Emergency Numbers Systems Board

Overview of Legacy E911

Overview of “Next Gen” E911

ENSB Cybersecurity Committee
Emergency Numbers System Board

- Formed in 1979, 17 Member board
- Coordinates installation and enhancement of county 9-1-1 emergency telephone number services systems.
- The board issues guidelines and determines review procedures to approve or disapprove county plans for these systems.
- Provides for audit of Trust Fund accounts; and sets criteria for reimbursing counties.
- Recently passed “Carl Hen’s Law” which will add additional requirements
  - “requiring the Board, in consultation with the Maryland Cybersecurity Council, to establish certain cybersecurity standards for public safety answering points; requiring the director of each public safety answering point to examine the cybersecurity of the public safety answering point under certain circumstances and to submit to the Board a certain report”
Legacy E-911 system

- All analog 911 trunks, currently provided by Verizon in all counties
- System has redundancy but is limited
  - Each county has trunks from 2 different central office
  - Most counties have a backup center in their county
  - Each county can transfer calls to 1 other county using older technology call routing.
Add Cellular E9-1-1 Components

**Originating Calls**

- ILECs
  - CO
- CLECs
  - CO
- WSPs
  - MSC
- PDE
  - MPC

**Emergency Service Providers**

- Other ES Providers
- Primary PSAPs
- Secondary PSAPs

MSC – Mobile Switching Center

PDE/MDC - Positioning equipment

SRDB – Selective Router DBMS – Database Mgmt System

**Difficult and costly to integrate new call or messaging sources, and the corresponding data needs.**
Adapt for VOIP - E9-1-1 Components

Difficult and costly to integrate new call or messaging sources, and the corresponding data needs.

ESGW – Emergency Services Gateway
VPC – VoIP positioning center - (routing of Call)

Originating Calls
ILECs
CLECs
VSPs

Emergency Service Providers
Other ES Providers
Primary PSAPs
Secondary PSAPs

Selective Router
SR DB
ALI
DBMS
MSAG

VoIP Dynamic Updates

Wireline Subscriber Records or VoIP Shell Records

ESGW - Emergency Services Gateway
VPC - VoIP positioning center - (routing of Call)
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What’s Driving NG9-1-1?

● Newer technologies/services
  ▪ Text, image, video, telematics, sensors, subscriber info, emergency location info

● Need to “mainstream” 9-1-1 technology

● Improve survivability
  ▪ Network resilience, virtual PSAPs

● Improve interoperability and information sharing
How NG9-1-1 is Different

- Technology
  - IP Packet Based vs Circuit Switched

- Interoperability
  - No longer a “local” service
  - Interoperates at county, region, state and national levels
How NG9-1-1 is Different (cont’d)

● Functionality

  ▪ Replicates E9-1-1 capabilities

  and

  ▪ Adds new capabilities, direct control options

  ▪ Wide ranging additional data options

  ▪ GIS-based instead of tabular data for location validation

  and routing control
How NG9-1-1 is Different
(cont’d)

- IP SIP based  (all call handling is SIP based)
  - Uses numerous IETF RTFs, such as ECRIT, INVITE, REFER, BYE, PIDF-LO

Example functional areas:
- Location Validation Function  (GIS based)
- SIP ingress and call routing control  (ESRP with ECRF)
- SIP delivery of call and data  (multimedia supported)
- Queries for wide range of added data
NG9-1-1 Ecosystem

NG9-1-1 Core Services
- LNG/LSRG
- ESRP/PRF
- LIS
- CIDB
- BCF
- ECRF/LVF
- LPG

Communications Service Provider (CSP)
- TDM Networks
- IP Networks

E9-1-1 Selective Routers (SR)
- E9-1-1 ALI

PSAP Networks
- Call Taker System
- Dispatch Console
- Map Display
- Logging & Reporting
- CAD

Extended Emergency Networks
- Homeland Security
- FEMA
- Town Hall

Geographical Information System (GIS)

Radio Network

NENA 9-1-1 Association
This diagram is simplified for illustrative purposes.
The Nature of NG9-1-1

- Designed to support interoperability
- Designed with open standards
- Designed for and enables open competition
- Enables a transition to competitive service provider environment
- Necessitates regulatory (and legislative) change
NG9-1-1 Common Benefits

PSAPs and Responders

- Text/IM to 9-1-1
- Files to 9-1-1, such as photos or video clips
- Streaming video
- Telematics and sensor data
- Additional Data available
NG9-1-1 PSAP Benefits

- Virtual PSAP (geographically distributed)
  - NG9-1-1 controlled to individual or hosted CPE
- Nomadic and/or mobile call taker workstations
- Policy-based alternate routing with new options
  - To alt PSAP, or spreading calls to multiple PSAPs
  - Invoked directly within minutes by PSAPs (online)
- Additional Policy-based routing for:
  - Language preference of caller
  - Type of technology > IM, Sensor, Satellite phone
NG9-1-1 Responder Benefits

● Informative data to dispatch and field responders

● National standards for data interfaces

● Adaptable for future needs

● Text/IM via 9-1-1
Senate Bill 339: Public Safety – 9-1-1 Emergency Telephone System (Carl Henn’s Law)

This bill enhances and alters the regulatory framework that governs the State’s 9-1-1 system.

- Cybersecurity Standards (minimum standards)
  - Cybersecurity, oversight and accountability of service level agreements between counties and NG service providers
  - In consultation with the Maryland Cybersecurity Council
  - National industry and 9-1-1 system trade association best practices
  - Response protocols for an attack
  - PSAP director to certify the PSAP meets Board standards and a report detailing the exercise leading to the certification prior to PSAP receiving any Board funding
Cybersecurity and Investigations

Cybersecurity

• Identify minimum standards for cybersecurity, oversight, and accountability of service level agreements between counties and core service providers of NG911 services

• Recommend a COOP template including cybersecurity risk mitigation strategy and annual evaluation/practice

• Identify suggested requirements for local agency compliance, based on industry standards and best practices surrounding NG911 technology and cybersecurity protection and prevention

Investigations (Ad Hoc)

• As needed to investigate network or PSAP-affecting events to provide after action reporting to the board