BID-0028
December, 2010

9-1-1 Public Emergency Reporting Service (9-1-1 PERS) Network-to-Network Interface Between Wireless Service Providers (Wireless Carriers) and Bell Canada's Network

Version 4.0

TABLE OF CONTENTS

DOCUMENT HISTORY

1.0 August 2002 Initial Release

2.0 November 2003 Sections 4.2, 5.1, 6.1 and 6.3 were modified to reflect the introduction of a web based access arrangement for Electronic File Transfer.

3.0 June 2006 Sections 4.2.1, 4.2.2, 5.1, 6.1 and 6.3 were revised to remove references to the e-mail method for file transfers.

4.0 December 2010 Sections 4.1, 4.2, 5.1 to 5.8, 6.1 to 6.7 were removed and referenced. Section 2.3.3 and 7 were added to reflect introduction of Wireless E9-1-1 Phase II Stage 1. Sections 1.2, 2.1, 2.2, 2.3 were revised to reflect the introduction of Wireless E9-1-1 Phase II Stage 1.

DISCLAIMER

Bell Canada reserves the right to modify the interface described in this document for any reason including, but not limited to, ensuring that it conforms with standards promulgated by various agencies from time to time, utilization of advances in the state of the technical arts, or the reflection of changes in the design of any equipment, techniques or procedures described or referred to herein.

BELL CANADA SHALL NOT BE LIABLE FOR ANY DAMAGES OR INJURIES INCURRED BY ANY LEGAL PERSON OR PERSONS, INCLUDING BUT NOT LIMITED TO CORPORATIONS, ARISING DIRECTLY OR INDIRECTLY FROM A DESIGN INCOMPATIBILITY WITH THE NETWORK, OR ANY CAUSE WHATSOEVER.

Readers are specially advised that the technical requirements contained herein may change.

If further information is required, please contact:

BELL CANADA
WSP Carrier Administrator
930 D'Aiguillon, bureau 320
Québec, QC G1R 5M9
Phone: 866-888-0268
E-mail: clecitc.support@bell.ca
Web site: www.bce.ca/aboutbce/regulatory/interface-disclosures

1.0 INTRODUCTION

1.1 PURPOSE

This document describes the interfaces between a Wireless Service Provider's (WSP, hereafter referred to as Wireless Carrier) network and the Bell Canada 9-1-1 Public Emergency Reporting Service (hereafter referred to as 9-1-1 PERS) network for the purpose of providing wireless end users access to emergency services providers. These interfaces allow 9-1-1 calls originating from Wireless Carriers' customers to be routed through the 9-1-1 PERS network to the appropriate 9-1-1 primary Public Safety Answering Points (P-PSAPs) These interfaces also allow the Wireless Carriers to interconnect to the 9-1-1 PERS Data System and transmit the pertinent cell site / sector location information as well as supplemental Phase II Wireless Data.

This document covers only Wireless Carrier interconnection with 9-1-1 PERS. Interconnection to Basic 9-1-1 Emergency Service, where provided, is outside the scope of this document.

The Terminal-to-Network interfaces between Bell Canada 9-1-1 PERS network and a 9-1-1 Service Bureau are outside the scope of this document.

Operational issues that deal with interconnection between the Wireless Carrier and Bell Canada are also outside of the scope of this document. Those issues are dealt within the Wireless Carriers Interconnection to Bell Canada 9-1-1 Public Emergency Reporting Service (9-1-1 PERS) documentation and in special agreements with a particular Wireless Carrier.

1.2 GENERAL

9-1-1 PERS provides the transport of all 9-1-1 calls between callers and primary Public Safety Answering Points (P-PSAPs), and between the primary PSAP and associated police, fire and ambulance dispatch centres (referred to as secondary PSAPs). The municipalities and the various agencies are responsible for answering and responding to the emergency calls.

Wireless 9-1-1 trunk-side interconnection to the 9-1-1 PERS network provides the Wireless Carrier with the ability to transport additional information critical to assisting wireless 9-1-1 callers. When a Wireless Carrier's customer dials 9-1-1, the call is switched at the Mobile Switching Centre (MSC) and transported to Bell Canada designated E9-1-1 Tandem (a.k.a. Selective Router) switch. The 9-1-1 call is then routed from the E9-1-1Ttandem switch, based on the Emergency Service Routing Digits (ESRD) received, to the designated PSAP. In the WSP E9-1-1 Phase I environment, the wireless 9-1-1 caller's calling party number (referred to as call back number) and the originating cell site / sector location information are delivered to the PSAP call taker's terminal. The WSP E9-1-1 Phase II provides an additional wireless location information; the Phase I data is augmented with the supplemental location information to the PSAP; Longitude/Latitude co-ordinates, Uncertainty and Confidence values or an error code.

To enable appropriate response to 9-1-1 calls from wireless customers, each Wireless Carrier must transmit the ESRD Customer Record Information (i.e. cell site / sector's ESRD 10-digit number and ALI) to the Bell Canada 9-1-1 PERS Data System. Interconnection by Wireless Carriers to the Bell Canada 9-1-1 PERS is available only within the boundaries of municipalities that have subscribed to the service.

Wireless Carrier 9-1-1 trunk-side interconnection is accomplished by establishing the following:

a) Signing of the Bell Canada Interconnection Agreement for the Provision of 9-1-1 Service to Wireless Carriers
b) Where applicable, signing of the appropriate contract with municipalities

c) Establishment of dedicated trunk interconnection using the User Part of the CSS7 signalling specification for Integrated Services Digital Network (ISDN) (i.e. ISUP);
d) Appropriate trunk-side connections between the Wireless Carrier switch and the designated Bell Canada E9-1-1 Tandem switches;
e) The use of ISUP (CCS7) signalling on 9-1-1 trunks;
f) An appropriate connection to the ALI and
g) An appropriate Internet access to enable data transfer between the Wireless Carrier Customer Record Information System (CRIS) and Bell Canada 9-1-1 PERS Data System

2.0 SERVICE DESCRIPTION

In a typical emergency response operation, the 9-1-1 call is delivered to a Primary PSAP where the call taker determines the nature of the emergency and forwards the call to the appropriate police, fire prevention or ambulance dispatch centre. The Primary PSAP call taker is supported by a number of special features which can facilitate targeted and accurate response. 9-1-1 PERS is provided in conjunction with all primary exchange services. Local governments are responsible for the PSAPs and dispatch centres.

2.1 SERVICE OVERVIEW

Following is a brief description of the activities performed by the Bell Canada 9-1-1 PERS network:

The **9-1-1 PERS Data System** receives data from the Wireless Carrier's Emergency Service Routing Digit (ESRD) Customer Record Information System, to create and maintain the 9-1-1 centralized databases. A matching procedure is performed between the ESRD Customer Records Information System (CRIS) data and the 9-1-1 Data System's Wireless 9-1-1 Street Address Guide (Wireless 9-1-1 SAG) to create a database containing cell site / sector pseudo addresses, ESRDs' routing telephone number and Emergency Service Number (ESN). That database is used to support Selective Routing and Automatic Location Identification (ALI) features.

The **Wireless 9-1-1 SAG** is a database, which contains pseudo addresses in a given area, listed as street names and corresponding civic number ranges. For wireless cell sites / sectors, special mapping is created to allow ESRDs' Emergency Service Number (ESN) assignment. The civic number range is the ESN assigned to the Emergency Service Zone (ESZ).

The **ALI** feature is the capability to display the wireless caller's originating cell site / sector pseudo address, call back number, /Latitude co-ordinates, Uncertainty and Confidence values or an error code at the PSAP's call-taker position.

Selective Routing is the capability of routing 9-1-1 calls to the designated PSAPs based on the wireless ESRD's designated location.

An **ESN** corresponds to a geographical area (i.e. Emergency Service Zone) where all wireline residents and wireless cell site / sectors aiming at that area are served by the same set of primary and secondary PSAPs.

When a wireless customer located in a Bell Canada 9-1-1 PERS served area dials 9-1-1, the call is answered at the Primary PSAP associated to the cell site / sector's ESRD designated location. The wireless cell site / sector's pseudo address and ESRD number are automatically displayed at the 9-1-1 call-taker screen, when available. If the ESRD has a WL2 Class of Service, the ALI will request location information from the WSP's Location Platform (either a MPC – Mobile Positioning Centre for CDMA networks or a GMLC – Gateway Mobile Location Centre for

GSM/HSPA networks) using the CBN (Call Back Number) and the ESRD as the query key. Once the Location platform returns the subscriber's location back to the ALI, a second call display containing supplemental location information (Longitude/Latitude, uncertainty and confidence) values is sent to the PSAP. The 9-1-1 call-taker determines which public service is required (police, fire prevention or ambulance) and conferences and/or transfers the call to the appropriate secondary PSAP.

2.2 NETWORK OVERVIEW

9-1-1 PERS utilizes two networks, voice and data. The voice network is based on E9-1-1 Tandem switches. The 9-1-1 Tandem switches are paired for redundancy purposes; end-offices and Mobile Switching Centres (MSCs) connect to both the primary and secondary E9-1-1 Tandem switches with dedicated 9-1-1 trunks (i.e. 9-1-1 interconnection service arrangement trunks) and facilities connect the 9-1-1 tandem switches to the primary and secondary PSAPs. The data network is comprised of 9-1-1 ALI computers and facilities connecting PSAP display terminals to the 9-1-1 PERS data network. The introduction of the Canadian Wireless E9-1-1 Phase II Stage 1 service requires additional interconnections between the ALI computers and the WSP.

The proper operation of Bell Canada 9-1-1 PERS service is dependent on a number of requirements that must be met prior to service turn-up. These requirements include:

a) Establishment of ISUP (CCS7) interconnection;

b) establishment of the interconnecting 9-1-1 trunks to gain access to the 9-1-1 PERS voice network;

c) the collection and assignment of cell site / sector location data from several sources (Wireless Carrier, PSAPs and Bell Canada) in order to create and maintain a centralized E9-1-1 database; and,

d) the creation of a selective routing database that is then uploaded to the E9-1-1 Tandem switches in order to route wireless 9-1-1 call to the designated PSAP.

e) E9-1-1 Phase II Service is dependent on connectivity between ALI and the MPC/GMLC as outlined in Section 7 of this document.

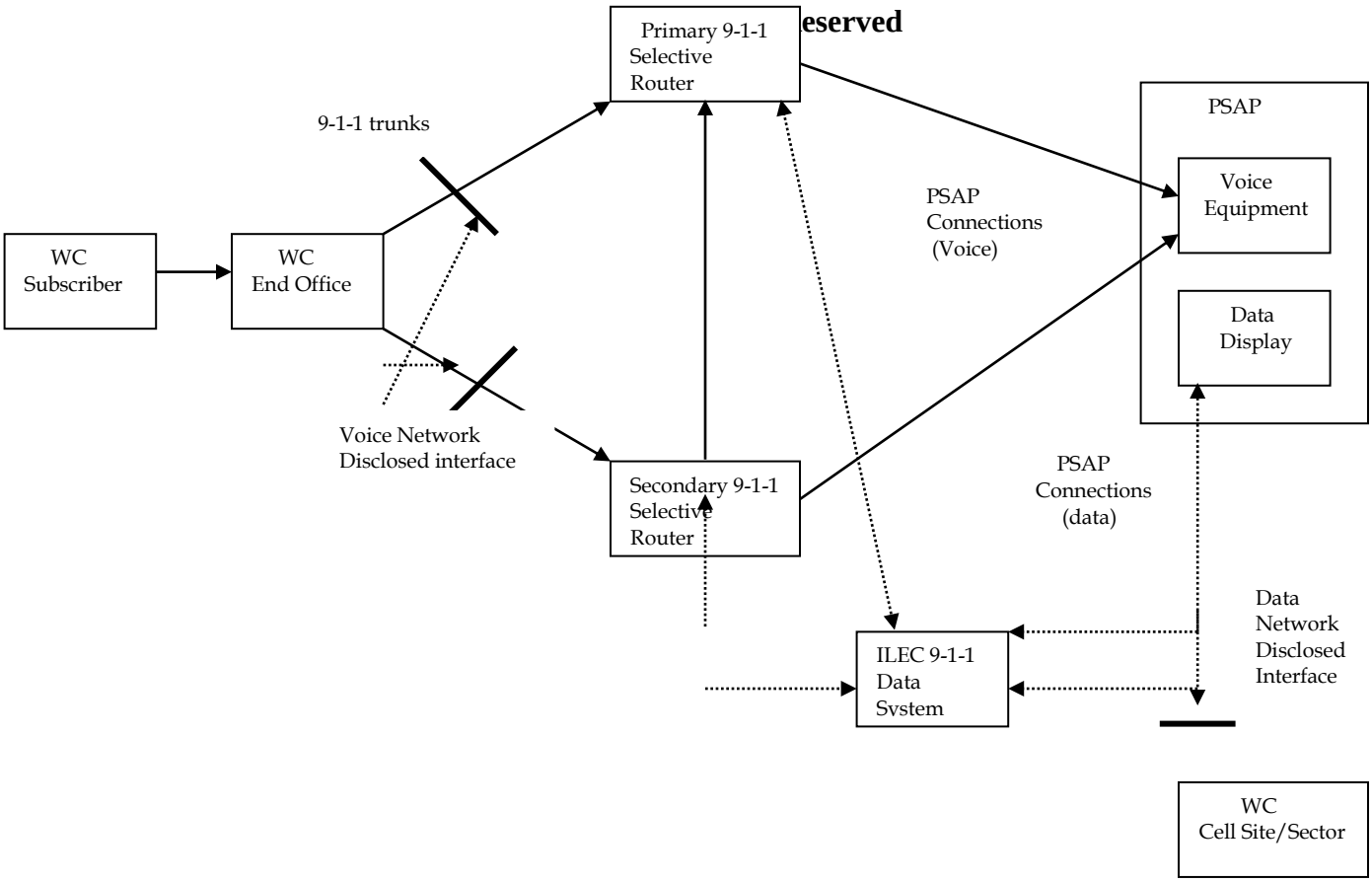


Figure 1 : Trunk-side interconnection to Bell Canada 9-1-1 PERS

2.3 9-1-1 FEATURES

9-1-1 PERS service supports the following network features on wireless trunk-side 9-1-1 interconnection:

2.3.1 Selective Call Routing

The Bell Canada 9-1-1 PERS Management System matches the wireless cell site / sector pseudo address to an Emergency Service Zone (ESZ). The ESZ can represent Municipality boundaries (i.e. police, fire and ambulance serving areas). Providing that the wireless cell site / sector associated ESRD has been loaded and processed, the selective call routing feature automatically routes an emergency call to the 9-1-1 PSAP serving the wireless cell site / sector location coverage / tower orientation.

2.3.2 Cell Site/Sector Location Information - Wireless E9-1-1 Phase I Service

This feature provides the PSAP call taker with a visual display of the wireless 9-1-1 call information including but not restricted to Wireless Carrier name, cell site / sector pseudo address, and class of service. 9-1-1 PERS also provides emergency service zone and appropriate police, fire prevention, and ambulance dispatch centres.

2.3.3 Caller Location Information–Wireless E9-1-1 Phase II Stage 1 Service

For 9-1-1 dialled calls originating from WSPs having implemented the Wireless E9-1-1 Phase II Stage 1 Service, the call display information includes Phase I information as well as but is not limited to:

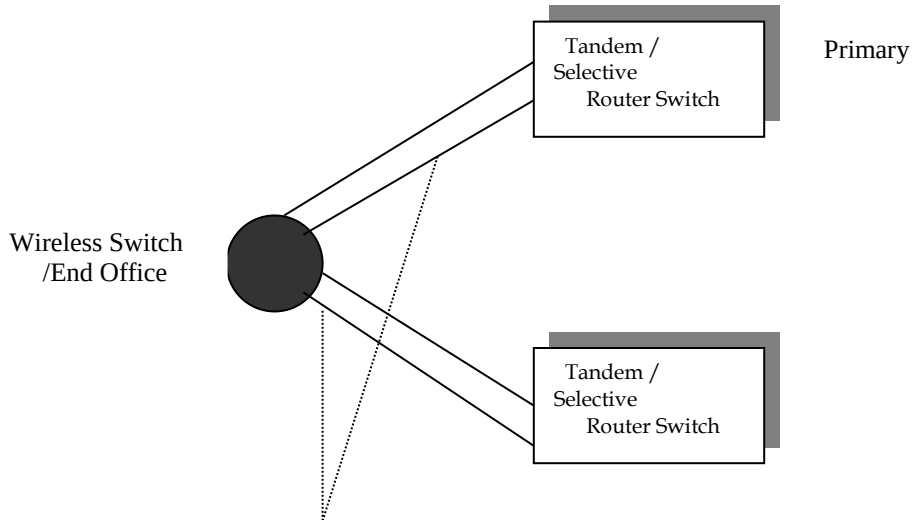
- the 9-1-1 caller's longitude;
- the 9-1-1 caller's latitude;
- the 9-1-1 caller's location computed area of uncertainty (radius in metres); and
- the confidence factor (in percentage).

This additional information will be appended to the existing Phase I data record.

3.0 Voice Network Interface

This section provides details of the interface requirements to interconnect with the Bell Canada 9-1-1 PERS voice network.

Each 9-1-1 tandem (Selective Router) switch is paired with a backup switch; they are designated as a primary and secondary tandem switch, based on a Bell Canada assignment. Dedicated 9-1-1 interconnection service arrangement trunks link all wireless switch / end-offices in the served area to both tandem switches. 9-1-1 calls are routed using the trunks that connect the wireless switch / end-office to the primary tandem switch. In the event of a primary trunk failure or a primary tandem switch failure, the originating switch re-directs the 9-1-1 calls to the secondary tandem switch.



Secondary

Dedicated and diversified (where available) ISUP 9-1-1 trunks

Figure 2: 9-1-1 Trunks

3.1 PHYSICAL TRUNK INTERFACE

Dedicated 9-1-1 trunks link each wireless switch / end office in the served area to a pair of E9-1-1 Tandem switches, which are designated as primary and secondary tandems based on Bell Canada assignment. Under normal circumstances, 9-1-1 calls are routed by the Wireless Carrier using the dedicated 9-1-1 trunks that connect the wireless switch to the primary E9-1-1 Tandem. In the event of a failure of the primary trunks or the primary E9-1-1 Tandem, the Wireless Carrier can invoke an automatic overflow to redirect the 9-1-1 calls to the secondary E9-1-1 Tandem Providing that the ESRD record is available in the Selective Routing Database, the secondary tandem always attempts to carry overflowed traffic back to the primary tandem switch for delivery to the primary PSAP. If the ESRD is not available the call is default routed directly to the primary PSAP. In that condition, further conference / transfer to a secondary PSAP is featureless.

The primary function of the trunks connecting the wireless switches / end-offices to the E9-1-1 Tandem switches is to provide the signalling capabilities. These can be grouped into two main areas:

- protocol between the wireless switch / end-office and the E9-1-1 Tandem switches for call set-up,
- 9-1-1 features set support

In all cases, the 9-1-1 trunks must:

• be dedicated,
• be applied on diverse routing for contingency purposes, where available,
• be provisioned as an absolute minimum of 2 trunks from each wireless switch / end-office to each tandem switch,
• conform to P.001 grade of service to each tandem switch.

P.001 Grade of Service means a grade of service that will ensure a probability of less than one (1) call out of one thousand (1,000) incoming calls will encounter a busy signal on the first dialing attempt during the busy hour of the average busy day. This grade of

service is the standard set out in Bell Canada 9-1-1 PERS tariff (refer to Stentor's National Tariff 7400, Item 635.4, as filed on July 30, 1997).

The interface specifications for the ISUP (CCS7) signalling trunks are the same as those defined in Schedule 1 Part 5, Intercarrier Interface Specification, "Feature Group D" Access Using Common Channel Signalling System Number Seven (CCS7), dated April 6, 1993, as filed by Bell Canada under Tariff Notice 4774.

3.2 ISUP (CCS7) SIGNALLING REQUIREMENTS

The ISUP (CCS7) signalling requirements are further described in the following Telcordia documents:

GR-2956-COR*E, CCS/SS7 Generic Requirements in Support of E9-1-1 Service,* describes the Signalling System No. 7 signalling between the originating switch and the E9-1-1 tandem, and between E9-1-1 tandems. Interworking with this SS7 signalling is also described in this document.

GR-905-CORE, *Common Channel Signalling (CCS) Network Interface Specification (CCSNIS) Supporting Network Interconnection, Message Transfer Part (MTP), and Integrated Services Digital Network User Part (ISDNUP).*

GR-1432-CORE, CCS Network Interface Specification (CCSNIS) Supporting SCCP and TCAP.

It is expected that the A-link arrangement described in Section 2 of GR-905-CORE will be utilized for CCS-based interconnection in support of E9-1-1 Service.

Common Channel Signalling No. 7 (CCS7) is the layered CCS protocol used by national and international telecommunications networks to provide highly reliable information transfer with low delay and without loss or duplication of messages.

GR-905-CORE and GR-1432-CORE describe the interface protocol and messages expected to cross the network interface. Specifically, Section 3.1 of GR-905-CORE describes the Message Transfer Part (MTP), Section 3.2 of GR-905-CORE describes the Integrated Services Digital Network (ISDN) User Part (ISDNUP) for non-call related messages, and Section 3.3 of GR-905-CORE describes the ISDNUP for call-related messages.

In addition, Section 2 of GR-1432-CORE describes the Signalling Connection Control Part (SCCP), and Section 3 of GR-1432-CORE describes the Transaction Capabilities Application Part (TCAP) portion of the SS7 protocol, which play a role in non-circuit related message exchanges.

The following ISUP Signalling (IAM) parameters are used for wireless trunk-side 9-1-1 interconnection:

IAM Parameter Description	IAM Parameter Use
Generic Digits	pANI/ESRD 10-digit Number
Calling Party Number	10-digit Call Back Number
Called Party Number	Must be « 911 or 11 »

3.3 9-1-1 TANDEM / SELECTIVE ROUTER SWITCH SIGNALLING

In addition to the above, the 9-1-1 tandem switches use specific ISUP (CCS7) signalling on the inter-tandem trunks to support wireline-based 9-1-1 PERS features. These features are not supported on 9-1-1 trunks between the wireless switch and the 9-1-1 tandem switch.

4.0 Data Network Interface

PLEASE REFFER TO WSP IMPLEMENTATION DOCUMENT

This interface is intended to transport the ESRD routing "telephone" number associated with a Wireless Carrier's cell site / sector and the cell site / sector pseudo location information for the purpose of updating Bell Canada 9-1-1 PERS Data System.

5.0 ESRD Customer Record Information Files and Records

PLEASE REFFER TO WSP IMPLEMENTATION DOCUMENT

This section defines the wireless ESRD identification and cell site / sector pseudo location information to be transmitted by the Wireless Carrier to Bell Canada 9-1-1 PERS Data System.

After processing the received data, the 9-1-1 PERS Data System will generate an Error Return file (serving as a processing acknowledgement as well as for returning any file or record error to the Wireless Carrier). Details of Error Return files are discussed in Section 6.

6.0 Error Return Files

PLEASE REFFER TO WSP IMPLEMENTATION DOCUMENT

7.0 Canadian Wireless E9-1-1 Phase II Stage 1

The introduction of the Canadian Wireless E9-1-1 Phase II Stage 1 service requires additional interconnections between the ALI computers and the WSP. Typically, the ALI computers will interoperate with a Mobile Positioning Centre (MPC) for carriers using CDMA technology while it will be a Gateway Mobile Location Centre for carriers using GSM or HSPA technologies.

In order to facilitate interconnection with the various WSPs, Bell Canada has established 2 Points of Interconnection (POI) where WSPs are to meet with Bell over DS-1 links.

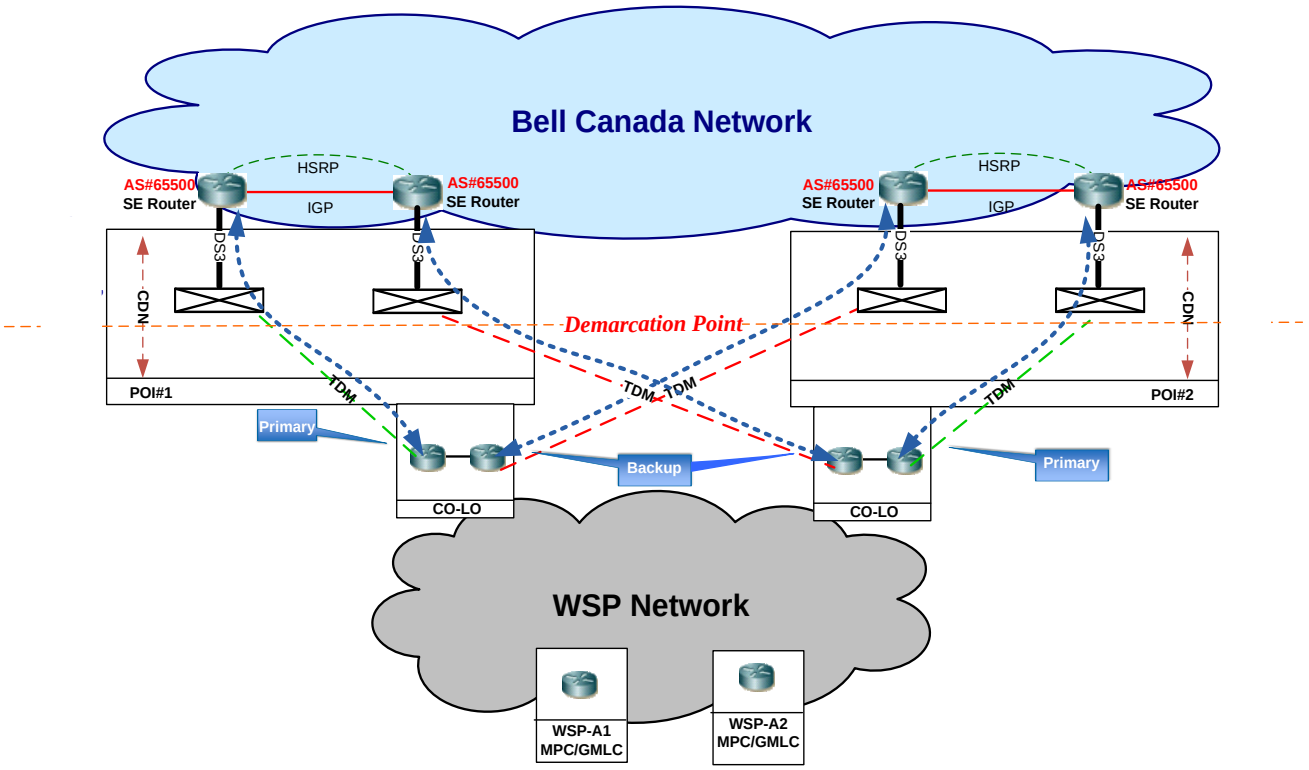


Figure 3: **POI Interconnection for CO-LO**

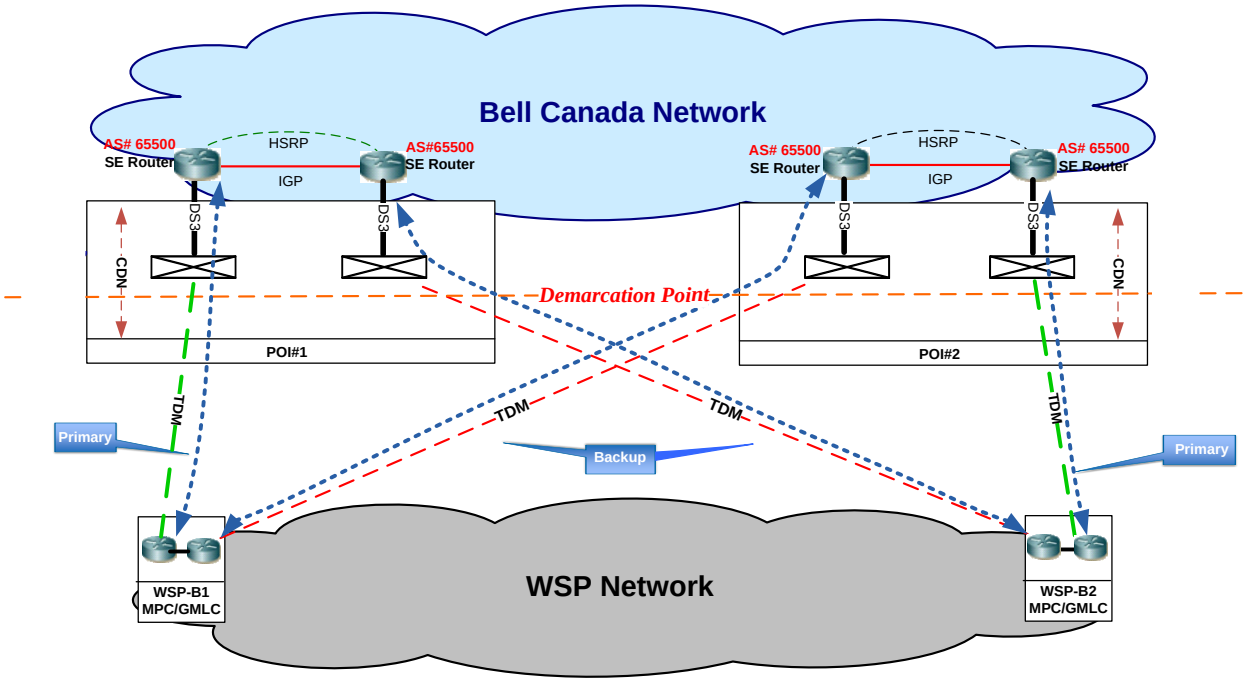


Figure 4: POI Interconnection for Remote Sites

The interconnecting network is designed to support full redundancy within the POI site. As such, all network components are duplicated and can individually sustain fault recovery.
POI diversity is not offered nor mandated. In the unlikely event that a POI site experiences a full outage, the service can be automatically or manually switched to the secondary ALI.
Full end-to-end network redundancy is dependant on the WSP's network design however a minimum of 4 links per WSP is required to meet the reliability requirements for this service.

Wireless Carrier 9-1-1 Phase II Stage I interconnection is accomplished by establishing the following:

a) Two Points Of Interconnection (POI) between WSPs and Bell over DS-1 links.

b) Dedicated private point-to-point TDM interconnection between the ALI and the MPC or GMLC (CDMA vs GSM\HSPA). A minimum of 4 links is required; one per SE router.

c) IPSec tunnel at the POI: If encryption is required by a wireless carrier, the carrier is responsible to bring its own IPSec box in the co-lo.

d) IPv4

e) HTTP v1.1

f) TCP, non persistent, port 9210

g) Application layer heartbeat mechanism to ensure network and applications are alive and well.

h) Message format is defined in OMA-MLP v3.2 [**OMA MLP**]. Refer to section XX below for further details.

i) Carriers to supply their own router and maintain them.

j) Carriers to supply /30 public IP address for DS1 connection

k) Bell Demarcation is at the POI
   a. *Carriers responsible for their portion of the network interconnection*
   b. *Interconnections done at the POI as per existing CDN tariff*
   c. *POI interconnection via TDM interface only*
   d. *LOA (letter of authorization is required)*

l) Dynamic Routing is required between Bell and Carrier's networks

m) Bell to advertise ALI's NATed IP addresses only

In order to initiate the interconnection process WSP must send an email to:

phase2wireless911@bell.ca

The reception of a request triggers a process that will engage all of the neccessary departments within Bell in order to proceed with design and implementation of the interconnection. This email will also trigger the distribution of of a Customer Package which among other things contains details regarding necessary testing that will have to be performeded by the WSP in order to finalize interconnection to the live 9-1-1 platform.

7.1 ALI-WSP Communications

The ALI-to-WSP communications are governed by the CISC Report ESRE0047 [**ESRE0047**]. The messages exchanged between the ALI and the WSP are formatted based on the OMA-MLP v3.2 specification [**OMA MLP**]. There are two XML-based messages defined for 9-1-1 emergency request: ELIR (Emergency Location Information Request) and ELIA (Emergency Location Identification Answer). In a typical implementation, there will be two connections established with the WSP, one to each redundant node.

7.2 Processing Wireless E9-1-1 Phase II Location Requests

The ALI-WSP communications are triggered by a wireless E9-1-1 call over a cell site / sector with an ESRD that has a service class equal to WL2. When this happens, the ALI will setup the communication session with the appropriate WSP Location platform based on the Data_LSP_ID of the ESRD record. It then crafts ELIR messages with the pANI (ESRD), the ANI (CBN) and other WSP specific parameters. If the communication session establishment succeeds, the ELIR messages are sent to the WSP over the TCP connection(s) and the ALI then "listens" for an answer on the same TCP connection(s).

7. 2.1 ELIR location request message from ALI

The ALI creates the ELIR message based on the XML structure below.

```
<?xml version="1.0"?>
<!DOCTYPE svc_init SYSTEM "MLP_SVC_INIT_320.DTD">
<svc_init ver="3.2.0">
<hdr ver="3.2.0">
<client>
<id>clientId</id>
<pwd>clientPwd</pwd>
<serviceid>client.serviceid</serviceid>
</client>
</hdr>
<eme_lir res_type="SYNC" ver="3.2.0">
<msid type="msidType">NPANXXXXXX</msid>
<esrd>NPA511XXXX</esrd>
<eqop>
<resp_timer>30</resp_timer>
</eqop>
<geo_info>
<CoordinateReferenceSystem>
<Identifier>
<code>4326</code>
<codeSpace>EPSG</codeSpace>
<edition>6.1</edition>
</Identifier>
</CoordinateReferenceSystem>
</geo_info>
<loc_type type="INITIAL" />
</eme_lir>
</svc_init>
```

clientId: This parameter identifies the client ID assigned to the ALI. This parameter is used for login purposes and included in the ELIR message so the WSP can identify the ALI originator of the request. The client ID is determined by the WSP and provided in the Wireless Phase II Customer Template. Maximum allowed size is 24 characters.

clientPwd: This parameter specifies the password associated with the client ID. This parameter is used for login purposes and included in the ELIR message so the WSP can authenticate the ALI originator of the request. The password is determined by the WSP

and provided in the Wireless Phase II Customer Template. Maximum allowed size is 24 characters.

client.serviceid: This is an optional parameter that can be set to uniquely identify an ALI computer in the ELIR message. This information may be used by the WSP when reporting problems to Bell. This value would be provided by Bell (currently not used).

<msid type="***msidType***">NPANXXXXXX</msid> contains the mobile phone number, CBN as presented to the ALI by the E9-1-1 Tandem at call time.

msidType: Usually, MDN for CDMA networks, MSISDN for GSM or HSPA networks. This value is determined by the WSP.

<esrd>NPA511XXXX</esrd> contains wireless tower phone number, ESRD as presented to the ALI by the E9-1-1 Tandem at call time.

7. 3 Processing Wireless E9-1-1 Phase II Location Responses

Once the ALI has successfully sent the ELIR messages to the WSP, it waits for the ELIA from the WSP.

The validation scheme depends on the message format received. The following sub-sections describe the expected message formats and their specific validation schemes.

7.3.1 ELIA positive response message from WSP

Below is the expected XML structure of an ELIA message received when the WSP has successfully processed the ELIR within the allotted time.

```
<?xml version="1.0"?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<eme_lia ver="3.2.0">
<eme_pos>
<msid type="MSISDN">NPANXXXXXX</msid>
<pd>
<time utc_off="0000">YYYYMMDDMMHHSS</time>
<shape>
<CircularArea srsName="www.epsg.org#4326">
<coord>
<X>DD MM SS.sssN</X>
<Y>DDD MM SS.sssW</Y>
</coord>
<radius>RRRRRR</radius>
</CircularArea>
</shape>
<lev_conf>90</lev_conf>
</pd>
<esrd>NPANXXXXXX</esrd>
</eme_pos>
</eme_lia>
</svc_result>
```

7.3.1.1.1 *Validations*

The following describes the validations performed on the successful ELIA. Any validation failure at this point will produce an ALI error message to the PSAP.

- The MSID and the type values in the response must correspond exactly to those in the request.
- The <msid> and <pd> elements, including the sub-elements and attributes, must be present.
- The format of the <X> value is of the format DD.MM.SS.sssH and must be as follows:

  - DD: Mandatory 2 digits [0-9] degrees
  - [space]: Mandatory single space
  - MM: Mandatory 2 digits [0-9] minutes
  - [space]: Mandatory single space
  - SS: Mandatory 2 digits [0-9] seconds
  - .: Conditional dot. Must be present if decimal seconds are present

- sss: Optional 1 to 3 digits [0-9] decimal seconds. Additional digits are truncated (*Release 2*).
- H: Mandatory single character “N” or “S” heading

- The format of the <Y> value is of the format DDD.MM.SS.sssH and must be as follows:
  - D: First digit is optional and if present must be a value of [0-1] for hundred degrees
  - DD: Mandatory 2 digits [0-9] degrees
  - [space]: Mandatory single space
  - MM: Mandatory 2 digits [0-9] minutes
  - [space]: Mandatory single space
  - SS: Mandatory 2 digits [0-9] seconds
  - .: Conditional dot. Must be present if decimal seconds are present
  - sss: Optional 1 to 3 digits [0-9] decimal seconds. Additional digits are truncated (*Release 2*).
  - H: Mandatory single character “E” or “W” heading

7.3.2 ELIA Error Response format from WSP

Depending on the error encountered, the WSP may respond with two different formats:

1. Format 1

```
<?xml version="1.0"?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<eme_lia ver="3.2.0">
<eme_pos>
<msid type="MSISDN">NPANXXXXXX</msid>
<poserr>
<result resid="N">description</result>
<time utc_off="0000">YYYYMMDDMMHHSS</time>
</poserr>
<esrd>NPANXXXXXX</esrd>
</eme_pos>
</eme_lia>
</svc_result>
```

The above format is typically used when the WSP's location infrastructure is able to process the ELIR but unable to provide a successful location fix.

```
<?xml version="1.0"?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<eme_lia ver="3.2.0">
<result resid="N">description</result>
</eme_lia>
</svc_result>
```

2. Format 2

The above format is typically used when the WSP's location infrastructure is unable to process the ELIR.

7.3.2.1 *Validations*

The following describes the validation performed on the unsuccessful ELIA. Any validation failure at this point will produce an ALI error message to the PSAP.

- The <result> element must contain the *resid* attribute and an associated value.

7.4 Heartbeat Mechanism

An application layer heartbeat mechanism is implemented between the ALI and the WSP to ensure that the network and the services are available when required. This is achieved by sending heartbeat messages at regular interval from both the Primary and the Secondary ALI, irrespective of which one is Active. The heartbeat message format is the same as the ELIR location request with a few differences described below.

7.4.1 ELIR heartbeat message from ALI

The following represents the XML structure for a heartbeat ELIR.

clientId and *clientPwd* are per WSP Connection configuration and *msidType* is per WSP

```
<?xml version="1.0"?>
<!DOCTYPE svc_init SYSTEM "MLP_SVC_INIT_320.DTD">
<svc_init ver="3.2.0">
<hdr ver="3.2.0">
<client>
<id>clientId</id>
<pwd>clientPwd</pwd>
<serviceid>client.serviceid</serviceid>
</client>
</hdr>
<eme_lir res_type="SYNC" ver="3.2.0">
<msid type="msidType">0000000000</msid>
<esrd>0000000000</esrd>
<eqop>
<resp_timer>5</resp_timer>
</eqop>
<geo_info>
<CoordinateReferenceSystem>
<Identifier>
<code>4326</code>
<codeSpace>EPSG</codeSpace>
<edition>6.1</edition>
</Identifier>
</CoordinateReferenceSystem>
</geo_info>
<loc_type type="CURRENT" />
</eme_lir>
</svc_init>
```

(LSP ID).

Configuration parameters can be set specifically in the WSP configuration screen of the corresponding WSP. The *msidType* used by the heartbeat is the same one as the first LSP ID configured for this WSP (LSP ID #1).

<msid type="***msidType***">0000000000</msid> contains the fake mobile phone number which is set to 000-000-0000 for a heartbeat message.

<esrd>0000000000</esrd> contains the fake wireless tower phone number which is set to 000-000-0000 for an heartbeat message.

7.4.2 ELIA heartbeat response message from WSP

The following represents the expected format of an ELIA heartbeat response from the WSP.

```
<?xml version="1.0"?>
<!DOCTYPE svc_result SYSTEM "MLP_SVC_RESULT_320.DTD">
<svc_result ver="3.2.0">
<eme_lia ver="3.2.0">
<eme_pos>
<msid type="MSISDN">0000000000</msid>
<poserr>
<result resid=4>UNKNOWN SUBSCRIBER</result>
<time utc_off="0000">YYYYMMDDMMHHSS</time>
</poserr>
<esrd>0000000000</esrd>
</eme_pos>
</eme_lia>
</svc_result>
```

Appendix 1: Glossary

9-1-1 PERS 9-1-1 Public Emergency Reporting Service
Bell Canada 9-1-1 system that provides Automatic Location Identification (ALI), Automatic Number Identification (ANI) and Selective Routing.

9-1-1 PERS Data System Complete set of processes, databases and supportive hardware that form the data sub-network of the Bell Canada 9-1-1 PERS.

ALI Automatic Location Identification
For WSP E9-1-1 Service, the pseudo and physical location information associated with the wireless cell site / sector's ESRD 10-digit routing telephone number

ANI Automatic Number Identification
Cell site / sector's telephone number (ESRD for wireless)

CBN Call Back Number
The 10-digit telephone number for the wireless device placing the 9-1-1 call

CCS7 Common Channel Signalling Number 7

CLEC Competitive Local Exchange Carrier
Competitive provider of local telephone service

CRI Customer Record Information
For WSP E9-1-1 Service, wireless ESRD transaction records contains in the source system

CSG Carrier Services Group
Department in Bell Canada which interfaces and deals directly with the carriers

ESN Emergency Service Number
Number of the emergency service zone defined by a unique set of one primary PSAP and three secondary PSAPs (police, fire and ambulance).

ESRD Emergency Service Routing Digit
10-digit routing number of cell site / sector used for selective routing and ALI display key

ESZ Emergency Service Zone
Area defined by a unique set of one primary PSAP and three secondary PSAPs (police, fire and ambulance).

FSN File Sequence Number
Number assigned to ESRD Customer Record Information and Error Return files.

HTTPS HyperText Transfer Protocol Secure

ILEC Incumbent Local Exchange Carrier

LSP Local Service Provider
Provider of local telephone service; includes ILECs, CLECs and Resellers.

MLP Mobile Location Protocol
Application-level protocol for obtaining the position of mobile stations (mobile phones, wireless personal digital assistants, etc.) independent of underlying network technology. The MLP serves as the interface between a Location Server and a Location Services (LCS) Client

NPA Number Plan Area
The three-digit area code.

NXX Network Exchange (prefix)
The first 3 digits of the 7-digit Telephone Number (TN).

OMA Open Mobile Aliance

PSAP Public Safety Answering Point
The answering location for 9-1-1 calls originating within a specified area.

Wireless Carrier Also referred to as Wireless Service Provider
Provider of mobile telephone service

Wireless 9-1-1 SAG 9-1-1 Street Address Guide
Database, which contains pseudo addresses, listed as street names and corresponding civic number ranges, where the civic number range is the ESN assigned to the ESZ