Internet pricing as an “ideal pricing scheme that is able to provide different levels of services to different users with different needs, charge users only for their perceived quality of service (‘QoS’) and consumer resources, [and] support the non-uniformity of Internet traffic with different QoS requirements”.⁴⁸

An IIP regime would have the following characteristics:

- The price paid by each Internet user would reflect the demands that he or she places upon the network. Moving more bytes would cost more, as would demanding a jitter-free, latency-free connection. The price charged to the user

would be proportional to the costs incurred by ISPs to provide the service required.

- Quality of Service guarantees would be available for a price in proportion to the cost of providing them. Under such a system, VoIP users would have access to the high-quality service they need. However their doing so would not slow the network for or impose costs on others, because their price would reflect their costs.⁴⁹
- Peak-load pricing would apply. Use during high-demand times of day imposes external costs on other users in the form of reduced speed. It also costs ISPs in the long run, because they must eventually create new capacity which will only be used during high-demand hours. The price paid to use the network should be proportional to the total demand on the network at the time of use. Such a system would reward users for shifting use to off-peak hours, thereby increasing the overall speed and efficiency of the Internet.⁵⁰

Such a regime would have advantages in terms of both equity and efficiency. It is equitable for users of an Internet application to pay the cost of meeting the bandwidth, jitter, and latency requirements of their application. The network is scarce, expanding it is expensive, and different users impose very different demands upon it. According to one estimate, roughly 5% of Internet users consume roughly 90% of the bandwidth.⁵¹ To charge high-requirement users and low-requirement users the same amount is to require the latter to subsidize the former.⁵² The subsidy might take the form of higher flat access charges (to fund the network expansions required by high-demand users), or it might take the form of slower speeds. This subsidy might be appropriate if there was a public policy reason to encourage high-requirement use more than low-requirement use, but given that most high-requirement use is for personal entertainment purposes, this is not the case.

IIP would also encourage the efficient use of a scarce resource — bandwidth. Those who develop new applications should consider and seek to minimize demands on the network. If users pay the *actual* costs of their use (as opposed to a flat rate approximation), they will prefer applications which minimize these costs. Users will also shift their Internet usage to lower-demand periods. These responses to price discrimination will encourage the efficient use of the Internet and maximize social welfare.

As is often the case with Internet policy, a road transportation analogy casts light on this argument. Many features of Ontario's Highway 407 toll road pricing regime could be usefully imitated by ISPs. The price paid by a 407 user is based on: (i) the distance travelled; (ii) the weight of the vehicle; and (iii) the time of day at which the travel occurs.⁵³ Although this pricing scheme may have been calculated to maximize the operator's profit, it also has substantial efficiency benefits.

Distance travelled and vehicle weight correspond to the impact of the travel on the highway, and thereby to the maintenance costs created by the use. The time of day represents the number of other users who also want to use the resource at that time. Charging more for use at peak times creates an incentive to substitute use at other times, and thereby promotes a more efficient usage pattern overall.

Of course, price discrimination is often unpopular with users. Jeffrey Dale, head of the Ottawa Centre for Research and Innovation, recently invoked the 407 analogy to make the opposite point.

Every now and then, to build a new road that bypasses traffic, they put a toll road in. And that's a two-tier system. Do we really want that? I tell you, when I'm in Toronto and I want to get across town, I'll hop on the 407. But it bugs me that I'm paying for a road.⁵⁴

We cannot have highways without paying for them; they are enormously expensive, and they do not build or maintain themselves. We can only decide whether to pay for them with taxes or pay for them with tolls. Roads built with taxes are mostly paid for by people who never use them, or who place lighter-than-average burdens upon them. Meanwhile, those who need the highway most urgently at a given point in time (and who would be willing to pay extra for it) cannot justifiably be given priority. Paying for superhighways — of either the pavement or information variety — via across-the-board flat charges is both inefficient and unjust. Sophisticated pricing schemes like the 407 model and the IIP described above are superior, and the CRTC should tolerate, if not encourage, their adoption among Canadian Internet service providers.⁵⁵

Technical Feasibility of IIP

Even if the IIP described is “ideal”, can ISPs afford to implement it? Economists acknowledge that adopting a more efficient pricing regime is only wise if the cost of implementing and administering the system does not outweigh the efficiency gains.⁵⁶ Two technical challenges of IIP must be acknowledged.

Distribution of Costs

A high-requirement user does not only impose costs on his or her own ISP. These costs are spread across various network administrators. A user's data is split into countless packets, each of which may take a different route to the destination. Costs are incurred by the owners of each wire over which a part of the data travels. This makes it challenging to, for example, provide true quality of service guarantees to users. As one expert recently explained,

In order to make it work properly, service providers around the world have to agree on giving each other's top traffic the same edge when it flows across multiple networks. . . . we would need agreement from all Internet service providers that when packets are tagged as high priority that we would

all treat it [that way] when it comes on our networks and pass it through without delay or minimal delay.⁵⁷

However, this challenge is not as severe as it initially appears. Currently, under “peering” pricing arrangements, ISPs of approximately the same size agree to carry each others’ traffic free of charge. ISPs of different sizes enter “transit arrangements” whereby smaller ISP “X” pays a larger ISP “Y” a flat fee to compensate Y for carrying more of X’s traffic than X does of Y’s traffic.⁵⁸ There is no apparent reason why peering arrangements could not accommodate the IIP regime described above, especially if ISPs are able to reach a consensus protocol for providing and pricing Quality of Service. If they are unable to do so, then transit arrangements might need to become somewhat more complex, so as to allow each provider to collect from others the congestion price of traffic which they originate.

Cost of Metering

Ideally, the price of Internet use would be precisely calibrated to the congestion that it causes to others. However, implementing such a system would be challenging and costly. North American regulators confronted a similar challenge when designing pricing regimes for telephone service.⁵⁹ The F.C.C. concluded at the time that, although metered pricing for telephone calls would be more efficient, the cost of monitoring and billing use in this way would outweigh the advantage. Professor Yoo argues that, due to the nature of packet-switching technology, “transaction costs associated with metering Internet traffic are likely to be even more significant than those associated with local telephone service”.⁶⁰ Yoo defends contractual prohibitions on bandwidth-intensive network uses as a second-best alternative, given the technical difficulty of metering.⁶¹

Arguably, Yoo gives up on the potential benefits of IIP too quickly. While the technical barriers cannot be ignored, substantial progress has been made toward overcoming them. In Canada, high-speed Internet access is already sold in tiers, with users paying more for faster speeds and higher maximum data transfer. This is a substantial improvement over totally flat pricing, and there is reason to believe that ISPs might be contemplating further moves toward IIP.⁶² Professors Nguyen and Armitage recently surveyed various Internet pricing models,⁶³ most of which are designed to provide some if not all of the characteristics of IIP. For example, under the “smart market” system, each packet would have a header indicating how much the sending party would be willing to pay to ensure the prioritized delivery of the packet,⁶⁴ and congested servers would conduct auctions between packets in the queue.

The Impossibility of Perfection

Nonetheless, perfect IIP is not yet technically feasible, because network administration tools are not yet sufficiently sophisticated. Moreover, a Canadian ISP might not be able to unilaterally implement IIP in the

absence of a new pricing protocol among all ISPs, even if they had all the right tools and the intention to apply “ideal” pricing. Therefore, whatever network administration policies an ISP adopts, User A may nonetheless pay more or experience slower speeds than User B despite the fact that A’s impositions on the network are equal to or lesser than B’s. Reasonable deviations from ideal pricing should not be considered violations of subsection 27(2) of the *Telecommunications Act*, so long as they were not intentionally caused by the ISP.

What if an ISP did not intentionally cause a problem, but was negligent or willfully blind in its creation? Professor Felten asks us to consider a hypothetical ISP which is aware that a “jitter” phenomenon occurs on its wires that slows down certain high-demand applications. Suppose that ISP

didn’t take any obvious steps to cause the problem but is happy that it exists, and is subtly managing its network in a way that fosters jitter. Network management is complicated, and many management decisions could impact jitter one way or the other. A network provider who wants to cause high jitter can do so, and might have pretextual excuses for all of the steps it takes. Can regulators distinguish this kind of stratagem from the case of fair and justified engineering decisions that happen to cause a little temporary jitter?⁶⁵

This mandate may be challenging for the CRTC. However, the Commission may be assisted by the large number of technically sophisticated users who will be ready and willing to complain about unjust discrimination on the part of ISPs. A policy reform which gives users the right to not be discriminated against except on the basis of ideal pricing will encourage them to vigilantly monitor network speeds and prices, and report infractions to the CRTC.

Charging Content Providers

Many ISPs would welcome the opportunity to charge *providers* of high-requirement content, in addition to consumers thereof. As noted previously, Videotron CEO Robert Despatie has called for a tariff on content providers, the revenues from which would presumably go to ISPs to offset network-expansion charges.⁶⁶ Presumably, Google has jumped aboard the net neutrality bandwagon due to an apprehension that, absent regulation, they might eventually be required to compensate ISPs for the demands placed on the Internet by Google’s content.

A high-requirement content provider would obviously prefer a flat-rate Internet pricing regime, which would allow it to continue receiving subsidies from low-requirement users. However, if IIP were to be implemented, the content provider might be indifferent as to whether it is the user or the provider who pays. If the users pay, they will respond by consuming less high-requirement content. It is not clear whether the high-requirement provider would prefer this outcome to the alternative of paying an IIP price itself.

Given their ownership of the wires and the lack of any convincing argument to the contrary, ISPs should in principle be allowed to charge congestion prices to either the provider or the consumer, so long as the total amount charged is closely tied to the actual congestion impact of the usage. As Georgetown Law Professor Gregory Sidak observes,

There is no basis in economic theory to presume that it would be socially optimal for end users to pay for all of the cost of building a high-speed broadband network while the companies that deliver content or applications to those same end users over that network—and therefore derive substantial economic advantage from its use—pay nothing.⁶⁷

In Canada, however, there are two practical impediments to imposing congestion pricing on content providers as opposed to users. Firstly, the parent companies of Canadian ISPs also own Internet content providers. I will argue below that ISPs should not discriminate (other than pursuant to IIP regimes or reasonable approximations thereof) against content provided by their corporate parents, and enforcing such a principle is technically difficult enough. Requiring ISPs to administer neutral IIP pricing to such affiliated content would be even more challenging.

The second impediment is jurisdictional. If Canadian ISPs were to send CRTC-authorized bills to foreign content providers for the congestion impact of their content, those bills would not be paid. Congestion pricing for content providers could only be introduced through an international treaty binding, at the very least, the United States. In the interim, the equity and efficiency value of congestion pricing can be obtained in a system which charges only users.

Unjustifiable Discrimination

To the extent that it is reasonably technically feasible, every user and content provider should have the right to the same speed and the same price as every other user or content provider who places the same technical demands on the network when the congestion level is equal. In other words, forms of discrimination *other* than IIP or approximations thereof are *unjustifiable*. Specifically, the CRTC should interpret subsection 27(2) of the *Telecommunications Act* to forbid the following four types of discrimination.

1. Discrimination based on the ISP's legal or moral opinions

In blockading www.voices-for-change.ca, Telus cited privacy and security concerns. Such issues should be left to courts and statutory tribunals, which have the expertise and the legitimate authority to address them. There is no justification for vigilante behaviour by an ISP. This principle was recognized by recent *Criminal Code* amendments designed to curtail child pornography, which require ISPs to remove material only upon receipt of a court order.⁶⁸ It is likewise inappropriate for ISPs to

remove material based on moral or aesthetic judgments, as did HostOnFibre in withdrawing web-hosting service from slad.net.⁶⁹

The Internet began as a non-commercial public commons, and to a large extent retains this character. Free speech online should not be curtailed by profit-oriented private actors. If and when censorship must occur, it must be public authorities authorized by the due process of law which perform this function. The CRTC should treat any discrimination based on an ISP's legal or moral judgment as a violation of subsection 27(2).

2. Discrimination in favour of owned or affiliated content

ISPs currently have a financial incentive to discriminate in favour of content provided by entities which they own or with which they are affiliated.⁷⁰ Rogers and Bell, for example, are owned by corporations which also own content-providers, and might well be tempted to bias their networks in favour of this content. Even a small and independent ISP could be offered money by Content Provider X to prioritize X's data over that of Content Provider Y. It might make business sense to enter such an arrangement, even if the ISP would lose some customers in doing so. Shaw's \$10 VoIP QoS Enhancement, according to Vonage Canada, constituted discrimination in favour of Shaw's own VoIP service.⁷¹ In a recent article, Barbara Van Schewick used a comprehensive economic analysis to show that even an ISP with very little market power might profit by discriminating in favour of owned or affiliated content.⁷²

Subsection 27(2) should be interpreted to forbid this type of discrimination. For example, suppose ISP X is affiliated with online Game A. Unaffiliated Game B has the same network requirements (bandwidth, latency, jitter, etc.) as Game A. Every Canadian customer of ISP X who uses Game B should have the right to the same speed of access and same level of network charges as a ISP X customer who uses Game A, within the limits of technical feasibility.

Strong economic arguments support this principle. In their F.C.C. submission, Professors Wu and Lessig emphasize the importance of investment in the development of future applications.⁷³ The Internet is a platform for competition among these applications, and the competition will be most fruitful for consumers if the platform is level. Professor Van Schewick identifies two ways in which discrimination in favour of owned or affiliated content impedes application innovation by acting as disincentives to investment. Firstly, it allows ISPs to capture some of the profit which would otherwise accrue to the application innovator, thereby reducing the innovator's incentive. Secondly, it introduces uncertainty among potential innovators, who will come to perceive the Internet as an unreliable and constantly shifting source

of unknown costs. They will respond to the uncertainty by investing less in Internet applications.⁷⁴

Moreover, the Internet is not just a marketplace; it is a platform for free expression and cultural exchange. Canadians should be able to use the Internet to communicate and create without being unduly exploited by ISP profiteering. As a matter of principle, it should be just as easy for a user to access information published by a non-profit organization as it is to access the largest multinational's Web site (assuming that the two Web sites place the same technical demands on the network). This will not be true for long if content providers are permitted to pay ISPs for express-lane access to users.

3. Discrimination based on demand inelasticity or market dominance

Even in the absence of legal/aesthetic judgments or a bias for owned/affiliated content, some ISPs may be tempted to target certain applications while leaving others with equal requirements untouched. One anonymous visitor to Michael Geist's Web site claimed that, in discriminating against certain network uses, "cable companies target[t] services that are painful to the consumer if they [are] degraded. Typical users do not care if they have to restart a BitTorrent session to download music — they do care if their long distance telephone service is poor".⁷⁵ While this allegation is unsubstantiated, it is plausible that ISPs might charge higher rates or offer poorer service to certain users simply because they do not believe that those users will respond by switching to a different ISP. Given the limited competition between broadband ISPs in Canada, it seems unlikely that the market alone can discipline this type of "unjustifiable" discrimination. The four largest Canadian ISPs (Bell, Rogers, Shaw, and Telus) together received 63% of retail Internet access revenues in 2005, an increase from 44% in 2001.⁷⁶

4. Absolute blockades of legal and safe content

Apart from material which is spam, dangerous, or illegal, absolute blockades of content should be forbidden. Even "justifiable" IIP-oriented discrimination should not take the form of a total blockade. Every legal and non-destructive use should be available at some price and at some speed. Subsection 27(2) of the *Telecommunications Act* should be interpreted so as to forbid all absolute blockades.

The Justification for Regulation

This paper's "bright line" test proposes to permit price discrimination based on network demands, while forbidding many other forms of discrimination. This would seem to accommodate the most common ISP argument against network neutrality regulation — that *someone* needs to pay for the Internet, and that those who place the heaviest burdens on it should pay their fair share.⁷⁷ However, an ISP might plausibly claim the

right to engage in the forms of discrimination which were defined above as "unjustifiable". The wires and servers which form the Internet are private property. ISPs have a *prima facie* right to do whatever they want with property they paid for, built, and own. Accepting a payment from Yahoo to prioritize its data stream to users is not, they might argue, a particularly heinous abuse. Grocery stores give priority shelf space to cereal brands which pay shelving fees, and can choose to exclude some brands completely. Why shouldn't an ISP be allowed to do the same with content? A similar argument might be made by Mr. Snood, CEO of the Alberta ISP which evicted the vampirism Web site *slad.net* from its server. If it was legal for him to start a magazine and refuse to print submissions from vampirists on aesthetic grounds, why should it be *illegal* for him to found an ISP and refuse hosting to them for the same reasons?

Public interest arguments can also be adduced in support of this position. This essay's proposal would curtail the ability of ISPs to profit from network investments by making side-payments from content providers and subsidization of corporate siblings via data discrimination illegal. This will tend to reduce the rate of investment in these networks by reducing the anticipated profit.⁷⁸ We must also bear in mind the precedent we set by curtailing profits in this way. Entrepreneurs throughout the economy could be deterred from innovating for fear that their profits too might eventually be confiscated by regulators.

In response, it should first be noted that the impact of the proposed regulations on profit may be negligible, given that there is no clear case of a Canadian ISP having profited from "unjustifiable" discrimination. Moreover, the anti-regulation arguments lose much of their force when the highly regulated context of the industry is considered. Broadband networks have been profitable in part courtesy of subsidies from the public delivered by the CRTC.⁷⁹ The recent case of *Federation of Canadian Municipalities v. AT & T Canada Corp.* provides an interesting example.⁸⁰ Leducor Inc. was unable to convince Vancouver to permit it to lay cable on municipal property. The CRTC obligingly compelled the city to do so in exchange for a nominal payment, relying on sections 44 and 64(2) of the *Telecommunications Act*. This decision constituted a subsidization of Leducor at the expense of Vancouver municipal ratepayers, who would have benefited had their municipality been able to name its price for the access sought by Leducor.⁸¹ In a regulated industry like telecommunications, corporations receive subsidies from the public but must also anticipate special constraints on their profitability such as the neutrality regulations proposed by this paper.

Nonetheless, we must still weigh the benefits of new regulation against its innovation-deadening costs. For two reasons, cost-benefit analysis supports regulation in the case of network neutrality, but not in the case of the supermarket shelves cereal-stocking situation men-

tioned previously. Firstly, the Internet is a platform not only for commerce, but also for democracy and culture. Excessive ISP discrimination, therefore, risks skewing not just cereal purchases, but also our intellectual firmament and our creative process.

More importantly, permitting discrimination always undermines innovation, even in the grocery store. Someone who invents a fantastic new cereal may not be able to get it into the consumer's line of vision without coming up with the shelving fee demanded by the grocery store. This barrier to entry is deleterious for consumers, because they are less likely to be exposed to an outstanding product which they would prefer over the market incumbent. However, the benefit to the consumer of regulating cereal-shelf neutrality is negligible, given how little they have to gain from switching cereals. The benefit of regulation (more cereal choice for consumers) is outweighed by the cost (infringement of grocery stores' private property rights and negative impact on future grocery store investment). The opposite is true of the proposed network neutrality regulation. The advantages of allowing users to choose between applications competing on a level playing field are enormous. The profound economic benefits which the Internet has produced to date would arguably have been impossible in the absence of net neutrality.

These arguments help explain the economic rationale for network neutrality regulation. They do not, however, provide us with a response for Mr. Snood, who might claim the same right to exclude aesthetically objectionable content from his servers as he would have to exclude it from a magazine. The CRTC's moral authority to prevent ISPs from discriminating on the basis of legal and ethical judgments comes from the doctrine of the "common carrier". Common carriers are exempted from liability for libellous or otherwise illegal content they carry, but in return, they are forbidden to interfere with that content. Section 36 of the *Telecommunications Act* provides that "except where the Commission approves otherwise, a Canadian carrier shall not control the content or influence the meaning or purpose of telecommunications carried by it for the public".⁸² Telus and Hostonfibre.com may have violated this section by discriminating against Voices for Change and slad.net, respectively.

IV. Proposed Legal Reforms

Is the Existing Statute Sufficient?

Above, this essay discussed the CRTC's efforts to address the network neutrality issue using subsection 27(2) of the *Telecommunications Act*. No contravention was found in the *Cybersurf* and *VoIP* decisions, but the CRTC did put ISPs on notice that the "issue can ... be addressed by the Commission on a case-by-case basis, should it arise".⁸³ One might argue that that no

further action need be taken on the net neutrality file in Canada. Refraining from further neutrality regulation at this point in time would have the virtue of allowing maximum discretion to the regulator in the face of rapid technological change.

However, subsection 27(2) is highly ambiguous. Among the enormous variety of possible traffic shaping and bandwidth management policies, it is far from clear today *which* the Commission considers "unjust" discrimination, "undue" preference, or "unreasonable" preference.⁸⁴ Allowing this ambiguity to persist has two important deleterious consequences.

The first is business uncertainty. Canadian carriers and content providers will be able to plan more efficiently if they are given some certainty about what forms of discrimination will be allowed. In the absence of it, they may make inefficient investment decisions. If "justifiable" discrimination is to be permitted (as I argue it should), then application developers should be made aware of this as soon and as unequivocally as possible. This will encourage them to give due weight to the necessity of economizing on bandwidth as they develop new applications.

Secondly, the rule of law is better served by greater clarity. Although some discretion must be retained by the decision-maker in every administrative process, when it is possible to enunciate broad principles, we should do so. The "bright line" test stated above is just such a broad principle. The *Telecommunications Policy Review* echoes this point with its argument that "Canada's telecommunications legislation should provide a clearer direction on when regulation is required as well as on the nature and extent of regulatory measures".⁸⁵

Three Necessary Changes

Only three modest legal reforms would be necessary to give effect to this essay's proposal. Firstly, the *Telecommunications Act* was written for the telephone age, not the Internet age. The two sections of the Act relevant to the net neutrality issue, sections 27(2) and 36, apply only to "Canadian carriers", a term defined in the Act to include only those who use, own, or operate a "transmission facility" in order to "provide telecommunications services to the public for compensation".⁸⁶ This excludes a number of companies which might be in a position to engage in Internet discrimination, such as Vonage and Primus. The *Telecommunications Act* should be amended so as to add "Internet Service Provider" to the definitions. ISPs should be defined so as to include anyone in a position to control the flow of data on the Internet. The phrase "or internet service provider" should then be added to sections 27(2) and 36, after the words "Canadian carrier".

Secondly, The CRTC should issue an order indicating that it will interpret subsection 27(2) so as to prohibit "unjustifiable" discrimination as defined above,

but specifically authorizing ISPs to engage in “justifiable” discrimination.

Thirdly, the CRTC or another federal agency needs to launch a consumer education campaign. One advantage of flat-rate Internet pricing regimes is their simplicity. Any movement toward the complex ideal described above increases the likelihood of consumer confusion. For example, Rogers Communications Inc. currently sells four tiers of high-speed Internet access to users in Toronto. It costs \$12 per month to upgrade from “lite” to “express” service. According to Rogers’s “Product Comparison” page, the only service enhancement which a user receives in return for this upgrade is four additional e-mail accounts.⁸⁷ Presumably the service is faster, but how much faster? How much time will the average user save on a given task or application?

Rogers’s speed tiers represent a very minor deviation from flat-rate pricing. However, even this small step is so poorly explained by the ISP that Canadian consumers are completely unable to make informed decisions about upgrading. How much more difficult will it be for consumers to understand a complex ideal Internet pricing scheme of the type described above? The CRTC must ensure that ISPs’ price discrimination regimes are

as transparent and comprehensible as possible to consumers.

An excellent model for this consumer-education mission is the Financial Consumer Agency of Canada’s “Credit Cards and You” Web site.⁸⁸ Like Internet access, credit cards are priced in a very complex fashion which can easily confuse consumers. The FCAC has responded with an excellent Web site which compares credit cards available in Canada.⁸⁹ The CRTC or the Ministry of Industry should launch a similar initiative for Internet access.

The intellectual ferment stimulated by the TPR makes this a good time for federal authorities to develop an intelligent network neutrality policy. The issue has not yet been consumed in hyperbole as it has south of the border, and this may facilitate a thoughtful approach. This paper has suggested that efficient price discrimination should be tolerated and encouraged, while most other forms of discrimination should be curtailed. This model, the application of which would require only a few minor reforms, could be an important building block for an efficient and equitable Canadian telecommunications policy.

Notes:

¹ In this paper, the acronym “ISP” will be used broadly, to refer to all those who are in a position to control the flow of data on the Internet.

² Industry Minister Jim Prentice has made no public comment about network neutrality as of September 2007. Nor did the previous Minister, Maxime Bernier, take any apparent interest. (David Reevely, “Maxime Bernier’s misguided Free-marketism” *The Ottawa Citizen* (Feb 26, 2007) A10.)

³ Professor E. W. Felten, “Nuts and Bolts of Network Neutrality” (2006) online: Princeton University <<http://itpolicy.princeton.edu/pub/neutrality.pdf>>.

⁴ *Ibid.*, at p. 2.

⁵ Catherine McLean, “Rogers ‘metered’ on-line billing” *The Globe and Mail* (25 May 2006) B16 [McLean].

⁶ T. Wu, “Network Neutrality, Broadband Discrimination” (2003) 2 *Journal on Telecommunications & High Technology Law* 141 at 159.

⁷ *Ibid.*, at 19.

⁸ “NetMotion Wireless Adds Quality of Service Capabilities to Mobile VPN; Traffic Shaping Policies Prioritize Critical Wireless Network Traffic Such as VoIP” *PR Newswire* (6 November 2006).

⁹ Alex Hutchinson, “Toll booths could soon pop up on information highway” *CanWest News* (22 June 2006); and Michael Geist, “Rogers must come clean on traffic shaping on its Internet service” *The Ottawa Citizen* (17 April 2007) D1.

¹⁰ Shaw Communications, “Quality of Service Enhancement.” online: Shaw Communications <<http://www.shaw.ca/en-ca/ProductsServices/Internet/ServiceEnhancement.htm>>.

¹¹ Vonage Canada, “Who controls how you use your Internet access? Vonage Canada challenges Shaw ‘VoIP tax.’” (7 March 2006) online: Vonage Canada <<http://pr.vonage.com/releasedetail.cfm?ReleaseID=197866>>.

¹² Telus, “Alberta court grants interim injunction against posting TELUS employee photos” (28 July 2005) online: Telus Inc., <http://about.telus.com/cgi-bin/news_viewer.cgi?news_id=605&mode=2&news_year=2005>.

¹³ L.A.Goodman, “Telecoms aim to tilt Internet playing field” *Edmonton Journal* (5 November 2006) D12.

¹⁴ Shannon Montgomery, “Edmonton web host asks vampire website to leave in wake of Montreal shooting” *Canadian Press NewsWire* (20 September 2006).

¹⁵ C.S. Yoo, “Network neutrality and the Economics of Congestion” (2006) 94 *Geo. L. J.* 1847 at 1851.

¹⁶ G. Sinclair *et al.*, *Telecommunications Policy Review Panel Final Report* (Ottawa: Telecommunications Policy Review Panel, 2006) [Sinclair *et al.*]; and Michael Geist, “Telecommunications Policy Review Submission” online: Telecommunications Policy Review, [www.telecomreview.ca/epic/internet/intprp-gecrt.nsf/vwapj/Geist_Michael.pdf/\\$FILE/Geist_Michael.pdf](http://www.telecomreview.ca/epic/internet/intprp-gecrt.nsf/vwapj/Geist_Michael.pdf/$FILE/Geist_Michael.pdf) at 6.

¹⁷ Sinclair *et al.*, at 6-18.

¹⁸ *Hush-A-Phone Corp. v. United States*, 238 F.2d 266 (D.C. Cir. 1956).

¹⁹ Geist Submission, *supra* note 16, at 6.

²⁰ Alexander Panetta, “Videotron lobbying for Internet ‘transmission tariff’” *Globe and Mail* (1 November 2006).

²¹ E.g. U.S., Bill HR. 5417, *The Internet Freedom and Non-Discrimination Act*, 109th Cong., 2006 (Sensenbrenner bill); U.S., Bill HR. 5273, *The Network Neutrality Act*, 109th Cong., 2006 (Markey bill); U.S., Bill S. 2917, *The Internet Freedom Preservation Act*, 109th Cong., 2006 (Snowe-Dorgan bill); U.S., Bill S. 2360, *The Internet Non-Discrimination Act*, 109th Cong., 2006 (Wyden bill).

²² Markey Bill, *supra* note 21.

²³ *Ibid.*

²⁴ *Ibid.*

²⁵ Wu, *supra* note 6.

²⁶ *Ibid.*, at 12.

²⁷ *Ibid.*, at 14.

²⁸ *Ibid.*, at 16.

²⁹ *Ibid.*, at 15-16.

³⁰ *Ibid.*, at 29.

³¹ T. Wu, and L. Lessig, “Ex Parte Submission in CS Docket No. 02-52”. Submission to the Federal Communications Commission. (22 August 2003).

- ³² *Ibid.*, p. 3.
- ³³ *Telecommunications Act*, S.C. 1993, c. 38, s. 27(2).
- ³⁴ Canadian Radio-television and Telecommunications Commission, "Telecom Decision CRTC 2006-61: Access to the Quality of Service Enhancement Service of Shaw Cablesystems G.P. (Shaw) and Packet-Cable functionality of Rogers Communications Inc., Shaw, and Vidéo-tron Ltée" (21 September 2006) online: Canadian Radio-télévision and Telecommunications Commission <<http://www.crtc.gc.ca/archive/ENG/Decisions/2006/dt2006-61.htm>> at para. 48.
- ³⁵ *Ibid.*, at para. 24.
- ³⁶ *Ibid.*, at paras. 51–55.
- ³⁷ Canadian Radio-television and Telecommunications Commission, "Telecom Decision CRTC 2005-28: Regulatory framework for voice communication services using Internet Protocol" (12 May 2005) online: Canadian Radio-television and Telecommunications Commission <<http://www.crtc.gc.ca/archive/ENG/Decisions/2005/dt2005-28.htm>>.
- ³⁸ CRTC 2005-28, at para 449.
- ³⁹ CRTC 2005-28, at para 475.
- ⁴⁰ CRTC 2005-28, at para 480.
- ⁴¹ CRTC 2005-28, at para 475.
- ⁴² Canadian Radio-television and Telecommunications Commission, "Reconsideration of Regulatory framework for voice communication services using Internet Protocol" (1 September 2006) online: Canadian Radio-television and Telecommunications Commission <<http://www.crtc.gc.ca/archive/ENG/Decisions/2006/dt2006-53.htm>>.
- ⁴³ *Order Varying Telecom Decision Crtc 2005-28 (Regulatory framework for voice communication services using Internet Protocol) by removing economic regulations which interfere with the incumbents' VoIP access independent service offerings*, P.C. 2006-1314, SOR/2006-0288.
- ⁴⁴ Canadian Radio-television and Telecommunications Commission, "CRTC 3-Year Work Plan 2006-2009" online: Canadian Radio-television and Telecommunications Commission, <<http://www.crtc.gc.ca/eng/BACKGRND/plan2006.htm>>.
- ⁴⁵ Yoo, *supra* note 15 at 1864.
- ⁴⁶ J. G. Sidak, and Daniel Spulber, "Cyberjam: The Law and Economics of Internet Congestion of the Telephone Network" (1998) 21 *Harv. J.L. & Pub. Pol'y.* 327 at 354.
- ⁴⁷ Yoo (2006), *supra* note 15; and T.T.T. Nguyen, and G.J. Armitage, "Evaluating Internet Pricing Schemes: A Three-Dimensional Visual Model", (2005) 27(1) *ETRI Journal* 64.
- ⁴⁸ Nguyen and Armitage, *ibid.*, at 64.
- ⁴⁹ Felten, *supra* note 3, at 4.
- ⁵⁰ Sidak and Spubler, *supra* note 46.
- ⁵¹ G. Wesel, "Perspective: No Free Lunches on the Net", (May 5, 2006) online: CNET News.com, <http://news.com.com/No+free+lunches+on+the+Net/2010-1034_3-6068868.html>.
- ⁵² Yoo, *supra* note 15 at 1854.
- ⁵³ 407 ETR, "Tolls and Fees", online: 407 ETR <http://www.407etr.com/About/custserv_fees.asp>.
- ⁵⁴ Hutchinson, *supra* note 9.
- ⁵⁵ Of course, there are some economic differences between the Internet and the 407. For example, whereas driving on the 407 contributes to maintenance costs whenever it occurs, "the marginal cost of transporting additional packets is essentially zero when the network has spare capacity": Nguyen and Armitage, *supra* note 47 at 66.
- ⁵⁶ Yoo, *supra* note 15 at 1865.
- ⁵⁷ Peter Wilson, "For whom the Internet tolls?" *The Vancouver Sun* (9 March 2006) B2.
- ⁵⁸ Yoo, *supra* note 15 at 1871.
- ⁵⁹ *Ibid.*
- ⁶⁰ *Ibid.*, at 1875.
- ⁶¹ *Ibid.*, at 1876.
- ⁶² MacLean, *supra* note 5.
- ⁶³ Nguyen and Armitage, *supra* note 47.
- ⁶⁴ Nguyen and Armitage, *supra* note 47, at 66.
- ⁶⁵ Felten, *supra* note 3 at 5.
- ⁶⁶ Panetta, *supra* note 20.
- ⁶⁷ Gregory Sidak, "Testimony regarding Net Neutrality before the United States Senate Committee on Commerce, Science, and Transportation." (7 February 2006) online: United States Senate Committee on Commerce, Science & Transportation <http://commerce.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1708&Witness_ID=6144>.
- ⁶⁸ *Criminal Code*, R.S.C. 1985, c. C-46, s. 164.1, described in Geist Submission, *supra* note 16 at 4.
- ⁶⁹ See Montgomery, *supra* note 14.
- ⁷⁰ Geist Submission, *supra* note 16 at 6.
- ⁷¹ Vonage Canada, *supra* note 11.
- ⁷² Barbara van Schewick, "Towards an Economic Framework for Network Neutrality Regulation." (2007) 5 *Journal on Telecommunications and High Technology Law* 329, online: Social Science Research Network <<http://ssrn.com/abstract=812991>>.
- ⁷³ Wu and Lessig, *supra* note 31.
- ⁷⁴ Van Schewick, *supra* note 72.
- ⁷⁵ Comment by user "bstrosberg", online: Michael Geist Blog <<http://www.michaelgeist.ca/content/view/1147/125/>>.
- ⁷⁶ Canadian Radio-television and Telecommunications Commission, *CRTC Telecommunications Monitoring Report 2006*, online: CRTC, <<http://www.crtc.gc.ca/eng/publications/reports/Policy/Monitoring/2006/tmr2006.htm>>.
- ⁷⁷ For example, Wesel, *supra* note 52.
- ⁷⁸ Sidak, *supra* note 68; Wu, *supra* note 6 at 33.
- ⁷⁹ Kevin MacArthur, "Net Neutrality in Canada" online: NetNeutrality.ca <<http://www.neutrality.ca/>>.
- ⁸⁰ [2003] 3 F.C. 379, 2002 CarswellNat 3702 (F.C.A.).
- ⁸¹ *Ibid.*
- ⁸² *Telecommunications Act*, S.C. 1993, c. 38, s. 36 [*Telecommunications Act*].
- ⁸³ CRTC 2005-28, *supra* note 38, at para. 475.
- ⁸⁴ *Telecommunications Act*, *supra* note 82, s. 27(2).
- ⁸⁵ Sinclair *et al.*, *supra* note 16, at 64-5.
- ⁸⁶ *Telecommunications Act*, *supra* note 82, s. 2(1).
- ⁸⁷ Rogers Communications, "Rogers.com — Hi-Speed Internet Comparison" online: Rogers.Com <http://www.shoprogers.com/store/cable/internetcontent/compare_RC1.asp?shopperID=L51PJM0CGEK78PXH7551EC3C53XB3WV2>.
- ⁸⁸ Financial Consumer Agency of Canada, "Credit Cards and You — Service Fees on Credit Card Transactions" online: <http://www.fcac.gc.ca/eng/publications/CreditCardsYou/CreditCardServiceFees_e.asp>.
- ⁸⁹ *Ibid.*

