

## **9-1-1's Technical Future: The Future Path Plan**

*By NENA Technical Committee Chairs*

In meeting the NENA mission, NENA's technical process must make sure two things happen—that we deal effectively with the new challenges in bringing 9-1-1 services to all callers, and that we make sure we retain previous capabilities and reliability.

Adding components and functions to the overall 9-1-1 system, including a growing variety of non-traditional ways to access 9-1-1 (such as telematics), is advisable only if the proposed method is clearly more effective, more dependable, and/or much more economical than what we have, or than other alternatives. A technical plan for future 9-1-1 systems needs to provide a long-term direction for development to support new call sources and needs.

To date, E9-1-1 service has been intentionally designed with certain characteristics. Examples are alternate routes as backups if the primary route fails, circuit path diversity, redundancy of critical components (such as PSAP datalinks and duplicated data bases), call congestion control, etc. Also, service parity is a basic objective—every potential 9-1-1 caller should have the same likelihood of a successful 9-1-1 call connection, regardless of the source of the call, whether from an ILEC, a CLEC, an ISP, or a wireless carrier. The P.01 service standard is an example.

The Future Path concept is an approach meant to reintroduce and refocus attention on these issues. We should not lose what has been gained due to speed of effort, or due to lack of knowledge of past practices and standards on the part of newer parties to the 9-1-1 process. And we need to aggressively manage the technical evolution of the overall 9-1-1 system and emergency communications process in ways that meet the basic criteria, and serve local and national emergency needs. Accomplishing this involves the development of specific concepts defining the nature of future E9-1-1 service and systems, what objectives need to be met, and what basic criteria need to be used to test the validity of proposed solutions.

This basic technical policy, in the sidebar at the end of this article, is a guideline to focus technical development work on maintaining fundamental characteristics of E9-1-1 service by anyone providing equipment, software, or services.

Future development of the technical path plans is the responsibility of the Technical Committee lead group (Roger Hixson, Billy Ragsdale, Barb Thornburg, Tom Breen, Tony Busam, Tom Hinkleman, Bob Tilden), with the support of Technical Committee members. Each NENA Technical Committee will apply the Path Plan Criteria to any and all development efforts. The NENA Executive Board will pursue ways to obtain the funding and exposure necessary to develop and implement the concepts and requirements prescribed by the Technical Committees, as well as obtaining the regulatory and legal support needed by those involved in providing E9-1-1 services to deliver it.

Following are some questions and answers that further explain the 9-1-1 Future Path Plan.

**When the end of the technical path process is completed, what new ideas and tools would we expect to have in place?**

An expansion of the Path Plan Criteria to specify technical and operational characteristics needed to meet or exceed the Requirements and Criteria in each major element of a future 9-1-1 system and service process. This would frame development by vendors of a robust architecture that uses industry standard protocols to carry E9-1-1 calls and the necessary related data to PSAPs, and the capability to share that data with others involved in delivering emergency care, such as trauma centers, etc. This architecture will allow PSAPs to receive calls from almost any originating location, and it will also allow them to transfer the call to any required location along with either the data, or a “key,” that the destination location can use to retrieve the data. This architecture could use one or more forms of Internet protocol to carry data, as well as other standard network protocols such as ISUP, TCAP, etc.

**Some LECS have raised issues with doing interLATA call and data delivery. What is the impact on the Future Path Plan?**

LECS are not necessarily opposed to doing interLATA tandem-to-tandem transfers for 9-1-1 service. Their position is that they are not currently permitted to do so, unless certain, very limited criteria are met. This is largely because the forbearance orders, which were written about non-9-1-1 telecommunications services, do not cover interLATA tandem-to-tandem transfers, or many of the other data and call related issues that have arisen since the orders were released. The cart is sort-of in front of the horse because of the timing of the forbearance orders and the need to do more with E9-1-1 calls, such as the data content required for wireless E9-1-1 calls. Our understanding of this issue is that it has, for the most part, become an issue following the 1996 Federal Telecom Act, and the move of RBOCs to provide interLATA service pursuant to the Act’s Section 271. The permitting part, here, relates to their interpretation of that process and their 271 approval.

**Isn’t this interpretation just form over substance?**

Probably not. A somewhat twisted analogy would be to ask if the well-known Miranda warning is just form over substance. Many cases are dismissed because a “technicality” occurred when the police failed to follow Miranda rules. If a regulated RBOC-SSP fails to follow the rules related to call processing, etc., they expose themselves to serious penalties from the FCC. The issue speaks directly to the RBOC’s ability to provide interLATA service under current law.

**What role does the DOJ have in this ?**

The DOJ relates because the Modified Judgment Decree includes an exception decision by Judge Green in the late 1980s to allow use of interLATA delivery by 9-1-1 SSPs under certain circumstances, which may be useful as a precedent to an expansion of this concept. Only Congress can change the requirements for RBOC-SSPs to allow them to perform all of the call processing that might ever be needed on an E9-1-1 call. The FCC can only enforce/require carriers to do what the Congress has allowed in the various telecommunications Acts. We could request that the FCC clarify their interpretation of federal statute (as the implementing federal agency), or seek to do that in federal court if the FCC is not willing to do it—i.e., seek to clarify the MFJ in light of current federal statute.

**What does a non-dialable number for 9-1-1 centers accomplish for 9-1-1 technical matters?**

In short, no more anonymous calls can arrive on E9-1-1 dedicated trunks/lines. Only network elements and certain authorized, originating TNs would be able to send calls to such non-dialable numbers. Also, from a human operations perspective, using 911 as an NXX code would allow the maintenance technicians (etc) to immediately recognize a TN as being related to a PSAP. Some 9-1-1 service system providers have already applied such numbering for routing TNs in selective routers. It also potentially relieves other dialable numbers for use as real TNs. (See Tony Busam's concept paper also in this issue.)

**Can you explain how 5-1-1 as an NXX would have a similar value?**

It would be used for pANIs, for wireless and possible PBX applications. Many of the same benefits apply.

**It sounds like the access or backdoor numbers, the numbers NENA is collecting for the PSAP Registry, have a high-security sensitivity to them. Does 9-1-1 as an NXX, and a dedicated tandem-to-tandem architecture alleviate some of that concern?**

Using 9-1-1 as an NXX reduces (greatly) the concerns over security, since only network elements and certain authorized, originating TNs would be able to send calls to such non-dialable numbers. We shouldn't put too much association between 9-1-1 as an NXX and tandem-to-tandem transfers. They are not actually dependent upon one another, even though using 9-1-1 as an NXX would certainly work for tandem-to-tandem transfers, but so would any other routing number.

**What do we mean by tandem-to-tandem architecture?**

Tandem-to-tandem architecture would provide the ability for an E9-1-1 call to be sent between selective routers (E9-1-1 tandems). NENA Recommended Standard 03-003 provides the technical details on how it is to be accomplished, but here's a high level summary. Internetworking (aka: tandem-to-tandem) for E9-1-1 uses SS7/ISUP signaling controlled, "dedicated" (for now) trunks between E9-1-1 tandems to pass calls between the machines. Some day, if and when we get the buy-in of IXCs, these calls could use SS7/ISUP signaling with priority coding on shared (non-dedicated) trunks and achieve the same call processing result. There are several applications of internetworking in use in America today, but it is not a widespread concept at this time. However, it should be!

**What do nation-wide call transfer and tandem-to-tandem transfer mean to the average PSAP manager?**

It can mean a lot to PSAP managers, as it will allow call transfer to any other PSAP with a 911 prefix number assignment using a national directory. It would also mean anonymous calls will essentially disappear.

**Can we develop a policy paper to create a tandem to tandem transfer?**

We already have: NENA 03-003, NENA Recommendation for the Implementation of Inter-Networking, E9-1-1 Tandem to Tandem. In order to create a policy paper, we must take into consideration the limitations that the usual E9-1-1 SSPs are required to operate under. Most specifically, they are not presently allowed to carry interLATA traffic. So, that means that any interLATA tandem-to-tandem transfers must ride an IXC network. We should be careful in issuing any policy statement that assumes how IXCs will or won't react to being brought into the E9-1-1 call carrying business.

**Some states have begun looking at statewide data base management. What are the benefits of that?**

The more we move toward an architecture that will need to interoperate with multiple databases for information related to an emergency call, the more complicated it becomes to have localized data base operations. A statewide data base could result in increased standardization of content and better ALI access for transferred calls within the state. There are a number of issues to consider on what direction databases and their management should take, some of which are:

- effectiveness of central vs. more localized data base management, re: familiarity with the local areas
- overall cost considerations (hardware costs, personnel costs, etc., and cost to the ultimate users—the public)
- capability for standardization
- overall effectiveness of various PSAP to DB linkage designs, ALI steering, secure web access to distributed DBs, etc.
- effectiveness of access for non-PSAP users of data
- centralizing the MSAG maintenance function (benefiting both multiple service providers, and 9-1-1 authorities)

**Why do we need a technical path for 9-1-1?**

That's easy. Look at all the future technologies that we can already see coming down the pipe in relation to an E9-1-1 call. Picture the cost and confusion and implementation delays involved if everyone has their own technological solution. We're already experiencing that. A well thought out and clearly defined path will allow all members of the puzzle to build toward a common architecture that will deliver the most bang for the public safety buck.

**Not every issue that requires some technical guidance will evolve into a standard. What is NENA doing with those issues? Can you give me an example?**

These areas would be handled through Technical Information Documents or Technical Policy statements. As we deal with issues, a decision to use the Technical Standard or one of these will be made. Using 911 as an NXX is an example. It requires technical guidance to understand the value it will bring to the puzzle, but it certainly doesn't need a NENA standard. Another example would be the MLTS Model Legislation—this probably would be a Technical Policy document if we were developing it today.

**SIDEBAR:**

**NENA's Future Path Plan Criteria for Technical Evolution**

**Definition/Requirement: In present and future applications of all technologies used for 9-1-1 call and data delivery, maintain the same level or improve on the reliability and service characteristics inherent in present 9-1-1 system design.**

New methods or solutions for current and future service needs and options should meet the criteria below. This inherently requires knowledge of current 9-1-1 system design factors

and concepts, in order to evaluate new proposed methods or solutions against the Path Plan criteria. NENA stands ready to assist and evaluate these efforts.

**Criteria to meet the Definition/Requirement:**

1. Reliability/dependability as governed by NENA's technical standards, and other generally accepted base characteristics of E9-1-1 service
2. Service parity for all potential 9-1-1 callers
3. Least complicated system design that results in fewest components to achieve needs (simplicity, maintainable)
4. Maximum probabilities for call and data delivery with least cost approach
5. Documented procedures, practices, and processes to ensure adequate implementation and ongoing maintenance for 9-1-1 systems