Dynamic Location Routing and MLTS

FCC – May 2, 2018

AGENDA

May 2, 2018

- <mark>Key Points</mark>

- Review Bandwidth's Role in ECS.

- Review Bandwidth MLTS Solution.

  - **Dynamic Location Routing.**

- Response to Specific FCC Questions.

- Summary and Recommendations

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# PREVIOUSLY PROVIDED KEY POINTS

- 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.**

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KEY POINTS FOR TODAY

- Fundamental difference in responsibility of providing location between terrestrial operators and wireless operators.
    - Wireline, POTS, PBX, VOIP – self identification of location
    - Wireless, CMRS – handset and network calculation of location

- Key Point: Class of Service
    - Bandwidth uses CoS to control data display to the PSAP
    - However, some view CoS as a "commitment" to certain performance requirements

- Key Point: The danger of equating "Wireless 9-1-1" and "Mobile VOIP 9-1-1"
    - Wireless Operators are massive 100-billion dollar companies wit commensurate resources and market penetration.
    - Mobile VOIP and OTT Apps are nascent, innovative and susceptible to regulations that group them with "Wireless" for purposes of accuracy, taxes and performance.

- Key Point: Uber-based location is a myth for 9-1-1.
    - The lesson learned from Uber is the power of customer self-provisioning of location

- A New Paradigm is needed: Location Object's sent at call start.

Would the public be responsive to a 9-1-1 call being delayed to pop a map on the screen and ask the user to confirm "pick-up address"?
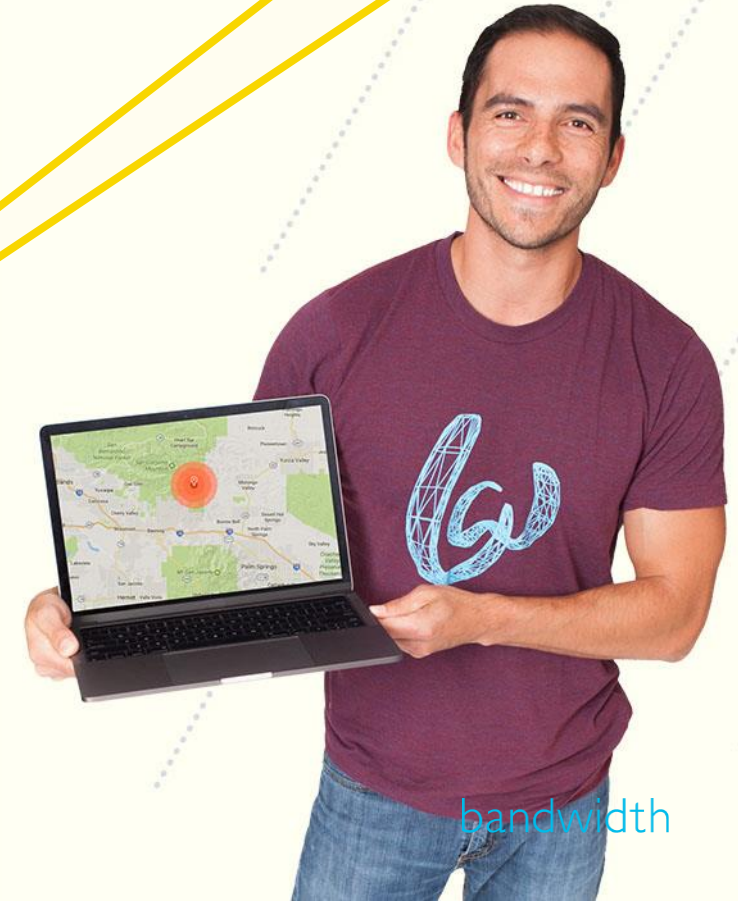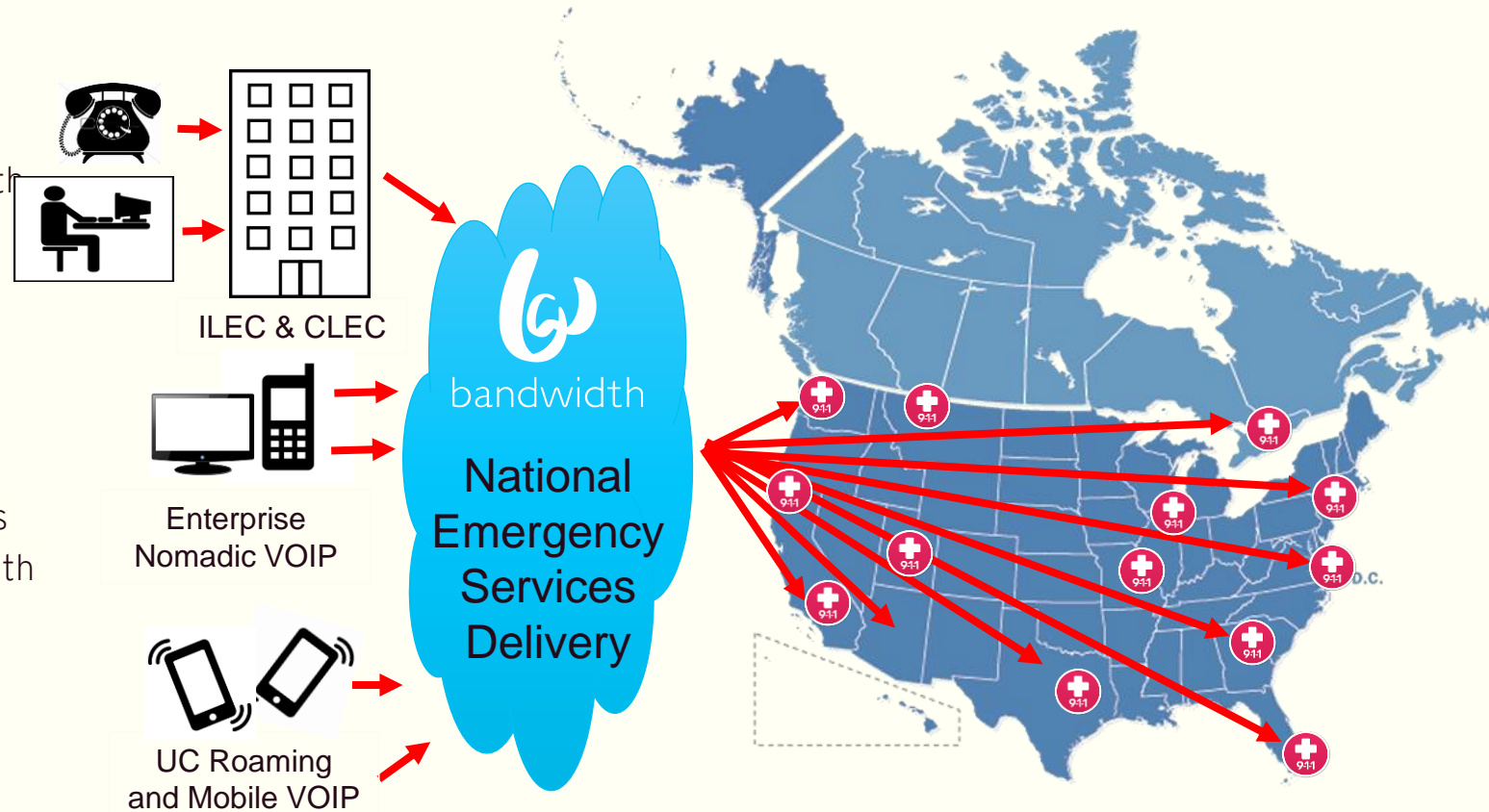
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Bandwidth's Role in ECS

- 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.

ILEC & CLEC

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National
Emergency
Services
Delivery

Enterprise
Nomadic VOIP

UC Roaming
and Mobile VOIP

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

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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.

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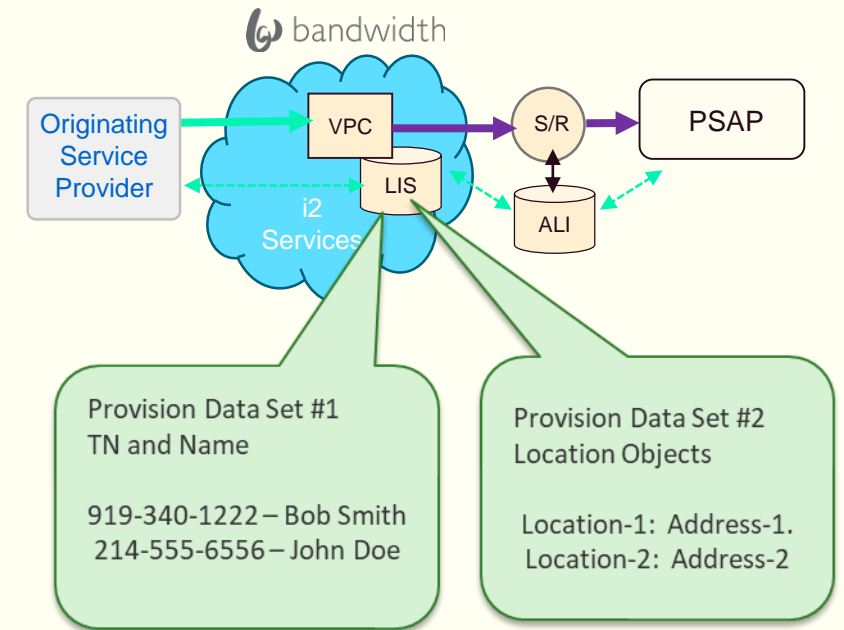- Response to Specific FCC Questions.

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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 <u>all</u> Locations.

- Provisioning using modern Bandwidth APIs.

- Location still makes use of "Address_Line_2."

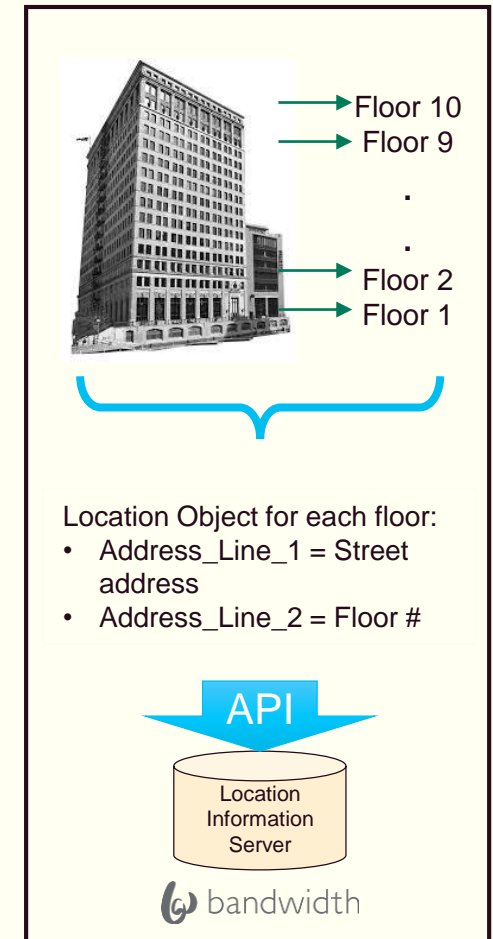- **However, the Subscriber's Location is determined at** <u>call-time.</u>

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.

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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. Example:

- 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.

Floor 10
Floor 9
.
.
Floor 2
Floor 1

Location Object for each floor:
- Address_Line_1 = Street address
- Address_Line_2 = Floor #

API

Location Information Server

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

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DISPATCHABLE LOCATION CAPABILITIES OF CURRENT MLTS TECHNOLOGIES

- Which combinations from the lists below can potentially support dispatchable location?
  - Communications service types: IP, non-IP, Hybrid;
  - MLTS service type: on premises hardware and software; hosted cloud solutions; over-the-top applications
  - MLTS Operator/Manager: Customer-managed, Third-party managed
  - End user device: Wired, Wireless, Soft Phone;

- Legacy PS-ALI and modern i2 VOIP provision a specific address per end-point (phone).

- Wireless Operators provision a specific X-Y for cell-sector location and use this for routing.
  - Evolution in wireless location accuracy involves provisioning addresses for "surrogate" location identifiers like WiFi AP's

- Key Point: Wireline and VOIP rely on the user self-identification of location
  - User maintains update of that location vial API's and Portal products.

- Key Point: Wireless Operators rely on device and network to "find" devices and end-user is not asked to "confirm" (like Uber)

- Support of Dispatchable Location is not due to "<u>service</u> type", it is due to <u>provisioning</u> type.

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Can you share your Network Deployment Architecture?
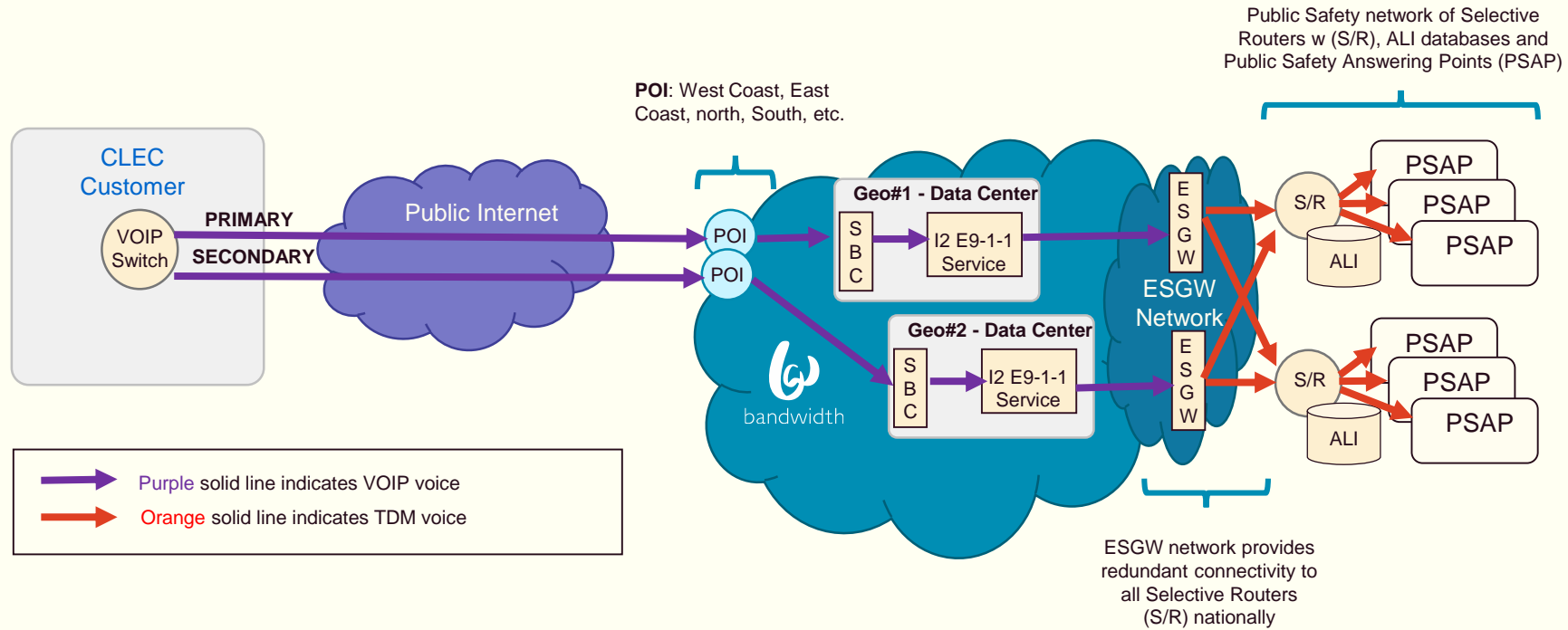
- Primary and Secondary connections over public Internet

- Optional to use Direct Link Service (DLS).

AUTOMATIC VS. MANUAL LOCATION DETERMINATION

- What automatic location detection methods for MLTS are currently available? What action is needed by MLTS manufacturers/MLTS operators/communications service providers to make it widely available?

- For Manual, how much user participation required? How can it be minimized?

- Even if a portable device cannot detect the caller's actual location, are there ways of determining whether a device is in a different location than it was previously?

- For VOIP end-points, HELD De-Reference can be used against a LIS to identify end-point location
  - Requires manual wire-map of enterprise network to be created and maintained.
  - Can make use of WiFi access point MAC address or RFID as ancillary "surrogate" location references

- Key Point: VOIP end-points are not smart phones
  - They generally do not have advanced capabilities like GPS or BLE for RFID detection.
  - These devices are generally not "location self detection capable"

- As a result, the creation of customer Portals, HELD capabilities, and API's can ease customer or enterprise self-management of location, but can not replace it.

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CALL-BACK CAPABILITIES.

- Which platforms/technologies and what type of call-back capabilities

- Call-Back for end-points with unique DID's is trivial

- Call-Back for legacy PS-ALI with use of ELIN/ERL is provided by PBX functionality (and is well understood).

- Bandwidth also provides services for non-DID end-points – termed "Alternate End User Identifiers" (AEUI)

- Several options provided for call-back:
  - Can assign Call Back Number either as fixed value or dynamic at call time.
  - We provide the tools for CLEC or MLTS vendor to construct "Call Back Pool" similar to ELIN/ERL technique of the past

- Key Point: Call Back is technically trivial but has implications due to tax and sur-charges that drive implementations
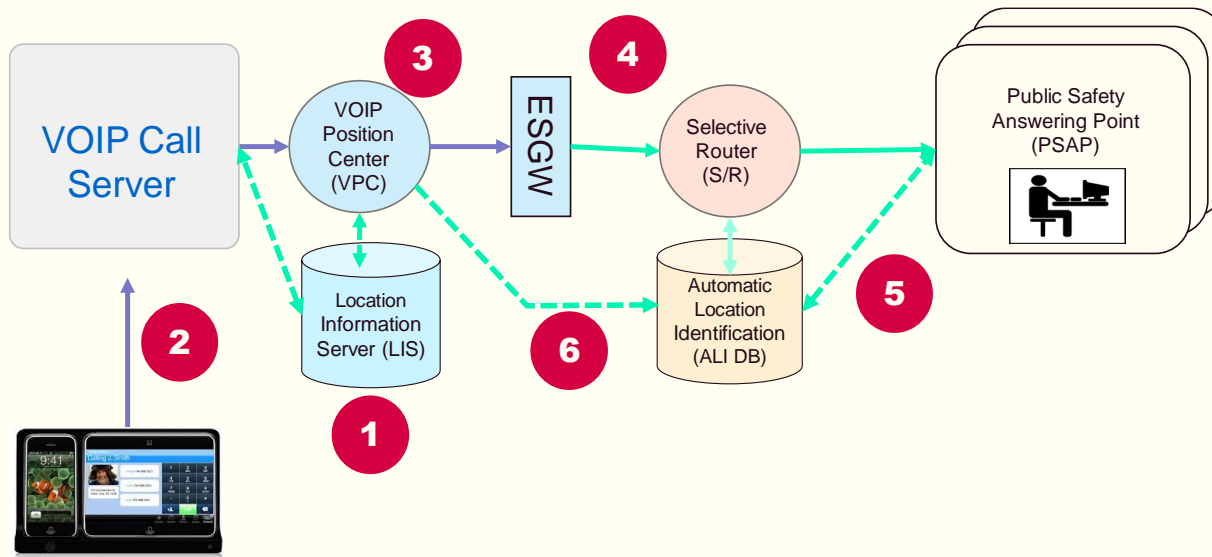
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Standards Used in Current MLTS 911 Equipment and Service Offerings

- Interfaces

- Signaling

- Data Formats

- Bandwidth makes use of NENA i2 and i3 standards for processing of 9-1-1 traffic

1. VOIP Service Provider (VSP) provisions TN, name, address to the LIS DB.
2. Subscriber makes 9-1-1 call.
3. VPC receives the call and routes call to media gateway to convert from VOIP to legacy TDM. Also, VPC changes TN of call to a temporary "key" (ESQK)
4. S/R receives call and routes to PSAP based on "key"
5. PSAP asks ALI for location using "key" which points to VPC.
6. VPC knows the "key" maps to the TN and fetches Name and Address from LIS and returns this data to ALI and PSAP.

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DEMARCATION OF RESPONSIBILITIES

- How do you divide various responsibilities today? What is the communications service responsible for? What is the MLTS operator responsible for? What is the enterprise responsible for? Can a third-party vendor (e.g., OTT APP Provider) access your location information?

- Details of how location information is shared:
  - Process: who is currently responsible for what? Who collects location information? Who sends to PSAP/ALI? How is this done?
  - Format: For Access and data exchange
  - Delays

- Bandwidth is a CPaaS provider predominantly servicing our clients as a wholesale provider.

- Customer's include ILEC, CLEC, 2-Way connected Providers and Universal Communications providers.

- Our clients take responsibility for adequately provision each end-points with appropriate location and call-back datum
  - Pass-through provisioning is possible through our clients Portal or API products through to Bandwidth's.
  - Bandwidth's provisioning portals and API's are real-time with no practical delay between updates and availability of data to public safety

- Bandwidth is exploring additional market segments and enterprise focused services.

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STATE/MODEL LEGISLATION

- *State/Model Legislation*

  - Some states have enacted location accuracy requirements for MLTS. In addition, NENA has proposed model legislation. (Business MLTS must provide one validated Emergency Response Location (ERL) for each 7,000 square-foot workspace within each floor; small buildings with less than 7,000 sq. ft. on a single level and located in a single contiguous property could provide one ERL. Different requirements apply for shared residential MLTS.)

  - Are these approaches effective, and what are their shortcomings? Do they address all types of modern MLTS scenarios? For example, how would they work in a hosted environment or with a VPN? Would they be appropriate for devices that auto-locate? Are they appropriate for NG911?

- Bandwidth supports the FCC's initiative to update ECS rules to benefit the public.

- ECS rule-making is an opportunity to accelerate the uptake of NENA i3 NextGen 9-1-1 solutions.

- Current rules lack recognition of the inherently nomadic nature of modern IP communications.

  - Rules remain in a mindset of "static address" and "ALI provisioning" rather than modern i2/i3 methods

  - Formerly "fixed" end-points can become mobile and need X-Y support as an alternative to civic address.

  - Rules/Laws requiring location updates "within 24 hours" of a change are dated.

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    - Attractive to ECS customers because it adds value and simplifies operations.
    - Compatible with both legacy S/R and ALI as well as ESInet.
    - Is a "tool kit" to assist with building products that comply with MLTS regulations.

- Rule making could encourage innovative OTT Apps rather than inhibiting them
    - Tight rules on what constitutes "9-1–1" may drive traffic to the Admin Line

- Class of Service
    - Technical use of CoS may have unintended considerations

- There are significant issues when equating "Wireless 9-1-1" and "Mobile 9-1-1"

- Uber-based location is a myth for 9-1-1 – it is not automatic, it is self-provisioned

- A New Paradigm is needed: Location Object's sent at call start.

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THANK YOU