Third party access to cable modems in Canada

By François D. Ménard

In collaboration with Timothy Denton

Introduction

In Canada, the Canadian Radio and Television Commission[1], the CRTC, is the governmental agency equivalent to the FCC in the USA. In this article, we discuss the history of the recent CRTC decision to allow resale at a discount of cable modems by Internet service providers. The CRTC has recently made this decision as an answer to the request for immediate relief filed by the Canadian independent Internet Service Providers (ISPs), against the incumbent cable television carriers, on May 17th 1999[2].

In its Decision 99−11[3], issued on September 14th 1999, the CRTC ordered that cable television carriers make their cable modem Internet access services available for resale by ISPs at a 25% discount from their lowest retail rates, until such time as the commission approves interconnection rates.

In this article, we attempt to provide the reader with the facts that have led to this decision.

The Canadian cable television operators have been regulated under the Canadian Telecommunications Act since January 1996[4], in those instances where their systems have been used to provide telecommunications services. Despite being ordered to provide third party access to their facilities, the Canadian cable television carriers continued to expand their market share by foot−dragging in the implementation of third party access mandated by CRTC Decisions 98−9[5] and 99−8[6].

To this date, no intervention by the Canadian Federal Government has yet to result in ISPs competing against cable television carriers in the marketplace today. Even Decision 99−11, which finally brings some desperately needed relief, will not allow ISPs to provide all the services that they want to provide. Decision 99−11 is inadequate from the perspective that ISPs are condemned to accept today's Internet access service definitions provided by the incumbent carriers.

The Regulatory situation in the USA versus Canada

Canadian cable television operators have been regulated since January 1996 as common carriers when providing Internet Access Services. This fact seems to be the principal reason there is a policy difference between Canada and the United States as regards third party access to cable.

The Canadian approach to regulate cable television operators as common carriers seems to have been taken from a relatively pure application of the law. In Telecom Decision CRTC 96−1 of January 31, 1996,[7] the Commission first determined that the services in question were not "programming" within the meaning of the Broadcasting Act. Then the Commission determined that, since "broadcasting" is a special case of

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1 http://www.crtc.gc.ca
2 http://www.caip.ca/CRTC/CAIPjn17.doc
3 http://www.crtc.gc.ca/INTERNET/1999/8045/02/d99−11.htm
4 http://www.crtc.gc.ca/ENG/TELECOM/DECISION/1996/D961_0.txt
5 http://www.crtc.gc.ca/ENG/TELECOM/DECISION/1998/D989_0.txt
6 http://www.crtc.gc.ca/INTERNET/1999/8045/02/d99−08.htm
7 http://www.crtc.gc.ca

"telecommunications" in Canadian law, the next issues to be determined were a) whether a person that carries on a distribution undertaking under the Broadcasting Act is a "telecommunications common carrier" pursuant to the Telecommunications Act when it provides non−programming services using the same distribution network, and b) the second issue, of whether the telecommunications common carrier is subject to the legislative authority of Parliament. The whole of the CRTC decision reads as a straightforward application of legal reasoning from the statutes in question.

The same issue has not been resolved in the United States. The FCC's brief in the Portland cable access ruling[8] of August 16, 1999, the Commission's lawyers wrote:

> "To date, the Commission has not declared whether broadband capability offered over cable facilities is a "cable service" under the Communications Act, or instead should be classified as "telecommunications" or as an information service".

and later:

> "For the foregoing reasons, the Court should recognize that there is an unresolved controversy concerning the proper characterisation of cable modem service, keep in mind the possibility of agency pre−emption..., and resolve the dispute in a narrow fashion".

The Internet, in Canada, has never been given the chance to evolve into a regulatory gray−zone, as it has evidently happened in the USA. This is largely because the CRTC decision to regulate cable television operators as common carriers in Canada occurred before the phase of mass commercialization of the Internet. In contrast, the US Cable Television cable television operators, fearing common carrier obligations, are now steadily invoking the argument that it is not in the public interest to regulate the Internet, in order to avoid being regulated as common carriers.

Regulatory status of Canadian cable television carriers with respect to Internet access services

Even though Canadian cable television operators have been declared to be common carriers since January 1996, the cable television carriers have since consistently demonstrated their mastery of the art of evading regulation. By showing a pretty face in appearing to fully collaborate with the CRTC, they have been able to delay third party access without any reprimand. At a time when some smaller players have already begun selling services to ISPs, such as Regional Cablesystems in Sudbury, Ontario, none of the big players have yet to make their services available for resale by third parties.

[8] Variously available at http://www.natoa.org and on the Cybertelecom mailing list at mailto://cybertelecom−l@listserv.aol.com

Timeline Summary

Date	**Action**[9]	**Details**
January 30th 1996	CRTC Decision 96−1	CRTC decides Cable TV Operators are common carriers when providing Internet Access services
December 6th 1996	CRTC Public Notice 96−36	CRTC asks for comments on setting a regulatory framework for Decision 96−1
Early 1997		Beginning of private negotiations between CAIP[10] and CCTA[11]. First proposal by the cable television carriers to use TCP/IP interconnections to meet the goals of Decision 98−9 and 99−9 rather than unbundling sets of 6 MHz spectrum channels. First proposal by the CCTA to use the method of equal access packet forwarding by source IP address at a POI instead of unbundling cable channels.
July 9th 1998	CRTC Decision 98−9	CRTC decides that Internet Access would be made available to third parties at rates that would need to be approved by the commission. The CRTC further requires that reports be filed on an interim basis demonstrating the progress made in implementing this decision.
July 9th 1998	CRTC Public Notice 98−14	CRTC asks for comments on the facts that the commission should take into consideration when approving the rates to be filed as a result of Decision 98−9.
Winter 1998−1999		Evidence of foot dragging in the private negotiations between CAIP and the CCTA from the part of the CCTA. (i.e. change of the principal party responsible for conducting the third party access tests from Rogers to Videotron).

[9]The URLs to all of the CRTC documents are found throughout the document.
[10] CAIP, the Canadian Association of Internet Providers, http://www.caip.ca
[11] CCTA. the Canadian Cable Television Association, http://www.ccta.ca

May 17th 1999	CAIP Part VII Application	CAIP Requests immediate relief and demands that the Resale of services be made available immediately.
July 6th 1999	CRTC Decision 99−8	CRTC requires that the rates for third party access be filed by September 6th 1999.
September 6th 1999		Cable television carriers file substantially incomplete comments to Decision 99−8 accompanied with a request for an extension until November 8th 1999.
September 14th 1999	CRTC Decision 99−11	CRTC answers to the Part VII Application of CAIP filed on May 17th 1999 by mandating resale of cable modem services at a 25% discount to the lowest resale rates, to ISPs.
September 21st 1999	Letter from the CRTC addressed to the CCTA and Videotron.	CRTC grants the requested extension to November 8th 1999 made by the cable television carriers. Reminds CCTA and Videotron that the third party access rates to be filed are not to be limited to residential services.
November 8th 1999	New deadline for cable television carriers to file third party access (TPA) rates as set forth by CRTC Decision 99−8.	Cable television carriers are expected to file finished rates. Several new points previously left unanswered in the CCTA−CAIP negotiations are expected to be raised, including a number of restrictions directed only at interconnecting ISPs.
November 18th 1999	Deadline for interested parties to provide comments on the proposals for the TPA rates filed by the cable television carriers.	ISPs are expected to provide their comments on the failure of these proposed third party access rates to meet their objective of a profit margin greater than the one of resale (>25%). ISPs are also expected to challenge the attempts of cable television carriers to vertically control the interconnections by disputing the legitimacy of the TPA service restrictions.

December 15th 1999	Availability of resale, at a 25% discount from the lowest market prices, by ISPs, in compliance with CRTC Decision 99−11.	Cable television carriers have no choice but to comply with Decision 99−11. It remains to be seen whether or not the cable television carriers will comply by this date. Will Canadian ISPs take the risk of advertising that you will be able to get cable modem services from them as your 1999 Christmas Gift?
June 2000	Availability of cable modem services from ISPs through interconnections facilitated by third party access rates. The cable television carriers have repeatedly committed to this time frame. Changing it would potentially cause them a lot of damage. Videotron has scheduled the industry trial for TPA being conducted between UUNET and Videotron in Montreal, to be completed by June 2000.	The availability of TPA by June 2000 guarantees almost 6 months of resale activities in the Canadian marketplace. Until this date is reached, the ISPs can pretty much advertise their services as being the same thing, but at a good discount. (i.e. Buy cable modem services from an ISP and get at least the same thing or even better, at 10% less). What remains to be found is if, by the time TPA is available, ISPs will be able to compete with the bundling of Internet Access and Voice over IP−based Residential Telephony services of the incumbents cable television carriers.

The state of cable television telecommunications infrastructure in Canada

Cable television distribution facilities are generally newer in Canada than in the United States and the overall penetration rate is higher in Canada than in the United States, both in terms of subscription rates and homes passed (homes to which the service is available). Because of these important facts, Internet Access over cable television facilities has been widely marketed in Canada since 1995. In the province of Quebec, the two largest incumbent cable television carriers have already announced the entire bi−directionalization of their hybrid fiber coaxial backbones. Finally, in Canada, cable television networks have never been subject to municipal licences, but have always been subject to federal regulation under the Broadcasting Act.

In Decision 98−9, the CRTC found both that the Canadian cable television carriers had substantial market power and that the market for high−speed Internet access services was not sufficiently competitive for the commission to forbear from regulating. The finding by the commission that the Canadian cable television carriers had substantial market power with respect to the provisioning of higher−speed Internet access services is good testimony to the advanced state of this telecommunications infrastructure in Canada.

Meeting the obligations of being a cable television carrier in Canada

Decision 96−1 was not strong enough to ensure that cable television carriers would begin to meet their common carrier obligations. By way of Decision 98−9 and Decision 99−8, the CRTC tried to politely enforce the common carrier obligations of cable television operators. Since then, Canadian cable television carriers have continued to expand their market at the expense of ISPs by delaying the implementation of the earlier CRTC orders.

To this date, intervention by the Canadian Federal Government has yet to result in ISPs being afforded the chance to compete effectively. Canadian cable television carriers still offer their services as a monopoly. Although Decision 99−11 finally brings some desperately needed relief, the mere ability to resell the services of the cable television carriers is not enough. To approve only resale of services, as defined by the cable carriers, is to prevent the ISPs from competing with the cable carriers by providing superior services over the cable television infrastructure.

ISPs are now aware of the services they will need to provide in the long run, if they are to fully compete with everything that cable television carriers are indeed capable of offering. However, today, the Internet access services of the cable television carriers are designed in such a way that Internet telephony and Internet television would not work very well.

In Decision 99−11, the CRTC clearly stated that the implementation of the decision to force resale of cable modem services would not be permitted to further delay the current schedule for the implementation of the July 1998, Decision 98−9.

The CRTC is responsible for ensuring a smooth transition from a requirement for resale to a third party access environment. In order to do this, the CRTC must clearly understanding all implications of regulating by way of mandating TCP/IP interconnections between the facilities of the ISPs and of the cable television carriers.

Resale Versus Third Party Access

As explained earlier, in Decision 99−11, the CRTC decided to mandate the resale of cable modem services. This decision went against the original intention of the CRTC not to mandate resale, as stated in Decision 98−9 of July 9th 1998. The reason why resale has been mandated was purely the result of the CAIP complaint of May 17th 1999.

The CRTC will probably never admit it in public that mandating resale was probably the only way to get the ball rolling again after the extremely poor responses of the Canadian cable television carriers to both Decisions 98−9 and 99−8.

No cable television carrier is expected to welcome competition from parties to which it is obligated to resell services at a 25% discount below lowest retail rates. The 25% figure is very important as 1) it denies the possibility that discount−based bundling of services be used at a disadvantage to ISPs and 2) it also forces cable television carriers to develop third party access rates which guarantee at least a 25% margin for ISPs.

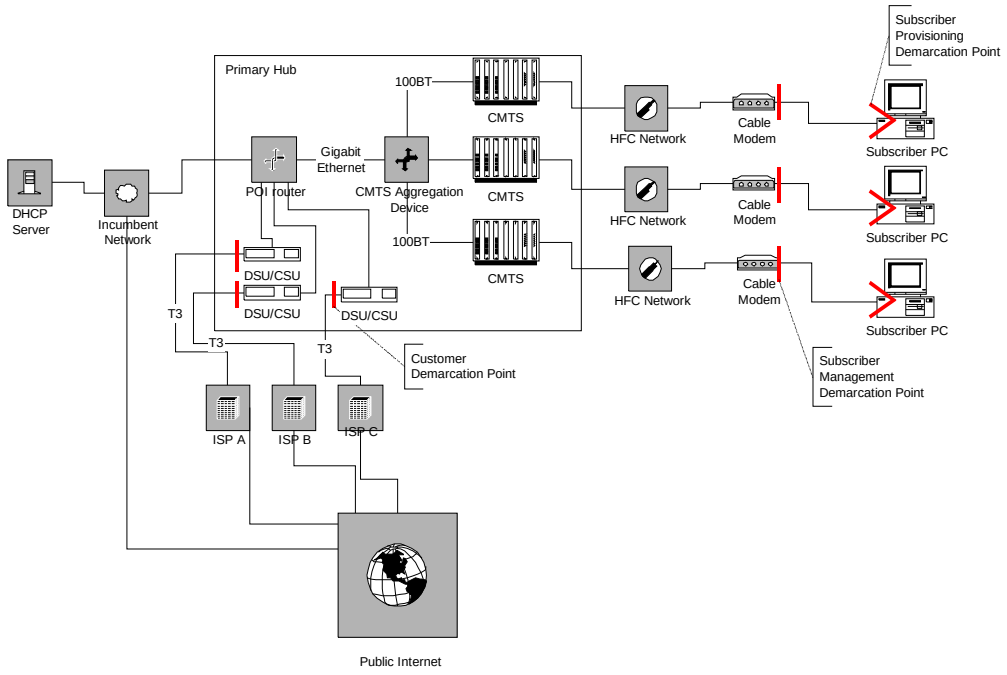
Third Party Access

Discussions conducted between CAIP and Videotron in the summer of 1999 were revealed to the public through a status report filed on August 10th 1999[12]. This report stated that cable television carriers were now going to claim that the Point Of Interconnection (POI) should not be used to introduce any architectural change to their existing networks, but rather as a mere addition required for providing interconnections to third parties. Specifically, Videotron challenged the POI reference architecture[13] of the CCTA, by saying that the POI was an addition to their existing network architecture and that the reference architecture below was not a representation of their network.

Third party access is enabled by a Point Of Interconnection (POI), which provides the interconnection between the ISP network and the cable television carrier network.

The following diagram depicts the original proposed architectural reference model of interconnection between the Canadian cable television industry and the Canadian ISPs.

[12] http://www.crtc.gc.ca/ENG/PROC_REP/TELECOM/1998/8638/CCTA/Tech0810.doc
[13] http://www.crtc.gc.ca/ENG/PROC_REP/TELECOM/1998/8638/CCTA/tekdec22.doc



TEKTON	TITLE: Equal Access Logical Network Diagram	FILENAME: EA Logical.vsd
	PROJECT: Equal Access – Point of Interconnect	CREATOR: Frank Reiter
	DATE: 12/11/98 TIME: 2:35:21 PM PG: 1 OF 1 PGS	© 1998 Tekton Internet Associates, Inc

Diagram courtesy of Tekton Internet Associates Inc. From http://www.crtc.gc.ca/ENG/PROC_REP/TELECOM/1998/8638/CCTA/tekdec22.doc

However, in order for this drawing to represent the present view of Videotron, there would need to be a line between the **CMTS Aggregation Device** box and the **Public Internet** box.

Equal access

The ability of the cable television carrier to interconnect its facilities to the Internet without having its traffic pass through the POI, represents a dramatic departure from the original memorandum of understanding between CAIP and the CCTA on the definition of POI. According to the ISPs, the ability for cable television carriers to bypass the POI causes the traffic of the cable television carriers to be treated preferentially. Furthermore, the fact that the traffic of the incumbent cable television carrier would not be routed through the POI would also result in customers of the incumbent cable television to never be affected by the downtime of the POI.

Third party access rates

The 25% discount decided in Decision 99−11 has serious implications on projected cost of the POI, which affects directly the third party access rates. The menace of resale and the mandatory 25% discount are two separate facts of Decision 99−11, which are now motivating the cable television carriers to develop more efficient rates and cost−effective POIs. The first motivating element is that the rates will now need to be completed, filed and approved as soon as possible in order to limit the duration of the availability of resale. The second motivating argument is that the cost of the POI must not become a deterrent preventing the margins of third party access to be any lower than the 25% margins granted through mandatory resale.

Forwarding IP packets by looking at the source address field

In the negotiations between CAIP and CCTA, "source routing" was chosen as the preferred way to split the traffic amongst multiple ISPs peering at a Point Of Interconnection (POI). The choice of the Canadian cable television carriers to use a Cisco TCP/IP router to perform this task was not an element of the negotiations. Neither CAIP nor CCTA found it a problem to limit the choice of the equipment for the POI to only one vendor, i.e. Cisco Systems Inc.

Splitting traffic using "Source Routing" means that the POI equipment is responsible for forwarding the traffic to ISPs by looking at the source field inside each IP packet. When the source IP address is matched as being assigned to a given ISP, the POI device forwards the packet onto the interface that provides the dedicated interconnection to a specific ISP.

The CCTA has proposed that no routing information be exchanged through the POI. The use of a full−blown TCP/IP router to perform source routing would thus be overly expensive. Finally, a device specialized in complex routing algorithms (OSPF, BGP−4) is an overly complex instrument for the only purpose of source routing.

Most Layer 3 Ethernet switches are capable of wire−speed source−address packet forwarding on all of their Ethernet ports. Such equipment has thus supplanted conventional TCP/IP routers as a more appropriate choice for the equipment of the POI. Historically, TCP/IP routers have been designed in such a way that their efficiency was attained by computing fast paths by finding similarities in the destination fields of each IP packets flowing through their interfaces. Forwarding packets by looking at the source field inside each IP packet has always been a challenging task for old process−switched software routers.

The architecture of Layer 3 Ethernet switches is better suited for this task, as they are usually designed using a hardware−based layer 3 switching which is aware of the content of IP packets. Layer 3 switches are capable to perform this task for each and every IP packet, at full wire speed, on each and every port of the switch.

Finally, the cable television carriers in Canada are still advocating that the "source−based policy routing" of Cisco routers has yet to be tested and that they need to test the Cisco equipment thoroughly before third party access can be made available. However, a number of Layer 3 Ethernet switch manufacturers are saying that their products have been shipped with this feature for quite some time already and that such load testing does not need to be performed on their equipment.

TCP/IP emerging as a regulatory middleware for bridging incompatible business models

The existence of TCP/IP and Internet Protocol layering demands a new understanding by regulators, and everyone else, of what interconnection could mean[14].

TCP/IP is a phenomenal tool for bridging incompatible business models. We shall look first at the incompatible business models, and then, in a subsequent essay, look at the concept of interconnection in an era of Internet protocols.

The following table illustrates the fundamental incompatibilities between the business models of Internet services offered by ISPs and Internet access services provided by the cable television carriers.

Internet Service Provider	Cable Television Carrier
Horizontally−specialized Internet services provider • Wants to offer the most specialized Internet Services for a flat fee per month. • Wants to compete with cable carriers to the full extent of what could be achieved if the ISP had complete control over all of the bandwidth available in the cable television network.	**Provider of vertically integrated Internet access services** • Wants to remain a traditional cable television carrier and preserve the status quo of non−IP−based television broadcasting. • Wants to offer mass market Internet Services, only as long as such services do not compete with existing television broadcasting activities. • Wants to compete with the incumbent local exchange carriers (ILEC) with lifeline residential telephony services in order to win the business of people who would only want a phone line.
Bandwidth should give birth to new applications • Generally prefers to throw bandwidth at the problem and maintain a rapid pace of innovation in the introduction of new services rather than sit back, and limiting the number of profitable applications while tightly controlling the bandwidth.	**Few regulated services should drive the need for bandwidth** • Allocates bandwidth carefully by confining all Internet Services to as few television channels as possible. Favours implementing IP QoS (Quality of Service) mechanisms for VoIP, rather than simply increasing the bandwidth available to all.

[14] The author will have more to say on this subject in a forthcoming paper to be produced in conjunction with Timothy Denton.

No entrenched business model	Entrenched business model
• Growing the pie is better than keeping it all for oneself. • To a certain extent, the ISP doesn't care about the way existing services are being sold today. An IP telephony dialtone doesn't have to sound like a PSTN dialtone. • Wants its Internet Telephony services to be different from the IP telephony services of the cable television carriers. • Wants its Internet Video Multicasting services to be able to fully compete with the traditional television broadcasting services of the incumbent cable television carrier. • Doesn't care about centralized control	• Bigger priority for going after the market share of the ILEC requires, than growing the overall market. • Risks of failure if the innovation is too strong, therefore offers same services as ILEC, but cheaper. • No will or capability to become a specialized provider, you have to be small for doing this. Total costs of ownership curves generally have an S shape. The cost of the infrastructure far outweighs the ability to remain flexible. • Favours centralized control
Simple, all−you−can−eat bill	**Complex usage−based billing**
• Favours horizontally−specialized, all you can eat, flat−fee per month, traditional Internet Access business model over a business model of generating revenue streams on a per−application basis.	• Favours TCP/IP applications, which are vertically integrated with their infrastructure in a proprietary manner. • Happy to charge on a per−application basis and firewall certain TCP/IP ports.

In the era of the Internet, TCP/IP interconnections have the potential to become much more than the regulatory equivalent to traditional facilities−based interconnections.

Without developing a new approach to telecommunications policy which favours horizontal specialization of services rather than the vertical integration of services, the regulators are facing the prospect of seeing Internet services, as we know them today, never materialize in the high−speed Internet access marketplace.