Canadian Radio-television and Telecommunications Commission
Conseil de la radiodiffusion et des télécommunications canadiennes

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Various organizations – Applications regarding testing 9-1-1 call centre systems in the Next-Generation 9-1-1 environment

Summary

9-1-1 is a bridge that connects Canadians to emergency services in times of need. Federal, provincial, territorial, and municipal governments, as well as telecommunications service providers (TSPs), all play a role in ensuring that Canadians can access 9-1-1 services. The Commission's role is to regulate the TSPs that connect 9-1-1 calls to first responders.

Next-Generation 9-1-1 (NG9-1-1) is a new and improved 9-1-1 service. Once launched, NG9-1-1 will give Canadians and first responders tools that will provide quicker and more accessible communication during emergencies. The Commission acknowledges the importance of NG9-1-1 and will continue to support the transition within its mandate.

While existing 9-1-1 systems are mostly analog, NG9-1-1 systems use digital technology that requires 9-1-1 call centres to perform regular software updates. First responder groups filed two applications with the Commission. In the applications, these groups stated that they will need to test these software updates before they can be used. They also asked the Commission to require NG9-1-1 network providers, namely Bell Canada, Saskatchewan Telecommunications, and TELUS Communications Inc., to establish and operate a lab to test software updates.

These applications fall outside of the Commission's mandate because 9-1-1 call centres are the responsibility of provinces, territories, and municipalities, and these governments are responsible for ensuring that 9-1-1 call centres are equipped to test NG9-1-1 systems for future software updates. Accordingly, the Commission is not positioned to mandate a testing lab for 9-1-1 call centres as requested by the first responder groups.

Background

1. When a person makes a 9-1-1 call, their telecommunications service provider (TSP) delivers that call to a 9-1-1 call centre operated by a provincial, territorial, or municipal government. The 9-1-1 call centre, known as a public safety answering point (PSAP), then dispatches first responders to the emergency.

2. Telecom Regulatory Policy 2017-182 outlined the Commission's role regarding 9-1-1 services. The Commission regulates the TSPs that connect 9-1-1 calls to PSAPs.

PSAPs, and the first responders they dispatch, are the responsibility of provincial, territorial, or municipal governments. These governments are referred to as local 9-1-1 governing authorities (LGAs).

3. Next-Generation 9-1-1 (NG9-1-1) is a new and improved 9-1-1 service that is being deployed across Canada. In Telecom Regulatory Policy 2017-182, the Commission directed incumbent local exchange carriers (ILECs)[1] to establish and operate NG9-1-1 networks that connect calls to PSAPs.

4. In that same regulatory policy, the Commission defined the boundaries of the ILECs' NG9-1-1 networks as starting at the points where they connect with the networks on which 9-1-1 calls are made (originating networks)[2] and ending where they connect with PSAP networks. Any NG9-1-1 systems located within the originating networks or PSAP networks are not part of the ILECs' NG9-1-1 networks.

5. The ILECs incur an expense to establish and operate NG9-1-1 networks. The ILECs recover this expense through a Commission-approved tariff (the NG9-1-1 Tariff). Through the NG9-1-1 Tariff, the ILECs receive a fixed amount each month for each originating network subscriber that has access to 9-1-1 services.

Applications

6. The Commission received two similar applications from first responder groups, which include 17 PSAPs and LGAs (hereafter, the Applicants).[3] The Applicants submitted that NG9-1-1 will require regular software updates, which will need to be end-to-end tested and validated in a lab to prevent unintended disruption of calls and data delivery to PSAPs.[4] They added that written guidelines, such as the National Emergency Number Association's (NENA)[5] i3 architecture standard (the NENA i3

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[1] In the 9-1-1 context, the ILECs are Bell Canada, Saskatchewan Telecommunications, and TELUS Communications Inc. (TCI), which operate the 9-1-1 networks for their respective incumbent serving territories. Small ILECs are also mandated to provide a 9-1-1 network for their serving territories, but they have outsourced this requirement to Bell Canada or TCI.

[2] In the 9-1-1 context, originating networks are the commercial wireline, wireless, and voice over Internet Protocol networks that are used by the public to initiate calls.

[3] The Applicants consist of Barrie Fire and Emergency Service, BC Emergency Health Services, the City of Calgary, E-Comm 9-1-1, Edmonton Police Service, the Government of British Columbia, Grande Prairie Fire Department, Hamilton Fire Department, Hamilton Police Service, Lethbridge Fire and Emergency Services, Nova Scotia Emergency Management Office, Ontario Provincial Police, RCMP E-Division, Saanich Fire Department, Strathcona County Emergency Services, Toronto Fire Services, and Toronto Police Service.

[4] In a live environment, 9-1-1 calls made by the public, along with ancillary data, are delivered from originating networks to NG9-1-1 networks to PSAPs and processed by PSAPs. In contrast, in a lab environment, pre-release software updates can be tested and validated using simulated test calls.

[5] NENA is a not-for-profit 9-1-1 association whose mission is to improve emergency response through standards development, training, thought leadership, outreach, and advocacy.

standard)[6] and "build-to" specifications created by the ILECs for originating network providers (ONPs) and PSAPs, are not sufficient unless combined with lab testing.

7. The Applicants therefore requested that the Commission mandate:

    - the ILECs to establish and operate an end-to-end testing lab, funded by the NG9-1-1 Tariff, where PSAPs can directly test their systems against any software updates that could affect the delivery of NG9-1-1 calls and data to PSAPs (hereafter, the NG9-1-1 Lab); and

    - a software update quality assurance program as part of the NG9-1-1 Lab. This program would be managed by the CRTC Interconnection Steering Committee's Emergency Services Working Group (ESWG)[7] or another national body, to create standard processes for testing and releasing the above-mentioned software updates (hereafter, the QA Program).

8. In the Commission's view, the record of this proceeding focuses primarily on the NG9-1-1 Lab, with the QA Program becoming relevant only if the Commission were to approve the NG9-1-1 Lab.

9. The Applicants highlighted some key differences for PSAPs between the current analog Enhanced 9-1-1 (E9-1-1) environment and the new digital NG9-1-1 environment to support their view that an NG9-1-1 Lab is necessary even though no similar lab currently exists. Particularly, E9-1-1 has had very few software updates over the past decades, and these updates have been handled by the ILECs and ONPs, which are more technically sophisticated. PSAPs have therefore had a minimal role in the implementation of E9-1-1 software updates.

10. In contrast, NG9-1-1 will be an evolving environment requiring regular software updates across all interconnected NG9-1-1 systems. This means that PSAPs will need to actively maintain a suite of systems in collaboration with their vendors, ONPs, and the ILECs. For instance, unlike the analog telephone systems managed by the ILECs in the E9-1-1 environment, PSAPs will be required to maintain their own digital NG9-1-1 call handling systems (CHS)[8] in line with the evolving NENA i3 standard and ILEC specifications.

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[6] The adoption of the NENA i3 standard as the foundation of Canada's NG9-1-1 networks was recommended by the Emergency Services Working Group (ESWG) and approved by the Commission in Telecom Decision 2015-531.

[7] The ESWG is a volunteer-based, advisory body consisting of representatives of telecommunications service providers, PSAPs, and 9-1-1 system vendors for TSPs and PSAPs, among others. The ESWG assesses technical and operational issues regarding the provision of 9-1-1 services and makes recommendations to the Commission.

[8] CHS are a critical NG9-1-1 system on PSAPs' side of the NG9-1-1 demarcation point. CHS are responsible for, among other things, (i) receiving calls and ancillary data delivered by upstream NG9-1-1 networks, (ii) distributing incoming calls to call-takers within a PSAP according to pre-determined rules, (iii) populating computer-aided dispatch systems with relevant data, and (iv) facilitating the transfer of calls to other PSAPs where necessary.

11. The Applicants added that a pre-existing proposal from the ILECs (ESCO0745), in which the ILECs offered access to their existing NG9-1-1 Tariff-funded labs[9] for ONPs and PSAP CHS vendors (hereafter, the ILECs' Proposal), did not meet their needs for the following reasons:

    - CHS vendors are not required to participate.
    - Even if CHS vendors were to participate, they would likely only test basic CHS configurations, not customized setups used by individual PSAPs.
    - CHS vendors are not equipped to test other PSAP systems like computer-aided dispatch systems,[10] which are also uniquely configured for each PSAP.

12. The Applicants concluded that PSAPs need direct access to the NG9-1-1 Lab independent of their CHS vendors. This would allow PSAPs to test all their specifically configured systems, which the ILECs' Proposal does not provide.[11]

13. The Commission received interventions from the Agence municipale de financement et de développement des centres d'urgence 9-1-1 du Québec and Association des centres d'urgence du Québec; Bell Canada; the Canadian NG9-1-1 Coalition;[12] a member of the public; Ministère de la Sécurité publique du Québec; Ontario's Ministry of the Solicitor General and Ministry of Health together with the Ontario Provincial Police; Quebecor Media Inc., on behalf of Freedom Mobile Inc. and Videotron Ltd.; Rogers Communications Canada Inc.; Saskatchewan Telecommunications (SaskTel); and TELUS Communications Inc. (TCI).

Commission's analysis

14. All TSPs opposed the request for the Commission to require the ILECs to establish and operate the NG9-1-1 Lab. TSPs submitted the following reasons for their opposition to the request:

    - PSAP systems are outside of the NG9-1-1 network boundaries defined in Telecom Regulatory Policy 2017-182. As a result, it would be inappropriate to use the NG9-1-1 Tariff to fund the testing of PSAP systems.

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[9] ILEC labs are a simulated end-to-end environment that allow the ILECs to test and validate any planned NG9-1-1 network updates prior to releasing them to their live NG9-1-1 networks.

[10] Computer-aided dispatch systems receive call data from CHS and are used by PSAPs to create and manage records for an emergency, dispatch first responders according to their status and their location relative to the scene, and monitor and communicate with first responders in the field.

[11] The ILECs' Proposal excludes the testing of any non-CHS systems because those systems are not directly interconnected with NG9-1-1 networks, meaning that any related software updates do not affect the delivery of NG9-1-1 calls and data from ONPs to the ILECs and then to PSAPs.

[12] The Canadian NG9-1-1 Coalition is a national association representing PSAPs and LGAs in matters related to the NG9-1-1 transition.

- Many LGAs already collect 9-1-1 levies,[13] which could be used to fund testing facilities for PSAPs on a commercial basis.
- Future NG9-1-1 software updates will follow standardized compatibility guidelines to ensure different systems work together from ONPs to the ILECs to PSAPs. Moreover, end-to-end testing involving PSAP CHS vendors will continue to occur for major software updates. Therefore, there is no need for PSAPs themselves to conduct end-to-end lab testing.
- The E9-1-1 environment has maintained 99.999% reliability without an end-to-end lab. The same proven method for managing software updates will be used in NG9-1-1.
- The NG9-1-1 Lab would not replicate real-world operations perfectly. Therefore, even with lab testing, software updates would still need to be validated in the live environment. As a result, the most effective testing approach for PSAPs is to use test calls delivered through live NG9-1-1 networks, which can deliver those calls to PSAP labs,[14] where available, to not disrupt PSAPs' live operations.
- Most PSAPs across the country are too small and lack the resources to set up and maintain their own labs, which would be necessary to effectively use the NG9-1-1 Lab.
- The ILECs' Proposal is a better solution. It targets a smaller number of ONPs and CHS vendors that are more technically skilled than PSAPs. Moreover, CHS vendors serve as single points of contact between the ILECs and PSAPs. PSAPs in need of additional testing can use commercially available NG9-1-1 testing facilities.

15. The Commission considers that it would be inappropriate to use the NG9-1-1 Tariff to fund the establishment and operation of the NG9-1-1 Lab, given that:
    - PSAPs' transition to NG9-1-1 is the responsibility of LGAs; and
    - suitable testing alternatives are available to PSAPs on a commercial basis.

PSAPs' transition to NG9-1-1 is the responsibility of LGAs

16. The Commission plays a narrow role regarding 9-1-1 services, which is to regulate the TSPs that connect 9-1-1 calls to PSAPs. PSAPs, and the first responders they dispatch, are the responsibility of LGAs.

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[13] 9-1-1 levies are monthly charges imposed by LGAs to fund the operations of PSAPs. 9-1-1 levies are collected by ONPs from their subscribers and sent to LGAs. 9-1-1 levies are distinct from 9-1-1 tariffs, which are approved by the Commission and enable the ILECs to recover the costs of operating their 9-1-1 networks.

[14] PSAP labs consist of duplicate systems, including CHS and computer-aided dispatch systems, to conduct testing without affecting live 9-1-1 operations. Some PSAPs use their backup locations, which are equipped with identical systems as their primary locations to ensure business continuity in case of catastrophes.

17. The Applicants requested that the Commission require the ILECs to establish and operate the NG9-1-1 Lab, funded by the NG9-1-1 Tariff, in which PSAPs can test their NG9-1-1 systems.

18. The NG9-1-1 Tariff is intended to compensate the ILECs for the costs associated with establishing and operating NG9-1-1 networks that connect calls to PSAPs. However, the applications that initiated this proceeding concern the testing of PSAP systems that lie outside the ILECs' NG9-1-1 network boundaries.

19. As stated in Telecom Regulatory Policy 2017-182, LGAs are responsible for PSAPs' transition to NG9-1-1. This responsibility includes providing PSAPs with funding to test their new systems. Accordingly, it would be unjustified to use the NG9-1-1 Tariff to cover the costs of testing systems that do not form part of the ILECs' NG9-1-1 networks.

Suitable testing alternatives are available to PSAPs on a commercial basis

20. Based on the record of this proceeding, the ILECs' Proposal can be implemented quickly and cost-effectively.

21. The Applicants' three key concerns regarding the ILECs' Proposal are the following:

    - CHS vendors are not required to participate.
    - If CHS vendors were to participate, they may only test basic CHS setups instead of specific PSAP configurations.
    - The proposal does not cover testing of non-CHS systems.

22. Regarding the first two concerns, the Commission considers that it is the responsibility of PSAPs to manage relationships with their vendors. PSAPs can require their CHS vendors to opt into the ILECs' Proposal and define testing expectations in their contracts.

23. The ILECs' Proposal could be enhanced by including PSAPs' session border controller (SBC)[15] vendors. SBCs are critical for ensuring interoperability between NG9-1-1 networks and PSAPs' CHS. The record of this proceeding shows that:

    - SBCs are often integrated into CHS, so CHS vendors typically incorporate SBC testing in their processes; and
    - Bell Canada and TCI are open to including SBC vendors in their proposed testing services, while SaskTel does not have distinct SBC vendors in its territory.

24. Accordingly, the ILECs' Proposal should be updated to allow CHS vendors in Bell Canada's and TCI's territories to negotiate additional access for their SBC partners, if needed. This would allow CHS vendors to assess the value and cost of including their

[15] SBCs are special-purpose devices used at network borders to protect and regulate Internet Protocol communication flows.

SBC partners in testing and, where justified, negotiate the terms of the additional access with Bell Canada and/or TCI on behalf of their SBC partners.

25. For PSAPs that need additional testing options beyond the ILECs' Proposal, the record shows that these can be purchased from the ILECs or directly from the ILECs' vendors. The Applicants submitted that PSAPs are already facing financial pressures, and incurring additional testing costs would increase these pressures. Nevertheless, it is LGAs that are responsible for providing funding to PSAPs.

Conclusion

26. The Commission denies the Applicants' request for the NG9-1-1 Lab because 9-1-1 call centres fall outside of the Commission's mandate and are the responsibility of provinces, territories, and municipalities. The Commission considers that PSAPs should instead work with their CHS vendors to participate in the ILECs' Proposal, and/or work with their provincial, territorial, and municipal authorities to secure funding for additional testing capabilities through commercial arrangements. Given that the QA program described in paragraph 7 of this decision relies on the NG9-1-1 lab, the Commission is not mandating the program.

27. The Commission encourages PSAPs to work with all their system vendors to come to mutual agreements on expectations for product support services, particularly related to testing for software updates.

28. The Commission expects the ILECs to accommodate and negotiate in good faith any commercial access requests to their existing labs from ONPs and CHS vendors.

29. The Commission expects the scope of the ILECs' Proposal to be extended to include PSAPs' SBC vendors. Where justified, CHS vendors are encouraged to negotiate additional ILEC lab access for their SBC partners.

30. The Commission encourages all ONPs and PSAP CHS vendors, along with their SBC partners, to consider opting in to the ILECs' Proposal.

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