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**

- **Primary PSAPs**
- **Secondary PSAPs**
- **Other ES Providers**

- **SR DB**
- **ALI**
- **DBMS**
- **MSAG**

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

**Glossary**

- **MSC** - Mobile Switching Center
- **PDE/MDC** - Positioning equipment
- **SRDB** - Selective Router DBMS - Database Mgmt System
- **PDE/MDC** - Positioning equipment
- **MSC** - Mobile Switching Center
- **PDE** - Positioning equipment
- **MPC** - Mobile Positioning Center
Originating Calls

- ILECs
- CLECs
- VSPs
- ESGW
- VPC

Emergency Service Providers

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- Primary PSAPs
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Difficult and costly to integrate new call or messaging sources, and the corresponding data needs.
E9-1-1 vs NG9-1-1

- Complex analog trunking and data network
- Class 5 switch for Selective Router
- Translation based control
- Limited to voice calls
- Data bandwidth 20 char (digits)
- Complex Emergency Gateway Network for VoIP
- Custom interfaces for each service type

- Engineered, managed IP networks (ESInet)
- IP software selective routing function
- GIS and database controls
- Voice, text, video
- Bandwidth unlimited
- Direct handling of Internet sourced calls
- Standard IP interface for all service types
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
- LPG
- BCF
- ECRF/LVF

Extended Emergency Networks

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

Geographical Information System (GIS)

ESInet

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

Radio Network

Homeland Security
- FEMA
- Town Hall
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