# Next Generation 9-1-1

## “Where we’re going we don’t need roads!”

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# What this presentation covers

1. What is NG9-1-1
2. Overview of NG9-1-1 efforts
3. What NG9-1-1 promises to offer
4. What NG9-1-1 means for the PSAPs
5. Transitioning to NG9-1-1
6. Challenges



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# 1. What is NG9-1-1

# What is NG9-1-1? – Many things!

- First, a Vision then a Concept and in the process of becoming an Architectural Design
- A step in the evolution of 9-1-1 services
- A solution to accommodate access to emergency services for existing and emerging technologies and services (IM, SMS, ACN, VoIP, RTT, Video, Telematics, etc…)
- A System of Systems (not monolithic)
- An architecture built around the Internet Protocol suite including at the PSAP – All calls to be presented as IP at the PSAP
- An architecture using Open Standards instead of proprietary software
- Policy & Data driven using software applications and databases in an IP environment
  - Its all about Data!... Collection, management, integration, sharing, correlation, storage, manipulation, integrity, reliability, traceability, etc…
- A solution to better accommodate technology and services evolution (future-friendly)



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# What is NG9-1-1 (NENA Definition)

- A system comprised of hardware, software, data and operational policies and procedures to:
  - provide interfaces from call and message services
  - process emergency calls and non-voice (multimedia) messages
  - acquire and integrate additional data useful to call routing and handling
  - deliver the calls/messages and data to the appropriate PSAPs and other appropriate emergency entities
  - support data and communications needs for coordinated incident response and management

- The basic building blocks required for NG9-1-1 are:
  - Emergency Services IP Network(s) (ESInet)
  - International Standards Compliant IP Functions
  - Software Services/Applications
  - Databases and Data Management
  - IT and physical Security
  - Human Processes



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# What NG9-1-1 inherits from E9-1-1

- Remains a Service for citizens to request emergency assistance
- 9-1-1 as universal access number for dialable services in North America
- Remains location-based for Routing and Dispatch
  - Automatic location determination in all origination networks essential for routing and dispatch
- Retains PSAP and Agencies Concepts
  - PSAP definition expanded from “building” to “function”
  - Always require the capability to locally dispatch first responders at emergency site



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# Major differences with E9-1-1

- Moves away from closed, proprietary architectures in favour of “internetworks” enabling information sharing between various parties, including local, state/provincial and federal entities
- Expands beyond 9-1-1 to support N-1-1 and other 800 services (poison control, AZMAT, etc.)
- Ability to provide federated services to interconnected emergency entities (including but not limited to the PSAP) such as realtime language translation
- Software based over off-the-shelf hardware
- PSAPs no longer isolated – Inter-PSAP transfers capabilities expanded including outside of normal jurisdictional ranges
- Support supplemental data beyond the usual CNAI (such as Telematics, building floor plans, etc.) for event characterization and correlation
- Ability to support foreign emergency access numbers (1-1-2, 9-9-9, etc.) for international roamers



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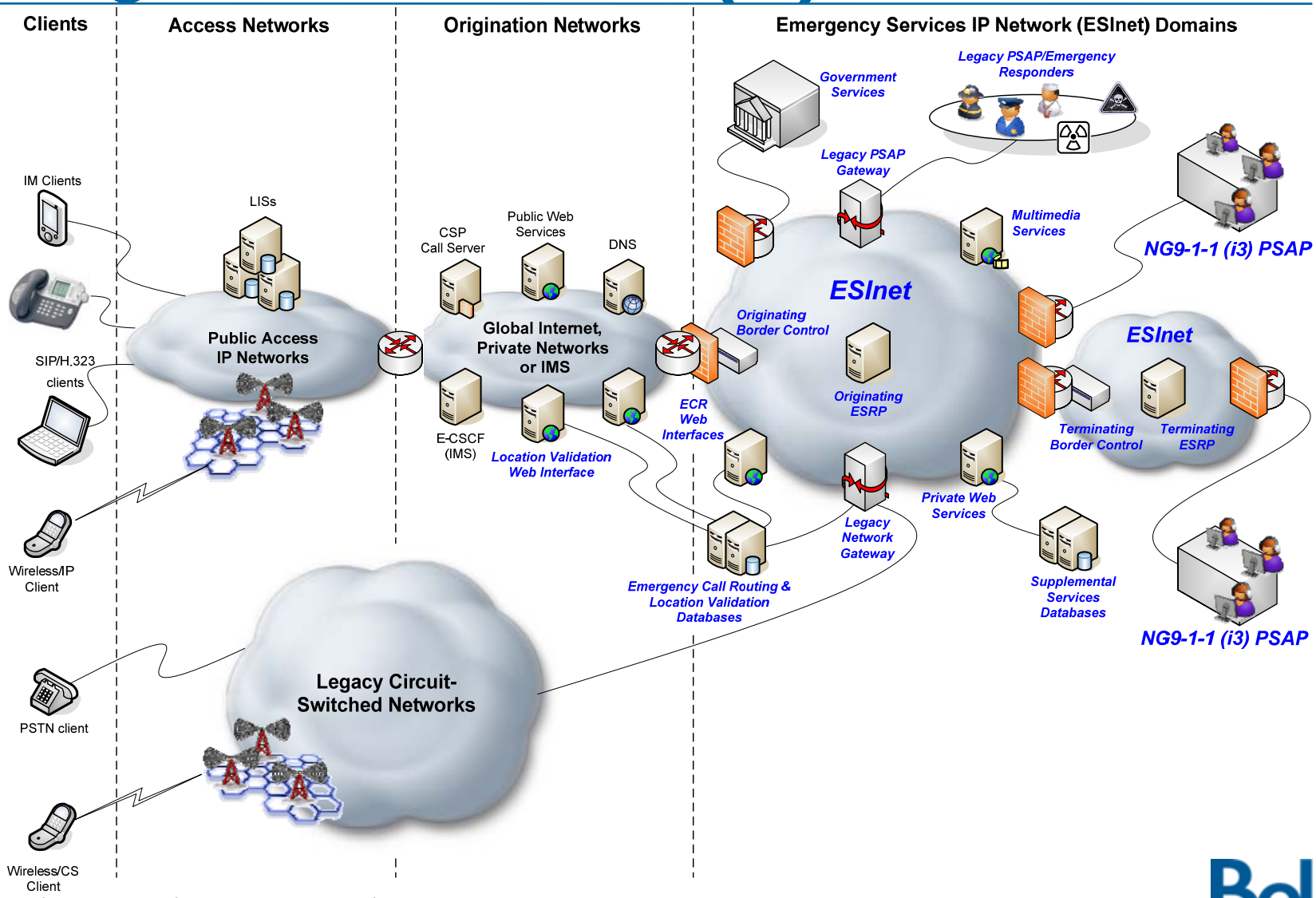
# Long Term Solution (i3) – NG9-1-1



# Long Term Solution (i3) – NG9-1-1

- Gradually replaces the E9-1-1 infrastructure as we know it today (E9-1-1 becomes NG9-1-1)
- PSAPs become natively IP
- ESInet is purely SIP-based
- ESInet is secure and private (trusted zone)
- Interconnection to/from ESInets are secure and private
- All calls presented as IP (Gatewaying and protocol mediation required)
- Supports “all” originating technologies, old and new
- Strongly coupled with IETF models and protocols
- Assumes Location is provided with the call



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# 2. Overview of NG9-1-1 efforts

# The NG9-1-1 Milestones

- 2001:
  - The idea that the current architecture needed to evolve germinated through NENA's Future Path Plan
- 2003:
  - NENA and VON joined to address E9-1-1 solutions for VoIP
  - NENA E9-1-1 VoIP roadmap is defined (i1, i2, i3)
  - Development work officially kicked-off at NENA
- 2004:
  - Network Reliability and Interoperability Council VII (NRIC VII) work started
- 2005:
  - The Concept of NG9-1-1 is born (evolution of E9-1-1 out of which i3 is part of)
  - NENA Next Generation Partner Program launched
  - NG9-1-1 Proof-of Concept trials (Tx A&M and others)
  - Publication of NENA NGPP Initial Findings & Recommendations
- 2006:
  - NENA i3 Technical Requirements published (NENA TRD 08-751 v1)
  - Next Generation Transition Planning Committee created
  - US Department of Transportation "Next Generation 9-1-1 Initiative" project kicked off
- 2007:
  - NENA i3 Functional Description published (NENA 08-002 v1)
- 2008:
  - USDOT NG9-1-1 Proof-of-Concept Testing Report published
- 2009:
  - "Pre NG9-1-1" or "NG9-1-1 Ready" products starting to emerge on the market (mostly PSAP CPE)
- 2010:
  - NENA i3 Technical Specifications published (planned)
  - NENA NG9-1-1 Operations Information Document published (planned)
  - NENA NG9-1-1 Transition Plan Considerations Operational/Technical Information Document published (planned)



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# NENA – Leadership in Action

- Unprecedented collaborative effort towards enabling NG9-1-1 in the US
  - Next Generation Partner Program
  - Next Generation Transition Planning Committee
  - Long Term Definition Technical WG
  - NG9-1-1 Data Development WG
  - NG9-1-1 PSAP CPE WG
  - Next Generation Security Standard WG



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# NG9-1-1 Partner Program

- Public & Private sector / NENA committee
- **Scope/Goal**: Address policy issues around NG9-1-1, coordinating with the NENA national Reg/Leg Committee (Funding, Jurisdiction, Regulation, Legislation, Education, Disaster Planning, Interoperability, Data and Information Sharing, Core/Facilitation Services, Certification/Accreditation). Foster partnership with other interested entities involved in different NG9-1-1 initiatives (DHS, DOJ, DOT, etc.).
- **Deliverables**: Multiple reports on NG9-1-1 policy issues and recommendations



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# Transition Planning Committee

- **Scope/Goal:** Define transition plans for the migration from the legacy E9-1-1 environment to NG9-1-1 systems supporting emergency services focussing on three categories of network and associated subsystems: originating networks, the core emergency services and PSAP Networks and the necessary operational, service and management features required for the overall NG9-1-1 system to function. Develop gap analysis and transition plans based upon an initial assessment of baselining legacy and NG9-1-1 starting points.
- **Deliverable**: NG9-1-1 Transition Plan Considerations Operational/Technical Information Document (in progress)



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# Long Term Definition (i3) WG

- **Scope/Goal:** Consider technical specifications and create appropriate documentation for implementing 9-1-1 service in an end-to-end IP environment.
- **Deliverables**:
  - i3 Technical Requirements Document 08-751 (published)
  - Functional and Interface Standards for NG9-1-1 Document 08-002 (published)
  - Detailed Functional and Interface Standards for NG9-1-1 (i3) Document (in progress)



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# NG9-1-1 Data Development WG

- Joint Technical/Operations Committee
- **Scope/Goal**: Address NG9-1-1 Data requirements such as supplemental data, business rules & databases, GIS, Call Routing & Location Validation data
- **Deliverables**: Various Technical and Operational Documents (in progress)



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# NG9-1-1 PSAP CPE WG

- Joint NENA CPE/APCO Committee
- **Scope/Goal:** Prepare requirements documents and standards that apply to PSAP CPE part of the NG9-1-1 system
- **Deliverable:** Technical Requirements Document (TRD) for NG9-1-1 PSAP equipment scheduled to be published by the end of 2009.



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# Next Generation Security WG

- Joint Technical/Operations committee
- **Scope/Goal:** Develop and promote security standards, policies, and guidelines for NG9-1-1 across all committees and disciplines of NG9-1-1
- **Deliverable**: Security for NG9-1-1 Standard (NG-SEC) Document (in approval process)



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# 3. What NG9-1-1 promises to offer

# NG9-1-1 Promises

- Fully replace the E9-1-1 architecture, with all capabilities and functions in place today
- Network and applications fully Open Standards based
- Running on off-the-shelf hardware – nothing 9-1-1 specific (except maybe applications)
- Support for both circuit-switched and packet-switched voice and non-voice calls, old and new
- Added capabilities to support changes for current and new types of originating services, technologies and calling devices
- Added flexibility for the PSAPs and 9-1-1 Authorities
- Added capabilities to integrate and interoperate with emergency entities beyond the PSAP
- Lower Cost of Ownership



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# 4. What NG9-1-1 means for the PSAPs

# NG9-1-1 and the PSAPs

- Evolve/replace existing voice & data CPE to IP
- Education/training at all levels
- Potential impacts to jurisdictional responsibilities
- Changes in governance, processes and SOPs
- Requires high bandwidth broadband connections to the ESInet
- More info to manipulate – Calls for improved call taker tools
- Additional IT support (operations, maintenance, security)
- Increased data management activities
- Added flexibility through direct control of business rules (disaster/alternate routing, PSAPs interwork, etc.)
- Access to external federated services in the ESInet (e.g. logger, supplemental data, storage, etc.)
- Increased opportunity for PSAP consolidation
- Increased flexibility in PSAP operations (e.g. remote call taker)



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# 5. Transitioning to NG9-1-1

# Transition – A Considerable Task

- "*The NG9-1-1 environment will differ considerably from the current 9-1-1 environment. The changes are not limited to standards and technology. They include the governance, management and operation of the system and the delivery of services, both traditional 9-1-1 services along with other new emergency services. The changes affect the entire 9-1-1 community, including the general public and other emergency services. The planning and transition to an NG9-1-1 System will be an extensive, multi year effort.*" (Excerpt from draft Transition Plan)
- A thorough gap analysis was performed over 16 baseline scenarios (including i2) resulting in 3 transition reference models
  - Findings triggered the introduction of new network functions solely for the purpose of transition – Legacy SR Gateway, centralized LIS, centralized Subscriber Database
- 9 impacted/involved stakeholders identified
- Need for coordinated transition planning identified as paramount
- A set of more that 30 requirements/prerequisites for transition have been defined
- Work in progress… More to come!



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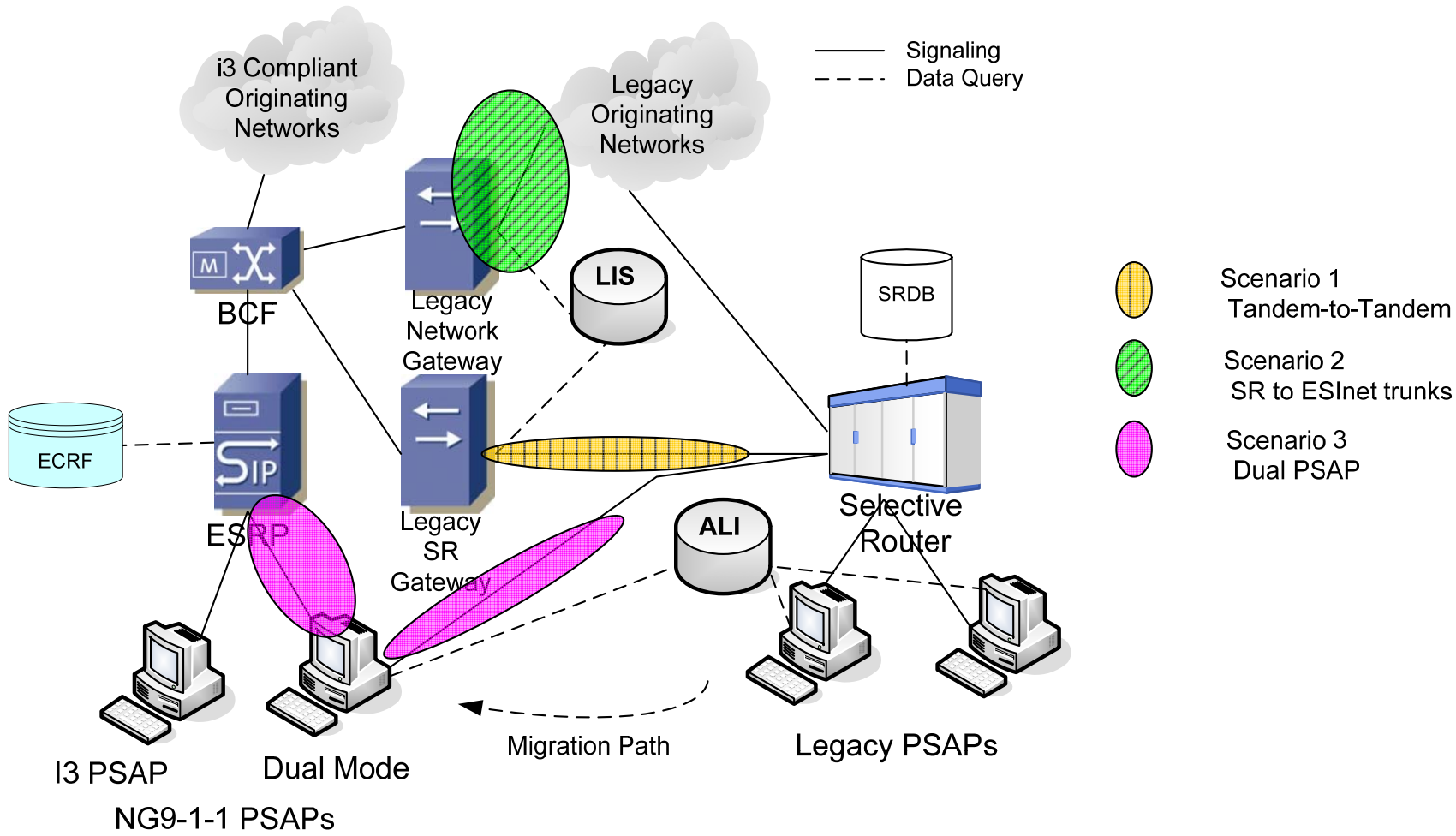
# Transition Reference Models



# 6. Challenges

# Challenges

- Funding
- Regulation / Legislation
- Security
- Caller's Location
- Transition
- Data Management
- ESInet enablement
- Standards Development dependency
- End-to-end Reliability, Maintainability, Serviceability, Traceability, Interoperability



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# Summary

- NG9-1-1 provides a target technical architecture to aim for
- NG9-1-1 requires fundamental changes in federal, state/provincial and local policies to enable its implementation
- NG9-1-1 requires full support from ALL emergency stakeholders to happen
- Transitioning origination networks, E9-1-1 infrastructures and PSAPs to NG9-1-1 will take years (decades?)
- Data management will be critical for transition and ongoing operations of NG9-1-1
- NG9-1-1 requires availability of caller's location from any/all origination networks
- Fully featured, standards based NG9-1-1 will likely be implemented in successive releases; but unless it's a full replacement for existing E9-1-1 functions, including additional features to bring 9-1-1 service up to the level needed in today's emergency communications environment, it is not a true "next generation" of 9-1-1
- Support for some technologies/services still unclear/undefined (Push-to-Talk, H.323 VoIP, current SMS)
- Solution still in early stages of service life cycle and thus will likely evolve as various groups' findings are brought to light and incorporated in the design
- NG9-1-1 seems to be gaining momentum in the U.S.
- Canada's current E9-1-1 path as suggested by Canadian 9-1-1 SPs works towards NG9-1-1



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# We don’t need roads, but we do need a roadmap… Ongoing

# Questions?

# Thank You!

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