 ITS 214

E-911
Adapted from Material Created by
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Definitions from the Master Glossary maintained by
NENA
(National Emergency Number Association)
at http://www.nena.org/standards/technical/master-glossary

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Traditional E911 from Landline Phone

The E911 Sequence
1. Resident calls E-911
2. Class 5 CO passes call to Tandem Office
   • Adds ANI data
3. Tandem office connects call to PSAP
   • TN/ESN table determines which PSAP
   • ESN Emergency Service Number
   • Passes ANI data to PSAP (only ANI)
4. PSAP consults ALI database
   • ANI info sent to ALI
   • Returns address, ESN

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Before The Call
Before the Call: MSAG

- Master Street Address Guide
- Maintained by government authorities
  - Typically counties
- Maps street addresses into ESNs

Before the Call: OSS

- When a customer arranges phone service:
  - Customer tells telco his/her service address.
  - Telco assigns TN.
- The ILEC’s OSS:
  1. Queries the MSAG to determine the customer’s ESN based on address.
  2. Adds the TN, ESN to table in tandem switch.
  3. Adds TN, ESN, & address to ALI db.

Works Very Well, If…

- Single Telco playing with the Data.
- Phone number uniquely determines location.
- Location is unchanging.
- PSAP doesn’t need to be relocated in large-scale emergency.

Cellular Issues

- Obvious, yes?
- Call-back number no longer describes the physical location of the phone.
- But…
  - Service provider must know which cell caller is located in.
Cellular Solution – Phase 0

• Requires:
  – Cellular caller to reach PSAP.
  – Somewhere, anywhere.
  – No ANI or call back required.
• More-or-less universal.

Cellular Solution – Phase 1

• Requires:
  – Cellular caller to reach PSAP.
  – PSAP to know which cell caller is in.
  – PSAP able to call back.
• Let’s note:
  – Analog ANI is 10 digits, exactly.
  – SS7/ISDN can do more.
  – Many, many PSAPs have analog trunking.

Telco sets up a series of pseudo-ANIs.
  – 740-xxx-xxxx means “cellular 911 caller”
Telco sets up corresponding pseudo-ALIs.
  – “Call served by tower at 185 Court St NE
    antenna cell bin number 6:5-3552345”
When call is made, the telco:
  – Sends pANI to PSAP
  – Modifies pALI in real time to include call back number
  – PSAP gets real callback number from ALI db.

E911 from Cell Phone – Phase 1
Phase 1 Problems
- Cells can include multiple ESNs.
  - Sometimes even multiple states.
- Not useless, but...
  - Depends on caller for detailed location info.

Cellular Solution – Phase 2
- Calls for:
  - Cellular caller to reach PSAP.
  - PSAP to know precise location of caller.
    - Within 50 m for 67% of calls
    - Within 150 m for 95% of calls
  - PSAP able to call back.

Location Methods
- Choice left to service providers.
- Related to GSM/TDMA/CDMA choice.
- Equipment vendors jockey for one choice or another.

Current Status In US
- Here’s the FCC summary:
  - www.fcc.gov/cgb/consumerfacts/wireless911srvc.html
- Cell companies now mostly adhere to somewhat looser Phase II.
- PSAPs still old, old, old technology.
Current Status In Ohio

• Ohio according to NENA
  – All counties have E911
  – 10 counties do not have wireless Phase I deployed
  – 6 counties are at Phase I
• Since Fall 2005
  – Wireless per line surcharge for E911
  – Currently $0.28 per line

VoIP Issues

• Variation on the theme, but different.
  – IP addresses are not geographic
  – SOHO locations that reach PSTN through HQ could be on different continent!
• Facilities based VoIP providers know who they handed an IP address to
• Mobile and nomadic providers do not!
  – Sometimes called “over the top” providers
  – Use someone else’s network

In case you were wondering (I was)...

The Vonage vPhone aka “phone on a stick”