



Telecom Decision CRTC 2020-150

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CISC Emergency Services Working Group – Consensus report ESRE0089 regarding next-generation 9-1-1 mapping and addressing considerations

*The Commission **approves**, with modifications, the recommendations made in the CRTC Interconnection Steering Committee’s Emergency Services Working Group’s (ESWG) consensus report ESRE0089 related to the development of a Canadian geographic information systems (GIS) data model for Canadian next-generation 9-1-1 (NG9-1-1) mapping. The Commission **directs** that NG9-1-1 network providers are to be the default GIS data aggregators for their serving territories, in accordance with terms set out in the recommendations as approved. The Commission also requests the ESWG to submit, by **5 July 2021**, a follow-up report that provides recommendations on the creation and implementation of a GIS model and a civic address exchange format that are specific to Canada.*

Background

1. Canadians currently have access to either basic 9-1-1 or enhanced 9-1-1 service through wireline, wireless, and voice over Internet Protocol (VoIP) telephone services wherever a 9-1-1 call centre, also known as a public safety answering point (PSAP), has been established.¹
2. At present, when a caller dials 9-1-1, the call travels from the network from which it was placed to the local specialized 9-1-1 network. The 9-1-1 network then determines, based on certain location information, which PSAP serves the area from which the emergency request originated and routes the call to that PSAP, along with associated information such as the location and telephone number of the caller, if available. The PSAP then dispatches emergency responders as required.
3. In Telecom Regulatory Policy 2017-182, the Commission established a framework for 9-1-1 networks to transition to Internet Protocol (IP) technology in order to enable Canadians to access next-generation 9-1-1 (NG9-1-1) services. With NG9-1-1 services, callers will be able to supply information to emergency responders by such means as streaming video or sending photos, data, or texts.

¹ Basic 9-1-1 service enables callers to connect to 9-1-1 operators, who dispatch the appropriate emergency responders. Enhanced 9-1-1 service includes basic 9-1-1 service but also automatically provides 9-1-1 operators with ancillary information, such as the telephone number and location of the caller.

Geographic information systems data model

4. A critical requirement of 9-1-1 networks is the ability to accurately determine the location of the caller requiring emergency assistance. Once NG9-1-1 services have been implemented, information about caller location will be based on a mapping and geographic information systems (GIS) data model for the capture, storage, display, and analysis of spatially referenced data. GIS data will be used in the provision of NG9-1-1 core services,² such as the determination of caller location and call routing, and by PSAPs in the use of mapping applications to validate location and, ultimately, to dispatch emergency services.
5. There are three key roles associated with GIS data: providers, aggregators, and consumers. Data providers assign addresses and create, collect, maintain, and share spatial datasets; data aggregators gather data into logical datasets; and data consumers use the datasets at various points while processing 9-1-1 calls. Data providers may also act as data aggregators.
6. Entities that provide and aggregate data include 9-1-1 governing authorities³ and the addressing authorities of municipal, provincial, territorial, and First Nations governments. NG9-1-1 network providers⁴ act as data aggregators in certain situations. Data consumers may include NG9-1-1 network providers, telecommunications service providers (TSPs), PSAPs, and PSAP equipment suppliers.
7. In Telecom Decision 2015-531, the Commission approved the adoption of the National Emergency Number Association (NENA)⁵ i3 network architecture standard⁶ as the standard for NG9-1-1 services in Canada. The NENA i3 standard defines a [GIS data model](#) that includes the GIS data model for the United States.

² NG9-1-1 core services are the base set of services needed to process a 9-1-1 call on an emergency services IP network.

³ A 9-1-1 governing authority is a provincial, territorial, regional, or other governmental entity having administrative jurisdiction over a particular 9-1-1 system.

⁴ In Canada, NG9-1-1 network providers are Bell Canada, TELUS Communications Inc., and Saskatchewan Telecommunications.

⁵ NENA is a 9-1-1 standards-making organization whose mission is to foster the technological advancement, availability, and implementation of the 9-1-1 emergency system. NENA is based in the United States and has a Canadian chapter and membership. It is composed mostly of PSAPs, equipment vendors, and TSPs.

⁶ The NENA i3 architecture standard is an end-to-end IP-based network architecture standard. This standard also introduces the concept of an Emergency Services IP network, which is an IP-based network that connects TSPs with all public safety agencies that may be involved in an emergency.

8. Currently, caller location and call routing rely on legacy telephone number record formats and the Master Street Address Guide/Street Address Guide (MSAG/SAG).⁷ With NG9-1-1 services, a common format for exchanging civic addresses is used in combination with the GIS data model. To this end, NENA developed the Civic Location Data Exchange Format (CLDXF), based on an international standard for expressing civic addresses. The CLDXF has been adopted as the civic address exchange standard in the United States.

NG9-1-1 mapping

9. NG9-1-1 mapping is an integral component of the NENA i3 network architecture standard and falls under the authority of various levels of municipal, provincial, and territorial governments that are the source of mapping (GIS) data.

Report

10. On 8 October 2019, the CRTC Interconnection Steering Committee (CISC) Emergency Services Working Group (ESWG) submitted the following consensus report (the report) for Commission approval:
 - *NG9-1-1 Mapping (GIS) and Addressing Considerations*,
12 September 2019 (ESRE0089)
11. The report can be found in the “Reports” section of the ESWG page, which is available in the CISC section of the Commission’s website at www.crtc.gc.ca.
12. The ESWG initiated the report to consider the Canadian GIS mapping and data model, Canadian NG9-1-1 mapping, and the development of a common civic addressing format for Canada. The report includes recommendations pertaining to the collection and aggregation of GIS and addressing data, and to the secure delivery of such data to NG9-1-1 network providers (the recommendations). Finally, the report identifies matters for further consideration, in particular the process of nationally implementing a Canadian mapping and GIS data model and a Canadian-specific CLDXF. The report is based on the views of NG9-1-1 stakeholders.⁸ Participants reached consensus on the recommendations.
13. In the report, the ESWG concluded that the adoption of the NENA GIS data model standard as the baseline for assessing Canada’s NG9-1-1 requirements was appropriate. However, the ESWG indicated that several information input fields in the NENA GIS data model would need to be adjusted to meet Canadian-specific language and addressing requirements, such as the use of postal codes and

⁷ The MSAG/SAG is a database of street names and house number ranges; it defines emergency service zones within a community and the emergency service numbers associated to them in order to enable proper routing of basic 9-1-1 and enhanced 9-1-1 calls.

⁸ Stakeholders include NG9-1-1 network providers, GIS experts and practitioners, local and provincial governments, originating network providers, PSAPs, and vendors.

French-language prefixes and suffixes. The ESWG recommended the use of NENA's standards development process in making those adjustments.

14. The ESWG noted that the responsibility for creating, cleansing, and maintaining addressing and GIS data currently lies with addressing authorities, where such civic addressing is available. Where there is no provincial⁹ data aggregator, the NG9-1-1 network provider receives the required data directly from the local addressing/GIS authorities.
15. The ESWG stated that communication with GIS data providers and consumers will be necessary to ensure they are aware of the impact that the implementation of NG9-1-1 service will have on their roles, responsibilities, and processes.

Recommendations

16. In the report, the ESWG made the four following recommendations:
 1. that, where not otherwise defined by provincial legislation, and absent a provincial body that acts as a GIS aggregator, the Commission mandate that the incumbent local exchange carrier (ILEC) be, by default, the GIS and addressing data aggregator for its serving territory for the purpose of NG9-1-1;
 2. that, where a provincial body exists, or comes to be in the future, and in the absence of provincial legislation governing the responsibility for the aggregation of 9-1-1 GIS data, the Commission mandate that the ILEC formally identifies that provincial body in the NG9-1-1 service agreement signed with the applicable 9-1-1 governing authority, and states that the provincial body is responsible for providing aggregated GIS and addressing data to the ILEC on behalf of the 9-1-1 governing authority for the purpose of NG9-1-1;
 3. that the Commission require that sensitive 9-1-1 related datasets/layers be provided directly to NG9-1-1 network providers, without transiting through any shared open platform; and
 4. that the Commission mandate NG9-1-1 network providers to include in their NG9-1-1 service agreements with the 9-1-1 governing authority a provision that NG9-1-1-related GIS and addressing data must be provided to the NG9-1-1 network provider directly and in a secure manner.

⁹ For the purposes of this decision, the term "provincial" will henceforth be used as a generic term that includes provinces, territories, and First Nations governments.

17. Further, the ESWG indicated that it would

- provide, in a subsequent report to the Commission, its recommendations regarding the implementation process for a standardized, nationally available Canadian NG9-1-1 GIS data model, along with any associated processes for impacted stakeholders (PSAPs, TSPs, etc.);
- incorporate Canadian-specific requirements and other feedback into the next version of the NENA NG9-1-1 GIS data model standard document;
- provide, in a subsequent report to the Commission, its recommendations regarding the implementation process for a standardized, nationally available Canadian CLDXF, along with any associated processes for all impacted stakeholders (PSAPs, TSPs, etc.); and
- create a Canadian-specific CLDXF standard document to replace the current legacy telephone number record formats and the MSAG/SAG.

Commission's analysis and determinations

18. The Commission considers that stakeholders were appropriately represented in the development of the report and the recommendations.

19. The Commission considers the recommendations to be appropriate, reasonable, and consistent with the broader strategic objectives of its NG9-1-1 framework, namely, that solutions be standards-based and nationally consistent, and that they enhance the safety of Canadians by potentially reducing response times during emergency incidents.¹⁰

20. The Commission agrees with the general intent of the recommendations. However, recommendations 3 and 4 (found at paragraph 17 of this decision) will be combined to provide clarity for the impacted ILECs and ensure that obligations are not seen to be imposed on provincial data aggregators, over which the Commission has no authority.

21. Further, the modified recommendations will ensure that, where no provincial GIS and addressing data aggregator is in place, ILECs will take on that key role, thus facilitating the successful delivery of NG9-1-1 services in a safe and secure manner.

22. Accordingly, the Commission **approves** the recommendations, with modifications, and **directs** that:

1. by default, the NG9-1-1 network provider is to be the GIS and addressing data aggregator for its serving territory for the purpose of NG9-1-1, where not

¹⁰ See Telecom Regulatory Policy 2017-182, paragraph 24.

otherwise defined by provincial legislation, and absent a provincial body that acts as a GIS data aggregator;

2. in the absence of provincial legislation, when the provincial body has been established and agrees to act as a GIS data aggregator for 9-1-1 purposes, the NG9-1-1 network provider is to identify that provincial body in the NG9-1-1 service agreement signed with the applicable 9-1-1 governing authority; and
 3. the NG9-1-1 network provider is to include in its NG9-1-1 service agreement with the 9-1-1 governing authority a provision that specifies that sensitive NG9-1-1-related GIS and addressing data must be provided directly to the NG9-1-1 network providers in a secure manner without transiting through any shared open platform.
23. Further, the Commission requests the ESWG to file a follow-up report with the Commission, by **5 July 2021**, that includes an assessment of and recommendations pertaining to the following issues, identified as matters for further consideration in the report:
- the creation of a Canadian-specific CLDXF standard document, which would replace the current legacy telephone number record formats and the MSAG/SAG;
 - the implementation process for a standardized, nationally available Canadian CLDXF, and any associated processes for impacted stakeholders such as PSAPs and TSPs;
 - the incorporation of Canadian-specific requirements and other feedback into the next version of the NENA NG9-1-1 GIS data model standard document; and
 - the implementation process for a standardized, nationally available Canadian NG9-1-1 GIS data model, and any associated processes for impacted stakeholders such as PSAPs and TSPs.

Policy Directions

24. In accordance with subparagraph 1(b)(i) of the 2006 Policy Direction,¹¹ the Commission considers that approval of the ESWG report and the recommendations will advance the policy objectives set out in paragraphs 7(g) and (h) of the *Telecommunications Act*.¹²

¹¹ *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives*, SOR/2006-355, 14 December 2006

¹² The cited policy objectives are: 7(g) to stimulate research and development in Canada in the field of telecommunications and to encourage innovation in the provision of telecommunications services; and 7(h) to respond to the economic and social requirements of users of telecommunications services.

25. The 2019 Policy Direction,¹³ which complements the 2006 Policy Direction, states that the Commission must consider and specify how its determinations promote competition, affordability, consumer interests, or innovation, as applicable. The report addresses technical matters related to the accurate determination of caller location for emergency services, and the security of NG9-1-1 networks and the networks with which they interconnect. The Commission considers that implementation of the various measures outlined in the report will ensure the proper functioning of critical networks, and thereby promote consumer interests. The Commission's approval of the recommendations, as modified, promotes innovation and provides leadership in the coordination of the nationwide transition to NG9-1-1 networks and services, to the benefit of all Canadians. As technology and consumer expectations change, the Commission finds it imperative that 9-1-1 networks continue to maintain the path towards NG9-1-1, and that innovations in this field remain responsive to the public safety needs of Canadians.

Secretary General

Related documents

- *Next-generation 9-1-1 – Modernizing 9-1-1 networks to meet the public safety needs of Canadians*, Telecom Regulatory Policy CRTC 2017-182, 1 June 2017, as amended by Telecom Regulatory Policy CRTC 2017-182-1, 28 January 2019
- *CISC Emergency Services Working Group – Consensus report regarding a next-generation 9-1-1 network architecture standard for Canada*, Telecom Decision CRTC 2015-531, 30 November 2015

¹³ *Order Issuing a Direction to the CRTC on Implementing the Canadian Telecommunications Policy Objectives to Promote Competition, Affordability, Consumer Interests and Innovation*, SOR/2019-227, 17 June 2019