

Canadian Radio – Television and Telecommunications Commission  
Interconnection Steering Committee

**Report to the CRTC**

By

The Emergency Services Working Group, ECNS Committee

**Title: Report on the use of E9-1-1 information for the purpose of  
providing an enhanced community notification service (ECNS)**

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## **Introduction**

In Telecom Decision CRTC 2007-13 (“Decision 2007-13”), the Commission directed the CRTC Interconnection Steering Committee (CISC) to establish a set of standard guidelines, security procedures, processes and practices for Enhanced Community Notification System (ECNS). The Commission also directed that CISC submit to the Commission, within 12 months of the date of this Decision, a report identifying proposed security, privacy and accountability standards; any issues with establishing such standards; the viable solutions for any issues; and any recommendations with supporting rationale to improve the security, privacy and accountability of enhanced CNS.

The Commission noted in Decision 2007-13 that the deployment of enhanced CNS would be limited to areas where E9-1-1 service is already in place and further that there would be limitations to the information included in the E9-1-1 data, in particular, no data for wireless and nomadic VoIP subscribers. The Commission also noted that issues associated with the effectiveness of enhanced CNS alerts to persons with disabilities should be addressed. Accordingly, CISC was also directed to develop operational solutions associated with enhanced CNS implementation issues, including those identified above.

## **Background**

### 1. ECNS Committee

The CISC Emergency Services Working Group reviewed the direction from the Commission in Decision 2007-13 and determined that it would be appropriate for a discrete Ad Hoc Committee to be established to address the work directed to CISC and that the committee should be comprised of representatives from various municipal and provincial Emergency Management agencies, Emergency service agencies, 911 Service Providers, Local Exchange Carriers (LECs) and other interested parties. This committee would be known as the ECNS Committee (ECNSC).

### 2. 9-1-1 Services

Basic 9-1-1 service consists of routing 9-1-1 calls to a designated public safety answering point (PSAP), which is a specialized emergency call answer centre for all 9-1-1 calls originating within a specific geographical area. Enhanced 9-1-1 service includes all of the capabilities provided by basic 9-1-1 service, plus certain additional features and capabilities, including automatic location information (ALI) functionality.

ALI functionality ensures that a 9-1-1 caller’s name, listed or unlisted telephone number, address, type of service and other pertinent information are transferred from an Incumbent Local Exchange Carrier (ILEC) maintained E9-1-1 database to the PSAP along with each incoming 9-1-1 call.

E9-1-1 databases contain ILEC, Competitive Local Exchange Carrier (CLEC) and Small Incumbent Local Exchange Carrier (SILEC) subscriber information. They also contain fixed, or non-nomadic, local Voice over Internet Protocol (VoIP) service subscriber

information, if the service provider knows the address from which the call is placed and has populated the E9-1-1 database with this address. E9-1-1 databases do not contain the information of subscribers using wireless service or nomadic / non-native VoIP services as their primary exchange service.

### **Scope of ECNSC Activity**

This document outlines the current findings of the ECNSC to define security, privacy and accountability standards; to identify issues with establishing such standards and provide viable solutions for any issues; and any recommendations. Issues that could not be resolved in time for the initial report would be addressed in a subsequent report, subject to Commission approval.

### **Approach of the ECNSC**

The committee identified a number of number discrete issues to be addressed and established a series of six Task Identification Forms (TIFs) and assigned teams to work on the various issues in a more structured and manageable fashion. Refer to the task descriptions below:

#### **TIF 1 – Scope – 9-1-1 data for Enhanced CNS:**

Focus: Pull together and list overall tasks at hand – set up TIFs for specific areas of concern and supply the report to the Commission in twelve months. Sponsor: Rick Galway.

#### **TIF 2 – Safeguards for Enhanced CNS:**

Focus: Formulate a framework for the authorization to release data to CNS for a specific event. Study the feasibility of providing a portal for the purposes of system testing, auditing and training. Sponsor Ken Jones.

#### **TIF 3 – Consent (of subscribers) and Notification Requirements for Enhanced CNS:**

Focus: Deal with consent of subscribers and raise awareness of CNS program. Information to be used in specific circumstances. Sponsor Maureen Schmidt.

#### **TIF 4 – Operational Issues for Enhanced CNS:**

Focus: Levels of authorization - how will CNS receive the data? Use of Geographic Information System (GIS) layers – focus on wireless and VoIP notifications – carrier and emergency measures organizations relationships are necessary – implementation issues - actual notification process. Sponsor Chuck Thompson.

#### **TIF 5 – Other Issues Related to Enhanced CNS:**

Focus: Needs of hearing impaired and deaf subscribers, wireless and certain VoIP needs (nomadic / non-native) – develop guidelines, recommendations or specifications. Sponsor Linda Dickson.

TIF 6 – Network Congestion Issues Related to Enhanced CNS:

Focus: Impact of large scale ECNS incidents on telephone network. Possibility of network congestion due to number of calls placed for ECNS notification. This TIF was referred to the CISC Network Working Group (NTWG) for discussion and recommendations. Sponsor Leonard Eichel.

## **RECOMMENDATIONS for ESTABLISHING ECNS**

**The ECNC requests that the Commission approve the following recommendations:**

### **A. Recommended Safeguards for Establishing ECNS**

#### **1. Public Authorities.**

- i. The contract for the use of e-CNS info should be signed between the ILEC and the jurisdiction having primary authority for 9-1-1 (e.g. municipality and/or province.)
- ii. As part of the agreement, the ILEC would require the authorized administrator (*PSAP*) to certify that they are the representative of the public authority, and that the public authority has asked the authorized administrator to act on their behalf.

#### **2. Contract elements.**

- i. The ILEC - Public Authority contracts should contain the elements outlined in decision paragraphs 65, 95, 99, 102, 106, 109, 159, 236/238, as well as to consider item 111.
- ii. A draft common agreement should be developed by – and preferably between - the ILEC's.

#### **3. Security and protection of data during retrieval, transmission and storage.**

- i. Industry-standard IT precautions should apply to the entire process of access, transmission and storage of data. (E.g. encryption, use of firewalls, transaction/audit trails.)
- ii. 9-1-1 data transfers should only be provided over an encrypted link and/or file.
- iii. ILEC's should maintain user access logs.
- iv. The contracts should reflect that the ILEC and data receiver be will responsible for the integrity and protection of data from unauthorised users during retrieval, transmission and storage of data as indicated by their respective roles in the process. This protection should meet relevant IT security best-practices.

**4. Live-test precautions.**

- i. Precautions should be put in place by the public authorities to prevent erroneous or accidental "go-live" practice/test calls.

**5. Class of service.**

- i. The "class of service" distinctions (*i.e. commercial vs. residential*) should be added to the items eligible for data transfer.
- ii. The ILEC's should remove payphone, cell tower/sector, ESRD, and other non-dialable routing number information from the CNS data that they send to the Public Authority.

**6. System testing.**

- i. Recommended that regular, end-to-end system tests (or series of tests) form part of the contract between the CNS provider and the public authority. (E.g. end-to-end on the technical side, such as connections, downloads of information). This testing may be done using either fictitious data supplied by the ILEC, or by using real data gathered externally (*i.e.* not from the 9-1-1 database).
- ii. Further recommended that system tests (or series of tests) form part of the contract between the ILEC and the public authority.

## **B. Consent (of subscribers) and Notification Requirements for ECNS**

1. The initial introduction of E9-1-1 service to the public should include the use of other means besides billing inserts. While billing inserts are considered as minimum provisions to notify the public of the implementation of E9-1-1, other notification methods such as on-line billing, campaigns through community events, print and broadcast media to promote public awareness of the new system, are also recommended.
2. Initial and subsequent E9-1-1 public awareness campaigns must inform the public of the exclusion of wireless, nomadic and non native VoIP numbers, four party lines, devices for hearing impaired users and areas that do not have enhanced 911 services.
3. The content of initial and subsequent public awareness campaigns should inform the public to refrain from calling 911 and or others, to reduce network congestion unless there is a bona fide emergency or need. Those seeking additional information about the emergency should be directed to pre-designated Call Centres, where applicable e.g. 211, 311 or broadcast media such as radio, television and the internet.
4. To support the principle that public education should be continual and not considered a 'one time' endeavor, the costs of subsequent public education campaigns to promote public awareness of E9-1-1 should be considered part of ongoing operational costs i.e. in addition to system tests, cost of software and hardware upgrades, provisions for data security, staff training etc.
5. Initial notification and subsequent public awareness communications about the E9-1-1 service, should ensure that vulnerable populations such as the elderly, those with hearing, visual, language, literacy, cultural, and other impediments, are reached effectively.

## **C. Operational Issues for ECNS**

1. The tasks in this section should be dealt with in a Disclosure document by the ILEC's as part of their Tariff filing for Enhanced CNS. Due to the uniqueness of each of the ILEC's 911 database and their data interfaces it is recommended not to have a common standard but allow each ILEC to define this.
2. A standard file format protocol which will initially address wireline and fixed VoIP is necessary. Consideration should be given to the adoption of this standard for potential future implementation of wireless, other VoIP and hearing impaired users.
3. Frequency of updates from the Incumbent Local Exchange Carrier (ILEC) database is an issue along with a database validation process. A dispute process should be put in place for disagreements.

4. The type of data transport (speed, dial up and encryption) should be specified.
5. A ECNS notification process should be developed to advise neighbouring municipalities, other emergency responders, etc. of an ECS event.
6. Adequate post-mortem documentation should be available for liability reasons.

## **D. Other Issues Related to ECNS**

### **1. Needs of the Hearing Impaired**

Current TTY software programs do not integrate voice and text very well. New generation of hearing impaired / deaf rely more on wireless / text technology than wire line voice telephony. Currently there are technological challenges to providing enhanced CNS through the 9-1-1 system for the hearing impaired / deaf. ECNS support for hearing impaired subscribers cannot be supported at this time, since there is no way to identify these subscribers in the 9-1-1 database across all ILECs.

### **2. Needs of wireless subscribers**

This subscriber group includes cellular, PCS, mobile wireless, and satellite subscribers with assigned telephone numbers from the ILEC telephone exchange that is participating in the ECNS service. Due to the nature of wireless service and wireless E9-1-1, wireless subscribers' telephone numbers (TNs) are not populated in the E9-1-1 ALI database and there are no plans to do so. Basically, if the TN is not in the ALI database, then the TN can not receive an ECNS alert. Therefore, the use of the E9-1-1 ALI database as a means to facilitate ECNS to wireless subscribers would be neither practical nor appropriate.

Further, there is no readily available mechanism in wireless networks that can be used in a manner similar to the use of the ALI database for ECNS. Wireless handsets enter and leave radio cells and sectors in exchanges autonomously in various states (off, idle, talking) and at various speeds (pedestrian, automobile-highway). The handsets located in a cell or sector at any one time include subscribers with TNs assigned to that exchange, subscribers with TNs from other exchanges (domestic roamers), and subscribers from foreign countries (foreign roamers). Wireless telephone systems do know the cell or sector location of the operating wireless subscriber for purposes of call completion, call origination, and billing, however this information is embedded deep within the software of the mobile telephone exchange (MTX) switching platform. There are currently no technical standards or plans for extracting this data from the MTX for a purpose similar to ECNS and therefore infrastructure vendors do not support this capability.

The wireless industry should continue to explore other means of providing emergency alerts to wireless subscribers via activities with both Industry Canada Emergency Communications and the Canadian Wireless Telephone Association (CWTA) Public Alerting committee. These efforts and standards-based solutions are more appropriate for the development and implementation of ECNS for wireless subscribers than the use of the E9-1-1 ALI database, at this time.

### **3. Needs of Voice over Internet Protocol (VoIP) subscribers**

There are no issues surrounding the ability to provide Enhanced CNS to fixed VoIP customers. However, non-fixed, nomadic VoIP subscribers are not in the 9-1-1 data base and the mobility of non-fixed VoIP provides the same challenges as those of wireless subscribers.

In order to obtain CNS-type data for non-fixed VoIP subscribers, the Voice over Internet Service Providers (VISPs) would need to determine where their nomadic service are operating in real-time, and provide the customer TNs and data records. The overwhelming majority of VISPs do not have this functionality today. Looking ahead to the proposed i2 solution to offer E911 for non fixed VoIP which is currently being assessed by the CRTC, the challenge remains because 9-1-1 records will be built on the fly depending on the users current address in the LIS (Location information server □ IP 111.222.333=123 Fake St., Toronto, ON). Even with i2, there is no function to determine where a TN is currently operating unless a 9-1-1 call is made.

VoIP providers may have the ability to determine the IP of its customers, in the future, this IP may be able to be correlated with LIS data providing the current physical address, but a mechanism would be required for CNS customers to query VISPs in real time to determine if they have any customers in a given area. However at the present time there is currently no practical way to determine if these customers are in the affected notification area.

Authorities providing enhanced CNS for their residents must ensure that their public education programs regarding the implementation of CNS and ongoing public education as identified, contains specific information relating to this fact for nomadic and non-native VoIP subscribers.

### **4. Non-service and Basic 9-1-1 areas**

Non-service and Basic Service Areas would include areas such as the unorganized municipalities in northern Ontario and all of Newfoundland., which has Basic 9-1-1. As there is no ALI component associated with the types of service available in these areas, ECNS cannot be provided.

Alternate community notification systems should be considered for those municipalities/territories/unorganized areas until such time when E9-1-1 is available.

## **5. Four Party line Subscribers**

Some four party lines still exist in the Public Switched Telephone Network (PSTN) network. Party line service has been grandfathered into the network as it is a service of customer choice. Four party line subscribers should be notified of the limitations of ECNS under their circumstances.

Two party line subscribers are able to receive enhanced 9-1-1 service and, therefore, would be able to receive enhanced CNS

## **E. Network Congestion Issues Related to ECNS**

The issue of Network Congestion was referred to the CISC Network Working Group (NTWG) for discussion and recommendations. During the course of its review, the NTWG:

Solicited inputs from two emergency service providers (County of Strathcona and City of Gatineau). The County of Strathcona provided information in regards to their typical operating parameters such as typical volume, trunk size, number of messages being sent on a time basis (i.e., number of messages per hour, per day, etc.), message length, etc. The City of Gatineau provided inputs with respect to the desirable operational considerations of a CNS system that it plans to deploy.

Sought input from carriers based on the information provided by the CNS operators, regarding any potential network congestion impacts and to determine if any mitigation measures were required.

Based on the contributions received for this item, the NTWG concluded the following:

In order to protect the PSTN or any other local access network from overload conditions and to ensure effectiveness of CNS, the implementation of such a service will need to be addressed on a case by case basis.

Most telecommunication service providers (TSP) have already implemented some form of network protection procedure(s) in their local networks. These protection procedure(s) are activated when call attempts exceed design parameters and, when such procedures are activated, mass calling may be throttled back to the designed performance level of the local network.

The NTWG submitted the following recommendations for the ECNSC to consider:

1. The following general assumptions should be used by Telecom Service Providers providing access to the PSTN (entry TSP) for any CNS service offered by municipalities and/or public authorities, with the proviso that actual implementation will vary based on local network conditions:

CNS will be offered based on existing network capacity – the implementation of CNS will not drive network enhancements in the PSTN or other local access networks;

CNS calls should enter the local network at multiple entry points, where feasible;

Switches with near maximum operational limits should not be used for CNS entry points, unless no other alternatives are available;

CNS out-bound calling system should generally be served by hosts instead of remotes wherever feasible.

2. Municipalities and/or public authorities, who desire to implement CNS, should work together with entry TSPs on an as required basis to develop the service description, network characteristics and design on a per geographic basis.

3. Municipalities and/or public authorities should consider at a minimum, the following questions prior to engaging TSPs in an ECNS implementation planning session:

What is the biggest geographic area to be covered by the CNS broadcast?

What is the maximum number of lines to be covered by the CNS broadcast?

How fast does the CNS need to cover the entire area?

What is the call hold time (total length of message(s) for the call)?

Will call retries be used for calls that are unanswered?

4. A municipality and/or public authority immediately issue a notification to all operation control centres of the TSPs in their geographic area, once a decision has been made to invoke CNS callout. This will alert the TSPs of the mass callout event and would enable their operation control centres to intervene manually if necessary.

5. The NTWG noted that Section 4.2 of the Network Management Guidelines, entitled ‘Mass Calling Events’, sets out the notification principles and procedures to inhibit congestion and prevent the spread of network overload for mass calling. In a situation where the affected area is served by multiple TSPs and such TSPs are interconnected to each other, the principles set out in Section 4.2 of the Network Management Guidelines should be followed and that these procedures be modified to accommodate the emergency nature of CNS mass calling, if required.

**The conclusions and recommendation expressed by the Network Working Group have been accepted by the ECNS working group.**

## **F. Subsequent Issues Related to ECNS**

### **Common Alerting Protocol**

The Common Alerting Protocol (CAP) standardizes the content of alerts and notifications across all hazards, including law enforcement and public safety as well as natural hazards such as severe weather, fires, earthquakes, and tsunami. Systems using CAP have shown that a single authoritative and secure alert message can quickly launch Internet messages, news feeds, television text captions, highway sign messages, and synthesized voice over automated telephone calls or radio broadcasts. Alerts can be converted automatically and securely from the CAP XML format into forms suitable for each technology: Internet, news media, television, radio, telephones, Internet, etc.

CAP defines a single message format with the essential features to handle existing and emerging alert systems and sensor technologies. This standard format can replace a range of single-purpose interfaces among warning sources and dissemination channels. CAP addresses the concerns about compatibility and operational complexity that have been stifling development. CAP is compatible with emerging technologies such as Internet Web services, and with existing formats such as the U.S. national Emergency Alert System and the Specific Area Message Encoding (SAME) used for NOAA Weather Radio in the U.S. CAP is also compatible with alerting systems designed for multilingual and special-needs populations. Standardized warnings from various sources can be compiled in tabular or graphical form as an aid to situational awareness and pattern detection.

The International Telecommunications Union (ITU) has recommended CAP 1.1 as the international public alerting standard. Led by Public Safety Canada, Canada is implementing a National Public Alerting System (NPAS) that will use CAP as a public alerting standard. Integration of NPAS and local emergency alerting systems such as ECNS would be made possible when CAP becomes the ECNS standard.

## **G. SUMMARY**

Although this report is forwarded as a consensus document, it is important to understand that there are unresolved issues related to successful ECNS operation. It was noted that no organization currently exists for the registration or tracking changes of the hearing impaired community in Canada. None of the agencies contacted felt they were in a position to offer such a service, thus leaving the hearing impaired at a distinct disadvantage in a successful roll out of ECNS. The needs of wireless and certain Voice over Internet Protocol in an ECNS situation will not be met under the current

circumstances. The ECNS committee asks for further direction from the Commission on these important points in the future.

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