



Telecom Decision CRTC 2010-387

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Viability of proposals for the provision of E9-1-1 service for nomadic and fixed/non-native VoIP subscribers

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In this decision, the Commission determines that there are no viable alternatives to the voice over Internet Protocol (VoIP) 9-1-1 service currently provided with nomadic and fixed/non-native VoIP service. The Commission therefore directs nomadic and fixed/non-native VoIP carriers to make certain improvements to their current VoIP 9-1-1 service until next-generation 9-1-1 service is implemented. The Commission also requests the CRTC Interconnection Steering Committee Emergency Services Working Group to monitor developments that could lead to further improvements to the current VoIP 9-1-1 service or lead to a viable alternative solution, and to file an annual report of its findings.

Introduction

1. In Telecom Decision 2006-60, the Commission approved the recommendations of the CRTC Interconnection Steering Committee (CISC) Emergency Services Working Group (ESWG) regarding the technical and operational challenges associated with provisioning 9-1-1/enhanced 9-1-1 (E9-1-1) service with nomadic local voice over Internet Protocol (VoIP) service or with fixed/non-native VoIP service.¹ To address these challenges, the ESWG recommended a long-term solution based on the National Emergency Number Association i2 standard, adjusted as necessary for implementation in Canada. The Commission also requested the ESWG to file a report on a functional architecture based on this proposed solution for the implementation of VoIP E9-1-1 service in Canada.
2. The ESWG subsequently filed Non-Consensus Report ESRE0044, *Report on a Functional Architecture for the Implementation of VoIP E9-1-1 Service in Canada* (the Report). The Report included a functional architecture of a Canadian version of the i2 standard (referred to in this decision as Ci2) as proposed by Bell Aliant Regional Communications, Limited Partnership; Bell Canada; Saskatchewan Telecommunications; and TELUS Communications Company (collectively, the Companies).

¹ Fixed/non-native VoIP service involves the use of a telephone number that is not associated with any of the exchanges within a customer's public safety answering point serving area.

3. In Telecom Decision 2007-125, the Commission noted that, in principle, Ci2 met the requirements set out in Telecom Decision 2006-60. However, the Commission also noted that members of the ESWG had been unable to come to a consensus on Ci2 and that Cogeco Cable Inc., Rogers Communications Inc. (RCI), Shaw Communications Inc., and Quebecor Media Inc. (collectively, the Cablecos),² as well as MTS Allstream Inc. (MTS Allstream), questioned the viability of Ci2.
4. The Commission therefore considered it necessary to determine the viability of Ci2 before requiring the industry to proceed with its implementation. Consequently, in Telecom Decision 2007-125 and Telecom Notice of Consultation 2009-194, the Commission directed the Companies, the Cablecos, MTS Allstream, and interested parties to file additional information, alternative approaches, and economic studies of Ci2 for evaluation.
5. The Commission received submissions from various incumbent local exchange carriers (ILECs), high-speed Internet access service providers (ASPs), nomadic VoIP service providers, equipment vendors, and other interested parties.
6. The public record of this proceeding, which closed on 20 November 2009, is available on the Commission's website at www.crtc.gc.ca under "Public Proceedings" or by using the file numbers provided above.

Issues

7. The Commission has identified the following issues to be addressed in this decision:
 - I. Is the proposed Ci2 solution viable?
 - II. Are any of the proposed alternative solutions to Ci2 viable now?
 - III. Can the current VoIP 9-1-1 service be improved, and if so, how?
 8. The Commission notes that parties generally focused their submissions on nomadic VoIP services, although Ci2 was also intended to benefit subscribers of fixed/non-native VoIP services. For this reason, the Commission has also focused on nomadic VoIP services, but considers that its reasoning regarding the viability of Ci2 and of alternative solutions to Ci2 is generally applicable to fixed/non-native VoIP services as well.
- I. Is the proposed Ci2 solution viable?**
9. Based on the record of the proceeding, the Commission has concluded that it must consider the technical issues associated with the Ci2 solution, as well as 9-1-1 technology trends and evolution, in determining whether or not the solution is viable.

² At the time of publication of Telecom Decision 2007-125, Rogers Communications Inc. was known as Rogers Cable Inc. and Quebecor Media Inc. was known as Videotron Ltd.

Technical issues and technology trends and evolution

10. The Cablecos, MTS Allstream, and certain other parties submitted that Ci2 has been outpaced by market and technological developments, does not take into account the future market for Internet communications, and would be obsolete by the time it is implemented because of the advent of next-generation 9-1-1 service (NG9-1-1). They indicated that industry participants and international standard-making bodies are focused on developing NG9-1-1. As such, they submitted that implementing Ci2 would lead Canada to a technological dead end and would result in costly retrofits to convert a highly customized solution to one based on international standards. They added that the current VoIP 9-1-1 service, which provides a level of 9-1-1 service for nomadic and fixed/non-native VoIP service subscribers that is functionally comparable to basic 9-1-1 service, should be maintained until the deployment of NG9-1-1.
11. The Companies submitted that broadband, wireline, and wireless 9-1-1 service subscribers would benefit to some extent from the implementation of Ci2 in the long term and that Ci2 could serve as a stepping stone to NG9-1-1. However, the Companies added that if Ci2 is not adopted, the current VoIP 9-1-1 service should be maintained until NG9-1-1 is deployed.

Commission's analysis and determinations

12. The Commission notes that no parties indicated that Ci2 or a similar nomadic VoIP E9-1-1 service has been implemented in other countries. The Commission therefore considers that the proposed Ci2 solution is untested and that actual experience with respect to the feasibility and costs of implementing such a solution does not exist.
13. The Commission also notes that all parties agreed that the long-term goal in the evolution of the 9-1-1 network is to migrate customers to NG9-1-1. Further, the Commission notes that Ci2 implementation is expected to take at least two years and that, similarly, the deployment of NG9-1-1 is expected in a few years. The Commission considers that future solutions based on NG9-1-1 would support nomadic VoIP service by using location-aware devices to determine a subscriber's location, which would make it unnecessary for ASPs to implement a location-determining platform in their networks.
14. The Commission considers that NG9-1-1 offers several benefits that will likely result in a technologically advanced solution: it is based on international standards; it introduces improved technologies for location detection; and it provides access for multiple communications devices and technologies, on both wireline and wireless networks.
15. The Commission notes that access to nomadic VoIP services is migrating from wireline to wireless high-speed Internet access through the use of wireless devices such as cellphones. However, for technical reasons, Ci2 cannot be used to determine the location of a 9-1-1 caller when the nomadic VoIP service subscriber is using a wireless connection.

16. In light of the above, the Commission considers that by the time Ci2 would be implemented, it is likely that it will have become outdated as a result of technological changes and market developments such as the introduction of NG9-1-1.

Other considerations

Consumer demand and usage patterns

17. All parties generally agreed that there are currently fewer than 200,000 nomadic VoIP service subscribers in Canada and that the expected demand for this service has not materialized, despite previous projections that there would be millions of subscribers.
18. The Cablecos and MTS Allstream submitted evidence that the number of nomadic VoIP service subscribers is actually declining and that the number of 9-1-1 calls made by these subscribers is also declining and represents only a small fraction of total 9-1-1 calls. The Cablecos, MTS Allstream, and certain other parties submitted that, given the small and declining size of the nomadic VoIP service subscriber base, implementing Ci2 is not technically nor economically viable.

Commission's analysis and determinations

19. The Commission notes that, according to its 2009 *Communications Monitoring Report*, the number of nomadic VoIP service subscribers declined from 161,000 in 2007 to 153,000 in 2008, and accounted for 0.8 percent of wireline telephone service subscribers in 2008. Based on these statistics and assuming no further declines, the Commission notes that the nomadic VoIP service subscribers who would potentially use Ci2 comprise 0.4 percent of all 9-1-1 subscribers and 2 percent of high-speed Internet subscribers.
20. The Commission also notes that the *Nomadic VoIP Usage in Canada* study submitted by the Cablecos as part of this proceeding indicates that two-thirds of Canadian households with nomadic VoIP service do not use it as their primary phone service. In addition, when travelling, 73 percent of nomadic VoIP service subscribers use their cellphone instead of the nomadic VoIP service, and only 4 percent use their nomadic VoIP phone adapter. The Commission notes that these statistics indicate that most nomadic VoIP service subscribers rely on other wireline and wireless services as their primary telephone service, which they can use to obtain access to emergency services. Based on the Cablecos' study and as noted above, the Commission notes further that access to nomadic VoIP services is migrating from wireline to wireless high-speed Internet access.
21. In light of the above, the Commission concludes that the nomadic VoIP service subscriber base represents a small portion of 9-1-1 users and is in decline. It also concludes that subscribers, whether at home or travelling, are generally able to rely on other wireline or wireless services in order to access a 9-1-1 service that

is comparable to Ci2. Consequently, the Commission considers that the implementation of Ci2 would provide an additional benefit to only a small and decreasing subset of nomadic VoIP service subscribers.

Implementation costs

22. The Cablecos submitted that the costs of implementing Ci2 would be about \$200 million. The Cablecos, MTS Allstream, and certain other parties submitted that these costs are too high, making Ci2 unviable, and that alternative solutions exist that are more economically viable than Ci2.
23. Parties submitted different recommendations for allocating costs among the various companies. Some parties submitted that Ci2 is only economically viable if all the costs are shared among all E9-1-1 users, while other parties submitted that costs should not be subsidized by other wireline, wireless, or high-speed Internet subscribers, as Ci2 would only benefit nomadic VoIP service subscribers.
24. Parties also commented on the specific costs for the ASPs. Certain parties submitted that the high costs of Ci2 implementation would drive small ASPs out of business. They indicated that small ASPs lack the technical knowledge and expertise required for implementation, and should not be made responsible for any of the costs. Other parties submitted that VoIP service providers should be responsible for any ASP costs.
25. Finally, some parties submitted that small ASPs should be exempt from having to implement Ci2 as a way to reduce the cost of implementation. Other parties countered that such an exemption would create gaps in the coverage of nomadic VoIP E9-1-1 service in the areas served by the small ASPs, which would lead to public safety risks.

Commission's analysis and determinations

26. Based on the record of the proceeding, the Commission estimates that the overall cost of implementing Ci2 is more than \$180 million.
27. Historically, the service provider whose subscribers benefit from access to 9-1-1 service has been responsible for all costs of providing that service. Providers usually pass these costs on to their subscribers. It is through this mechanism that wireless, traditional wireline, fixed VoIP, and nomadic VoIP service providers currently cover the cost of providing 9-1-1 service to their own subscribers. The Commission notes, however, that this approach is not viable for nomadic VoIP service, as providers would not be able to generate sufficient revenues to bear the costs of implementing and operating Ci2, which are estimated at \$15 per month, per nomadic VoIP service subscriber.
28. Finally, the Commission considers that exempting small ASPs from implementing Ci2, while lowering the overall costs of implementation, would create public safety risks in the areas they serve. This is compounded by the fact that there are hundreds of small ASPs across Canada, so subscribers would not be aware of, or would have difficulty determining, where these gaps in service were.

Conclusion

29. Based on all the above, the Commission concludes that the implementation of Ci2 is not viable due to Ci2's technical limitations in the face of evolving 9-1-1 technology, decreasing demand for and usage of nomadic VoIP service, and the cost of Ci2 implementation.

II. Are any of the proposed alternative solutions to Ci2 viable now?

30. The Commission invited parties to suggest alternatives to Ci2 that may have arisen since Ci2 was proposed. The alternatives proposed were "IP tracker," variations of Ci2, and NG9-1-1.

IP tracker

31. RCI proposed an "IP tracker" alternative that is a variation of the current VoIP 9-1-1 service. This proposal would require a nomadic VoIP service provider to implement the capability to detect a major change in the IP address used to access the Internet and then automatically direct the subscriber to the VoIP service provider's call centre to update their location. When the subscriber dials 9-1-1, the call centre would direct the call to the appropriate public safety answering point (PSAP) and verbally provide location information, as is the case with the current VoIP 9-1-1 service.
32. The Cablecos conditionally supported the IP tracker alternative proposal on the basis that it is significantly less costly and quicker to implement than Ci2. However, they acknowledged that this solution involves assumptions that would work only on cable networks and not on ASP networks that are based on digital subscriber line (DSL) technology.
33. The Commission considers that the IP tracker proposal has a number of technical deficiencies, mainly that it may not be possible for VoIP service providers to detect major changes in the IP addresses assigned to high-speed Internet users of some ASPs, in particular those using DSL technology. The Commission also considers that the IP tracker solution would not enable providers to detect more common minor changes in IP addresses, which may result from a change in subscriber location.
34. Based on the above, the Commission concludes that the IP tracker proposal is not a viable alternative.

Variations of Ci2

35. The Cablecos proposed as alternatives a few variations to a specific part or parts of Ci2, all of which left most of the Ci2 architecture and processes intact and reduced the overall cost.

36. The Commission notes that the variations of Ci2 as proposed would result in reduced functionality or removal of certain important features and processes within Ci2. The Commission considers that this situation would negatively affect the overall functioning of Ci2 and the accuracy of information provided to PSAPs. Accordingly, the Commission concludes that the proposed variations would jeopardize the overall integrity of Ci2 and that implementation of these proposals would result in public safety risks.
37. The Commission also notes that the Cablecos stated in their submissions that their main motivation in proposing variations to the Ci2 architecture was to reduce the overall cost and complexity of Ci2 implementation in their networks. While the accompanying cost studies submitted by the Cablecos indicate that these changes would reduce overall Ci2 costs, the Commission concludes that the reductions are not significant.

NG9-1-1

38. The Cablecos, MTS Allstream, and certain other parties submitted that future solutions based on NG9-1-1 would be able to provide location information for nomadic VoIP service providers. They submitted that such solutions would use location-aware devices (e.g. GPS-enabled devices) to determine a subscriber's location and would therefore not require the implementation of a location-determining platform in ASPs' networks. They added that vendors and the industry are currently developing NG9-1-1 technologies and standards.
39. The Commission considers that, while NG9-1-1 solutions are likely to become viable alternatives in the future, the associated technologies and standards have not yet matured to the point where they can be considered viable alternatives today.

Conclusion

40. The Commission notes that all parties submitted that maintaining the current VoIP 9-1-1 service would be better than implementing any of the proposed alternatives, with certain parties supporting the alternative solutions only to the extent that they are less costly than Ci2. The Commission considers that the proposed alternative solutions are not technically viable, pose public safety risks, and lack the integrity and robustness required for 9-1-1 services.
41. The Commission therefore concludes that none of the proposals is currently a viable alternative solution to providing VoIP E9-1-1 service.

III. Can the current VoIP 9-1-1 service be improved, and if so, how?

42. The Commission notes that a number of previously mandated improvements to the current VoIP 9-1-1 service have already enhanced the quality of the service. For example, in Telecom Decision 2007-44, the Commission mandated the implementation of a VoIP 9-1-1 call routing service that enabled PSAPs

to receive nomadic and fixed/non-native VoIP 9-1-1 calls through the same access and priority queue as other 9-1-1 calls. In Telecom Circular 2008-2, the Commission provided guidance on the processes and procedures that nomadic VoIP service providers are to use in verbally determining a 9-1-1 caller's location. In addition, in Telecom Decision 2005-61, the Commission required local VoIP service providers to implement a stringent customer notification regime that informs customers of the service limitations and measures they should take, such as providing their location when making a 9-1-1 call.

43. The Commission notes that one of the improvements suggested in this proceeding is to require VoIP service providers to request customers to provide or confirm their most likely physical address when they change their billing address. Another suggested improvement is to require VoIP service providers to allow their customers to update online their most likely physical address. In both of these examples, this location information is to be used only in cases where the subscriber makes a 9-1-1 call and is not able to verbally provide their location.
44. The Commission notes that many VoIP service providers are already using the improvements suggested above and considers that such measures ensure the availability of additional information that could prove to be crucial in an emergency situation. The Commission considers that these measures complement the existing requirement for VoIP service providers to verbally request and/or confirm the caller's location for all 9-1-1 calls, and that their implementation would enhance public safety.
45. The Commission therefore directs all Canadian carriers that offer nomadic and fixed/non-native VoIP services to implement the following measures, within **90 days** of the date of this decision: (1) contact customers each time they change their billing address to confirm their most likely physical address for emergency purposes; and (2) ensure that customers are able to update their most likely physical address online. The Commission also directs Canadian carriers, as a condition of providing telecommunications services to nomadic and fixed/non-native VoIP service providers, to include in their service contracts or other arrangements with these providers the requirement that the latter abide by this direction.
46. Finally, the Commission requests the ESWG to monitor developments that could either improve the current VoIP 9-1-1 service or lead to a viable solution that would automatically provide a nomadic and fixed/non-native VoIP 9-1-1 caller's location to PSAPs. The Commission requests the ESWG to file with the Commission an annual report of its findings.

Secretary General

Related documents

- *Call for comments – Nomadic VoIP E9-1-1 service*, Telecom Notice of Consultation CRTC 2009-194, 15 April 2009, as amended by Telecom Notice of Consultation CRTC 2009-194-1, 4 June 2009
- *Emergency service obligations of nomadic local VoIP service providers related to determining the location of a 9-1-1 caller*, Telecom Circular CRTC 2008-2, 28 July 2008
- *CRTC Interconnection Steering Committee – Non-consensus report on a functional architecture for the implementation of nomadic VoIP E9-1-1 service in Canada*, Telecom Decision CRTC 2007-125, 7 December 2007
- *Routing of fixed/non-native and nomadic VoIP 9-1-1 calls to public safety answering points*, Telecom Decision CRTC 2007-44, 15 June 2007
- *CRTC Interconnection Steering Committee – Consensus report on E9-1-1 services provided to nomadic and fixed/non-native VoIP subscribers*, Telecom Decision CRTC 2006-60, 21 September 2006
- *Follow-up to Emergency service obligations for local VoIP service providers, Decision 2005-21 – Customer notification requirements*, Telecom Decision CRTC 2005-61, 20 October 2005