

Dynamic Location Routing and MLTS

FCC - December 6, 2017



Key Points for this Meeting

- Bandwidth supports the FCC's initiative to update ECS rules to benefit the public.
- Further, ECS rule-making presents an opportunity to accelerate the uptake of NENA i3 NextGen 9-1-1 solutions.
- Dispatchable Location capture and delivery to public safety begins with the origination service and therefore, NENA i3 SIP PIDF-Lo is a natural and necessary part of future ECS rule making.
- Bandwidth is currently deploying NENA i3 SIP PIDF-Lo solutions for the ECS space that provide cost effective and flexible solution for evolving ECS rules & laws.
 - **Branded “Dynamic Location Routing.”**
- Ultimately, the public will benefit from ubiquitous application of NextGen9-1-1 at a national level.
 - **The implication is that Originating Service Providers eventually implement SIP PIDF-Lo services.**
- Bandwidth recommends to startin now with ECS providers.



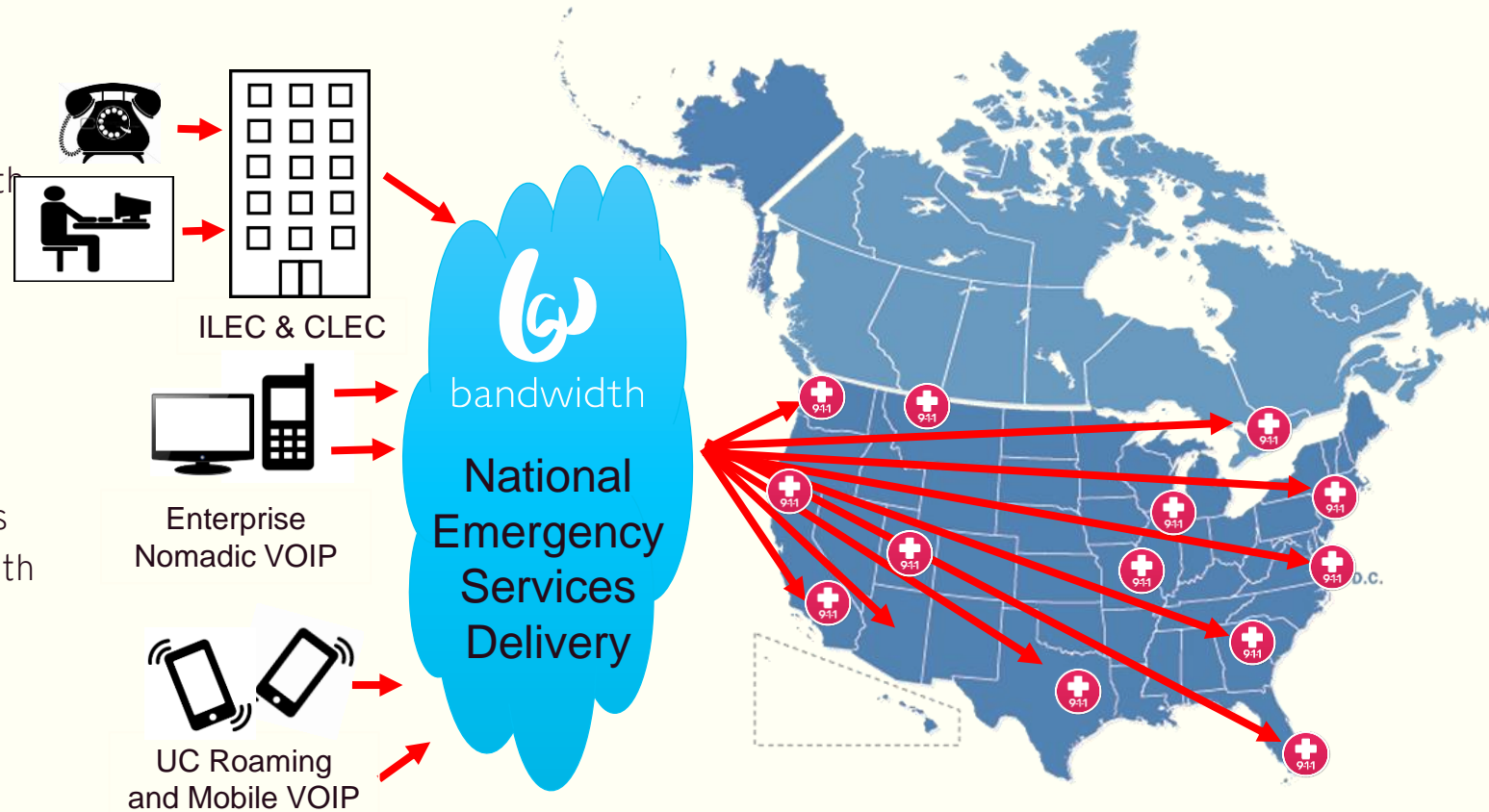
- Bandwidth's Role in ECS.
- Bandwidth's Observations on ECS.
- Bandwidth MLTS Solution.
 - Current Bandwidth MLTS Solution.
 - MLTS Using Dynamic Location Routing.
 - What Does This Mean for the Enterprise?
 - Dynamic Location Routing and MLTS.
- Delivering ECS Benefits Now.
- Recommendations to FCC.

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Bandwidth's Role in ECS

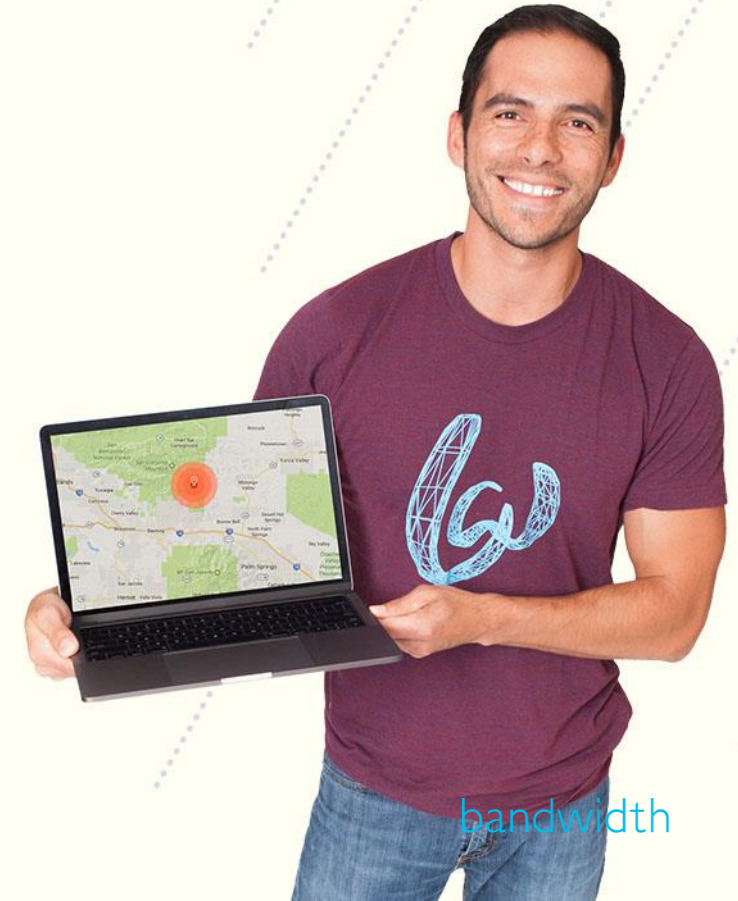
- ILECs & CLECs: Bandwidth provides multi-building, multi-campus and multi-state customers national 9-1-1 service.
- Soft-Switch and Soft PBX Vendors: Bandwidth powers some of the largest soft-switch and cloud-based PBX providers through bundled offerings and SIP Trunks.
- Universities & Municipalities: Bandwidth provides direct or channeled solutions to this burgeoning market requiring mobility and with very high expectations of performance and accuracy.
- UCaaS and CPaaS: Bandwidth connects cloud-based services to the Selective Router/ESInet infrastructure.



Only provider of both telephony services and 9-1-1 services nationally.

There is more to the “ECS Gap” than meets the eye ...

- “Fixing” ECS is more than setting a benchmark for “Dispatchable Location.”
- There are several industry initiatives that ought be considered in concert:
 - Legacy S/R and ALI are moving from rigid NPA-NXX routing to SIP PIDF-Lo routing based on NextGen9-1-1.
 - National Number Portability proposal to decouple traditional relationship between NPA-NXX and geographic boundaries.
 - Wireless 9-1-1 Phase III is driving the creation of a NEAD and associated technologies under the CTIA. This means that Wireless 9-1-1 is moving to **address** delivery for 9-1-1.
 - Fixed VOIP is giving way to Nomadic VOIP is giving way to Mobile VOIP which is moving to X-Y (latitude-longitude) location delivery for 9-1-1.
- ECS rules ought facilitate the merger of ECS 9-1-1 techniques and Wireless 9-1-1 technique because **the use cases are merging**.
- One common tool is the use of “Location Objects” and would avoid the pitfall of a **fixed address centric** approach to ECS.



Primary Issues with Current ECS (MLTS) Promulgated Rules

- Lacking recognition of the inherently nomadic nature of modern IP communications.
 - Wireline gives way to Nomadic VOIP gives way to Mobile VOIP.
 - Formerly “fixed” end-points can become fully mobile and need X-Y support as an alternative to civic address.
 - Rules/Laws (see Utah MLTS Statute example) requiring location updates “within 24 hours” of a change ... but change can be continuous.
- Lacking clear guidance for standards-based implementations.
 - Local Number Portability (LNP) provides a clear example of the merit of a ubiquitous and defined standard.
 - Otherwise LNP would never have worked.
 - The opportunity is to require ECS solutions to utilize NextGen9-1-1 methods.
- Lack of any re-use or, access to, or even consideration of NEAD resources.
 - Further, NEAD is a “closed” environment and commercially ready “open” solutions are available.

Example of Utah’s rules on next slide for reference.



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Example Regulation: Utah

Effective 5/9/2017

69-5-202. Location identification information shared with public safety answering point.

An owner or operator of a multi-line telephone system shall configure the multi-line telephone system in such a manner that, when an individual makes a 911 call using the multi-line telephone system, the multi-line telephone system automatically provides the public safety answering point that receives the call verified automated number information and automated location information that includes:

- (1) the street address, and, if applicable, the business name, of the location of the communications device from which the call is made;
- (2) the direct call-back telephone number for the location from which the call is made;
- (3) any applicable office, unit, or building number of the location from which the call is made;
- (4) the room number, or other equivalent designation, of the location from which the call is made; and
- (5)
 - (a) if the multi-line telephone system operates for a multi-story building, the building floor from which the call is made; and
 - (b) if the multi-line telephone system operates for two or more buildings:
 - (i) the building number, or other equivalent designation, of the location from which the call is made; and
 - (ii) the building floor from which the call is made.



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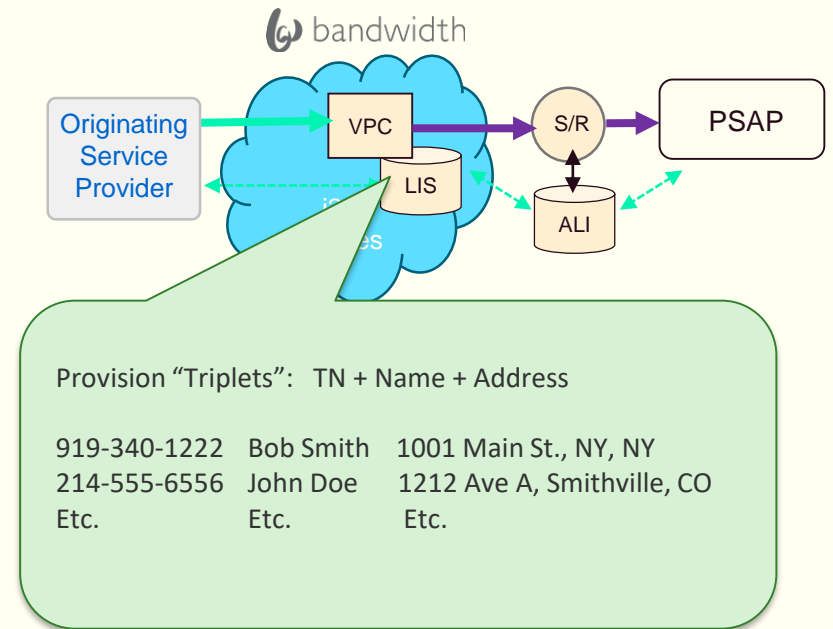
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Current Bandwidth MLTS Solution

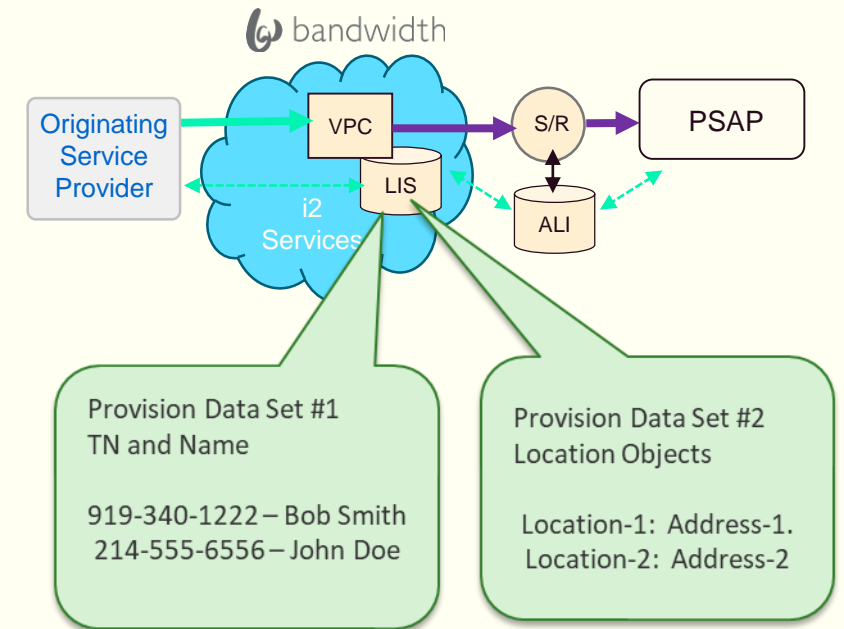
- For “Fixed” i2 Call Routing Service, Bandwidth requires:
 - Pre-provisioning of “triplet”: TN, Name, Address.
 - Essentially, “require” a DID per end-point.
 - Utilize “Address_Line_2” to identify Floor or Room number.
- Drawback is that non-DID endpoints are relatively common (e.g. school campuses).

Example: Extensions in each school classroom that do not have a DID assigned.



MLTS Using Dynamic Location Routing

- Dynamic Location Routing uses NextGen9-1-1 “SIP PIDF-Lo.”
- Breaks up the provisioning “triplet”: TN, Name, Address.
- Instead we now provision all “TN + Name”, then all Locations.
- Provisioning using same Bandwidth APIs.
- Location still makes use of “Address_Line_2.”
- However, the Subscriber’s Location is determined at call-time.



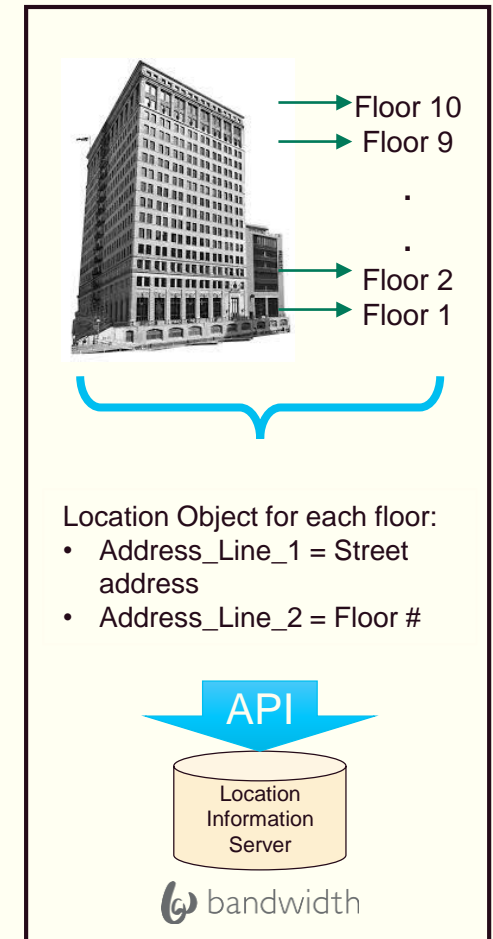
OPTION: End User can also be identified by “AEUI” (Alternate End User ID). This is useful for identifying services that may have IP End Points but not a unique TN.

What does this mean for the Enterprise?

Enterprises can streamline MLTS 9-1-1 by having the current location of the subscriber sent at 9-1-1 call time.

- Identify all WiFi access points in their buildings.
- Create a unique alpha-numeric “handle” for each access point.
- For example, convert WiFi MAC address into a string.
- Validate and store this set of Location Object via a Portal or API.
- At call time, detect the local WiFi MAC address and include it as the Location Reference in the SIP INVITE.

Key benefit to the Enterprise is reduction of labor associated with tracking which end-point is where when employees move about.



Dynamic Location Routing allows Enterprise to “provision once and you are set.”

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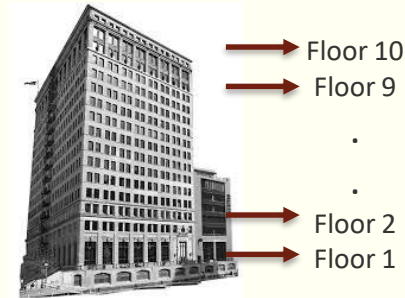
Step 1



Provision Subscribers

- Provision subscribers TN and Customer Name
- Provision an address of record for taxation purposes

Step 2



Provision Locations

- For MLTS, each address identifies floor or suite etc.
- A unique string can be used to identify locations as a shortcut.
- Provision all possible locations for an entire enterprise or campus

Step 3



Generate 9-1-1 Call

- At Call time, send SIP INVITE with TN of subscriber and “Lo”
- Directly include as XML-formatted “location Object” where the subscriber is at.
- Or just include the unique reference string.

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Delivering ECS Benefits Now

- Bandwidth's Dynamic Location Routing solution (based on SIP PIDF-Lo) is:
 - Attractive to ECS customers because it adds value and simplifies operations.
 - Compatible with both legacy S/R and ALI as well as ESInet.
 - Being sold now.
- Issues with a lack of clear FCC guidance/policies on NextGen 9-1-1 include:
 - PSAP's don't adopt true SIP PIDF-Lo because Operators don't send "Lo".
 - Operators don't send SIP PIDF-Lo because PSAPs can't receive it.
 - The first deployer of the technology spends the most to gain the least.
- Bandwidth is demonstrating in the market that ECS end-users can embrace NextGen9-1-1 now.
 - Economic and feature value.
- We are further demonstrating the commercial value of SIP PIDF-Lo for: Home Security, DIY, Telematics, PERS, Safety & Security OTT Apps and others.



THANK YOU



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