

Next Generation 9-1-1

Network Convergence & NG9-1-1

Presented By:

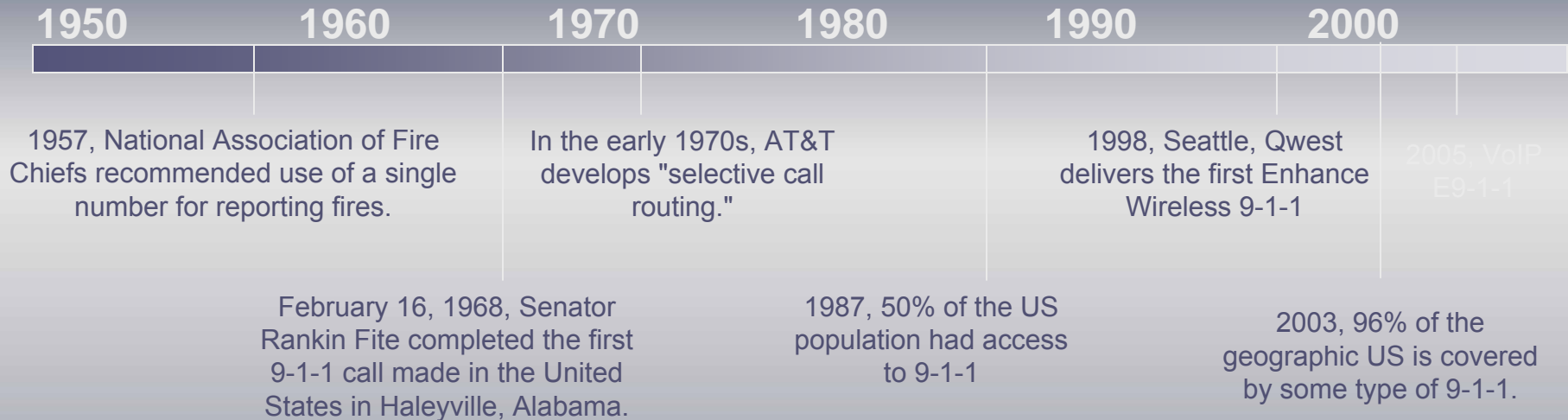
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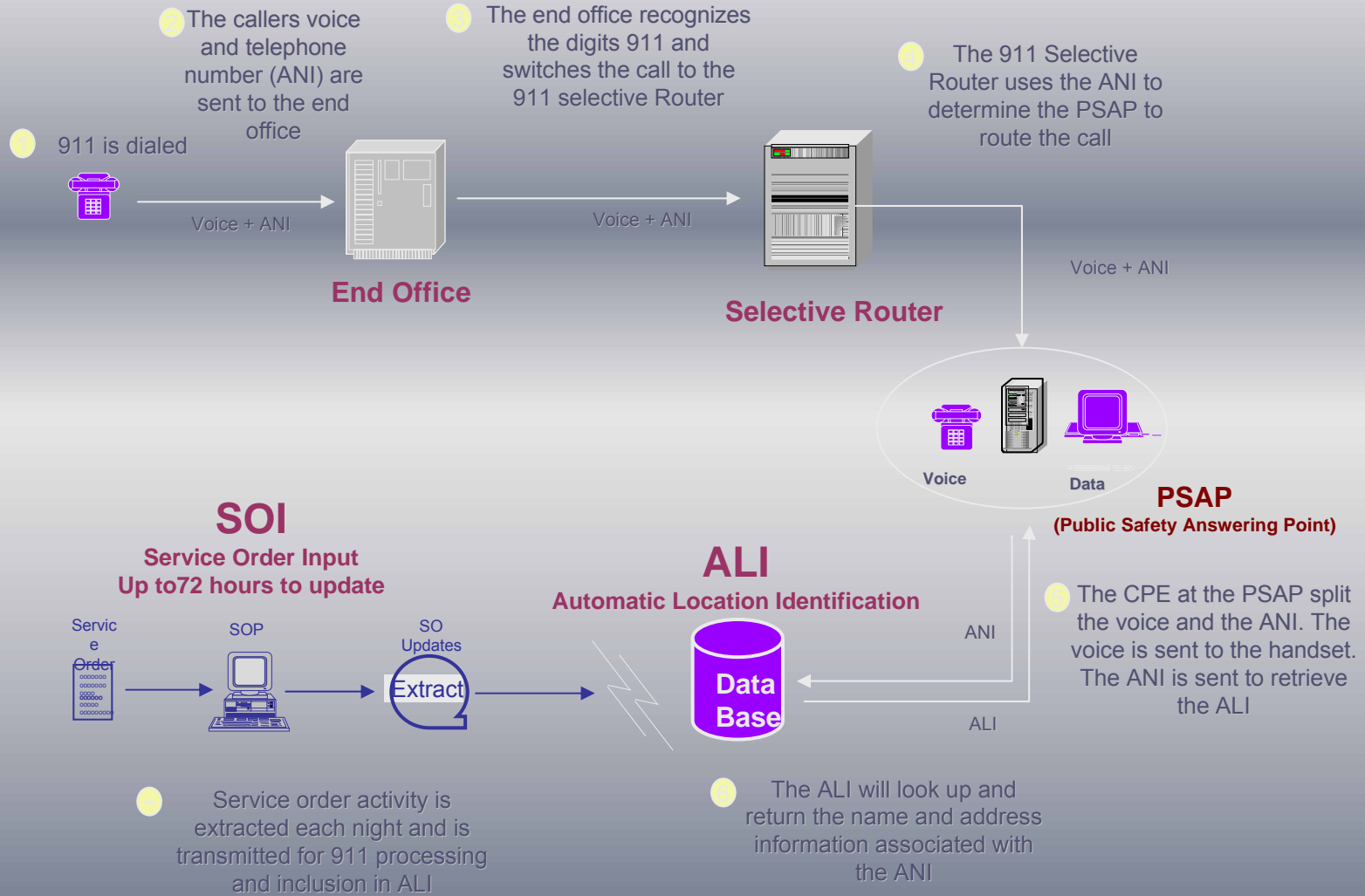
REScue911

The three-digit telephone number "9-1-1" has been designated as the "Universal Emergency Number." It is intended as a nationwide telephone number and gives the public fast and easy access to a Public Safety Answering Point (PSAP).



30 years after the introduction of Enhanced 9-1-1, the service remains essentially unchanged.

Legacy 911 System Overview



Fundamental and significant change in the communications industry is driving the need for Public Safety solutions that accommodate the many new ways that emergency services can be requested and the response provided.

Available

On the horizon

- **Basic 911** A direct connection between a dial tone office and the PSAP
- **Enhanced 911** Calls are routed based on location and calling party information is displayed (ALI)
- **Wireless 911**
 - **Phase 0** Calls are directed to a 10 digit administrative number at the PSAP
 - **Phase I** Calls are routed based on the cell site (Antenna) location
 - **Phase II** Calls are routed based on the callers location (XY)
- **VoIP (Voice over the Internet Protocol)**
 - **I1** Calls are directed to a 10 digit administrative number at the PSAP
 - **I2** Calls are routed based on the callers location (XY) over TDM
 - **I3** Calls are routed based on the callers location (XY) over VoIP
- **Telematics, ACN** OnStar, Automatic Crash Notification
- **Text Devices** Instant messaging to the PSAP
 - **PDA's, Blackberry**
- **Satellite Phones**
- **Air Phone**
- **Medical devices**
- **Video**

Discussion Points

- What the public expects
- What's In the news
- Explosive growth of wireless technologies
- Migration to NG9-1-1
- “Real World” Implementation Example
- Network Convergence – Public Safety
- “Real World” How to pay for it!

NYPD and YouTube



How would your 911 center handle this call?

- 14-Year old girl kidnapped. She doesn't want abductor to hear her talking so she text messages 911.

In the News

- **“Text Message Helps Rescue S.C. Teenager”** By JEFFREY COLLINS, ASSOCIATED PRESS, September 18, 2006

What the public expects

- BLOG Comments:

“If I were able to video a crime occur using my cell phone, I should be able to call 911 and send them that video.”

In the News

- **Cell phone used to nab subway flasher**
(New York-AP, March 14, 2006) - New York City police say a 15-year-old girl used her cell phone camera to snap a picture of a man who was exposing himself to her on the number seven train.

In the News

- **Would-Be Kidnapper Busted Thanks To Camera Phone**

(STNG) LEMONT TOWNSHIP, Ill. A Lemont Township man who tried to lure four teenage girls into his car last month was arrested Thursday after the same girls spotted him and took a picture of his license plate with a camera phone, sheriff's police said.

How would your 911 center handle these calls?

- Woman watches as a man car jacks a young woman's car. She calls 911 and sends a live video of the incident .
- A student messages 911 and reports a man with a gun has taken his class hostage. IP Video camera's in school send live video feed to dispatchers who pass it directly to the first responders.

The Next 5 Plus Years... Next Generation 9-1-1

Service - Data centric

Network – Digital, packet switched (converged voice & data)

CPE – digital w/conversion to analog voice

PSAP operations – Data centric emergency receipt

Steadily increasing reliance on non-traditional communications

Emergency messaging

Telematics

Mobile (Automatic Crash Notification)

Personal (May day)

Intelligent Highway

Weather

GIS

Video

The Word is “Content” or “Content Providers”



Explosive growth of Wireless Devices

- Chemical/biological sensors in mobile phones
- Electronic Textiles (e-textiles)
- Health Stability Chips
- Dust Network technology
- Machine-to-Machine (M2M) computing

Chemical/Biological Sensors

“Mobile phones will soon include biosensors, which will warn about the presence of bacteria, viruses, toxins, micro-organisms, radiations, nuclear particles and explosive powder.” Popular Science 2007.

Imagine a sporting event with 75,000 fans suddenly exposed to a biological agent. If just a tiny percentage had phones equipped with these sensors, local 9-1-1 would be overwhelmed.

Electronic Textiles (e-textiles)

E-textiles weave textiles with embedded wiring, sensors, actuators, and processing elements.

- ***Gait monitor*** - *reduce Falls Among the Elderly*
- ***Health monitor*** - *measure and record vital signs*
- ***Localization monitor*** - *help firefighters map their way through burning buildings*
- ***Environmental monitor*** - *Detect carbon monoxide or other chemicals.*



Health Stability Chips

Health stability chips are being implanted under the skin, added to individual mobile phones and woven into clothing. Any significant deviation from the norm could be reported to 911 to initiate a response.

By 2012, as many as seven million of these chips may be in existence. If just 10% alarm daily, 9-1-1 volume could increase by 200,000 calls 7x24!

Dust Network Technology

Dust Network technology involves use of thousands of tiny chips in paint that can monitor environmental conditions.

Integrity of airplanes, bridges, critical buildings, hazardous storage facilities, bank vaults, drug storage tanks and other similar assets will be sensed.

Machine-to-Machine Computing

- By 2009 every new car will be equipped with an “OnStar” type reporting device
- M2M now represents 12% of all Internet traffic
- It is estimated by 2011, M2M will exceed the total of all human calls and web clicks combined
- VeriSign’s system has peak loads in excess of four trillion queries a day. Even if only a portion of these exchanges are linked to emergency response alarm systems, the burden on 911 will be astronomical

Dilemma

Faced with the limitation of legacy public safety systems and budget constraints, how can the public's expectations be met and emerging technologies supported?

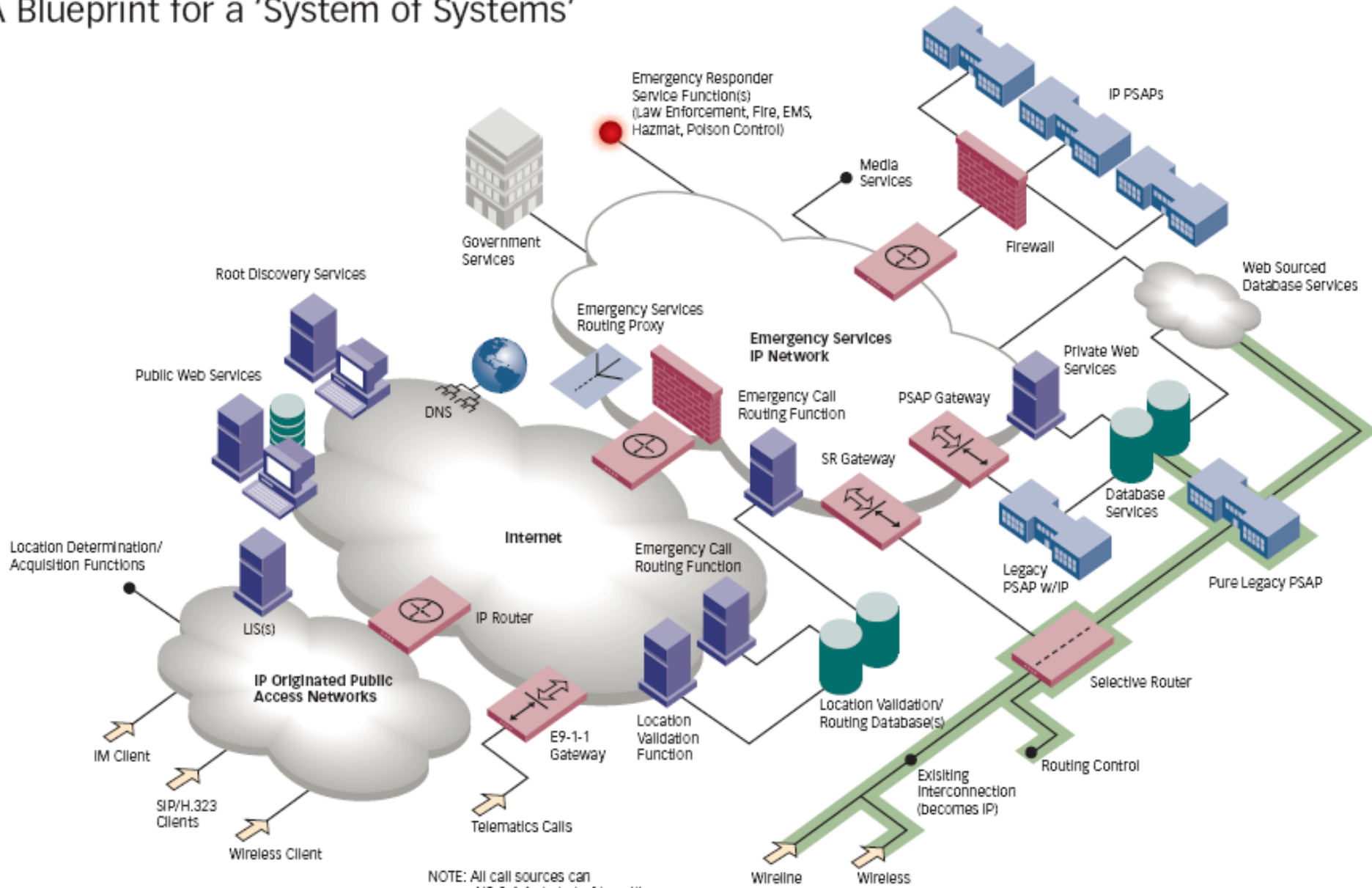
Next Generation 9-1-1 to the rescue! (?)

NENA has created the 08-751 NENA Technical Requirements Document (i3) that encompasses:

- External Interfaces between PSAPs and public/private networks delivering 9-1-1 calls to the Emergency Service system
- External Interfaces to systems and databases not in the PSAP that supply data and assistance in processing a call
- External Interfaces to systems that handle a call past the point where a call taker has exclusive control over it, such as the handoff to the Computer Aided Dispatch system
- External Interfaces to upper level management systems, such as disaster management systems, as well as peer PSAPs

NG9-1-1 i3 (simplified?)

A Blueprint for a 'System of Systems'



NG9-1-1 Enhanced Functionality

A natural or man-made disaster disables the PSAP or an event requires a temporary PSAP.

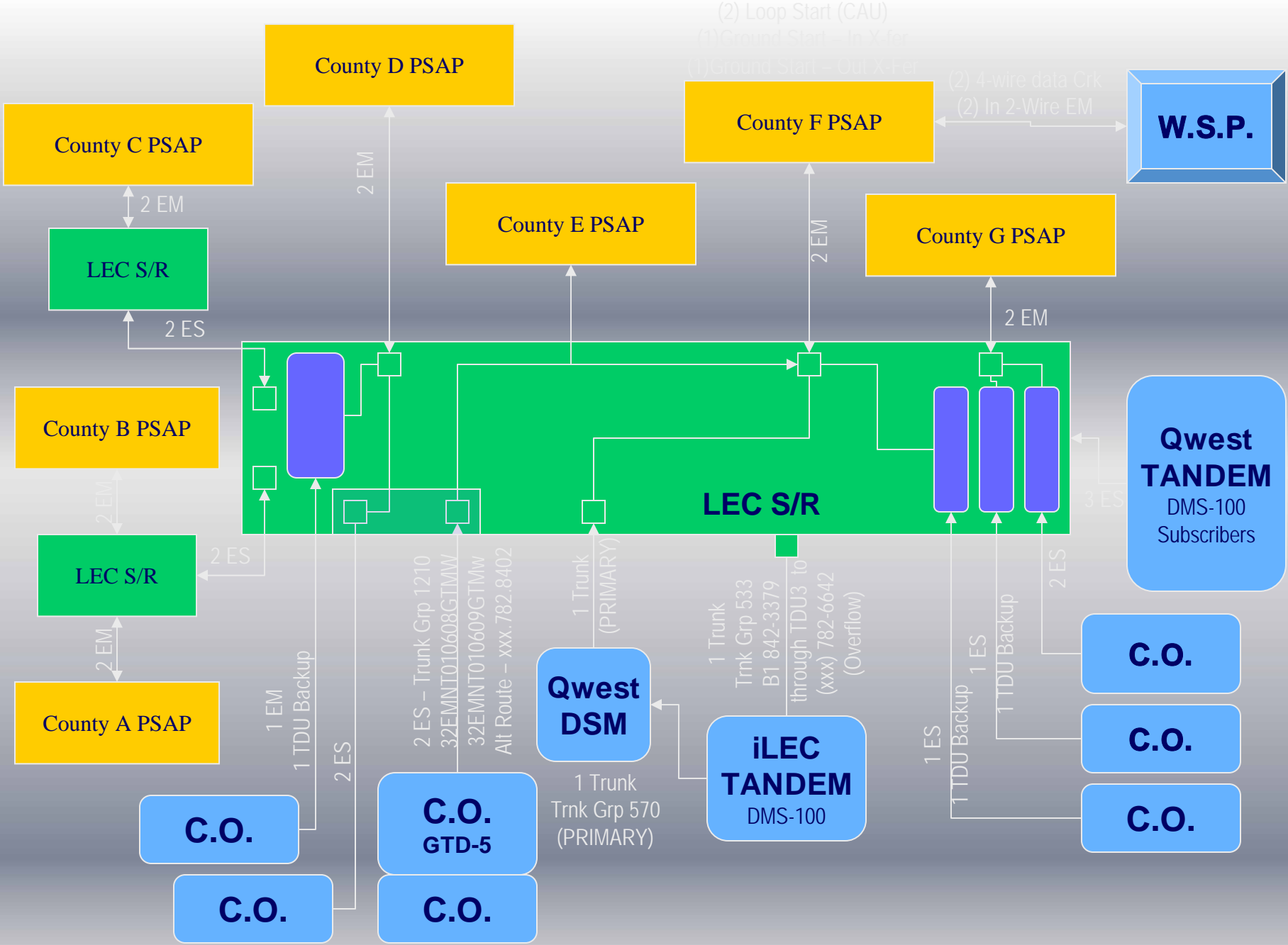
- Change the targeted PSAP on the fly.
- Change VoIP Subscriber address info on the fly without sending a 911 call to original operating PSAP and causing disruption.
- Launch an emergency notification message by circling an area.
- An i3 operator position pulls in data and video from disparate sources to provide decision support.

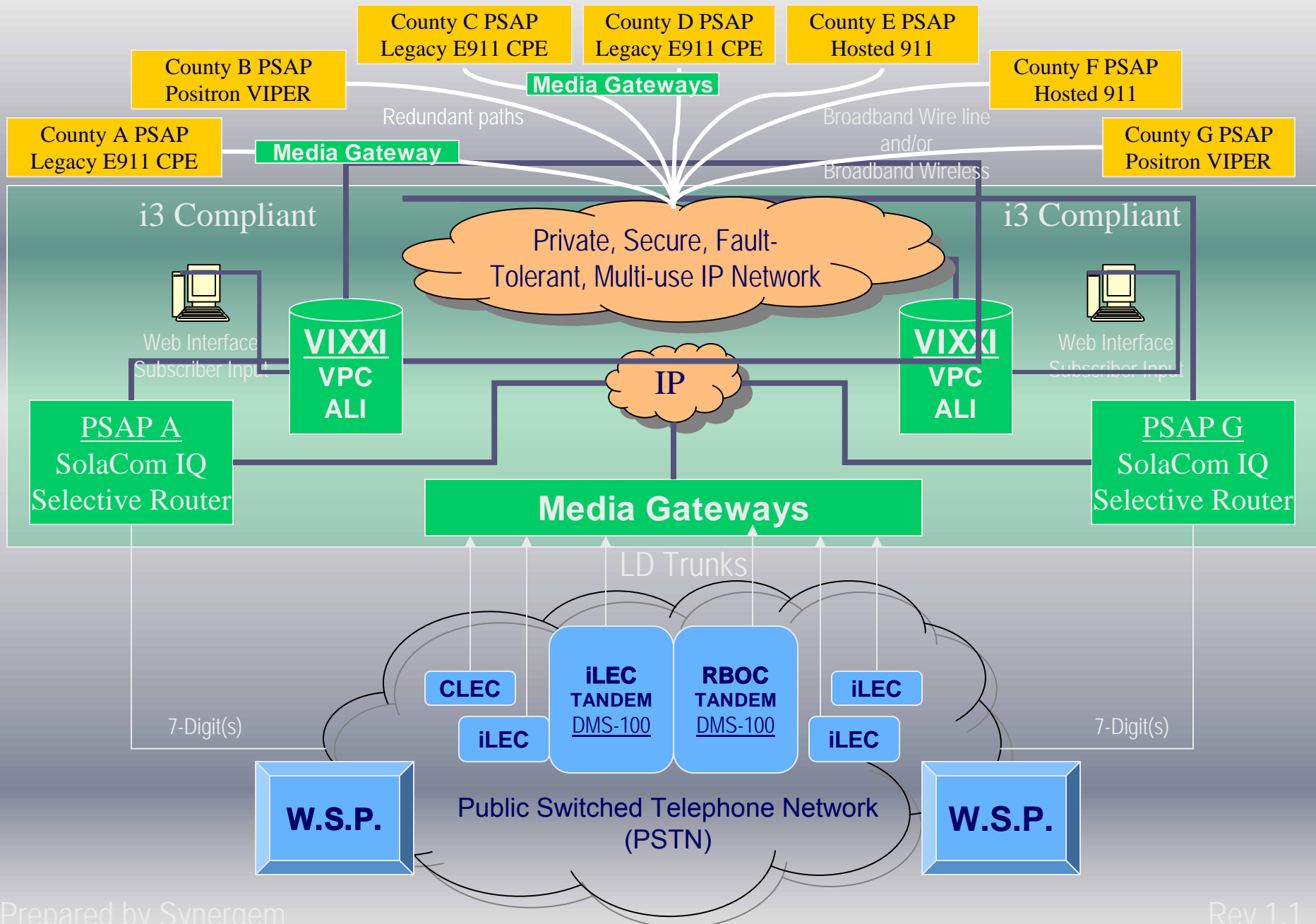
“Real World” example

Seven Counties served by multiple Local Exchange Carriers (LEC) and Wireless Service Providers (W.S.P.). Each PSAP has different plans to upgrade their legacy 911 CPE.

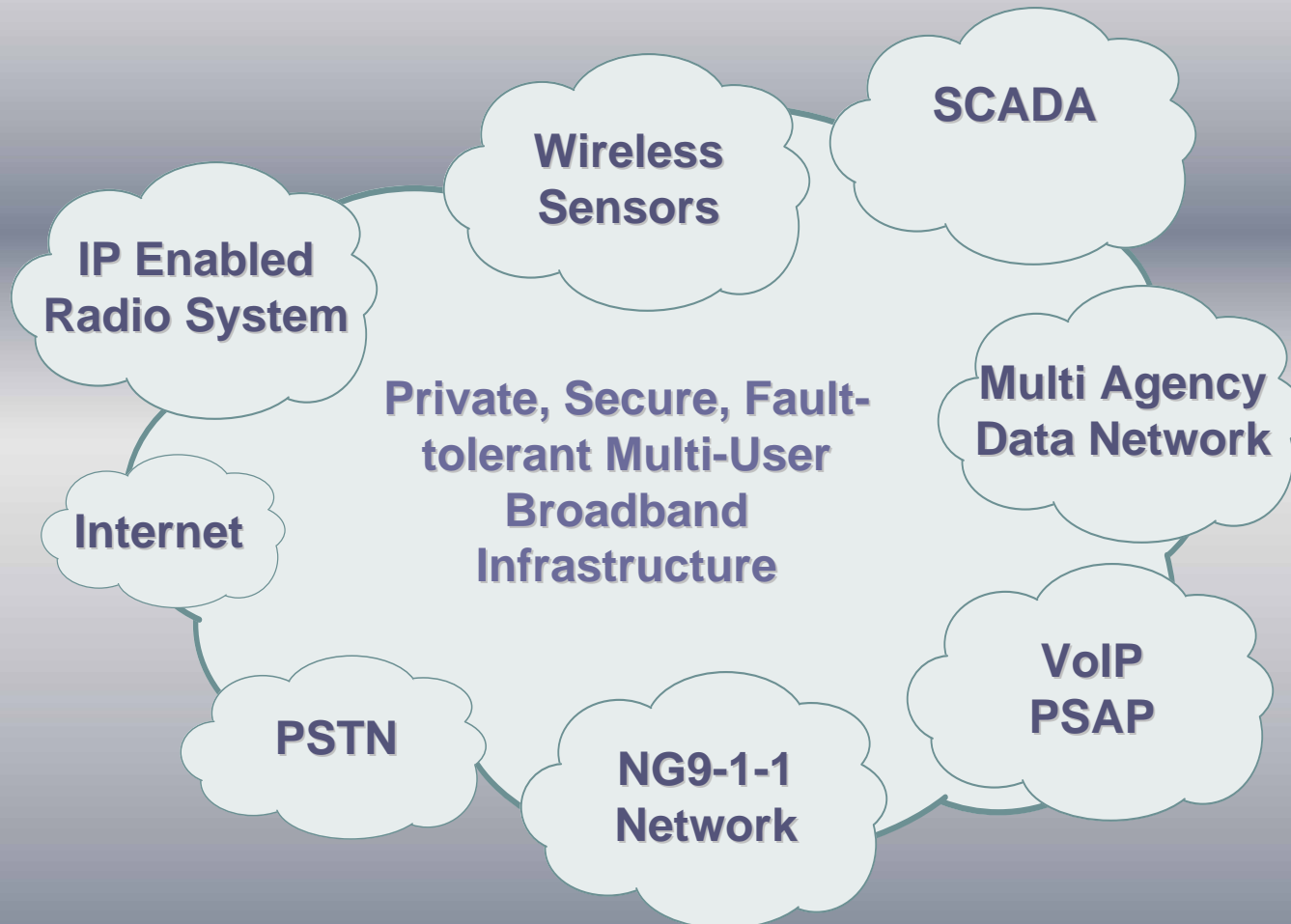
Justification:

- 1) Manufacture support for the existing 911 CPE has been discontinued making spare parts difficult to obtain.
- 2) Establish a framework to address interoperability issues with surrounding jurisdictions.
- 3) Adopt NG9-1-1 i3 standards
- 4) No increase in existing 911 budget.





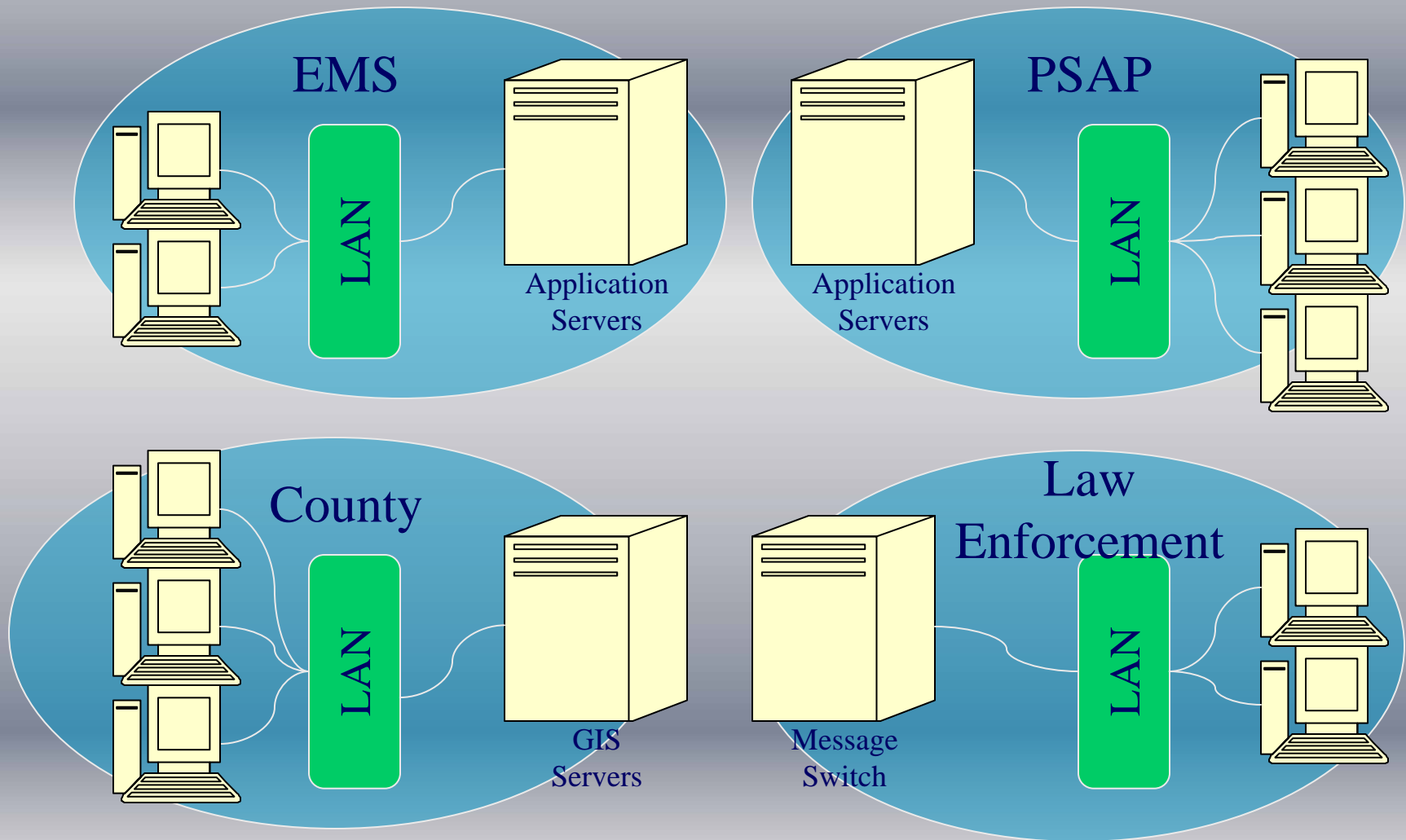
Network Convergence



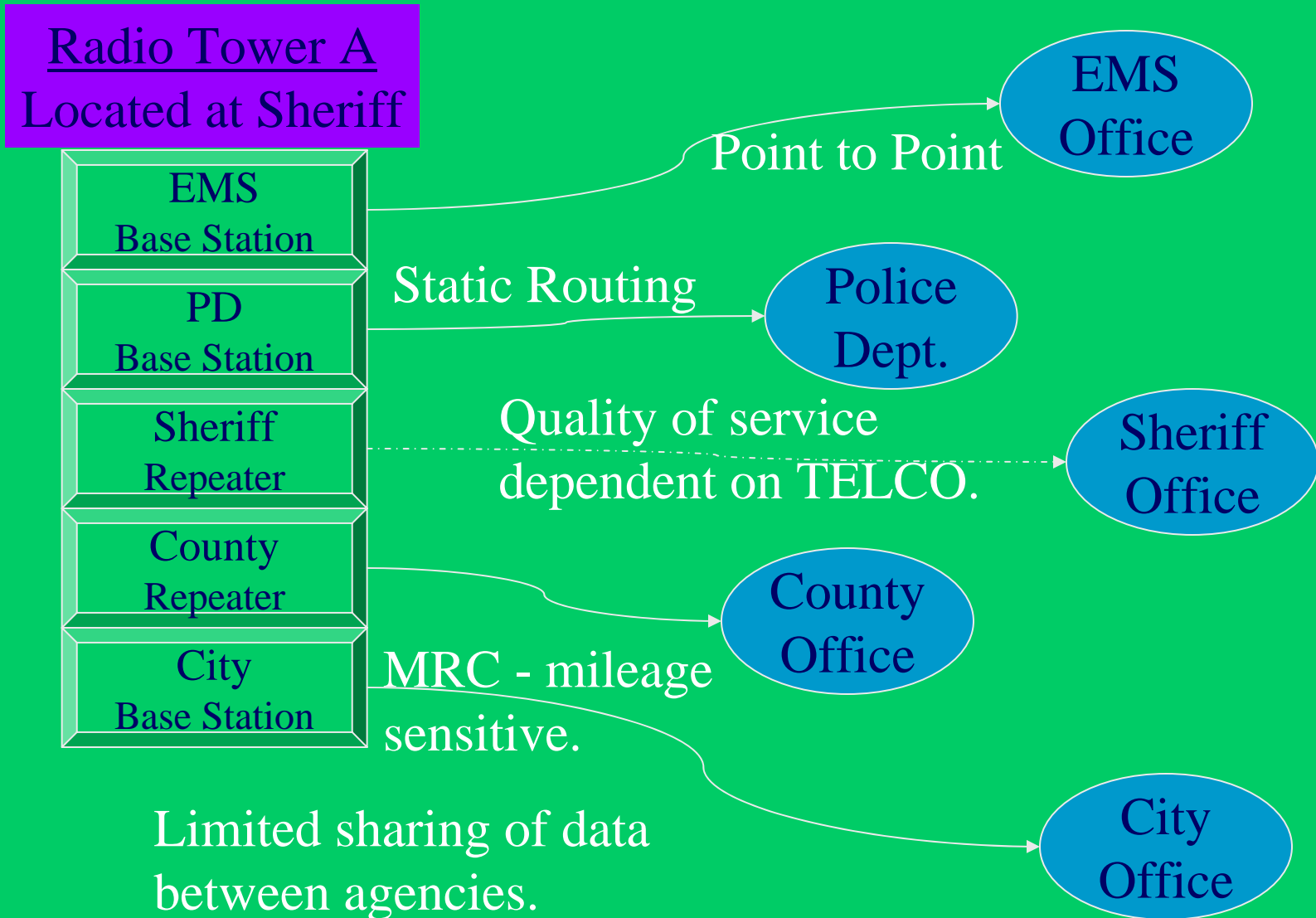
Convergence Advantage

- Interoperability
- Intelligent Routing
- Alternate routing - Survivability
- Operational efficiency
- Single IP network vs multiple disparate networks – KISS!
- Cost reduction
- Facilitates adoption of new technologies (i.e., Wireless explosion!)
- Provides access H.S.A. Interoperability grants

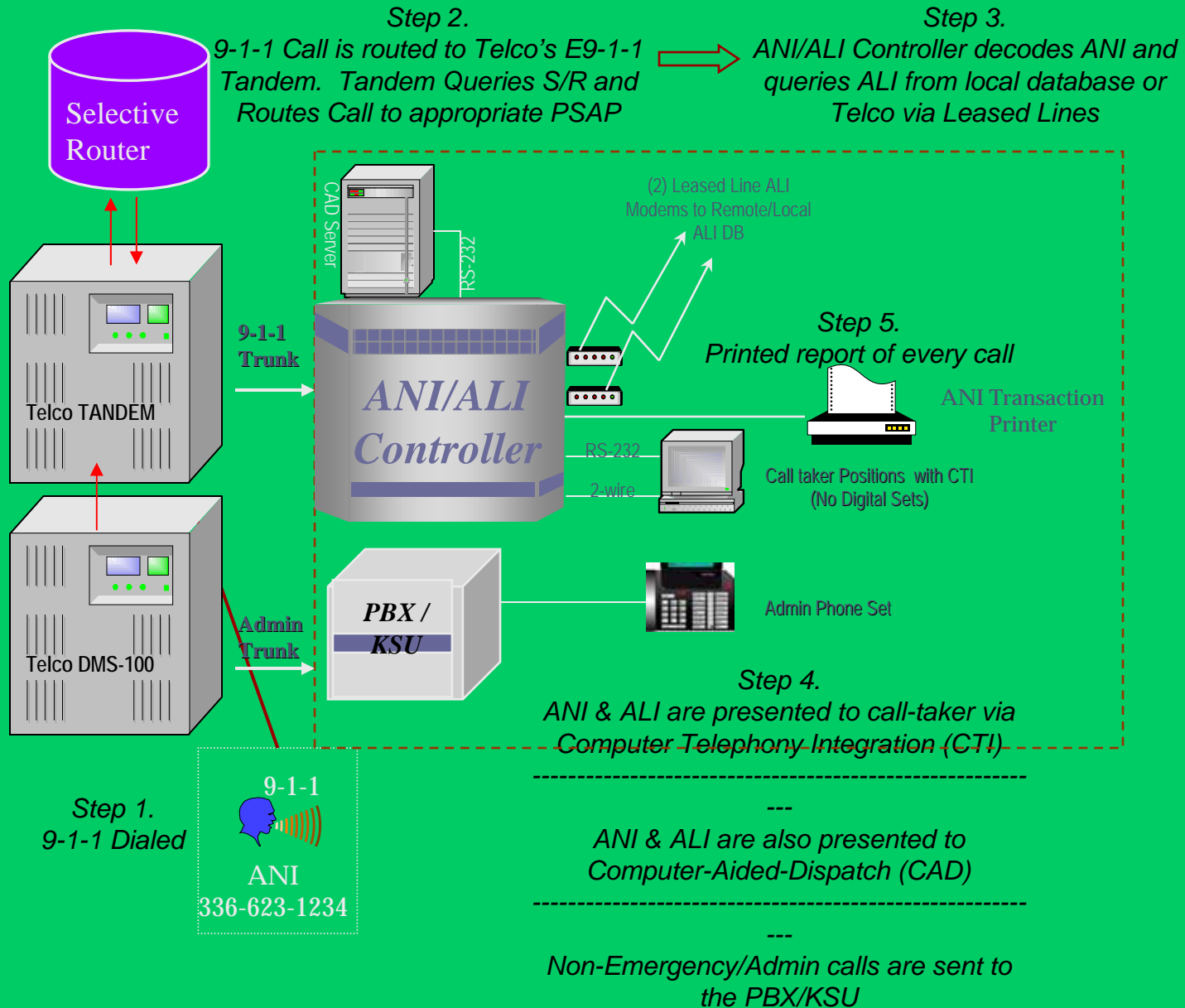
Legacy Public Safety Data Network



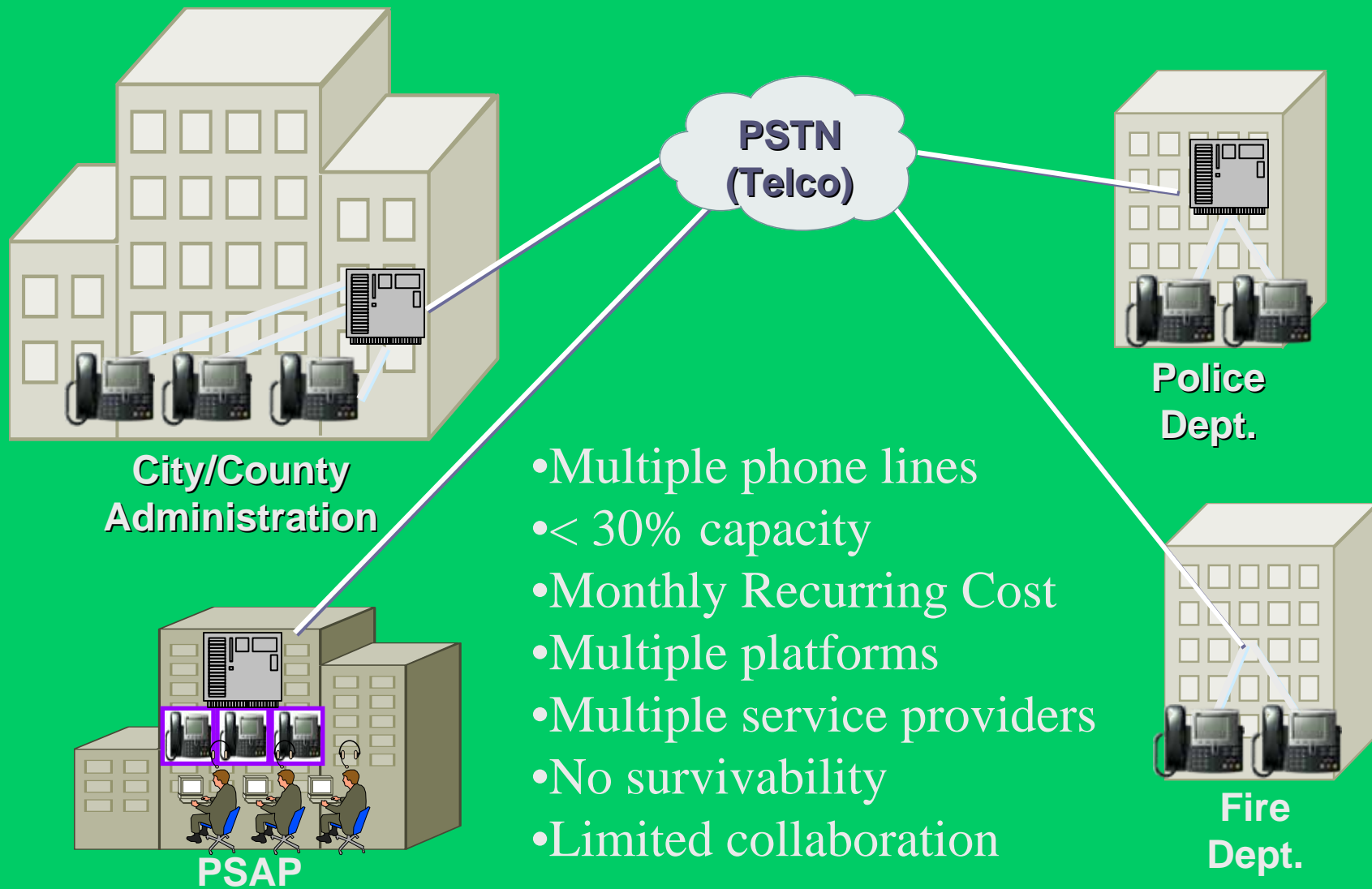
Legacy RF Network



Legacy Emergency Communications Call Flow

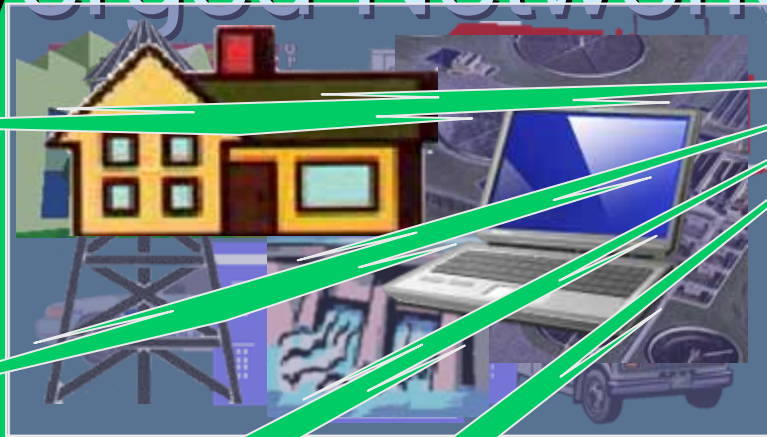


Legacy Telephony Network

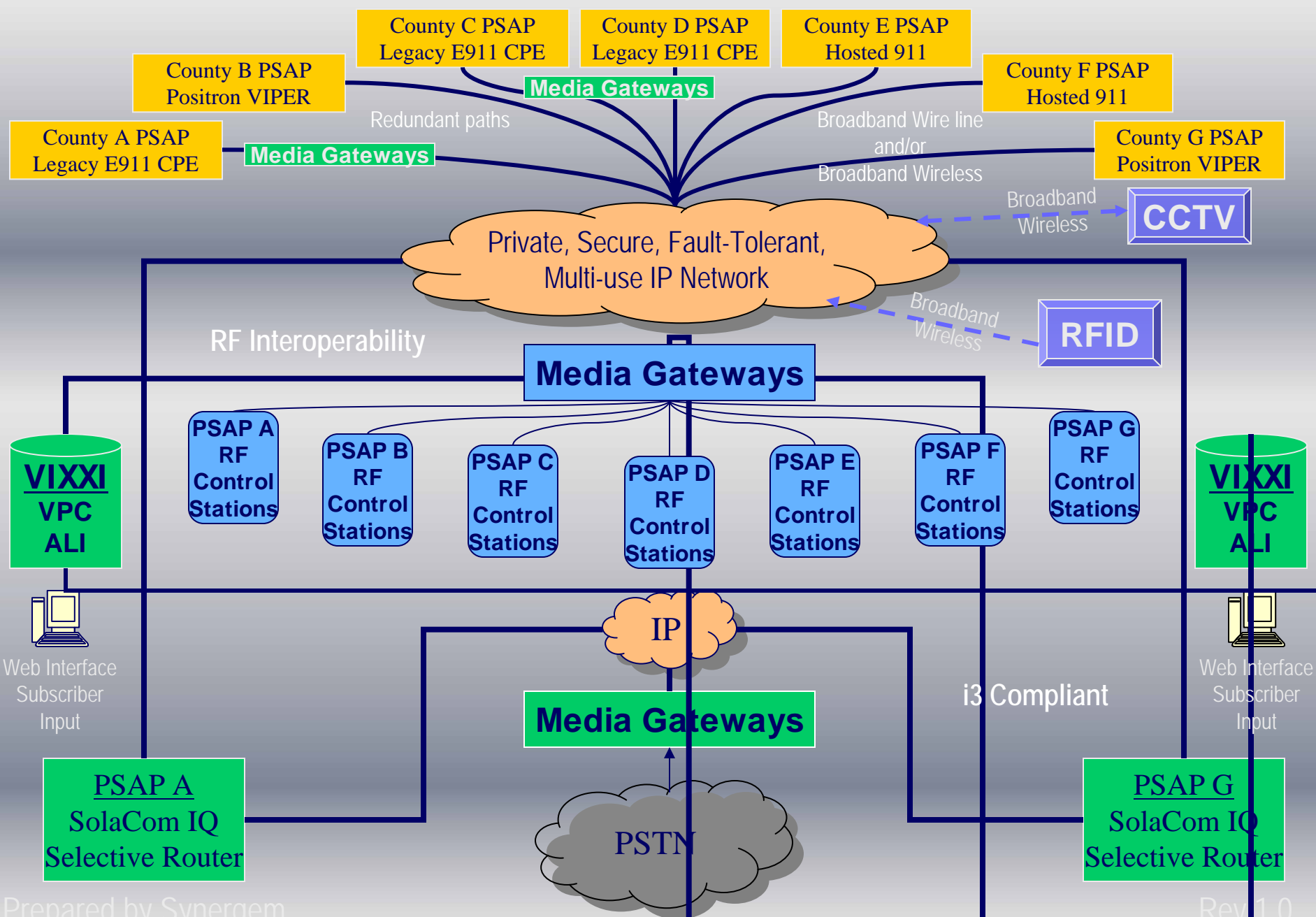


- Multiple phone lines
- < 30% capacity
- Monthly Recurring Cost
- Multiple platforms
- Multiple service providers
- No survivability
- Limited collaboration

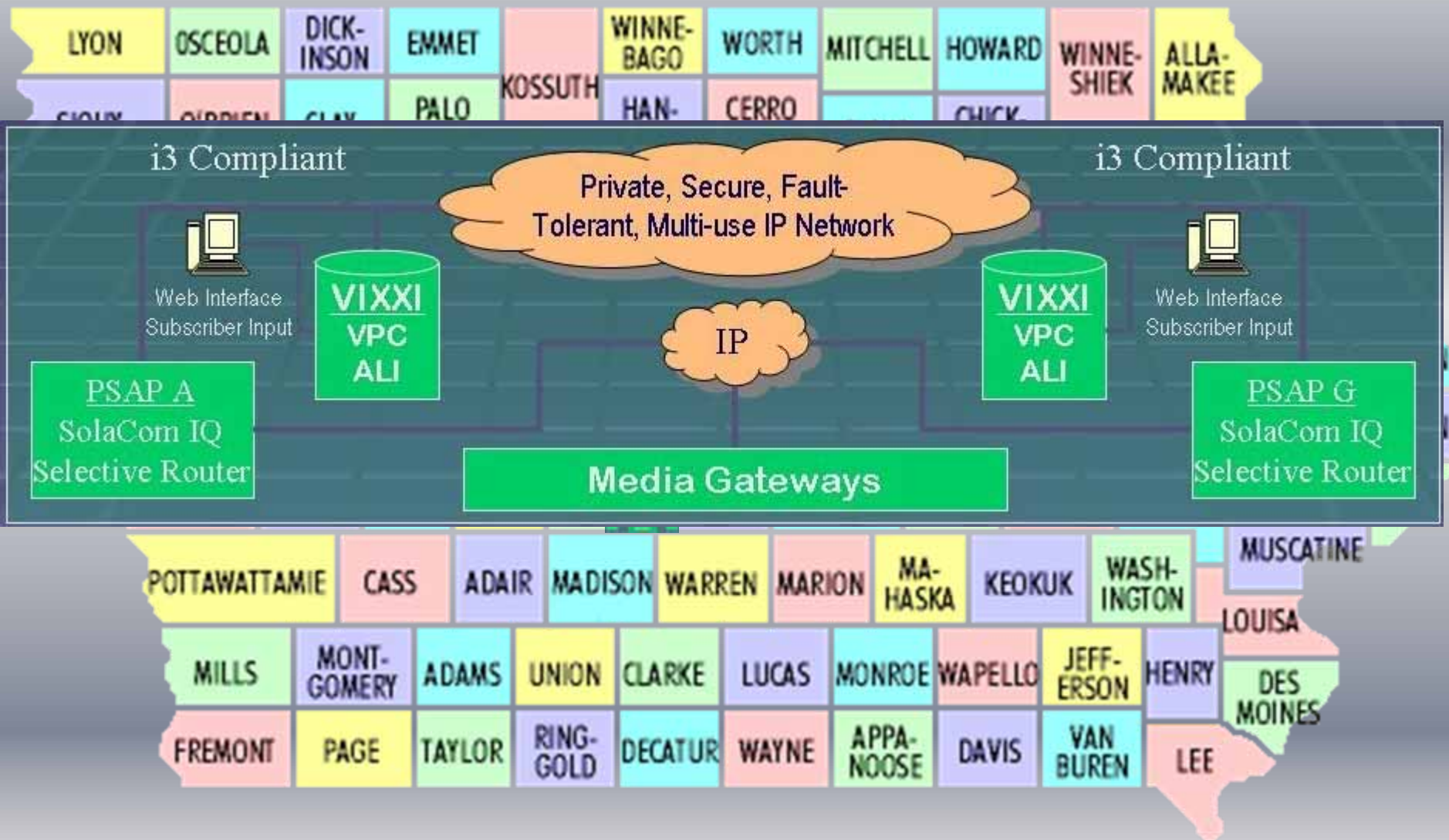
Multi-user / Multi-Service Converged Network



SCADA, Control, Data, Voice, Video, Security, High-Speed Data, Mobile, Metro LAN



NG9-1-1 Iowa



“Real World” Example: How to pay for it

- Small Town USA pays \$3,250 monthly to LEC for 911 network services - ANI, ALI & S/R. (\$164,000 total 5-year cost)
- County PSAP pays \$4,525 monthly (\$271,500 total 5-year cost)
- Town and County use a 5-year municipal lease to purchase redundant i3 Selective Routers. (\$339,250 total 5-year cost)
- Municipalities pays \$1,450 monthly for redundant, fault-tolerant, multi-use IP broadband connectivity to PSTN. (\$87,000 total 5-year cost)
- Net 5-year reduction in total budget \$(9,252)!

HR 3404

- NENA President Jason Barbour, ENP, testified before the Telecommunications Subcommittee of the House Energy and Commerce Committee on 9/19/07 on behalf of NENA and APCO in support of provisions of the 911 Modernization and Public Safety Act of 2007 (HR 3403). The legislation was introduced by Rep. Bart Gordon (D-TN) and House E9-1-1 Caucus Co-Chairs, Representatives Anna Eshoo (D-CA) and John Shimkus (R-IL).
- HR 3403 intends to “promote and enhance public safety by facilitating the rapid deployment of IP-enabled 9-1-1 and E9-1-1 services, encouraging the nation's transition to a national IP-enabled emergency network and improve 9-1-1 and E9-1-1 access to those with disabilities”. The bill contains provisions similar to S 428 which has been approved by the Senate Commerce Committee and awaits action by the full Senate.

Points to Remember

- NG911 facilitates adoption of emerging technologies and enables legacy technology
- NG911 (i3) \neq VoIP 911 System
- NG911 (i3) network technology is available today
- NG911 projects may be cost justified within existing budget