

**State of Arkansas
Statewide NG9-1-1 Plan**



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1. Executive Summary

The Arkansas Department of Emergency Management, the Department of Homeland Security Office of Emergency Communications, and the Emergency Telephone Services Board (ETSB), in conjunction with local government and communications providers of the state, have developed a course of action to improve 9-1-1 emergency communications through the adoption of a new system to include current technology and standardized training and procedures. This collaboration will result in improved interoperability among the Public Safety Answering Points (PSAP) and quantum improvements to the delivery of emergency services.

The expectation of the public is that an emergency caller in Southeast Arkansas receives the same level of service as someone dialing 9-1-1 in Northwest Arkansas—an expectation that is currently not met. Arkansas last reevaluated its wireless 9-1-1 surcharge in 2009—nearly a decade ago and is currently one of the lowest fees in the nation. The 15-cent increase in 2009 was not enough to keep up with the rapid demands of progressing technology and the costs associated with that technology. In addition, Arkansas' population of aging baby boomers combined with an increasing reliance on emergency services by the underprivileged has increased call volume and strained resources across the state.

Through deliberate and thoughtful research, the conclusion was reached to deploy an Internet Protocol (IP)-based network (Next Generation 9-1-1) intended to receive, process, route, and deliver all calls to 9-1-1 centers within a statewide Emergency Services IP Network (ESInet). Next Generation 9-1-1 will benefit all stakeholders--citizens and visitors to the state, PSAPs, first responders, and legislative decision makers. The current delivery methods of 9-1-1 are hindered by outdated technologies and a lack of networking. Emerging technologies are blocked by the analog environment currently employed by 9-1-1 systems in the state.

In Arkansas, the delivery of 9-1-1 is based upon the local government's ability to provide this service. The current result is a collection of stand-alone PSAPs with little ability to utilize emerging technology to the benefit of emergency services. Migration from today's legacy analog systems to a privately managed IP network will result in better service for citizens and better information for first responders. The deployment of this network along with standardized training for telecommunicators and agency certification requirements, as well as a state governing body for 9-1-1 will provide a uniform method of call delivery without regard to PSAP size. Service providers will have a streamlined method of delivering calls to the PSAPs with the IP network and interconnectivity provided by the ESInet.

This cost-effective solution will offer a clear path to the future within the state. With a uniform method of call delivery, receipt, and handling, each participating entity will be an equal within the first responder community of Arkansas. As such, emergency services within the state will reach a higher level of quality for citizens and increased safety for responders at a lower recurring cost for local governments.

2. Introduction

2.1 National Overview of the History and Background of 9-1-1

The Alabama Telephone Company implemented the nation's first 9-1-1 system in Haleyville, Alabama. On February 16, 1968, Alabama Speaker of the House, Mr. Rankin Fite, made the first 9-1-1 call from the Haleyville City Hall. Congressman Mr. Tom Bevill answered the call on a telephone located in the police department.¹ Early 9-1-1 technology had limited capability and 9-1-1 calls had to be delivered to an answering point within the caller's telephone exchange. Northeast Arkansas received the new number 9-1-1 in 1969. Although individual jurisdictions in Arkansas implemented 9-1-1 service, it was not until 1985 that the Arkansas State Legislature passed the Public Safety Communication Act. The 9-1-1 system implementation in Arkansas spanned over 20 years. Technology changes will compress that timeline for NG9-1-1.

Because there was (and still is) little correlation between a telephone exchange boundary and the emergency responder's jurisdiction, a 9-1-1 call could end up at a PSAP that did not serve the caller's location. Basic 9-1-1 service, as it has since been defined, did not provide any telephone number or location information with the call—it was a voice service only—and the caller had to provide his or her location and call-back information.

Significant advancement in 9-1-1 technology occurred with the introduction of Enhanced 9-1-1 (E9-1-1) service in the early 1980s. Using existing circuit-switched technology, 9-1-1 calls were selectively routed to the PSAP serving the caller's location. In addition, 9-1-1 call-takers were able to receive callers' telephone numbers and fixed locations.

An important part of E9-1-1 call routing is the placement of the caller's location information in the 9-1-1 database. The information in the 9-1-1 database is provided by two parties. First, the 9-1-1 Authority is responsible for creating the Master Street Address Guide (MSAG), with corresponding Emergency Service Zones (ESZ) and Emergency Service Numbers (ESN). The ESN enables proper routing of the landline 9-1-1 call. The second group is the communications carriers. When someone signs up for landline phone service, the Incumbent LEC and/or Competitive LECs update the database management system with new, changed, or deleted service address and so forth.

By the 1990s, the use of cellular technology increased dramatically. This consumer-driven change posed serious challenges for public safety, because landline E9-1-1 systems did not have the capability of providing location information for wireless callers. In 1996, the FCC released the First Report and Order on Docket 94-102, which mandated wireless E9-1-1 in two phases. Phase 1 provides the callback number and the address of the tower that received the wireless 9-1-1 call. Phase 2 provides the callback number and the caller's approximate location (as measured in longitude and latitude), within certain accuracy parameters. Although less-than-perfect and inherently less reliable than landline technology, wireless E9-1-1 still represents a huge improvement in a PSAP's ability to locate wireless 9-1-1 callers.

Not long after wireless E9-1-1 implementations began to reach maturity at the majority of PSAPs, Voice over Internet Protocol (VoIP), was introduced. In 2005, the FCC ordered that interconnected VoIP providers must provide their customers with E9-1-1 service.

¹ Alabama Chapter of NENA Website, "World's First 9-1-1 Call," http://www.al911.org/first_call.htm, April 18, 2008.

In 2004 Congress passed the ENHANCE 9-1-1 Act (the Act) and amended it twice through the NET 9-1-1 Improvement Act of 2008, and the Next Generation 9-1-1 Advancement Act of 2012. The Act as amended established a National 9-1-1 Implementation Coordination Office (ICO), or National 9-1-1 Program, as a joint program of the National Telecommunications and Information Administration (NTIA) in the US Department of Commerce and of the National Highway Traffic Safety Administration (NHTSA) in the US Department of Transportation (USDOT). The Act also required the ICO to manage a grant program and create a nationwide plan for migrating to a national IP-based emergency services network. The ICO released that plan in 2009.

The introduction of wireless or VoIP technology did not significantly affect the E9-1-1 system. The change from landline to wireless was mitigated by service providers that translated wireless and VoIP 9-1-1 calls to mimic landline calls, which allowed PSAPs to receive the wireless calls without expensive updates to their CPE. In summary, a wireless 9-1-1 call routes from the carrier's serving Mobile Switching Center (MSC), which is essentially the equivalent of a central office. From the MSC, the 9-1-1 call travels on a dedicated 9-1-1 network to the serving Selective Router, where the call is then routed to the correct PSAP. When the PSAP queries the 9-1-1 database, there are instructions to route the request to the appropriate wireless ALI database.

The current E9-1-1 system was never designed to receive calls and data from these new and emerging technologies. As a result, through cumbersome adaptations, E9-1-1 is being asked to perform functions it was not designed to handle, using outdated analog technology to deliver vital information to the PSAP. The reliance on this outdated technology has prevented the delivery of vital information that could save someone's life. Although the current E9-1-1 network has served the public safety industry well over the last 40 years, the E9-1-1 network must be able to accommodate the data demands of wireless and VoIP E9-1-1, as well as public safety technologies of the future.

Every time a new technology is introduced (e.g., wireless or VoIP) or system functions are expanded (e.g., location determination), the existing 9-1-1 network and equipment must undergo significant, convoluted, and costly engineering changes. These changes result in significant time delays and solutions that are not completely effective. The current 9-1-1 network and infrastructure cannot support the network and technology needs of the future. Delivering additional data on a 9-1-1 call requires a digital network to provide the speed and data capacity to properly deliver the 9-1-1 call and location data to the appropriate PSAP in the fastest manner possible.

The explosive growth in communications technology is forcing 9-1-1 Authorities (at every level of government) and PSAPs to change the way they operate to provide equivalent services to consumers. To support these trends, 9-1-1 Authorities and PSAPs must migrate to a new platform that enables these communications devices to access E9-1-1 service. As the rest of the world moves to an IP-based network, the current E9-1-1 system will continue to lag further behind technologically, will continue to degrade, and will be unable to meet the demands and needs of its residents and tourists. Consumers have adopted these technologies for their everyday communications and expect to be able to use them to communicate with 9-1-1. The nation's analog E9-1-1 system has reached the end of its ability to adapt to new modes of communication, particularly those based on Internet Protocol (IP) or that require greater capacity and speed to transmit the rich data streams and content so integral to modern communications. That is, while new high-speed digital networks have been developed and deployed, the E9-1-1 industry has not kept up with technology or the public's demand for more information.

3. Current 9-1-1 Environment in Arkansas

3.1 Overview of 9-1-1 Service in Arkansas

Arkansas maintains 127 total PSAPs across the State's 75 counties. While PSAPs within 3 counties are served by CenturyLink as the primary Local Exchange Carrier (LEC), the remaining PSAPs in all other counties are served by AT&T. 9-1-1 call delivery for all PSAPs, regardless of primary LEC, is handled by AT&T through their five (5) selective routers in the State:

- Little Rock Franklin
- Fayetteville Hillcrest
- Ft Smith Sunset
- Jonesboro Main
- Pine Bluff Jefferson

Approximately 6,500 emergency calls for service were received each day based on the 2.3 million calls across the state in 2016.

Newton, Calhoun, Cleveland, and IZard Counties have not implemented landline E9-1-1 service, while all other Counties have done so. However, every PSAP in the State was capable of receiving Phase I and II wireless E9-1-1 service as of January 2011. This achievement means that every PSAP in the state has the capability to receive Phase 2 location information for every wireless 9-1-1 call.

The 91st General Assembly in 2017 passed Act 574 to address concerns with the need for uniform 9-1-1 services, restricting creation of any new PSAPs. Their intent was written in the emergency clause of the legislation: "It is found and determined by the General Assembly of the State of Arkansas that there are currently more than one hundred twenty (120) public safety answering points in the state; that many of these public safety answering points are in close proximity to others, creating a duplication of services and errors in 9-1-1 service; and that this act is necessary to save taxpayer money and create more efficient government services."

Arkansas does not have a State level agency responsible for the coordination of 9-1-1 on a statewide basis. At present, responsibilities that are typically housed within such a statewide agency are shared amongst the Arkansas Department of Emergency Management (ADEM), the Emergency Telephone Services Board (ETSB), and the Arkansas Department of Finance & Administration (DF&A).

ADEM serves as the state's coordination center for the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk to the security of the Nation. Their Mission is to provide efficient and effective state level leadership, resources and coordination for a comprehensive all-hazards approach to emergencies and disasters impacting Arkansas. ADEM serves in a similar capacity for 9-1-1 In Arkansas due to the lack of a State-level agency focused solely on 9-1-1, however they are not statutorily responsible for any functions specific to the State's overall management of the 9-1-1 network to deliver 9-1-1 calls.

The ETSB consists of a representative from the State Auditor's Office; two (2) representatives from the CMRS provider community selected by a majority of the commercial mobile radio service providers licensed to do business in the state; the Director of the Arkansas Department of

Emergency Management; one (1) consumer member appointed by the President Pro Tempore of the Senate; one (1) consumer member appointed by the Speaker of the House of Representatives; and two (2) representatives from the PSAP community. The ETSB is statutorily responsible to:

- Establish and maintain an interest-bearing account into which will be deposited revenues from wireless service charges
- Manage and disburse the funds from the account to eligible PSAPs
- Promulgate regulations necessary to perform its duties
- Submit annual reports to the office of the Auditor of State outlining fees collected and moneys disbursed to PSAPs
- Retain an independent third-party auditor for the purposes of receiving, maintaining, and verifying the accuracy of any proprietary information submitted to the board by service providers

Arkansas Code § 12-10-326 establishes the role of DF&A in the 9-1-1 surcharge collection process. Under this statute, DF&A is required submit all remitted prepaid wireless 9-1-1 surcharge monies to the ETSB, less two percent (2%) they are authorized to retain to offset their administrative costs.

3.2 Current Statutory and Regulatory Environment and Program Structure

9-1-1 service in Arkansas is primarily governed by Arkansas Code A.C.A. § 12-10-301 through A.C.A. § 12-10-328. Currently, there is no agency that serves as an information and coordination resource for PSAPs. Agencies must rely on shared information from peers and other resources to determine operational practices and resource management.

3.3 Current 9-1-1 Technology

Although the current 9-1-1 network in Arkansas is reliable, it has not kept up with technology, and therefore is unable to provide comparable service for emerging communications devices. Because of the method in which the call delivery network and connections to Selective Routers is deployed today, a PSAP may not always be able to transfer the data associated with a 9-1-1 call to another PSAP on the network. There can be significant time delays associated with having to obtain location information from the caller; those delays affect the overall quality of 9-1-1 service and the ability of responders to arrive on scene in a timely manner.

At present, many PSAPs function independently of each other. There is limited integration of E9-1-1 and radio systems with one another or with other related or unrelated public safety systems. PSAPs not served by the same Selective Router are not able to transfer 9-1-1 calls without losing the caller's location and other premise information. Due to the lack of interoperability between systems, PSAPs are often unable to cross-share location information for emergencies that include a multiple jurisdiction response.

In May 2016, a Wake County, NC man died when a total of 11 minutes passed in order for first responders to arrive at a location less than a mile away. Similar incidents occur in Arkansas. While some operational issues contributed to this delayed response, an NG9-1-1 environment would have eliminated the primary factors resulting from technology limitations, as illustrated in the following table.

Limitation	Legacy Environment (what actually occurred)	NG9-1-1 Environment (what could have been)
PSAP Routing	Routed to neighboring County based on rules assigned to receiving cell tower sector	PSAP routing based on X,Y location of caller
Inability to Map Location	Disparate GIS systems and no maintenance or data sharing program between jurisdictions	Statewide GIS layers shareable amongst all jurisdictions, routed based on PSAP boundary
Inability to Transfer with Data	Transfer to neighboring jurisdiction, once recognized as necessary, did not provide ALI record and location	IP-based connections allowing direct transfer of all emergency caller data

Consumers and businesses are increasingly dependent upon new communications technologies and devices. Communications services are changing rapidly, and it seems that new devices and services are being rolled out daily. These new services enable the transfer of huge amounts of data, including pictures, videos, and messaging. Every day, our citizens use high-speed devices that use high-speed networks to access the Internet and go about their daily lives. Yet, most 9-1-1 calls made in Arkansas travel along analog circuits at least once before reaching an emergency telecommunicator. In addition, the current E9-1-1 system in place has limited messaging capability (query and response) and limited data content. The system is further constrained by the limited capabilities of PSAP call-taking and dispatch equipment.

In 2009, Congress and the FCC mandated that all television stations were required to make the switch to exclusively broadcast television signal in digital form. The benefit was television with better picture, sound quality, and multiple channels of programming. The same thing is happening now with 9-1-1 technologies. The network providers are converting to Internet Protocol (IP) technologies, requiring Arkansas' 9-1-1 systems to convert as well.

The explosive growth in technology is forcing 9-1-1 authorities and PSAPs to change the way they operate in order to provide equivalent service to consumers. To support these trends, the 9-1-1 platform must enable new communications devices to access Emergency 9-1-1 service. Delivering additional data on a 9-1-1 call requires a digital network to provide the speed and data capacity, i.e. bandwidth, to route the 9-1-1 call and location data to the appropriate PSAP. The current analog system must be replaced with a system that will route all 9-1-1 calls directly to an IP-based network.

3.4 Economics

3.4.1 Current Funding for 9-1-1 Service

Arkansas Code §12-10-318 took effect in 2010 and established a monthly surcharge for wireless, VoIP, and non-traditional telephone service devices in the amount of sixty-five cents (\$0.65). Providers are authorized to retain one percent (1%) of the total fees collected to offset administrative charges associated with the collection process. All remaining fees collected by service providers are remitted to the ETSB on a monthly basis.

Landline fees are remitted by service providers directly to each political subdivision on a monthly basis. Fees are assessed by each political subdivision on a per-access-line basis up to five

percent (5%) of the tariff rate. For political subdivisions with a population of less than 27,500, this amount may be increased to not more than twelve percent (12%).

In 2016, a total of \$6,694,213.28 in wireline revenue was reported to the ETSB by the PSAPs.

Arkansas Code § 12-10-326 established a 9-1-1 surcharge in the amount of \$0.65 per pre-paid transaction at the point of sale. Retailers are authorized to retain three percent (3%) of the total fees collected to offset administrative charges associated with the collection process. Retailers are required to remit the 9-1-1 surcharge collected for prepaid sales (less the three percent (3%) retained for administrative costs to DF&A each month with their remittance of their monthly sales and use taxes.

Once received by the ETSB, funds are disbursed as follows:

- Not less than eighty-three and one-half percent (83.5%) is distributed to each political subdivision operating a PSAP, based on population;
- Not more than fifteen percent (15%) is held in an interest-bearing account for the purposes of funding PSAP reimbursement requests related to upgrading, purchasing, programming, installing, and maintaining necessary data, basic 9-1-1 GIS mapping, hardware, and software, including any network elements required to supply enhanced 9-1-1 phase II cellular, voice over internet protocol, and other nontraditional telephone service;
- Not more than one-half percent (0.5%) is retained by the ETSB to offset administrative expenses.

3.4.2 Current Funding Concerns

In 2015, Arkansas PSAPs reported a total of \$50,055,078.40 in expenditures with total dedicated revenue of \$26,487,549.34. In 2016, Arkansas PSAPs reported a total of \$51,813,730.95 in expenditures and \$24,350,462.78 in dedicated revenue. Local tax dollars, meant for other purposes, are subsidizing approximately half of the operating costs each year to connect callers to life-saving emergency services.

4. The Future Environment: Next Generation 9-1-1

Much work has been done in many forums to design a 9-1-1 network and system to meet consumer expectations and improve the quality of 9-1-1 service and public safety. The plan is to use an IP-based network where 9-1-1 callers will use an IP device to access and request emergency assistance from an IP PSAP. This vision is called Next Generation 9-1-1 (NG9-1-1).

NG9-1-1 is an effort to enhance 9-1-1 capabilities by improving the hardware, software, data, and operational policies and procedures to process various types of emergency calls including non-voice (multimedia) messages; acquire and integrate additional data useful to call routing and handling; deliver calls and messages with corresponding data to the appropriate PSAP; and support data and communications needs for coordinated incident response and management.

In other words, NG9-1-1 is a secure, open-architecture (i.e., non-proprietary), and managed IP-based network to process and manage new communications devices such as voice and text messaging, data, and video. Once fully implemented NG9-1-1 will:

- Minimize operating costs;
- Reduce long-term costs;
- Facilitate 9-1-1 call handling and data sharing;
- Provide equal access for all 9-1-1 callers, including the hard-of-hearing and speech-impaired community;
- Resolve infrastructure limitations;
- Replicate the reliability and security of legacy networks;
- Improve functionality;
- Make greater use of information from outside agencies;
- Allow emergency responders to be better prepared for situations prior to arriving on the scene, potentially saving more lives;
- Provide significant benefits in disaster planning and recovery;
- Provide almost-instant backup and overflow during crises, periods of high call volume, and planned and unplanned outages;
- Support a variety of consumer devices;
- Support connectivity with outside organizations, with the ability of each PSAP to quickly change or add connections in response to emergencies;
- Provide the ability to transfer calls across PSAPs with both voice and data; and
- Provide the ability for call access and backup between and among PSAPs.

NG9-1-1 efforts in the US have been underway for approximately 10 years. A number of states have viable NG9-1-1 Systems based on an IP-based network, which is referred to as an Emergency Services Information Network (ESInet). The ESInet is the core of NG9-1-1 and is used as the transport mechanism for NG9-1-1 service delivery. The ESInet is the IP transport infrastructure upon which independent application platforms and core functional processes can be deployed. The ESInet will provide for broadband speed transmissions that will allow for the prioritized, efficient, and speedy delivery of voice, texts, videos, and pictures to 9-1-1 call-takers. This information can then be sent to responders in the field for safer and more effective field operations.

The National Emergency Number Association (“NENA”) is an ANSI-accredited Standards Developer, and is at the forefront of developing standards for emergency calling services. NENA follows the Internet Engineering Task Force (IETF) standards² and adds specific service-related features that apply to 9-1-1 service. In addition, NENA publishes 9-1-1 information documents that often contain recommended best practices.

The NENA i3 standard details the network, components, and interfaces required for NG9-1-1 service. Specifically, the term “i3 standard” generally refers to NENA Standard 08-003, *Detailed Functional and Interface Standard for NG9-1-1 (i3)*, or NENA STA 010.2-2016, *Detailed Functional and Interface Standards for the NENA i3 Solution*. This i3 Standard “...describes the ‘end state’ that has been reached after a migration from legacy Time Division Multiplex (TDM)

² The Internet Engineering Task Force (IETF) is the entity that creates and defines IP standards. The IETF also defines related protocols used on the public Internet and that may be adopted for use on private IP networks, including public safety IP networks.

circuit-switched telephony, and the legacy E9-1-1 system built to support it, to an all IP-based communication system with a corresponding IP-based Emergency Services IP network....”³

The NENA i3 Standard has the following critical underlying assumptions:

1. All calls entering the Emergency Services IP Network (ESInet) are Session Initiation Protocol (SIP)-based.
2. Access network providers operate some kind of location function for their networks.
3. All calls entering the ESInet will normally have location data in the signaling with the call.
4. The 9-1-1 authorities have converted their tabular Master Street Address Guide (MSAG) and Emergency Service Numbers (ESNs) to a GIS-based Location Validation Function (LVF) and Emergency Call Routing Function (ECRF).
5. The 9-1-1 authorities have accurate and complete GIS data, which are used to provision the LVF and ECRF. In addition, a change to the GIS system automatically updates the ECRF and LVF, which may affect routing.
6. All civic locations are validated by the access network against the LVF prior to an emergency call being placed (analogous to MSAG-validation).
7. All civic locations are periodically revalidated against the LVF to ensure that the location remains valid as the GIS system changes.
8. Legacy PSAP Gateways (LPGs) are included in the i3 architecture as the interface between i3 ESInets and legacy PSAPs, and between i3 PSAPs and legacy PSAPs.
9. Legacy Network Gateways (LNGs) are included in the i3 architecture as the interface between legacy originating networks and i3 ESInets.
10. Federal, state, and local laws, regulations, and rules are modified to support NG9-1-1 system deployment.
11. The specific protocol mechanisms, especially interworking of legacy telecom and ESInet/NGCS protocols is North-America specific and may not be applicable in other areas.

States that are moving ahead with NG9-1-1 implementations are finding that adopting a statewide approach is more affordable and provides greater interoperability than implementing on a county-by-county piecemeal approach. A statewide approach will take advantage of the economies of scale.

Arkansas is like several other states in that it does not have a state-level 9-1-1 agency or authority that is wholly responsible for the provision of 9-1-1 service. Adopting a statewide approach will allow the NG9-1-1 implementation of individual components such as mapping or databases to fit within a comprehensive plan.

³ National Emergency Number Association, *NENA STA 010.2-2016 Detailed Functional and Interface Standards for the NENA i3 Solution*, p. 15.

4.1 NG9-1-1 in Arkansas

To coordinate and transition to an NG9-1-1 environment, Arkansas needs to assign a state-level agency focused on 9-1-1 for:

- Funding management (collection and disbursement)
- Establishing standards, best practices, etc.
 - Legacy environment and systems
 - NG9-1-1 (interconnection, etc.)
 - 9-1-1 Telecommunicator training
 - Fund uses
- Strategic planning, roadmap

This agency will maintain the focus on 9-1-1 as a statewide system of systems that is interoperable and based on a consistent standard of service across the State.

4.2 Preparing for the Migration to NG9-1-1

There are two primary areas in NG9-1-1 that will generate costs: the ESInet and the NG9-1-1 Core Functions.

ESInet Service Costs	NG9-1-1 Core Function Service Costs
Physical connections	Logical internetwork functions
Routers/switches/firewalls	Routing and Location
Interconnections	Functional elements
Redundant and diverse paths	Network addressing and timing
Security	Logical routs, normalization, shaping
Bandwidth and capacity	Security
	Reporting and logging

Providing public safety services in a NG environment requires a physical connection to the network. 127 PSAPs (primary and secondary) in Arkansas today would require 127 end-point connections to any new NG9-1-1 network in the State.

For comparison purposes, we will use similar known and published costs for the IN9-1-1 system in Indiana, which has 96 end points and provides similar services to those that would be considered in Arkansas.

State of Indiana NG9-1-1 Contract (2015)	Arkansas
Total connections	96
2015 Population	6.6M
Total Square Miles	35,826
Total NG9-1-1 Cost	\$14,500,000
Total Monthly Recurring	\$1,208,333
NG cost per connection	\$12,587

Network costs are comparable to a point. More land mass in AR versus IN will have an impact on overall network and connectivity costs. Network and connectivity costs are driven by geographic

distance and availability, therefore total network costs should be higher as an overall percentage in AR than IN due to larger overall land mass and distances to cover between connection points (i.e. PSAPs).

Population per square mile is higher in IN than in AR. System sizing, capacities, design and operation would be similar between both states but fewer costs may result from a lower population in AR. An example may be costs for equipment that aren't necessary for additional processing capacities based upon call volumes.

Based on the factors identified above, a reasonable budgetary recurring NG9-1-1 connection cost in AR may be estimated at \$15,000 per connection per month for ESInet and NG Core Services in replacement of existing network costs.

Total Connections	Cost per Connection	Total Monthly	Total Annual
127	\$15,000	\$1,905,000	\$22,860,000
110	\$15,000	\$1,650,000	\$19,800,000
100	\$15,000	\$1,500,000	\$18,000,000
90	\$15,000	\$1,350,000	\$16,200,000

While these figures represent a reasonable maximum cost for ESInet and NG9-1-1 Core Services, the State will need to assure an adequate and sustainable funding source is in place to account for the potential increase. Based on observed annual revenues from the current surcharge amount, coupled with existing expenditures identified in Section 3 of this document, action will be required by the legislature to increase the surcharge in preparation for these costs.

The amount of the surcharge increase should be based not only on the above estimates for ESInet and NG9-1-1 Core Services but also the legacy 9-1-1 system costs that are in place today that will eventually be replaced by the NG9-1-1 system. These costs include network connectivity to the Selective Routers and to the PSAPs, and ALI circuit costs. These costs cannot be specifically identified due to a lack of consistent reporting capabilities and funding rules throughout the State, which will be addressed as part of Goal 1 of this plan. In order to fully fund 127 connections (127 existing PSAPs), the wireless surcharge would have to be increased by \$0.72 to \$1.37.

It is also important to note the period of transition (18-24 months) between the current and future environments. Increased overall costs will likely result by continuing uninterrupted operations of the existing 9-1-1 system while implementing NG9-1-1. A surcharge increase or other applicable funding source will need to be established with adequate time to create a surplus sufficient to offset this 'overlap' timeframe.

5 Goals and Objectives for NG9-1-1

The transition to NG9-1-1 will not happen overnight, but will occur in phases, and will require extensive and expensive changes. The concept of a complete end-to-end NG9-1-1 system is often difficult to comprehend, which is compounded by the fact that implementation will take years and will require the co-existence of the existing legacy network. Because the existing network will have to coexist with the NG9-1-1 network, operating costs during the transition will be higher than current and long-term costs. NG9-1-1 involves shared networks, shared databases, and shared applications. Because of the interconnected nature of NG9-1-1, implementation is more complex and requires collaboration among all the stakeholders.

There are many paths for the migration from the current 9-1-1 system to NG9-1-1. Policy and governance issues cannot be addressed by individual local jurisdictions or individual 9-1-1 authorities. The most effective and efficient method to implement NG9-1-1 is to have one statewide ESInet, with oversight and management by a state 9-1-1 agency or authority. At the same time, input from and coordination among participating entities during transition is important. A state 9-1-1 agency can ensure the establishment of a collaborative framework that will enable a shared, interconnected, and interoperable system of systems to come into existence.

Statewide coordination helps improve service uniformity and quality across the entire state to every county, and will tend to reduce the costs associated with implementation of a NG9-1-1 system. Statewide coordination will help ensure the security and reliability of the ESInet. Finally, statewide coordination can focus efforts, maintain priorities, help ensure the achievement of NG9-1-1 goals in a timely manner, and help ensure that every resident in the state will have equal access to the NG9-1-1 System.

It is essential to review all statutes, rules, regulations, and tariffs related to or involving 9-1-1 service. Any changes or updates that are needed to facilitate NG9-1-1 implementation should be initiated as appropriate. For example, it is important for the state 9-1-1 agency to be authorized by statute to support all functions that are needed for the agency to implement and operate the NG9-1-1 System.

It is important for policy makers to recognize that NG9-1-1 implementation requires a statutory and regulatory framework that assures the continued availability, quality, and sustainability of 9-1-1 service throughout the state. One of the key lessons learned from past 9-1-1 implementations is the importance of statewide coordination to maintain focus and priorities for funding and support of NG9-1-1 emergency services.

9-1-1 Stakeholders in Arkansas have developed this plan as a path to achieving a sustainable NG9-1-1 environment. This will be accomplished through the appointment of a single statewide agency that has the statutory and administrative authority to develop, coordinate, and integrate the foundation for a statewide NG9-1-1 system.

This agency will facilitate the creation of standards and aim at a NG9-1-1 migration, such as the creation of statewide GIS data layers and the procurement of an ESInet. This agency will also be responsible for establishing standards, managing 9-1-1 fund disbursements, and identifying opportunities for savings.

5.1 Action Needed to Achieve the Plan's Goals and Objectives

Section 8 – Attachment 1 to this report contains a chart listing the NG9-1-1 goals described above. Included with each Section 8 goal, are specific initiatives that will result in the completion of these goals. As each initiative is completed, the chart should be updated, as well as this Plan.

5.2 Tracking Progress

This NG9-1-1 Plan is intended to establish a vision for the statewide implementation of NG9-1-1 services. Because this Plan serves as a strategic planning guide for the future, this document and Plan must remain flexible to account for unforeseen circumstances or events. This plan is intended to foster collaboration and will need to be used on an ongoing basis.

The goals established in this plan are high-level, general directions, and the objectives for achieving the goals are concise, specific, and measurable. As goals and objectives are achieved, they should be documented in this plan. In addition, any changes to this Plan should be documented per the form established in Attachment 2 of this report. Section 6 provides information on how updates should be documented.

6. Updating the Plan

Changes to the plan are documented in the following manner:

- The Plan is given a new version number following the annual review and update cycle, or following any necessary interim update. The number given at that time is a full number, e.g., 1.0, 2.0 etc.
- Any changes made to the Plan on an interim cycle are given a fractional number, e.g., 1.1 or 1.2, etc.
- The date field documents the date of that change.
- The “description of change” field documents the nature of the change and the page and/or section affected.

7. Mechanism for Initiating and Monitoring an Implementation Project

Implementation of NG9-1-1 will require a statewide agency or board that will serve as a central information center, manage funding, and promulgate rules in accordance with future 9-1-1 legislation. Coordination between PSAPs and the statewide agency will help determine best practices during implementation and initial operation of NG9-1-1. The state implementation agency will monitor progress of NG9-1-1 upgrades throughout the state.

8. Attachment 1—NG9-1-1 Plan Status Report

Goal 1					
Encompass public safety communications under one governing body.					
				Completion Date	
Initiative #	Description	Owner	Goal	Actual	
1.1	Grant a current agency the statutory and administrative authority to facilitate a statewide NG9-1-1 system. The agency will be advised by established boards and commissions and have the authority to adjust the wireless, prepaid, wireline, and voice over internet protocol surcharges as recommended by a periodically conducted independent rate/program cost analysis.				
1.2	Identify and review current 9-1-1, telephone boards, commissions, and laws to make recommendations to better align with the functions and responsibilities of a statewide NG9-1-1 system.				
1.3	Develop statewide procurement mechanisms (i.e. state contract) for system components and services.				

Goal 2					
Identify and implement changes to current funding structures to facilitate a migration to a statewide NG9-1-1 environment.					
				Completion Date	
Initiative #	Description	Owner	Goal	Actual	
2.1	Conduct a statewide review of the current 9-1-1 system to identify gaps between the current system and the desired statewide NG9-1-1 system to develop an estimated cost and timeline to bring the new system online.				

2.2	Review all funding streams to include evaluating increase in wireless surcharge in future technology.			
2.3	Define the purposes for which 9-1-1 funds can and cannot be used.			

Goal 3 Pursue the creation and maintenance of statewide GIS data layers that align with the NENA NG9-1-1 data model.				
			Completion Date	
Initiative #	Description	Owner	Goal	Actual
3.1	In coordination with local 9-1-1 authorities, create accurate PSAP boundary data where it does not currently exist.			
3.2	Identify and implement data maintenance procedures.			
3.3	Identify additional necessary GIS data layers not currently maintained statewide and implement a plan for the creation and maintenance of this data in accordance with the NENA NG9-1-1 data model.			

Goal 4 Identify opportunities for consolidation.				
			Completion Date	
Initiative #	Description	Owner	Goal	Actual
4.1	Establish and adopt a classification system based on County population and call volume.			

4.2	Establish and adopt funding guidelines based on the County classifications.			
4.3	Establish and adopt rules for compliance with statewide standards related to the funding of Counties for the operation of PSAP(s).			

Goal 5 Initiate the implementation of a statewide ESInet.				
				Completion Date
Initiative #	Description	Owner	Goal	Actual
5.1	Conduct a review of private sector and public sector organizations that can develop and implement a statewide ESInet system that is compliant with the NENA i3 standard and determine estimated costs for construction and maintenance of the system.			
5.2	Designate a current state agency to administer the statewide ESInet system.			

9. Attachment 2—Document Change History

Version	Publication Date	Description of Change
1.1	5/31/2018	Final Working Group Revision
1.0	5/1/2018	Initial Version – ICTAP Assistance Complete

10. Attachment 3—Definitions⁴

Basic 9-1-1 (landline)	An emergency telephone system that automatically connects 9-1-1 callers to a designated answering point. Call routing is determined by the originating central office only. Basic 9-1-1 may or may not support Automatic Number Identification and/or Automatic Location Identification.
Emergency Services Internet Protocol Network (ESInet)	An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core functional processes can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInet may be constructed from a mix of dedicated and shared facilities. ESInet may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks).
Enhanced 9-1-1 (landline)	A telephone system that includes network switching, database and PSAP elements capable of providing automatic location identification data, selective routing, selective transfer, fixed transfer, and a call back number. The term also includes any enhanced 9-1-1 service so designated by the Federal Communications Commission in its Report and Order in WC Docket Nos. 04-36 and 05-196, or any successor proceeding.
FirstNet	The First Responder Network Authority (FirstNet) was established by Congress in the Middle-Class Tax Relief and Job Creation Act of 2012, after a large push for the need for interoperable communications by the public safety community. FirstNet is responsible for building, operating, and maintaining the first high-speed, nationwide wireless broadband network dedicated to public safety. ⁵
Next Generation 9-1-1 (NG9-1-1)	NG9-1-1 is an Internet Protocol (IP)-based system comprised of managed Emergency Services IP networks (ESInet), functional elements (applications), and databases that replicate traditional E9-1-1 features and functions and provides additional capabilities. NG9-1-1 is designed to provide access to emergency services from all connected communications sources, and provide multimedia data capabilities for Public Safety Answering Points (PSAPs) and other emergency service organizations.
Public Safety Answering Point (PSAP)	An entity responsible for receiving 9-1-1 calls and processing those calls according to a specific operational policy.
VoIP	The FCC requires that providers of interconnected VoIP telephone services using the Public Switched Telephone Network (PSTN) meet Enhanced 9-1-1 (E9-1-1) obligations. The FCC requires VoIP providers to transmit all 9-1-1 calls, as well as a callback number and the caller's registered physical location, to the appropriate PSAP.

⁴ National Emergency Number Association (NENA), "NENA Master Glossary of 9-1-1 Terminology," NENA-ADM-000.18-2014, 07/29/2014.

⁵ First Responder Network Authority, FirstNet, <http://www.firstnet.gov/about>.

Wireless E9-1-1 Phase 1	Required by FCC Report and Order 96-264 pursuant to Notice of Proposed Rulemaking (NPRM) 94-102. The delivery of a wireless 9-1-1 call with callback number and identification of the cell-tower from which the call originated. Call routing is usually determined by cell-sector.
Wireless E9-1-1 Phase 2	Required by FCC Report and Order 96-264 pursuant to Notice of Proposed Rulemaking (NPRM) 94-102. The delivery of a wireless 9-1-1 call with Phase I requirements plus location of the caller within 125 meters 67% of the time and Selective Routing based upon those coordinates. Subsequent FCC rulings have redefined the accuracy requirements.