

Commentary

Net Neutrality: Telecom Policy and the Public Interest

Neil Barratt
Leslie Regan Shade
Concordia University

Abstract: What is net neutrality? The debate about the shape of the Internet is being held behind closed doors, led by government and industry with little public input. This article examines net neutrality and the stakeholders in this emerging national debate. The authors discuss the legislative and policy implications, while at the same time exploring alternative models for achieving broadly accessible, affordable high-speed Internet access.

Résumé : Qu'est-ce que ça veut dire la « net neutrality »? Au moment, le débat sur le futur de l'Internet est contrôlé par le gouvernement et les intérêts du commerce, sans des consultations publiques. Cet article examine la neutralité de l'Internet et les participants divers dans cette discussion émergente. Les auteurs discutent les des conséquences législatives et politiques, pendant qu'ils explorent des modèles alternatifs pour atteindre l'accès à l'Internet universelle, haute-vitesse, et abordable.

Keywords: Telephony; Internet service; Network architecture

Net neutrality is a term that is being thrown around a lot these days in policy circles, the media, and among Internet activists in North America. The Internet is fast becoming—and is taken for granted as—a basic utility, used for myriad social, educational, and work-related tasks: e-mail, gaming, Internet protocol telephony, video distribution, social networking, and tele-medicine. Increasingly, broadband Internet access is a basic need for our participation in social life, both as citizens and as consumers. Net neutrality is an easy concept to grasp, but at the same time it is contested and technically obtuse. As an issue, it centres on how Internet infrastructure is built, who pays for it, and who benefits from it.

Precise definitions of the issue are contentious and debatable, but from a public-interest perspective there are two main positions. First, net neutrality means that the Internet, which is essentially just a large interconnected network of net-

Neil Barratt is an MA candidate in Media Studies at Concordia University, 7141 Sherbrooke St. West, Montréal, QC H4B 1R6. Email: neil.barratt@gmail.com. Leslie Shade is Associate Professor and MA program director at the Department of Communications Studies, Concordia University, 7141 Sherbrooke St. West, Montréal, QC H4B 1R6. Email: lshade@alcor.concordia.ca.

Canadian Journal of Communication, Vol 32 (2007) 295-305

©2007 Canadian Journal of Communication Corporation

works, has no centralized control mechanisms. A lack of centralization has been part of Internet development since the net went public, and advocates of net neutrality want it to stay this way. Secondly, the debate is often constructed around the separation of carriage from content—meaning that the people who own the networks do not control the content that runs over them. Using electricity as a metaphor, the electric utility does not differentiate between a toaster and a laptop—it counts the usage and charges the consumer. Within telecommunications, this line between carriers and content providers is mostly gone (albeit still blurred given digitization and cross-media convergence), and with neo-liberal policy sentiments, regulation is construed as out of style, out of date, and stifling to telecoms' competition and innovation. With the net neutrality debate finally starting to heat up here in Canada (two years after the issue surfaced in the U.S.), this paper serves to identify the major Canadian stakeholders and their positions. Net neutrality advocates are seeking a democratic Internet without centralized control mechanisms, while industry wants to ensure its profitability amid shifting markets.

This separation of carriers and content has been a part of telecommunications policy in Canada and the U.S., as well as policy for other network structures. Early railway legislation was the birth of so-called "common carrier" status and the beginning of the policy separation between network infrastructures and the content that moves over the network. The obligation was on the owner of the network to ensure that data was treated equally, as well as to make available their network to other networks. This provision is still enshrined in Canada's *Telecommunications Act*:

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. (Canada, 1993, S. 27.2)

This provision ensured the compatibility of the various infrastructures that allowed universal access to telephone service in Canada. As regulation has come under fire for limiting the market's ability to direct itself, net neutrality has been a key site of debate (Longford & Shade, 2007). Net neutrality keeps the principle of infrastructure compatibility alive on the Internet. This has long been a design principle of the Internet, meaning that no matter who owns the networks, the fibre lines, or the routers, they can pass data between and through them. This principle, also known as "end-to-end network design," has allowed for innovation through non-discriminatory treatment of applications (Lemley & Lessig, 2000).

The government has its own goals for telecommunications policy and the Internet. Repeatedly, Canada has set out increased broadband access as a policy goal. The government wants to deliver services online (broadly known as e-government initiatives), as well as achieve increased broadband penetration throughout the country, particularly for rural, remote, and Northern regions. The National Broadband Task Force, established in 2000, examined how best to achieve national broadband access for businesses and residents by 2004; while the final report issued in 2001 recommended deployment of a billion-dollar nationwide network, the budget was later decreased and emerged as BRAND (Broadband for

Rural and Northern Development) (Industry Canada, 2001). Statistics from the Organisation for Economic Co-operation and Development (OECD) for June 2006 indicate that Canada is a leader among G-7 countries for broadband penetration, ranking ninth for OECD member countries, with 22.4 broadband subscribers per 100 inhabitants (Organisation for Economic Co-operation and Development, 2006). There is a perception, however, that despite Canada's strong start on broadband initiatives, its position is slipping. This necessitates, according to Michael Geist (2007), a reconsideration of our overall federal broadband strategy.

The recent government-commissioned Telecommunications Policy Review Panel (TPRP) recommended a greater reliance on market forces—which in plain-speak means allowing the industry to self-regulate. The problem with this so-called “market logic” is that the history of the telecommunications industry does not read like a free-market textbook. Telecommunications has been regulated since its inception—for the benefit of the public—and the transition to a reliance on market forces misses a few key points. First and foremost, telecommunications service in Canada is a still a duopoly. With broadband Internet access, most Canadians only have access to two providers—usually telephone and cable—and switching between the two can be costly and result in a lengthy service gap. Secondly, broadband Internet access is increasingly understood as basic infrastructure—in other words, as a public good. If the reason regulation historically shaped Canadian telecommunications policy was its role in ensuring the provision of a basic public service, then a switch to a completely free market seems inopportune.

Information coming from Minister of Industry Maxime Bernier's office reflects an agreement with the TPRP (Goodman, 2007). Documents obtained by the Canadian Press in February 2007 indicate that the minister is wary of committing to a neutral network. While on the one hand claiming to take a “wait-and-see” approach, the Industry Canada documents—prepared for parliamentary Question Period—also argue for public policy that would “enable market forces to continue to shape the evolution of the Internet infrastructure, investment and innovation to the greatest extent feasible” (Goodman, 2007).

It is clear that Minister Bernier and representatives of telecom industries feel that market forces *will* further investment and innovation—but not everyone thinks that way. Government regulation, unfortunately, provides no clearer a path. Ensuring impartial network operation is about as complicated as it sounds. Certain forms of discrimination, like those that block spam or pornography, are warranted and even desired. Other forms, like the prioritization of time-sensitive VoIP packets, are necessary at certain times, but not at others. Determining ill intent in the highly technical realm of network architecture, packet shaping, and port blocking could be too complex to be made into easily enforceable legislation.

The traditional telecom industry is threatened by technological developments (mobile telephony entrants and new social uses), legal sanctions, and public perception that the industry is greedy and corrupt due to events such as WorldCom's U.S.\$11 billion accounting scandal and CEO Bernie Ebbers' resultant charges for fraud, conspiracy, and filing false documents with regulators (British Broadcasting Corporation, 2006), as well as AT&T's complicity with the National Security Agency in violating the privacy rights of American citizens in their dra-

conian illegal wiretapping and domestic spying program (Risen & Lichtblau, 2005). The networks built over the past decade or so are quickly reaching their limit, as more and more high-bandwidth applications and websites become popular. With innovations such as file sharing, social networking, and a panoply of Web 2.0 services, Internet users are now taking up more network space than ever before, something that certainly was not the case when the networks were being built. Videotron's Robert Depatie has suggested that content providers pay a transmission tariff for bandwidth-heavy content such as videos and music (Panetta, 2006). At the same time, television, telephony, and radio content are moving online, making content providers uneasy about the loss of traditional revenue streams.

In Canada, however, our content providers are often also our Internet Service Providers (ISPs). The extent of cross-ownership in Canada provides incentives to our large media firms to privilege their own content on their own networks. Shaw, a Canadian ISP, offers a \$10 quality of service (QoS) enhancement to clients who use a Voice over Internet Protocol (VoIP) company for their telephone service (Shaw Communications, 2007). Those clients who choose to use Shaw's VoIP service can save their money—their IP phone service is already prioritized. This practice, known as bundling, illustrates how the companies that own the networks can leverage that ownership into an anti-competitive practice.

Internet technology has not determined the way the Internet has developed—companies *are* capable of shutting down individual sites and services at a whim, just the way you can filter out adult content on your computer at home. A controversial move by Telus points out the power of telecommunications companies in controlling content and stifling public access to content that the company deems unnecessary. During its 2005 dispute with the Telecommunications Workers Union, Telus blocked access to a site sympathetic to the union, so that all Telus Internet subscribers (including most of the striking workers) were unable to view it (Barrett, 2005).

The issue of the public interest, the third part of this discussion, remains no clearer. Despite significant grass-roots mobilization in the U.S., bringing together partners as ideologically distant as the Christian Coalition and the Feminist Majority, there seems little in terms of a public viewpoint on this debate (Cook, 2007). In Canada, various public-interest groups are becoming involved—the Public Interest Advocacy Centre (PIAC), the Canadian Internet Policy and Public Interest Clinic (CIPPIC), the Electronic Frontier Foundation (EFF), and others—but it remains unclear what particular facet of this issue will rally Canadians to the cause. How does anyone relate to the idea of a “neutral network”?

Tim Wu, who teaches copyright and telecom at Columbia Law School, sees neutrality as a principle for utility. This means that the Internet treats all computers and data equally:

The idea is that a maximally useful public information network aspires to treat all content, sites, and platforms equally. This allows the network to carry every form of information and support every kind of application. The principle suggests that information networks are often more valuable when they are less specialized. (Wu, n.d.)

The suggestion is that the Web innovations we have seen (and grown dependent upon) over the past 20 years have been possible because there has been no centralized structure to control the network. Lemley & Lessig (2000) see this innovation as directly related to network design: "By its design, the Internet has enabled an extraordinary creativity precisely because it has pushed creativity to the ends of the network" (p. 9). But more than innovation could be at risk.

If network operators are allowed to restructure their networks, many lower-income Canadians could be increasingly shut out of the opportunities that the Internet is supposed to offer to all of us. The "two tiers" talked about by Videotron's Robert Depatie and Verizon's Ivan Seidenberg would not only earn revenue from individuals seeking access to the net, but also from businesses building Web content (Kapustka, 2006). Large corporations would thus be at an advantage when paying premiums for top-tier loading speeds. The question we must then ask is: Where does that leave bloggers? Small search engines? Independent news outlets? Other small-business websites? It leaves them in the lower tier, without the scale or capital needed to load as fast as their corporate competitors. This is a new variation of the digital divide.

Since it moved beyond dial-up, Internet access at home has been offered on scaled service levels. Users can subscribe to "basic," or "lite," or "super," or "ultra," or "premium"—every day brings a new adjective for Internet service. The different levels offer different speeds of access, different prices, and different limits on bandwidth usage. The new ways that Canadian Internet companies want to extract money from their networks are different for two main reasons. First, traditional scaled service never had any effect on users' access to content—pages may have loaded slowly, but they loaded—and this may no longer be the case. Secondly, the more sophisticated the network operators attempt to make their service, the more invasive they will have to be. Using the Shaw example from above, that QoS software requires Shaw to inspect packets of data that run along the network to identify VoIP packets and prioritize them. This would change the nature of the role of ISPs, as currently, they do not have the legal power to discriminate against content. The proposed model of a two-tiered Internet is premised on the idea of the ISP as a network gatekeeper, inspecting and verifying data as it runs across its wires.

Alternative logics

The development of telecommunications infrastructures has been uneven at best. At least this is the idea behind new forms of delivering broadband to the home. They all rely on the understanding that the present model of infrastructure development is insufficient and must be replaced, while still incorporating incumbent providers into the discussion. While so much infrastructure (electricity, gas, roads) has been built with the idea that monopoly is to a certain extent necessary, telecommunications infrastructure of late has been infused with hopes of achieving competitive market status. The legacy of incumbent providers, along with the high cost of building out network infrastructure, has made competitiveness more of a myth than a reality. Examining new forms of infrastructure development could provide solutions to the net neutrality debate.

One such form has been put in place in Fredericton, New Brunswick, the

largest Canadian example of municipally provided broadband. The city's free wireless network covers much of the downtown area and includes more than 100 access points for anyone with a laptop. The wireless network connects with a city-owned fibre network that serves as the backbone of Fredericton's broadband access. A city-owned corporation is in charge of deployment and project management. This is a central facet of some of the new thinking around broadband deployment as basic infrastructure. Just as the city takes upon itself the job of providing water and power facilities, understood as essential services, it can now add broadband access as an essential for the twenty-first century.

This idea of municipal provision of broadband has also been championed by CANARIE (www.canarie.ca)—a non-profit supported by the Canadian government and charged with advancing research on broadband networks. One of the most important aspects of municipal broadband is that it separates the infrastructure from the service—Fredericton still may buy its bandwidth from Bell or Telus, but the city owns the infrastructure. CANARIE's Bill St. Arnaud points to successful models of customer-owned last-mile networks in Sweden and Amsterdam (St. Arnaud, 2006). The municipality connects public buildings to a high-capacity fibre network, and residents can buy their own connection direct to their homes, cutting out telecommunications companies as infrastructure owners. This type of model, while dependent on municipal and private partnerships, would induce the structural separation that St. Arnaud and others see as necessary to improve networks and also reduce cost to consumers.

Toronto is taking another approach, using a municipal network as a business opportunity for the city-owned power and telecom company. Their wireless mesh network, which serves residents of the city, costs citizens \$29 per month for access. This model, however, does not include structural separation, as Toronto Hydro Telecom (THT) owns the network *and* provides the service in the area. THT's model provides a competitor to Bell's and Rogers' services. This wireless network, however, is also helping the City of Toronto comply with a provincially mandated switch to "smart" metering (linking electricity meters to permit automated downloading of their data). In effect, the city is using its residents to subsidize the cost of implementing this new program (Longford & Clement, 2006). It is also using publicly owned infrastructure (like the wireless spectrum and the street-light poles that the wireless antennae sit on) as a means by which to make a profit from this very same public. THT, nonetheless, is a corporation (as opposed to a non-profit in Fredericton), and it operates as such: "Our view is that if a private company—which we are—invests capital to build a network . . . spends money to develop a back-office infrastructure . . . spends time to promote, advertise and educate consumers . . . well then, that organization should be able to recoup its investment" (Gravelle, 2007).

Wireless networks, while attractive for their low cost in providing last-mile access, are limited by the technology available. Operating on unlicensed spectrum, wi-fi devices face a crowded landscape of signals. Their signals are also low power and provide a relatively small amount of bandwidth (a theoretical maximum of 54 megabits per second or Mbps). Given the rapid technological advancement, many are arguing for a move to fibre networks. There are different models

available. James Jones, a telecom consultant, advocates a city-run fibre network offering 1 gigabit per second (Gbps) service, using wi-fi to fill out the network (current municipal wi-fi networks often use a large array of wi-fi antennae deployed in a mesh formation, rather than connecting to a fibre line) (Jones, 2007). A city-owned fibre infrastructure could present the opportunity for true competition—again, separating carriage from service. CANARIE is researching models for “customer empowered” networks, where users would pay to access fibre already running near their residence. Another model would run high-capacity fibre lines to all public buildings (schools and libraries, for example), creating the basis of a gigabit network (1 Gbps—or at least 200 times what most ISPs are offering currently). These different models demonstrate collectively that new thinking is required to carry Internet infrastructure into the twenty-first century and to allow it to be a universally accessible facility, enabling citizens to take advantage of opportunities created by information and communication technologies.

Moving forward

In the final report of the Telecommunications Policy Review Panel, the panel recommended the establishment of a consumer-access provision that would “confirm the right of Canadian consumers to access publicly available Internet applications and content of their choice by means of all public telecommunications networks providing access to the internet” (Telecommunications Policy Review Panel, 2006, p. 190). Despite its longstanding unwillingness to involve itself in new media, the CRTC seems to feel the winds of change blowing. CRTC Commissioner Kevin French is quoted as saying, “We’re aware of [violations of net neutrality] and believe we have the legal equipment to deal with it, but we don’t have a case in front of us. Somebody has to file a complaint” (Geist, 2006). The new CRTC chairman, however, could change this (Tuck, 2007). In Canadian legislation, ISPs (who are often also network operators) are neutral—they cannot be held responsible for hate speech or illegal pornography (CBC News, 2006). This lack of liability does little to constrain ISPs from engaging in anti-competitive behaviour. At the same time, the important network owners in this country are lobbying the government for complete deregulation—the freedom to do as they like with their networks. So perhaps Canadian telecom policy is at a crossroads, where certain gains could be made in exchange for a move toward wider deregulation. In the U.S., the AT&T–BellSouth merger included a provision mandating network neutrality until the gaps in legislation can be filled. In Canada, were Minister Bernier to attempt revamping the CRTC or the *Telecommunications Act*, concerted action by public-interest groups could be aimed at forcing the inclusion of a net neutrality provision.

In October 2006, the Canadian Research Alliance for Community Innovation and Networking (CRACIN) held an Alternative Telecommunications Policy Forum in Ottawa to bring together community activists, academics, government representatives, and public-interest groups to discuss many of the issues emanating from the TPRP Report. While the TPRP Report did address net neutrality, participants at the Alt.Telecom.Forum recommended that a more specific net neutrality clause be added (in bold, below):¹

The *Telecommunications Act* should be amended to confirm the right of Canadian consumers to access publicly available Internet applications and content of their choice by means of all public telecommunications networks providing access to the Internet. This amendment should:

- (a) authorize the CRTC to administer and enforce these consumer access rights;
- (b) take into account any reasonable technical constraints and efficiency considerations related to providing such access, and;
- (c) be subject to legal constraints on such access, such as those established in criminal, copyright and broadcasting laws (TPRC, 2006, Recommendation 6-5, p. 6-18).
- (d) not withstanding any other provision in this paragraph, network operators shall not discriminate against content, applications, or services on broadband Internet services based on their source or ownership.**

In the U.S., the Federal Communications Commission (FCC) has recently announced an inquiry into net neutrality to ascertain whether Internet service providers are acting in discriminatory ways, such as blocking access to Internet sites, giving certain sites favourable treatment, and charging extra for certain services, and whether the FCC should consider a new principle of non-discrimination. Some FCC commissioners have called for a Notice of Proposed Rulemaking instead of an inquiry, because, according to Commissioner Michael Copps, “History shows that Notices of Inquiry like this have a way of disappearing into the regulatory dustbin, putting off decisions that need to be made now. These are no longer new and novel questions” (Rash, 2007).

Various initiatives in Canada have been recently initiated to educate the public about net neutrality, including the now-defunct website www.neutrality.ca, a panel presentation at the Ottawa public library, and a new site supported by CRACIN (www.whatisnetneutrality.ca).

Effort can be directed toward pursuing net neutrality legislation, either standing on its own or written into the *Telecommunications Act*. Public advocates can also concentrate on government and private-sector support of alternative network architectures and economic models. Support for new ways to build out infrastructure could provide Canadians with the results they are looking for: high-speed broadband, universally available and reasonably priced; enough competition to ensure that there is no advantage for providers to engage in discriminatory practices; and a managed balance between corporate and public interest. The bottom line is that cable and telephone companies understand the changing climate of the industry and the potential for profits. Government, under the mantra of market forces and bent on deregulation, must also be petitioned by advocates of the public interest. While Canada is near the top of the pack in achieving broadband penetration, our system is still a duopoly, and costs are still exorbitant. The answer—whether regulation, new networks, or some third way—may not be clear at the moment, but educating Canadians about telecommunications policy could not come at a more important time.

Acknowledgments

This article has benefited from the incredible and detailed commentary of our anonymous reviewers, as well as the support of the editorial team of the *CJC*.

Thanks to the SSHRC INE Public Outreach Program for support of the research from the Alt.Telecom.Policy Forum.

Notes

1. Thanks are due to the background Breeze webcasting and e-mail chatter at the forum, and to Ben Scott, Richard Smith, Michael Geist, and others for finessing the language here.

Selected Online and Print Resources—U.S. Debates

Flash Animation by the ISP-backed “Hands Off the Internet” group. URL: <http://www.don-tregulate.org>.

Free Press Resources on Net Neutrality. *S 2360: Internet Non-Discrimination Act of 2006* (U.S. Senate Bill 2360 Summary). URL: <http://www.freepress.net/congress/billinfo.php?id=168>.

Save the Internet Coalition FAQ. URL: <http://www.savetheinternet.com/=faq>.

Wireless Philadelphia. URL: <http://www.wirelessphiladelphia.org>.

Selected Online and Print Resources—Canadian Debates

Fred E-Zone (Fredericton’s broadband infrastructure). URL: <http://www.fred-ezone.ca>

Geist, Michael. *The search for Net neutrality*. URL: http://www.michaelgeist.ca/index.php?option=com_content?task=view&id=1040.

Geist, Michael. *What the Canadian government really thinks about Net neutrality*. URL: http://www.michaelgeist.ca/index.php?option=com_content&task=view&id=1664&Itemid=125.

Net neutrality: A public discussion on the future of the Internet in Canada (Transcript). February 6, 2007, Ottawa Public Library Auditorium. URL: http://www.cippic.ca/en/events/net_neutrality_transcript.pdf.

What is net neutrality? (An informational site developed by CRACIN student researchers Neil Barratt, Christina Haralanova, Michael Lenczner, & Alison Powell). URL: <http://www.whatisnetneutrality.ca>.

Zandberg, Brian. (2007, January 17). Canada sleeps through war to “save the Internet.” *The Tyee*. URL: <http://thetyee.ca/Mediacheck/2007/01/17/NetNeutrality>.

Further Reading

Bar, Francois, & Galperin, Hernan. (2004). Building the wireless Internet infrastructure: From cordless ethernet archipelagos to wireless grids. *Communications and Strategies*, 54, 45-68. URL: http://www-rcf.usc.edu/~fbar/Publications/CPR04_BAR_GALPERIN.pdf.

Bodnar, Christopher. (2004). Sewers and asphalt: The stuff of digital dreams? The re-regulation of telecommunications industries and democracy in Canada. In Marita Moll & Leslie Regan Shade (Eds.), *Seeking Convergence in Policy and Practice*, 2, 183-199. Ottawa: Canadian Centre for Policy.

Community Media Review. (2005). *A people’s guide to the Telecommunications Act of 2006* (Parts 1 and 2). URL: <http://saveaccess.org/readings>.

Heins, Marjorie. (2006, May 30). *Commentary: Net neutrality on center stage*. The Free Expression Policy Project. URL: <http://www.fepproject.org/commentaries/netneutrality.html>.

- McTaggart, Craig. (2006, September 30). *Was the Internet ever neutral?* Paper presented at the 34th Telecommunications and Communications Policy Research Conference. September 29-October 2, 2006. George Mason University School of Law, Arlington, VA. URL: <http://web.si.umich.edu/tprc/papers/2006/593/mctaggart-tprc06rev.pdf>.
- Meinrath, Sascha D., & Pickard, Victor W. (2006, September). *The new network neutrality: Criteria for Internet freedom*. Paper presented at the 34th Telecommunications and Communications Policy Research Conference. September 29-October 2, 2006. George Mason University School of Law, Arlington, VA. URL: <http://web.si.umich.edu/tprc/papers/2006/614/The%20New%20Network%20Neutrality%20v4.4.pdf>.
- Sandvig, Christian. (2007). Network neutrality is the new common carriage. *Info: The Journal of Policy, Regulation, and Strategy*, 9(2-3), 136-137.
- Scott, Ben, Cooper, Mark, & Kenney, Jeannine. (2006, May). *Why consumers demand Internet freedom: Network neutrality: Fact vs. fiction*. URL: http://www.freepress.net/docs/nn_fact_v_fiction_final.pdf.
- Turner, S. Derek. (2006, August). *Broadband reality check II: The truth behind America's digital decline*. Washington, DC: Freepress, Consumers Union, and Consumer Federation of America. URL: www.freepress.net/docs/bbrc2-final.pdf.

References

- Barrett, Tom. (2005, August 4). To censor pro-union web site, Telus blocked 766 others. *The Tyee*. URL: <http://thetyee.ca/News/2005/08/04/TelusCensor/> [April 11, 2007].
- British Broadcasting Corporation. (2006, September 26). *Worldcom's Ebbers enters prison*. URL: <http://news.bbc.co.uk/2/hi/business/5380458.stm> [April 12, 2007].
- Canada. (1993). *Telecommunications Act*. Ottawa, ON: Government of Canada. URL: <http://laws.justice.gc.ca/en/T-3.4/index.html> [April 12, 2007].
- CBC News. (2006, August 25). *CRTC denies request to ask ISPs to block hate sites*. URL: <http://www.cbc.ca/technology/story/2006/08/25/crtc-ruling.html> [April 11, 2007].
- Cook, Brian. (2007, March 26). Not neutrality. *In These Times*, 31(4). URL: http://www.inthesetimes.com/article/3081/not_neutrality/ [April 11, 2007].
- Geist, Michael. (2006). *Coming soon: The two-tiered Internet in Canada*. URL: <http://www.michaelgeist.ca/view/1091/1/> [March 26, 2007].
- Geist, Michael. (2007). *Policy responses to the user-generated content boom*. URL: <http://www.michaelgeist.ca/content/view/1600/135> [April 12, 2007].
- Goodman, Lee-Ann. (2007, February 6). *Government documents suggest Tories not nervous about ISPs interfering with Net*. CBC News. URL: <http://www.cbc.ca/cp/technology/070206/z020621A.html> [March 26, 2007].
- Gravelle, Sharyn. (2007). *Speaking notes for speech delivered to Wireless Cities Summit, January 24, 2007*. Toronto, ON. URL: http://www.thtelecom.ca/onezone/pdf/01-24-07_Sharyn%20Gravelle%20Speech_Wireless%20Cities%20Summit.pdf [April 11, 2007].
- Industry Canada. (2002). *The new national dream: Networking the nation for broadband access*. Ottawa, ON: National Broadband Task Force. URL: <http://broadband.gc.ca/pub/program/NBTF/index.html> [April 12, 2007].

- Jones, James. (2007). *Open letter re: San Francisco Municipal Communications Services efforts*. URL: <http://tech.groups.yahoo.com/group/sfwireless/message/657> [March 26, 2007].
- Kapustka, Paul. (2006, January 5). *Verizon says Google, Microsoft should pay for Internet apps*. URL: <http://www.informationweek.com/news/showArticle.jhtml?articleID=175801854> [April 11, 2007].
- Lemley, Mark A., & Lessig, Lawrence. (2000). *The end of end-to-end: Preserving the architecture of the Internet in the broadband era*. UC Berkeley Law & Econ Research Paper No. 2000-19; Stanford Law & Economics Olin Working Paper No. 207; UC Berkeley Public Law Research Paper No. 37. URL: <http://ssrn.com/abstract=247737> [27 February 2007].
- Longford, Graham, & Clement, Andrew. (2006, September 7). How long will Toronto's wireless network be free? *Toronto Star*, p. A21. URL: http://www.cwirp.ca/files/TorStar_OneZone.pdf [March 26, 2007].
- Longford, Graham, & Shade, Leslie Regan. (2007). *Telecom reform north of the 49th*. Paper presented at the National Media Reform Conference Media Research Pre-conference. January 11, 2007, Memphis, TN.
- Organisation for Economic Co-operation and Development (OECD). (2006). *OECD broadband statistics to June 2006*. URL: <http://www.oecd.org/sti/ict/broadband> [3 March 2007].
- Panetta, Alexander. (2006, November 1). Videotron lobbying for Internet 'transmission tariff.' *The Globe and Mail*. URL: <http://www.theglobeandmail.com/servlet/story/RTGAM.20061101.gtvideotron01/BNStory/Technology/home> [March 26, 2007].
- Rash, Wayne. (2007, March 23). FCC takes another stab at network neutrality. *eWeek.com*. URL: <http://www.eweek.com/article2/0,1895,2107354,00.asp> [March 23, 2007].
- Risen, James, & Lichtblau, Eric. (2005, December 21). Spying program snared U.S. calls. *The New York Times*. URL: <http://www.commondreams.org/headlines05/1216-01.htm> [April 12, 2007].
- Shaw Communications. (2007). *Quality of service enhancement*. URL: <http://www.shaw.ca/en-ca/ProductsServices/Internet/ServiceEnhancement.htm> [March 26, 2007].
- St. Arnaud, Bill. (2006). *Network neutrality issues*. Presentation made to Canadian Heritage, November 3, 2006. URL: http://www.canarie.ca/canet4/library/recent/Network_Neutrality_Heritage_Canada.ppt [March 27, 2007].
- Telecommunications Policy Review Panel (TPRP). (2006). *Final report*. URL: http://www.telecomreview.ca/epic/site/tprp-gecert.nsf/en/h_rx00054e.html [March 26, 2007].
- Tuck, Simon. (2007, February 24). CRTC chief's telecom target is deregulation. *The Globe and Mail*. URL: http://www.theglobeandmail.com/servlet/Page/document/v5/content/subscribe?user_URL=http://www.theglobeandmail.com%2Fservice%2Fstory%2FLAC.20070224.RCRTC24%2FTPStory%2FBusiness&ord=4785198&brand=theglobeandmail&force_login=true8 [March 26, 2007].
- Wu, Tim. (n.d.). *Net neutrality FAQ*. URL: http://www.timwu.org/network_neutrality.html [March 26, 2007].