

An Analysis of...

Telecom Decision CRTC 2008-108

**The Canadian Association of Internet Providers'
application regarding Bell Canada's traffic
shaping of its wholesale Gateway Access Service**

CRTC Reference: 8622-C51-200805153

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09 February 2009

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Background & Links

From spring to autumn of 2008, CRTC received comments from many parties on the throttling issue, and, on November 20th, handed decision 2008-108,

CRTC immediately moved on to Public Notice 2008-19, a process which blocks debate of the 2008-108 decision.

Because decision 2008-108 acts as a foundation upon which the CRTC intends to build subsequent policies, it is important to fully understand how the CRTC skewed the 2008-108 decision.

The CAIP vs Bell CRTC page:

http://www.crtc.gc.ca/PartVII/eng/2008/8622/c51_200805153.htm

The CAIP vs Bell 2008-108 decision (PDF):

<http://www.crtc.gc.ca/eng/archive/2008/df2008-108.pdf>

Paragraph numbers from this document are shown on the left side when they are quoted in this document. Text from the decision is shown in this colour.

Access to Information Act

To understand how the CRTC Council came to this decision, an Access to Information request was made to the CRTC in December to obtain all documents presented to the Council by the analysts. These documents are now in the public domain and can be obtained from any CRTC office by providing the [access to information reference number A-2008-00050](#). In short, they consist of simple powerpoint presentations devoid of any technical issues, focused on Bell Canada's arguments and devoid arguments provided by 3rd parties.

The Public Notice 2008-019

http://www.crtc.gc.ca/PartVII/eng/2008/8646/c12_200815400.htm

The CRTC documents, including the December 4th interrogatory provide background on the CRTC's thinking of this issue. The questions asked to the telcos show continued lack of understanding of the issues and lack of desire to understand the issue.

A CBC interview of Leonard Katz, the CRTC's vice-chairman

<http://www.cbc.ca/technology/story/2008/11/20/tech-crtcqna.html>

On the day the decision was made public, Mr. Katz provided the CBC with much insight on what arguments were given priority to help the CRTC justify its decision.

The Telecommunications Act

http://laws.justice.gc.ca/en/ShowFullDoc/cs/T-3.4//20090216/en?command=HOME&caller=SI&search_type=all&shorttitle=Telecommunications%20Act&day=16&month=2&year=2009&search_domain=cs&showall=L&statuteyear=all&lengthannual=50&length=50

General observations

- 8 *The CRTC understands that Bell has a 3 pronged approach to congestion resolution: traffic shaping together with capacity investments and usage based billing consistent with GAS tariff.*

Bell Canada provided conflicting reasons for the installation of DPI equipment. On May 15th, the reason was the customer usage data collection functionality for Bell Canada's usage billing. On April 15th, Bell stated that DPI was installed to relieve congestion in its network. Never was usage billing used by Bell as a means to reduce congestion. The two excuses were mentioned separately. While in this paragraph, the Commission speaks of a 3 pronged approach, later on, it states that throttling is the only viable network management instrument.

It is of note that GAS tariffs are specifically and explicitly capacity based. (the size of the pipe, not how much water flows through it). The Commission's text seems to imply that the CRTC has already agreed, without due process, to changing GAS tariffs to usage based instead of capacity based. Usage based billing cannot be "consistent" with current GAS tariffs.

- 9 *Some parties stated that Bell slowed traffic down to 30KB/s.*

The fact that the CRTC's interrogatory to Bell did not ask this question is significant. This should have been a key question asked to Bell, and the CRTC should have asked Bell to explain how it arrived at this speed. While this debate was going on, the CRTC released a study on broadband access in Canada. This document defined broadband as being at least 5mbps (625KB/s).

The CRTC failed to question Bell on this issue and its decision sets a precedent that allows anyone to advertise "broadband" service even if they only provide 30KB/s.

Myths on P2P use of bandwidth

Footnote3 *...P2P applications allow end-users to download a single file from multiple end-users simultaneously, thus creating the potential for faster download speeds*

and

30 *The Commission notes Bell Canada's submission that P2P file-sharing applications are designed to make the maximum use of downstream and upstream bandwidth and to use up additional capacity in the network as it becomes available. The Commission considers that intensive use of such applications could, during periods of high Internet traffic, result in network congestion and degrade the performance of Internet services for other end-users.*

The Commission failed to note that **all** TCP/IP applications are designed to make the maximum use of downstream bandwidth. While it is true that many P2P applications (but not necessarily all) will use otherwise idle upstream to contribute to the P2P network, the Commission failed to note that congestion of the upstream should not be a problem on ADSL infrastructure due to the slow speeds for upstream assigned to modems (800kbps in most cases).

The Commission failed to note that whether one downloads a movie from iTunes, BitTorrent, Bell Video Store or any other service, one will take the same download bandwidth. Evidence was filed to this effect, but ignored by the Commission.

This is very significant because it shows that the CRTC lacks sufficient technological experience to understand and debunk Bell's propaganda, and this has allowed the CRTC to render a decision based on extremely flawed premises.

The Commission failed to note that the real issue is a change in usage patterns where the access to large media files is becoming more and more popular. Targeting a single subset of applications is not only discriminatory, but does not solve congestion problem since other applications take up as much bandwidth.

In fact, the Commission failed to note that applications such as iTunes or Bell's Video Store have the same principle of needing to download the file before it is viewed as P2P applications, yet Bell Canada does not throttle them. The Commission failed to note that applications such as YouTube already consume more bandwidth than all P2P applications put together.

Is DPI the only feasible option ?

33. *The Commission notes Bell Canada's submission that the traffic-shaping approach it has implemented is the only practical option that is technologically and economically suitable, at this time, for addressing congestion in its ADSL network.*

The Commission failed to note that the primary, most practical and most economically suitable option to manage this type of network is intelligent matching of ADSL modem speeds to aggregation network capacity. This is a capability which Bell Canada has had from day one and does not require installation of expensive or controversial DPI equipment.

As part of 2008-19, other carriers, namely Telus, have stated that they can manage their network without DPI by properly provisioning capacity to match demand. The CRTC clearly failed to question Bell Canada's statement that a DPI solution was the only feasible one.

The Commission failed to note that Bell Canada raised ADSL speeds over 600% since 2003 but that aggregation capacity rose by only 50% between 2003 and 2007. (as per graphs provided by Bell Canada in its final 86 page July 11th 2008 filing).

The Commission failed to ask Bell Canada why it recklessly raised ADSL speeds before its aggregation infrastructure could cope with increased demand, especially when higher speeds and marketing campaigns promoted the very downloads which saturate the un-upgraded sections of Bell's network.

The Commission failed to ask Bell Canada why it raised ADSL speeds for Sympatico customers to 7mbps at a time it was busy installing its DPI equipment to allegedly combat congestion. If Bell Canada knew it already had a congestion problem requiring DPI equipment, why did it still go ahead with Sympatico speed increases that exacerbated the problem ?

Access to Information Act documents show that the Commission was given information about how the FCC viewed Comcast's practices:

Comcast's practices do not constitute reasonable network management, have contravened industry standards and impede the user's ability to use applications and access content of their choice.

How can the Commission support Bell's opinion that DPI is the only acceptable option ?

The Commission failed to note that Bell Canada's irresponsible network management and capacity planning resulted in a situation where Bell Canada is advertising and selling services it cannot provide.

Article 8.3 of Bell's tariffs

34. *In light of the above, the Commission considers that, based on the record of this proceeding, Bell Canada's application of its traffic-shaping measures to GAS is permitted under article 8.3 of its Terms of Service*

Paragraph 8.3 of the Bell General Tariffs states:

8.3 Customers are prohibited from using Bell Canada's services or permitting them to be used so as to prevent a fair and proportionate use by others. ...

Until branding changes late in 2008, Bell Canada was still running TV advertisements with its beavers shouting that you could download all the videos and music you wanted without fear of negatively impacting your neighbours (and/or vice versa).

How can the CRTC condone Bell using 8.3 to label certain types of use as disruptive while another is fair and proportionate when both have the same congestion impact on the aggregation network and when Bell publicly advertises that they cannot have negative impacts on others ?

Bell is accusing a certain group of negatively impacting another group when both groups use the same amount of network download bandwidth. That is like accusing grand mothers of preventing fair and proportionate use by aunts, when both spend as much time on the telephone.

The CRTC was given information showing that other applications such as YouTube had far greater bandwidth utilisation than P2P. This raises questions on why the CRTC would support Bell's use of 8.3 against a group of users whose impact on the network is less than users of other applications.

The CRTC has condoned Bell blaming an innocent group of customers doing what Bell's own advertisements loudly proclaimed could not harm other users. The CRTC should have condemned Bell for increasing ADSL speeds beyond what its aggregation network could support, resulting in a situation where fair and proportionate use (as defined by its advertising) was unsustainable.

It is important to note that Bell Canada throttles all P2P usage, even customers transferring small files or short audio/video streams. (the decision to throttle a flow is made within the first few packets and thus without any knowledge of how much data will be exchanged afterwards).

With this decision, the CRTC allows any carrier to sell and advertise capacity it cannot deliver.

With this decision, the CRTC allows any carrier to accuse users of abusing the network despite their service providers having purchased sufficient amounts of capacity to support their customer's usage.

46. *The Commission notes that Bell Canada provided data on the growth rate for GAS, which indicated that there was no substantive change in the growth rate after implementation of its traffic-shaping measures on GAS*

Considering that GAS throttling began in March and discussions at the CRTC spanned from April to early July, how could the CRTC not only accept such statistics, but also use them as part of their decision to support Bell's actions ?

Subsection 27(2) of the Act

27 (2) 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.

Katz (CBC): *It was mainly based on whether discrimination was going on and one of the pieces of evidence that was filed was that Bell had done this back in October 2007 to their own retail customers. That weighed quite heavily into the fact that there was no discrimination here and that they weren't trying to do something anti-competitive.*

Discrimination at the commercial level

The CRTC was tasked to evaluate the throttling practice for a regulated GAS service where service providers purchase capacity to support the usage of their end users.

Sympatico does NOT purchase GAS service. The relationship between Sympatico and Bell is private, unregulated and internal budgets transfers between Sympatico and Bell are not disclosed.

Bell Canada has given Sympatico preferential treatment with regards to access to neighbourhood DSLAMs ("remotes") while limiting GAS customers to CO based DSLAMs with lower line quality due to longer copper loops.

Bell Canada has given Sympatico preferential treatment by raising Sympatico line speeds up to 7mbps in summer of 2007, while keeping GAS customers at 5mbps. With significantly higher speeds, Sympatico customers cause significantly more congestion than GAS customers.

The application of equal throttling is therefore discriminatory against GAS customers who do not generate equal amounts of congestion.

As with general practice, GAS tariffs were approved with both Bell and the CRTC satisfied that the price for the service would cover capital and operating costs and provide Bell with reasonable profit. Due to the private nature of the Bell-Sympatico relationship, it is not possible to know whether Sympatico pays its fair share for the service.

Since GAS customers are known to pay for the capacity they use, the revenue shortfall which caused under investment in the aggregation network would lead one to conclude that Sympatico has not been paying its fair share.

The application of equal throttling is therefore discriminatory against GAS customers because the financial arrangements are not equal and GAS appears to be paying more for the service.

Because of the significant differences between Sympatico and GAS, the CRTC had no justification to conclude there was no discrimination. Equal amounts of throttling would be justified if, and only if, Sympatico also used GAS service and paid GAS rates.

The CRTC's declaration that section 27 (2) did not apply is even more unjustified considering the blatantly preferential treatment given to Sympatico customers (higher speeds, access to remotes etc.)

27 (2) 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.

Discrimination at the individual level

While the Commission put a large emphasis on the Bell Canada supplied argument that it treated Sympatico and GAS providers equally, it failed to look at the real issue discussed by third parties: discrimination of service based on contents of packets being transmitted.

By looking at packet contents, Bell Canada's DPI equipment guesses what application is generating packets. A person using a particular application to exchange information will be subjected to an unreasonable disadvantage (throttling) while a person using another application (such as Bell's Video Store) will not be subjected to this disadvantage, despite both using the same network protocol and the amount of bandwidth to download the content.

How the CRTC could ignore this blatant discrimination boggles the mind.

There are fundamental aspects of telecommunications which any regulator must uphold. A carrier's job is to deliver packets to their destinations. Packets with identical network features should all be treated equally. When a carrier treats packets differently despite them having identical network level features, it is, by definition, discrimination. What a user does with a packet once it has been delivered is none of the carrier's business and the carrier cannot be allowed to discriminate between packets based on what the carrier guesses the packets will be used for once they have left its infrastructure.

The ISO 7 layer model was designed to clearly delineate responsibilities. And the various protocols in use have clear delineations between packet headers and packet payload with a carrier having no business dealing with the payload of the packets it carries. The CRTC's decision and Access to Information documents do not discuss this important issue which is core to the concept of a common carrier.

The Commission failed to note that the tariffs clearly state that GAS service uses the PPPoE protocol to carry packets between end users and their service providers. This clearly defines what information is available to Bell Canada (the PPPoE header). Bell Canada not only admitted looking beyond the PPPoE header, it admitted looking beyond the TCP header, 3 network layers above where its jurisdiction ends.

In allowing Bell to treat packets differently based on information acquired beyond the network layers defined by the GAS tariffs, the CRTC has failed to uphold section 27-2 since it legalises discrimination of packets based on characteristics of their payloads and based on assumptions on how packets will be used once beyond Bell Canada's infrastructure.

It should be noted that Access to Information documents show that the Commission was made fully aware of the FCC opinion that Comcast's throttling practices were discriminatory. The following is text which the Commission was shown by its analysts (obtained via Access to Information) is part of the FCC decision:

Submit a compliance plan that describes how it intends to transition from discriminatory to non-discriminatory network management practices by the end of the year.

Having been given evidence that the FCC considered such practices to be discriminatory, the CRTC still decided to argue that Bell's actions were not discriminatory, and claim publicly that this was a major factor in its decision.

Equal throttling, unequal responsibilities

Furthermore, the CRTC failed to note the significant difference between the GAS-Bell and Sympatico-Bell relationship in terms of custodial responsibilities.

Bell Canada offers a CRTC regulated, tariff defined service to wholesalers. The scope of network management is defined by the PPPoE protocol, and Bell, acting as a neutral carrier, is expected to deliver the purchased bandwidth and transport PPPoE packets, irrespective of their content, from point to point.

Acting as a single entity, Bell and Sympatico act as an internet service provider and policies desired by Sympatico can be implemented by Bell or vice versa. They are not regulated and the entity can freely define the service, features and management policies and how the network is managed internally.

The CRTC cannot argue that equal throttling is non discriminatory since for GAS customer had no say nor choice in the matter, while Bell/Sympatico have full control

The application of equal throttling is therefore discriminatory against GAS customers because the latter have no control over the throttling while Bell/Sympatico has full control/decision over the throttling. This matter is worsened by the fact that Bell applies throttling to GAS telecommunications service, while Bell/Sympatico apply throttling to a retail ISP service.

Equal throttling would be non-discriminatory if, and only if, Sympatico were forced to buy GAS service.

Section 36 of the Act

36. *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.*

54. *The Commission notes CAIP's submission that traffic shaping can result in data transfer rates being significantly reduced. The evidence before the Commission is to the effect that the telecommunications that are subject to traffic shaping in the circumstances of this case reach their intended recipients with their contents unchanged, although more slowly than if traffic shaping had not been applied.*

The CRTC's interrogatory of Bell Canada did not cover HOW the throttling was applied. Bell Canada did not reveal how it implemented the throttling. How can the CRTC claim that it has evidence that the contents are unchanged, especially considering that the CRTC was given evidence in 3rd party submissions to the contrary ?

This is about section 36 of the **Telecommunications Act**, not the Applications Act. It is what happens to the data as it transits through Bell's infrastructure that is in question, not whether applications at each end can recover from harm inflicted to packets during transit.

55. *The Commission notes that, based on the record of this proceeding, the traffic shaping carried out by Bell Canada does not involve any editorial control over the content of the telecommunications and does not involve blocking any telecommunications.*

The CRTC ignored evidence presented to it that Bell Canada actively blocked about 20% of packets from being delivered when a connection is throttled. Bell Canada did not challenge this claim.

Bell Canada decides, based on contents of initial packet(s) of a flow whether the remainder will see a large portion of packets blocked. This CRTC ruling sets a precedent that would allow Bell Canada to blank out periods of telephone conversations for customers it doesn't like, arguing that because humans are able to request a sentence be repeated, that the message would eventually be transmitted.

The CRTC totally evaded discussions over the definition of content. The tariffs define GAS as a PPPoE service. The contents should therefore be defined as the payload of PPPoE packets.

By choosing which flows are to be throttled based on the contents of the packets, Bell Canada effects editorial control.

By willingly blocking a significant number of packets within its infrastructure, Bell Canada forces a large number of retransmissions to occur. This means that at the network level, about 20% of packets are sent twice, which results in a significant difference in the amount of data being transmitted. As a result of Bell's action, customers of ISPs who charge for usage, may find themselves being billed for data which was dropped by Bell Canada. Bell's DPI equipment have control over the content not only by choosing which content to throttle, but also by forcing some streams to transmit much more data than is necessary.

36. *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.*

56. *Finally, the Commission notes that Bell Canada is only applying traffic shaping to file-sharing applications, which, even without traffic shaping, require time for the complete file to be transmitted before an end-user can access it.*

The CRTC has decided that P2P communications are file sharing applications. The CRTC has imposed a meaning and purpose to a flow of packets identified by a few bytes in the contents of the first packet in that flow.

The CRTC has ignored the fact that not all P2P applications are "file sharing". Some actually stream data live using a distributed feed to allow widespread distribution. The BBC's iPlayer is an example of P2P technology used for live content. What about any new upcoming P2P applications ? How can the CRTC assume a meaning/purpose of new applications that do not yet exist ?

The CRTC has decided that P2P communications are not time sensitive and can take over 100 times longer to complete and not benefit from broadband speeds for which the end user is paying.

How can the CRTC assume that the user can wait hours instead of minutes (for small files) or days instead of hours for larger files ?

How can the CRTC know that the user is not working under a tight deadline and needs a file very fast ?

How can the CRTC know that a feed for content is always available ? What about a feed which is only available during peak hours (when other users are on-line to serve it) and a file content too large to be downloaded at only 30KB/s during a period when it is available ?

Only the end users can define the purpose of their telecommunications. Neither Bell, nor the CRTC have the right to define/influence/limit the purpose communications.

By accepting and incorporating Bell's definitions in its decision, the CRTC breaks the Telecom Act, section 36 by influencing (in fact: imposing/defining) the meaning and purpose of packets.

A carrier's role is to get packets from A to B. What is done once the packet arrives at destination must not be something which a carrier tries to guess and a carrier must not discriminate between packets based on the meaning/ purpose it has guessed by looking at their content. The carrier cannot possibly know what the user intends to do with packets once they are delivered, and cannot assume any packet priority unless one is specifically incorporated in packet headers by the sender of the packet.

The irony is that the CRTC could have agreed that Bell broke section 36 and given it special dispensation. Instead, the CRTC insisted in trying to show Bell didn't break section 36 and failed spectacularly.

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...The Commission notes that the DPI technology used by Bell Canada examines the header information of packets, which includes source and destination IP address information, in order to carry out traffic shaping. ...

This is a critical issue which the CRTC got completely wrong.

The CRTC was given evidence which included the packet formats of the various protocol layers involved in this service. Bell Canada admitted in its July 11th filing it was looking beyond the IP and TCP headers into an invented "application header" without providing any reference to standards (which do not exist).

The CRTC ignored the fact that by definition, DPI equipment looks into packet payloads.

The CRTC failed to recognise that GAS is a PPPoE service and as such, Bell Canada should be limited to handling the PPPoE headers and that anything beyond the PPPoE header is to be considered payload (including the IP and TCP headers which are part of the PPPoE payload)

How can the Commission state that Bell Canada only looks at packet headers despite all the evidence to the contrary ?

The failure to note that Bell Canada's equipment looks at packet payloads and has the potential to create serious privacy issues, has led to the failure of the CRTC to set guidelines to ensure that Bell Canada does not deviate from acceptable practice.

And while the privacy commissioner may have judged that the alleged current use may not violate the privacy act, this does not absolve the CRTC from its requirement to uphold the Telecommunications Act:

Section 7 of the Telecommunications Act:

Objectives: (i) to contribute to the protection of the privacy of persons.

Canadians require telecommunications carriers they can trust. If the CRTC cannot even notice an obvious case of a common carrier looking beyond the packet headers into the contents, how can we trust it to find other more serious violations ?

Another important precedent setting issue ignored by the CRTC is that of a carrier's jurisdiction within packets. The CRTC essentially condones that a carrier sell a service based on a specific protocol and trespass beyond that protocol's packet header to peek into the payload of a packet. This is a crucial trust issue. Will all Canadian communications need to be encrypted because the CRTC does not wish to uphold a core principle of telecommunications ?

Paragraph 74

74. *The Commission notes, however, that Bell Canada's actions have had significant impact on the performance of its GAS, albeit for one application, and that Bell Canada had not provided any advance notice to its GAS customers. ...*

Multiple applications are impacted by Bell's throttling. Bell has refused to disclose exactly which applications it throttles. The CRTC is in error by stating that only one application is impacted.

*Accordingly, the Commission directs Bell Canada to develop and file with the Commission, by **9 January 2009** proposed notification requirements to address future changes that impact materially on the performance of GAS.*

With the CRTC not requiring any type of auditing of Bell's DPI equipment, the specific wording of the CRTC decision allows Bell Canada to enable any feature which does not affect performance, notably those that have serious privacy implications without telling anyone and without anyone knowing what is being done.

The CRTC was made aware of the various capabilities this equipment has. While the Privacy Commissioner tolerates Bell's alleged use of DPI to throttle certain flows, it is fully aware that this very equipment can be configured to make very serious breaches to the privacy act. The CRTC, by not instigating oversight over this equipment, is failing its role as defined by Chapter 7 (i): to contribute to the protection of the privacy of persons.

The Commission considers that the notification period should be at least 30 days. The Commission further considers that, at a minimum, the notification of changes should provide clear and meaningful information describing what the changes are, what traffic can be affected, under what conditions, and for how long.

Considering that the Commission doesn't know itself exactly which applications are being impacted, considering that Bell has refused to divulge them during this process, considering that it appears that Bell has filters which wrongly classify unknown applications (especially encrypted ones) as P2P, it is very unlikely that Bell Canada will ever comply with the above and will invent technical excuses on why it cannot comply.

CONCLUSIONS

The Commission could have found a way to support its decision while maintaining technological honesty and accuracy in its decision.

By using inaccurate facts, ignoring evidence provided by 3rd parties and not asking the right questions to Bell Canada, the CRTC has greatly hurt its credibility in this highly visible dossier.

By not understanding the technology, the CRTC's decision has set precedents that go well beyond this one dossier and which may affect privacy and trust issues of carriers who, from now on, can look inside the contents of packets without permission from anyone and even manage packets differently based on their contents.

Unless the decision is reversed, the errors in the CRTC's decision will be accepted as fact and forever devalue not only the CRTC's relevance, but also the trust Canadians can have in their carrier.