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Legacy vs. Evolved Systems



Today's Legacy System

- Analog phone lines
- Not diverse nor resilient
- No video or image(s) possible
- Telco's control the network
- Routing based on static data
- Voice calls with little data

Tomorrows Evolved System

- Multiple methods and options to transport 911 calls and data
- Multiple levels of redundancy, from multiple providers
- Routing based on location of calling device
- More data and information available to 911



Public Safety Ecosystem





Today's Legacy system

- People
- Call Processing Equipment CPE
- Computer-aided dispatch CAD
- Management Information Systems (MIS)
- Event / Mission specific systems

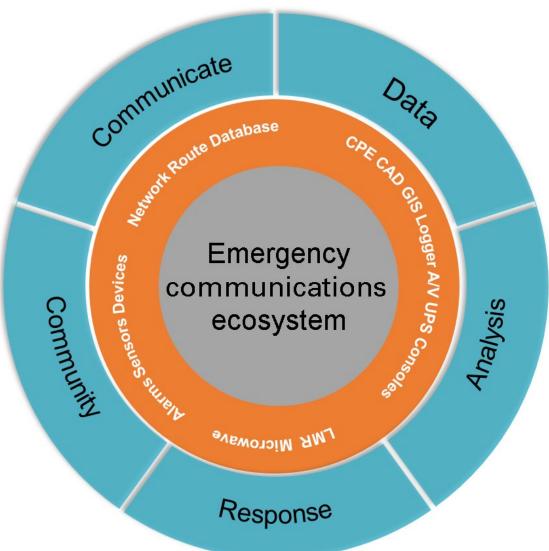
Tomorrows Evolved System

- People
- More information & Data Analytics
- Prioritization
- Artificial Intelligence*
- Predictive Response
- Smart Systems



Public Safety Ecosystem





Big Picture thinking is Critical

- Every project, technology, system and application will affect the entire process in some manner
- Every investment you make today must accommodate the emergency response ecosystem of tomorrow



Why are we changing 9-1-1



- 9-1-1 needs to catch up to todays realities to meet the technological and public needs
- Text, SMS, and MMS messages are outpacing other forms of communications
- Phase I and Phase 2 locations of today are imprecise
- With NG9-1-1 all calls will come with, and will be routed on, an accurate location
 - 911 will know the location of the call, even if the caller does not
 - Current and accurate GIS data will be needed to best understand the caller location
 - GIS of today will likely need to improve to meet the demands of NG9-1-1



Why are we changing 9-1-1



- Almost 87% of today's 9-1-1 calls are wireless*
- Over 1.77 Trillion SMS & MMS messages sent each day in US*
- In the US 92% of adults 18-34 years old own a smartphone**
- In Texas, from 2010 through 2013, more than 65 percent of wireless calls, in a sample from major cities, reached 911 without a location***
- Almost every 9-1-1 call today is downgraded to work with E9-1-1!
 - * 1 or more rebids required for location
 - ** source: ctia The Wireless Association® July 10, 2018
 - *** source: the Journal of Emergency Dispatch® March 30, 2019

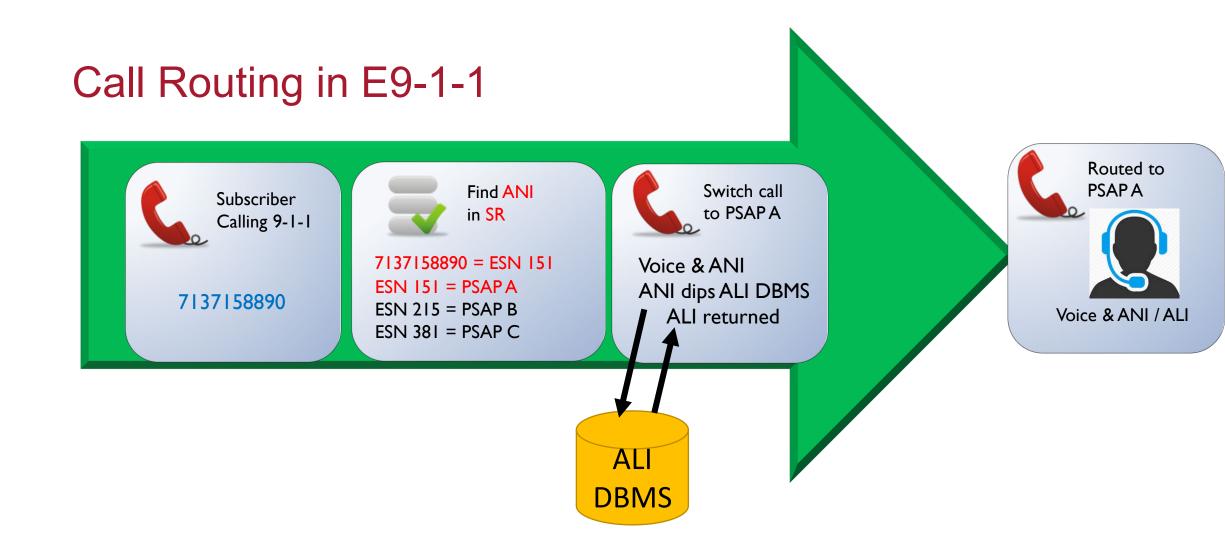


How are we changing 9-1-1



- Today's Legacy System
- Fragmented
- Fixed Hard coded not dynamic
- Inaccessible, not integrated
- E-911/computer aided dispatch (CAD)

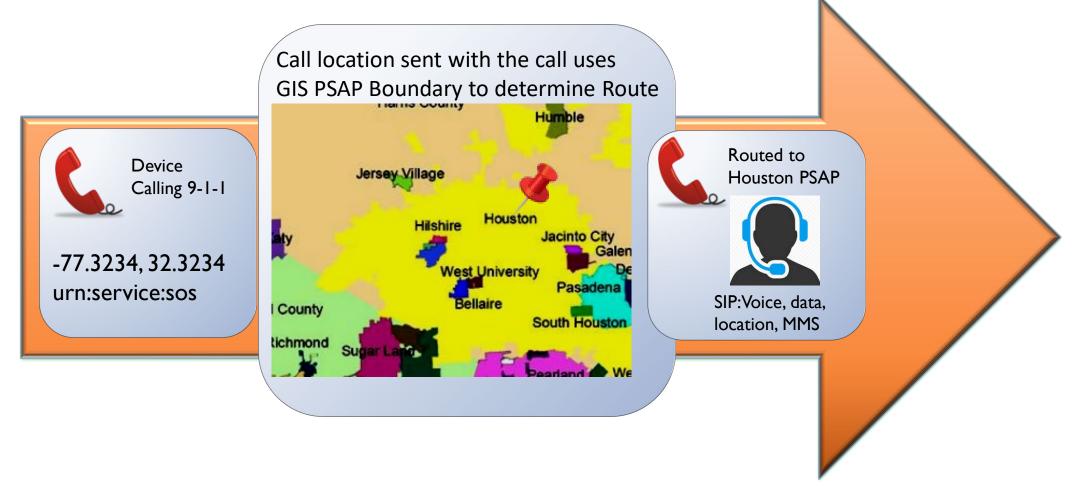
- Evolved System
- Broadband voice and data
- Wealth of data available
- Situational Awareness
- Dynamic on-the-fly re-routing
- Greater operational efficiencies
- Improved responder safety



Today routing based on 10 digit number (ANI or pANI).

The location, as ALI, comes after the call is routed to the PSAP

Call Routing in NG9-1-1



Call routing is based on calling devices location using GIS data

NG9-1-1 Call Routing Location Object

PIDF-LO with civic (address) information

```
<gp:geopriv>
       <qp:location-info>
          <cl:civicAddress>
             <cl:country>US</cl:country>
             <cl:A1>Texas</cl:A1>
              <cl:A3>Houston</cl:A3>
              <cl:A6>Rittenhouse </cl:A6>
             <cl:HNO>376</cl:HNO>
             <cl:LOC>Suite 2</cl:LOC>
             <cl:PC>77015</cl:PC>
           </cl>civicAddress>
         </gp:location-info>
        <gp:usage-rules/>
      </gp:geopriv>
```

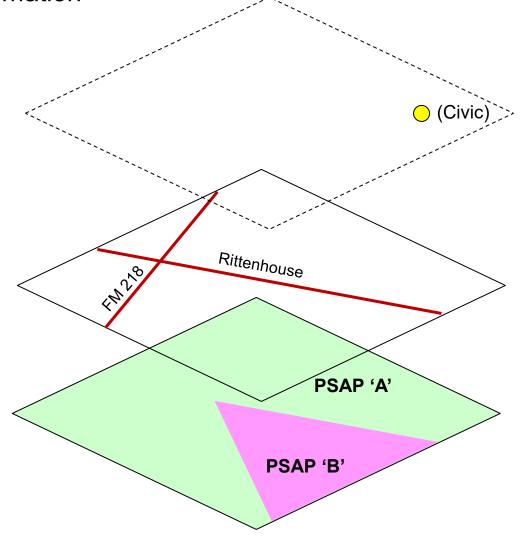
NG9-1-1 civic Call Routing Location Object

PIDF-LO with civic (address) information

Method civic:

'Civic' location geocoded to road centerline layer, using the address ranges and the name of the road centerlines.

Once the address is geocoded, the location is compared to the Polygon layer representing PSAPs.

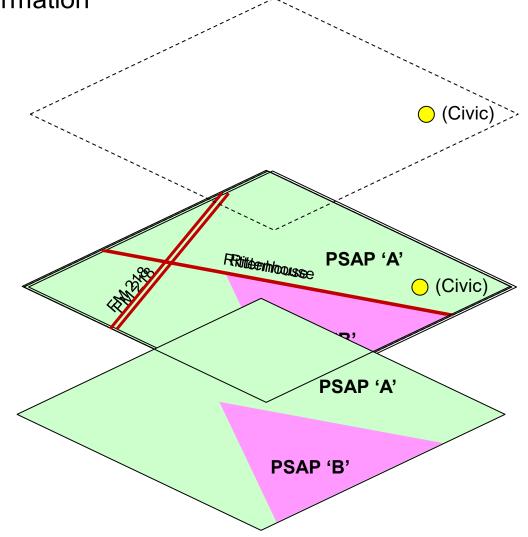


Call Routing in NG9-1-1

PIDF-LO with civic (address) information

Method civic:

The PSAP the geocoded 'Civic' location falls within is the PSAP the call is routed to.



Call Routing in NG9-1-1

PIDF-LO with geodetic (X,Y) information

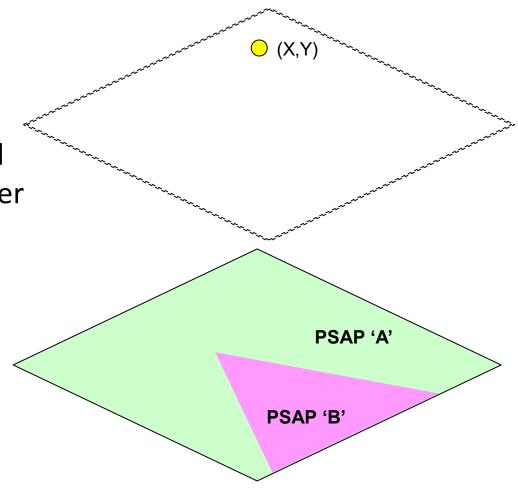
NG9-1-1 geodetic Call Routing Location Object

PIDF-LO with geodetic (X,Y) information

Method geodetic:

'Geodetic' location (X, Y coordinates) id located / plotted in the GIS Polygon layer representing PSAP Boundaries.

The PSAP the location "falls within" is the PSAP to route the call.





Technology Accessibility



- Accessible to 9-1-1 Today
- Voice 9-1-1 with phone number and location, alarms, telematics on vehicles
- Phase 2 location for mobile 9-1-1 calls (over 87% of 9-1-1 calls placed today)
- Text messages (20% of PSAP's are interim text-to-911 capable
- TTY/TDD

- Inaccessible to 9-1-1 today
- Additional Data
- Real time text MMS (Facetime)
- Video smart alarms, traffic images
- Community base sensors (IoT, cameras)
- Advanced location more precise
- Crowdsourcing applications (i.e. Waze)
- Social Media



NG9-1-1 Call Routing Advantages



NEWS

The 911 error that led to an officer's death

• "Sometimes the caller just agrees with what we ask to verify the location – they (the caller) is often in a panic and just wants help"

"About 5 to 10 times a year we find errors in the phone company database, which is the same data presented to the telecommunicator"

Army Vet Police Officer Killed After 911 Call Sent Him to Wrong Address

"Further investigation revealed the phone number from the original 911 call came from an address in an adjacent community., and not the residence of the officer-involved shooting,"

EXCLUSIVE: DC mom calls 911, but ambulance sent to wrong address

911 dispatcher inputting the address as **Galveston Place** instead of **Galveston Street**

911 SYSTEM ERROR SENDS FIREFIGHTERS TO WRONG ADDRESS



Questions?



