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Next Generation 9-1-1

Evolution & Integration with other Emerging Technologies

APCO CC9-1-1 Comm Center & 9-1-1 Services

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Topics to Cover

- NG9-1-1 – What it means may vary
- Architecture overview and terminology
- Other Emerging Technologies
- How to move forward– Sensible decisions for your agency/jurisdiction

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How will NG9-1-1 Systems Be Different?

- **IP-Based: components/personnel can be located anywhere**
- **Many new communications inputs**
- **Standard interfaces will make it possible for disparate systems, PSAPs and authorized agencies to interoperate**

So…just what is “NG9-1-1?”

- Next Generation systems will be a “network of networks” providing connectivity between PSAPs on a network within a specified geographic area to other networks both regionally and nationally.

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What Is i3 Next Gen 9-1-1

- i3 is the NENA architecture for a system of 9-1-1 services, functional elements and databases that run on an Emergency Service IP Network (ESInet).
- ATIS is also working on an IMS based Architecture for ESInets.
- Eventually, these will replace E9-1-1 capabilities while retaining the functions in place today.

IMS and Next Gen 9-1-1

- When the next generation emergency services network requirements were being developed (such as in NENA i3), 3GPP standards in support of emergency services had not attained a level where Common IMS services and capabilities provided a compelling value proposition for use in the next generation emergency services terminating networks.

- Now that 3GPP has developed common IMS standards and applied them to originating service providers' networks and the emergency services they support, it is reasonable to consider the application of common IMS standards to emergency services networks.

- For service providers that are deploying Common IMS in their networks, and also deploying emergency services terminating networks, there could be efficiencies gained and additional capabilities supported by deploying Common IMS elements in both networks.

Broadband Networks and Systems

BUILDING SECURE BROADBAND IP NETWORKS AND INTERCONNECTING PSAPS AND OTHER AGENCIES

Agencies share resources such as CAD, RMS, email & Internet applications

Building a Network

- Does your state currently operate a secure IP network that could be used for emergency services or for delivery of 9-1-1 calls?
- Have you assessed requirements for bandwidth to assure that the current network will handle future traffic?
- How will it be managed/governed in an environment with overlapping jurisdictions?

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DEPLOYMENT OF EMERGENCY SERVICES IP NETWORK (ESINET)

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ESInets

- Fundamental to the formation of NG systems is the creation and deployment of Emergency Services IP Networks, or ESInets.
- The ESInet is indeed a network of networks designed to achieve specific Quality of Service (QoS), Security and reliability levels while facilitating enhanced call routing and delivery.

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ESInets

- In addition the ability to reroute calls to, and share data with, any PSAP served by the ESInet is a benefit of the transition.
- In spite of the measurable benefit to making the transition, many PSAPs are finding that they are limited by equipment and networks incapable of providing a realistic evolution to NG9-1-1.

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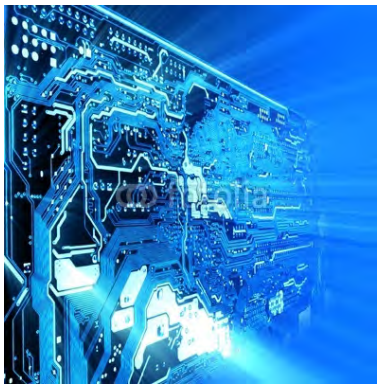
NG9-1-1 Elements



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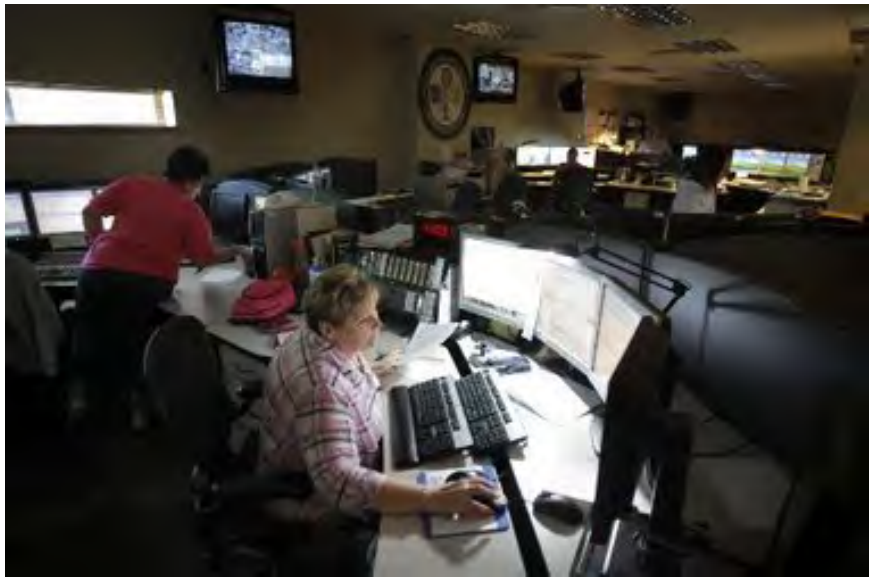
Systems & Functionality

NG9-1-1 Systems are made up of Functional Elements (FE) that will provide multiple features & capabilities. An FE does not have to correspond to a specific product or position in a PSAP.



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NG9-1-1Functional Element Examples

Dispatch	ECRF
Call Handling	ESRP
Mobile Data	BCF
Incident Creation	PRF
Logging & Recording	LVF

Beware of legacy 9-1-1 terms that are limited to only one function

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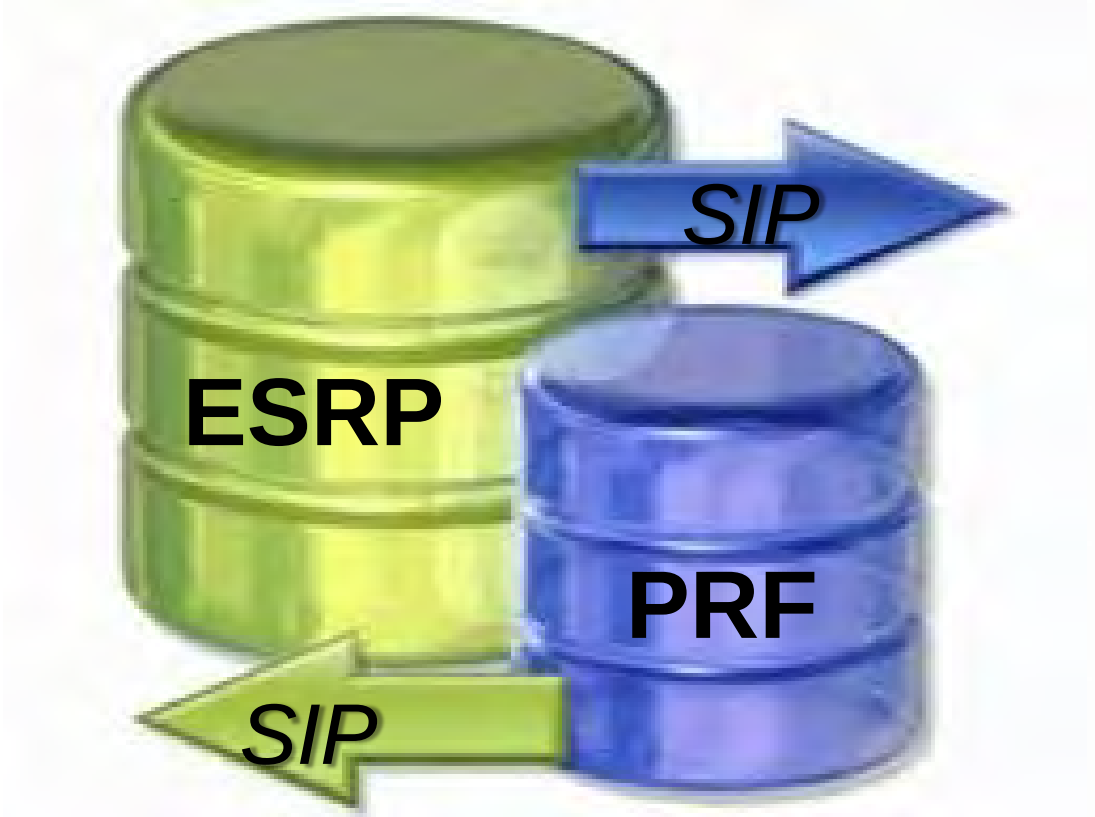
ESRP & PRF

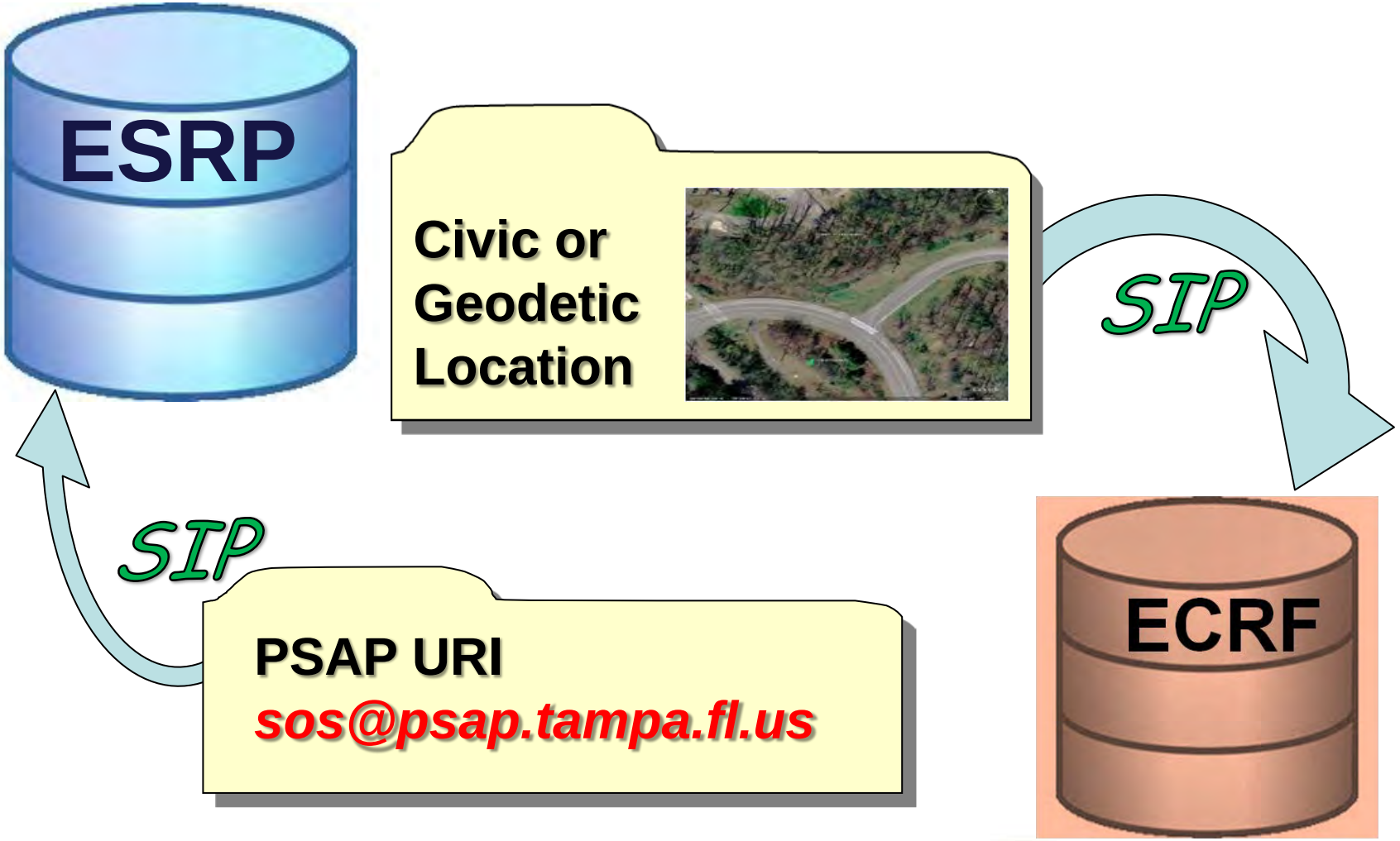
Emergency Service Routing Proxy

Policy Routing Function

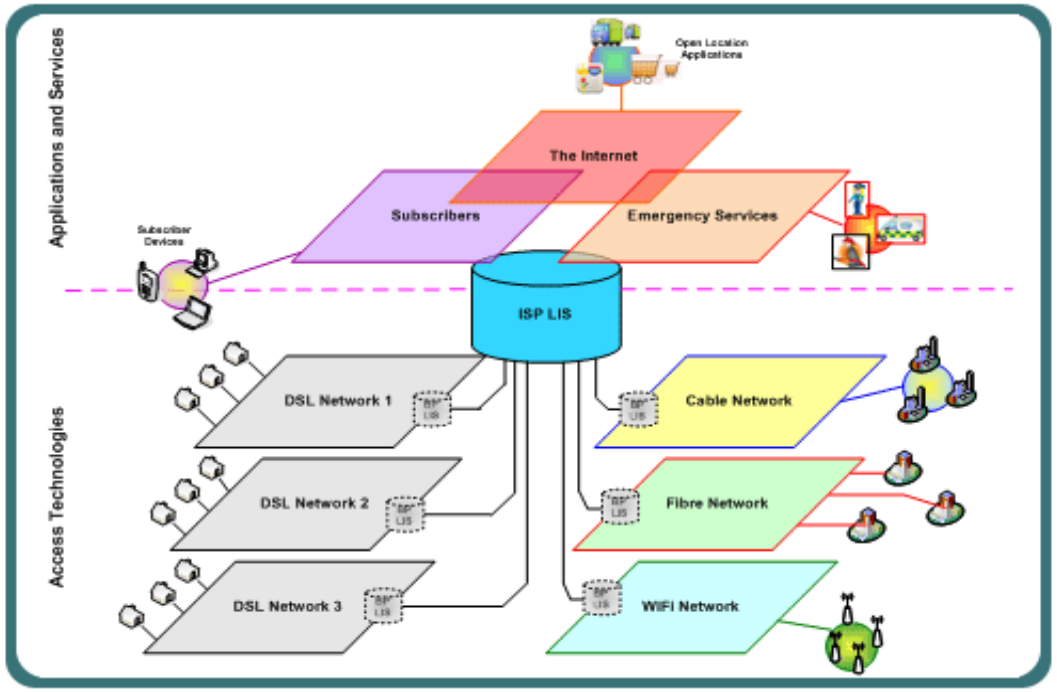
The Keys to the City



ESRP *queries the* ECRF (Emergency Call Routing Function)



LS-Location Server



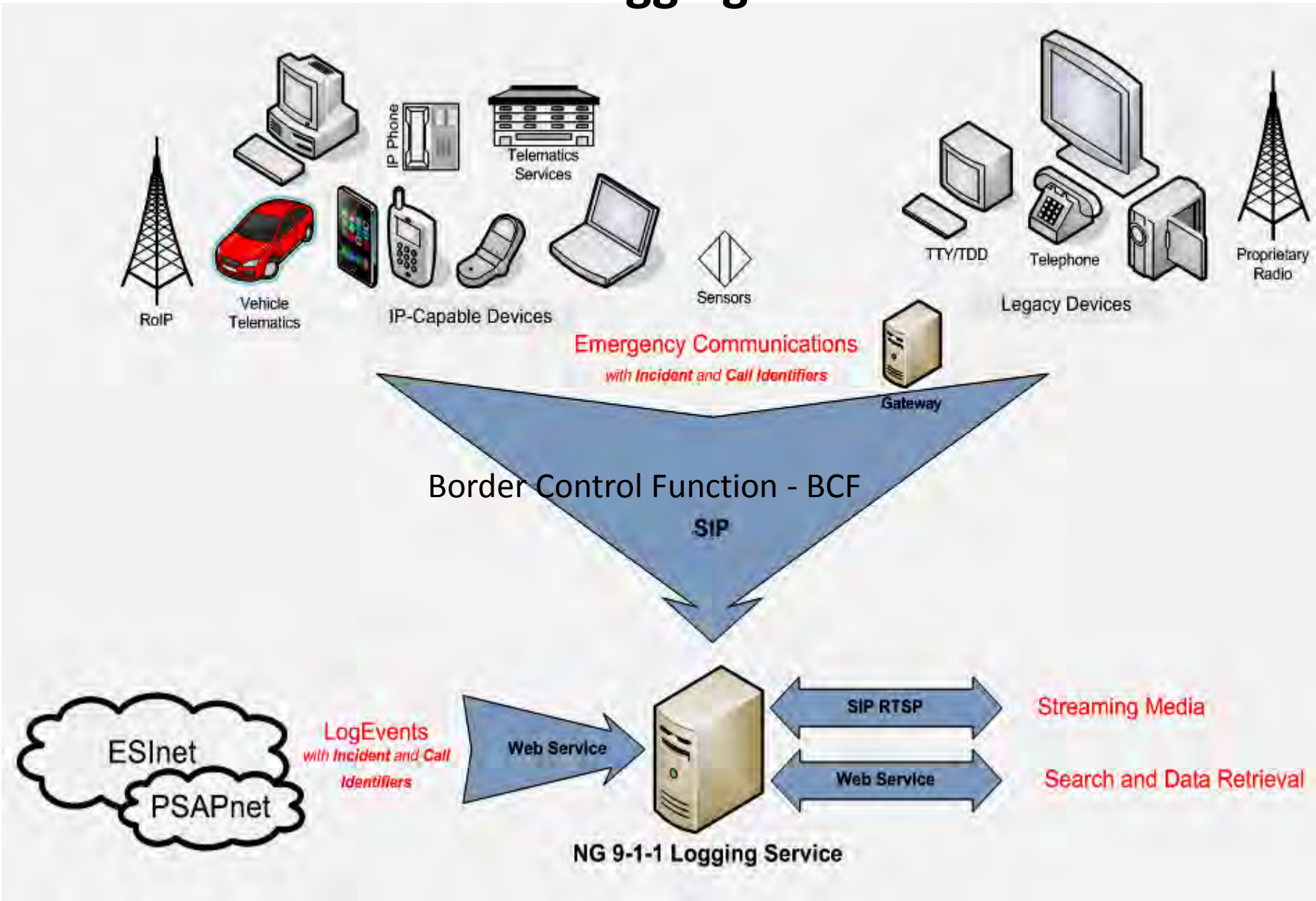
Everything Else

Left side

Apt A
4th floor

Suite 502
5th floor
SE corner of Bldg
Caution Hazardous materials

NG 9-1-1 Logging Services



Border Control Function - BCF

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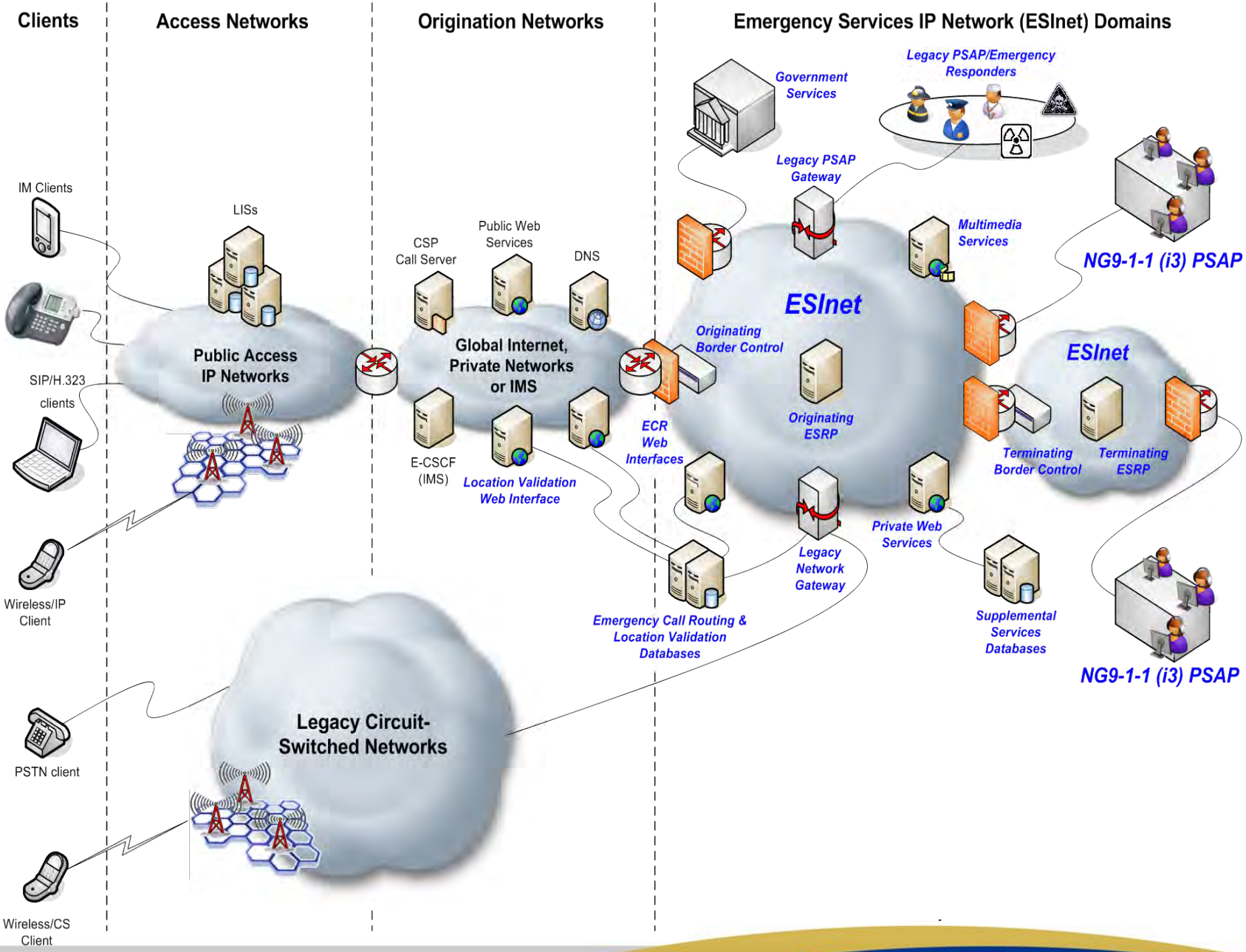
Gateways

Legacy Network Gateway-LNG

Legacy PSAP Gateway-LPG

Legacy Selective Router Gateway-LSRG


Clients
Access Networks
Origination Networks
Emergency Services IP Network (ESInet) Domains
IM Clients
LISs
Public Web Services
CSP Call Server
DNS
Government Services
Legacy PSAP/Emergency Responders
Legacy PSAP Gateway
Multimedia Services
NG9-1-1 (i3) PSAP
ESInet
Public Access IP Networks
Global Internet, Private Networks or IMS
Originating Border Control
SIP/H.323 clients
E-CSCF (IMS)
Location Validation Web Interface
ECR Web Interfaces
Originating ESRP
ESInet
Terminating Border Control
Terminating ESRP
Private Web Services
Legacy Network Gateway
Wireless/IP Client
Emergency Call Routing & Location Validation Databases
Supplemental Services Databases
NG9-1-1 (i3) PSAP
Legacy Circuit-Switched Networks
PSTN client
Wireless/CS Client

Other Emerging Technologies

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SMS-to-911, and beyond…

SMS to MMES

- Text is here but SMS is only the beginning
  - Recent FNPRM seeks comment on enhanced location info; delivery over WiFi; roaming support - - NG9-1-1 and MMES are just around the corner and should provide better solutions for all.

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SMS to MMES

- SMS has limitations:
  - No priority mechanism
  - Character limitations and possibility of fragmentation
  - “Store and Forward”
  - Only simple text supported
- 3GPP Multimedia Messaging Emergency Services (MMES) is next generation messaging for use by the public to reach emergency services.

SMS to MMES

- MMES protocols will allow for priority capabilities for emergency services messaging and for Multimedia Priority Service (MPS) users (e.g., government priority services users).
- Messaging component first introduced as Non-Voice Emergency Services in 3GPP SA1 (see study report in TR 22.871) Includes long-term vision of messaging for Next Gen emergency services.
- Supports RTT, Video and Photos.

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The Emergency Incident Data Document (EIDD)

Next Generation Data Sharing

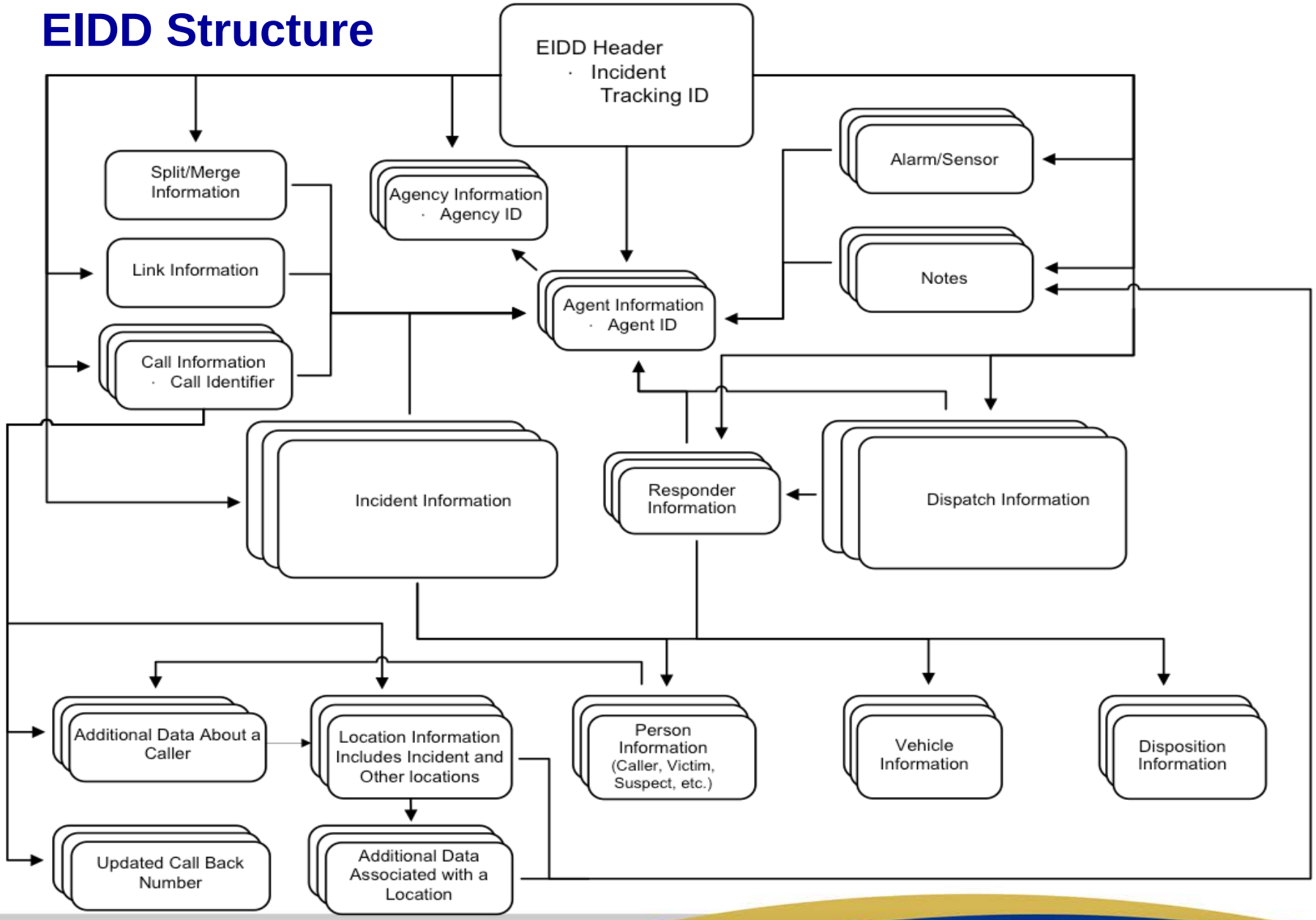
APCO/NENA ANS 2.105.1-201x
APCO/NENA NG 9-1-1 Emergency Incident Data Document (EIDD)

- Common data format for the communication of NG9-1-1 incident information.
- NIEM-conformant NG9-1-1 EIDD Exchange Standard
- To be used by NG9-1-1 systems to exchange incident information between disparate vendor systems.
- Defines specific elements, attributes, and data structures

APCO/NENA ANS 2.105.1-201x APCO/NENA NG 9-1-1 Emergency Incident Data Document (EIDD)

- Initiate the process of creating a National Information Exchange Model (NIEM) conformant, American National Standard (ANS)
- Used to share emergency incident information between and among authorized entities and systems.
- The final EIDD IEPD ANS will define
  - specific incident elements,
  - their attributes,
  - allowable values,
  - and data structures
- The FEs exchanging the data defined in the EIDD may be physically or virtually connected to each other.

EIDD Structure



FirstNet™

Nationwide Public Safety Broadband Network

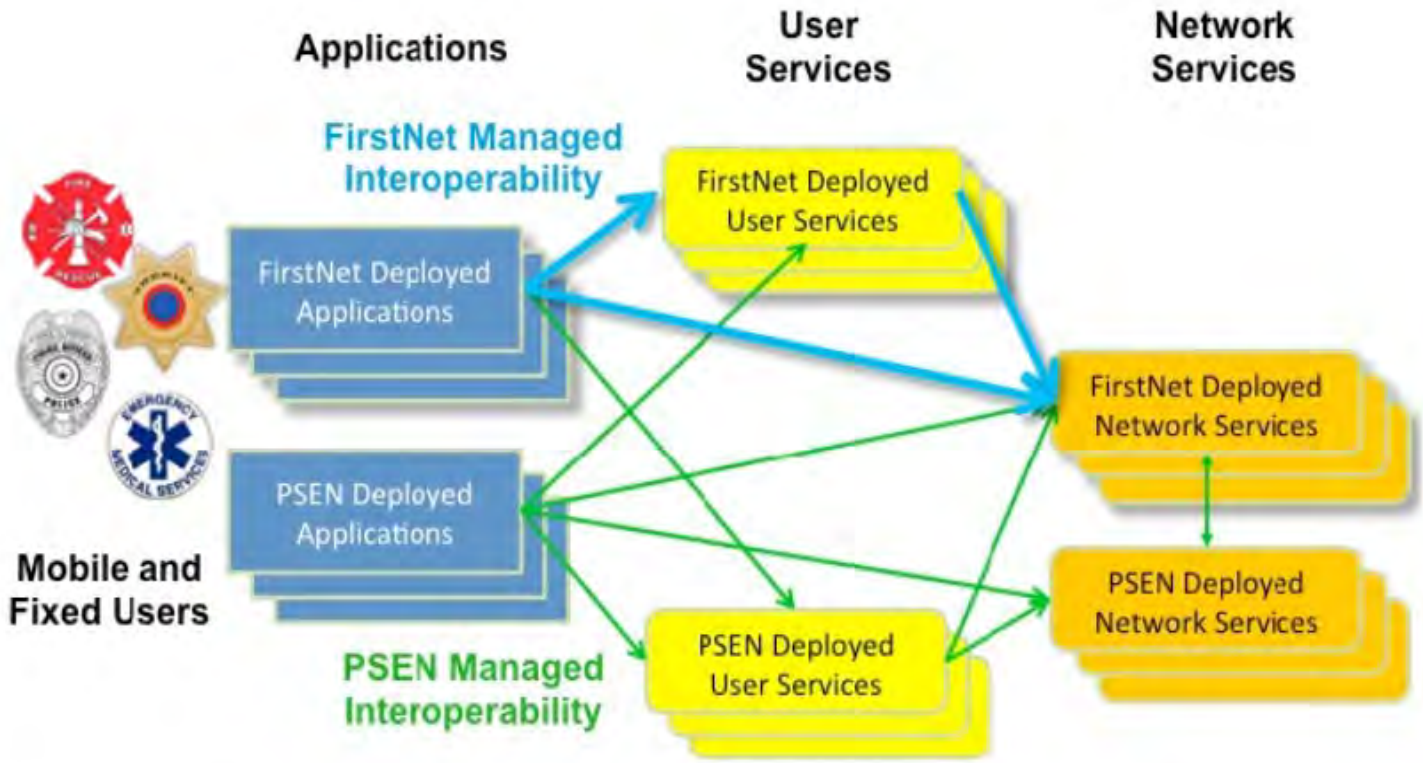
National Connectivity

Broadband

ESInets

Emergency Communications Stakeholders & Partners

FirstNet Apps



Examples

- Advanced multimedia telephone
- Video
- PTT Apps
- Fire situational awareness, etc.
- Computer-Aided Dispatch

- Celular Telephony
- Video
- Direct-mode PTT (not for Launch)
- Messaging, etc.

- Location
- Service Discovery
- DNS
- Identity
- Dynamic QoS, etc.

Why Apps?

- Mobile apps can be powerful tools for public safety communications
  - Serving both citizens and public safety professionals
  - Driven by new features and innovations, faster networks, and better devices
- The FirstNet nationwide public safety broadband network will bring advanced communications technology to first responders
- The transition to advanced, IP-based platforms, including Next Generation 9-1-1 systems will enable the use of new apps that will become essential components of emergency response

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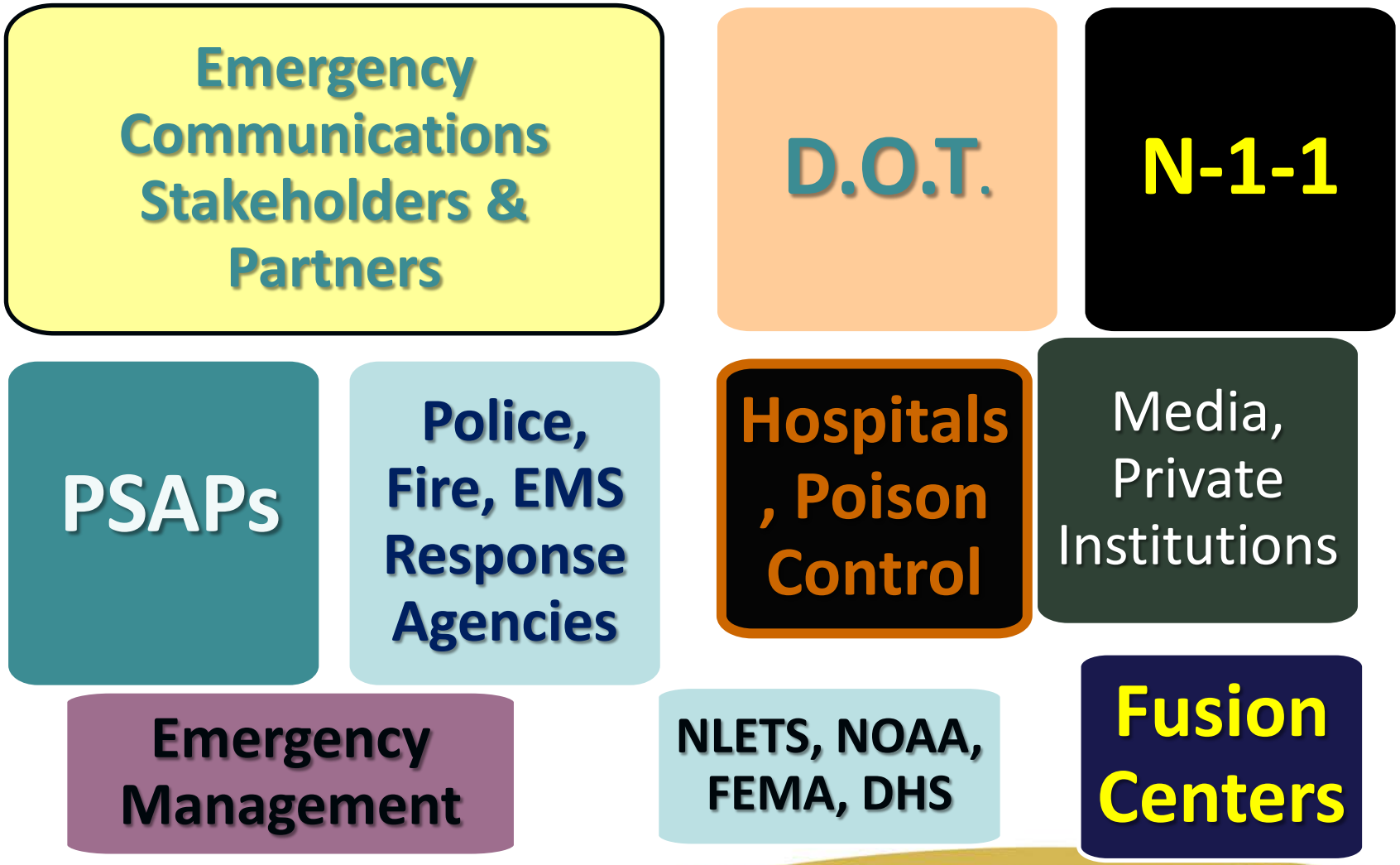
Decision Making and Planning

How do you position your agencies to transition to a *fully featured* NG9-1-1 system?

The devil is in the details

Public Safety Stakeholders

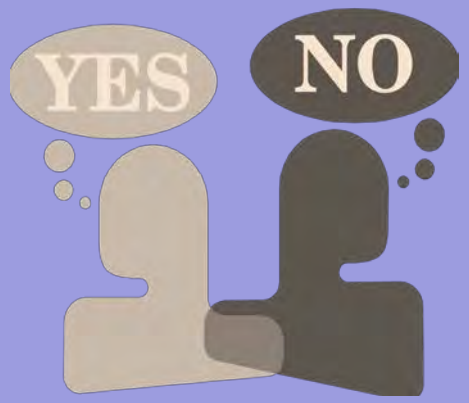
What is their state of technical & operational readiness?



Service Provider Stakeholders

Who are the origination & access network providers that will be involved?

Are they ready to move forward with NG9-1-1?



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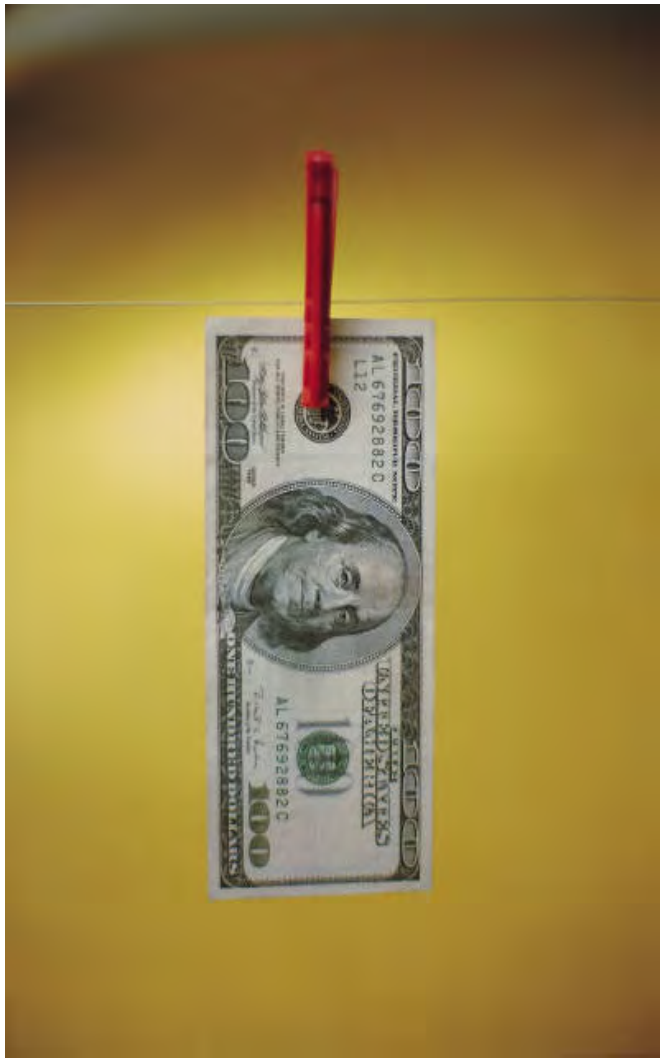
Governance Issues

Funding



System Management

Who will be the designated 9-1-1 system manager?

At what levels will contracted vendors be required?

Formal Project Processes

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What is the Common Denominator During an Emergency?

ALL Emergencies are LOCAL.

Interoperability of both voice and data services is critical as incidents unfold and expand.

Next Generation services can provide that interoperability

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IP-BASED EMERGENCY COMMUNICATIONS

9-1-1 calls are only one part of the public safety ecosystem

Requires a broad focus during the requirements and design phase

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Collaboration is Required

Managing data, coordinating services at all levels, and paying for them all require vision, leadership and a willingness to work collaboratively.

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NG9-1-1 Transition

Evolution not Revolution