

**State of Nebraska
Next Generation Telephone Communications Study
(Initial Report)**

Submitted January 2014 to:

**Nebraska Public Service Commission
Lincoln, Nebraska**



MissionCriticalPartners

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EXECUTIVE SUMMARY

Mission Critical Partners, Inc. (MCP) respectfully submits this report to the State of Nebraska and Nebraska Public Service Commission (PSC). Communications technologies are in the midst of rapid and radical changes. These technologies change the way people, institutions, businesses, and governments relate and interact with one another; they also support communications among the devices we use. These changes in communications have large implications for public safety.

Information Technology (IT) is steadily changing how people do their jobs and live their lives, and this rate of change will continue to accelerate for the foreseeable future. The challenge for public safety and first response agencies is funding and the necessary leadership to evolve with the constantly changing technologies.

Nebraska currently has 76 public safety answering points (PSAPs)¹ that vary significantly in available resources. The goal of this report is to identify those resources and propose ways to fully utilize the resources to benefit the state and PSC's Next Generation 9-1-1 (NG9-1-1) efforts.

This report provides an analysis on the current status of 9-1-1 communications equipment in the state, including geographic information systems (GIS), PSAP operations, and broadband and telephone infrastructure in and available to Nebraska. The report provides an assessment of Nebraska's statutory and regulations framework. Efforts and initiatives in progress or planned in other states that may be related to or have an impact on implementation of NG9-1-1 in Nebraska are also explored. In addition, potential costs are estimated for future planning.

MCP utilized a collaborative approach to this project, meeting with PSAPs, service providers, and state agencies to gain important stakeholder input. The Nebraska PSC, especially Jeff Pursley, provided beneficial support and documentation.

This study and subsequent recommendations should allow Nebraska to move forward with implementing robust, secure regional Emergency Services Internet Protocol (IP) networks (ESInets), interconnecting to form a statewide ESInet. This implementation would assist in the delivery of next generation services to callers, PSAPs, and first responders, while offering an improved level of service to the constituents of the respective 9-1-1 jurisdictions, and the state as a whole.

Nebraska is performing this planning at an excellent time. Many of the early adopters have provided lessons learned. Enough states that have at least started NG9-1-1 initiatives for data to be reviewed at a national level. What factors appear to be common in states that are successfully leading this transition and those that are still working to get started in NG9-1-1 planning is contained in this document. What is clear is that many states are at some level of strategic planning, including states that neighbor Nebraska, at the same time some of the cost for NG9-1-1 services appears to be decreasing.

¹ Definitions may be found on page 42.



1. APPROACH

1.1. PURPOSE

The purpose of this communications study is to assess the current statewide 9-1-1 network, examine any current or planned initiatives for the implementation of NG9-1-1 and identify the key governing bodies that will need to be involved in order to implement NG9-1-1 throughout the state.

The study provides information relating to the implications, cost, and considerations of next generation emergency telephone communications in Nebraska. It includes regulatory and funding, technology and operational assessments, and recommendations for a variety of options for planning, development, phased-in deployment, interconnection, and management of ESInet and required networks.

There is generally a strong correlation between funding and legislation. Current legislative language often only addresses today's realities, and requires revision to be progressive with future technologies and inclusive of funding sources. The current regulatory and funding framework as it relates to 9-1-1 at the federal, state, and local levels, including identification of stakeholders, pending actions, and regulatory constraints, were assessed to address any necessary revisions to current legislation to provide the maximum benefit to stakeholders.

Implementing a statewide ESInet within Nebraska will offer residents and visitors to the state an improved level of service, which is an ultimate goal of NG9-1-1. Understanding the processes, requirements/standards, best practices, security and integrity of data related to 9-1-1 is paramount for determining the most efficient and cost effective manner for implementation of next generation services.

1.2. SCOPE OF WORK

MCP was contracted to conduct a study of the implications, costs and considerations of next generation emergency communications in the state of Nebraska. There were statutory requirements for this initial report in Legislative Bill 595, *Provide for a Public Service Commission study of next-generation 911*, enacted May 8, 2013:

Sec.5. (1) ... The study shall include, but not be limited to, an examination of the following issues:

(a) Examination of the current statutory and regulatory framework for the management and funding of E-911 service in Nebraska;

(b) Examination and assessment of the current system of E-911 service within Nebraska;

(c) Examination of the Federal Communications Commission's open rulemaking regarding the deployment of next-generation 911;



(d) Identification of the federal, state, and local authorities, agencies, and governing bodies whose participation and cooperation will be necessary for the implementation of next-generation 911 in Nebraska;

(e) Examination of any efforts, projects, or initiatives currently in progress or planned related to any portion of the implementation of next-generation 911 in Nebraska;

(f) Examination of the plans and efforts of other states regarding the implementation of next-generation 911; and

(g) Any other issues related to the planning and implementation of next-generation 911.²

2. METHODOLOGY

A kick-off meeting was held on September 20, 2013. It was an open meeting in the Nebraska State Capitol building. The meeting was attended by State Senators, PSC representatives, PSAP representatives, vendor representatives, telecommunications providers, and lobbyists; the invitation list was developed to invite as many vendors, public safety individuals, telecommunications providers, and lobbyists as possible. The scope of work and deliverables were reviewed during the day-long meeting, with periods set aside for questions and discussion. Individuals attended different portions of the meeting, they determined would benefit them or the entity they represented, in an in-and-out fashion at different times during the day based on the agenda provided prior to the meeting.

The study began with interviews and analysis of the current regulatory and funding framework. MCP gathered information and assessed the current statewide 9-1-1 network capabilities and operations.

2.1. INTERVIEWS

MCP worked closely with Mr. Pursley, the State's project manager, to meet with the PSAPs, service providers, and GIS service providers.

2.1.1. PSAPs

MCP contacted all 76 PSAPs in the state. In conjunction with the State GIS committee, MCP sent an on-line survey to gather PSAPs data. Appendix A contains a copy of the survey questionnaire.

If a PSAP did not initially respond, MCP reached out multiple times with both phone calls and e-mails.

Table 1 lists the PSAPS within the state.

² <http://legiscan.com/NE/text/LB595/2013>



Table 1 – Nebraska PSAPs

Nebraska PSAPs	
Alliance/ Box Butte County	Johnson County
Antelope County Sheriff's Office	Kearney County Sheriff's Office
Beatrice Communications / Gage County	Keith County 911 / Arthur, Deul, Grant, Hooker, McPherson counties
Boone County	Keya Paha
Boyd/ Holt County	Kimball County
Brown County	Knox County
Buffalo County	Lincoln-Lancaster 911
Burt County 911	Madison County
Butler County	McCook Police Department / Red Willow County
Cass County Sheriff's Office	Merrick County Sheriff
Cedar County Sheriffs 911	Mid Rivers 911
Chadron Police Department/Dawes County	Morrill County
Chase County 911	Nance County
Cherry County	Nemaha County
Cheyenne County	Norfolk Police Department / Stanton / Pierce counties
Clay County	North Platte Police Department / Lincoln County
Colfax County Communications E-911	Nuckolls County
Columbus Police Department/ Platte County	Otoe County
Cuming County 911	Perkins County
Custer County 911	Pierce County Sheriff
Dakota County LEC	Polk County
Lexington/ Dawson County / Gosper County	Region 26 Council
Dixon County Sheriff's Department	Rock County Sheriff's Office
Douglas County 911 Communications Center	Saline County
Dundy County	Sarpy County 911
Fillmore County	Saunders County
Franklin County	Scottsbluff County Communications / Banner / Sioux
Fremont Police Department 911	Seward County
Frontier County 911	Sheridan County
Furnas County Sheriff 911	Thayer County
Garden County	Thurston County
Grand Island-Hall County	Washington County
Hamilton County	Wayne Police Department
Hastings 911 Center / Adams County	York County
Hitchcock County 911 Hitchcock	City Of York Police Department
Harlan / Phelps/ City Of Holdrege	Crete Police Department
Howard County 911	Richardson County / Falls City Police Department
Jefferson County	Lexington Police Department



PSC chose 14 PSAPs to participate in on-site meetings as a representation of the state. These PSAPs are highlighted in gray in the table above. While the on-site team was gathering information for Brown County, Cherry County had some of the information required, and as such was added. During a public meeting forum in Valentine, Nebraska, representatives from Keya Paha County expressed interest and were interviewed via phone. (Both are highlighted in green in the table above.) MCP believes these 16 PSAPs represent the state of Nebraska geographically, by the size of the PSAP and the respective 9-1-1 call volume.

The remaining Nebraska PSAPs were sent multiple notices via e-mail and phone. Of the remaining 60 PSAPs, 28 responded and their data was reviewed with them by phone. These 28 are highlighted in blue in the table above.

These groups total 44 of the 76 PSAPs, approximately 58 percent. This provides a good sample for analysis.

2.1.2. Service Providers

MCP contacted 49 service providers operating in the state to determine if they offered facilities and support suitable for local, regional, and statewide ESInets. Many of the service providers were contacted via telephone and e-mail; when possible, in-person interviews were conducted. The service providers were sent or given a survey as well. This survey was the basis for the analysis of wireless coverage in the state. Twenty-seven of the service providers responded to the survey and/or phone calls. Appendix B contains a copy of this survey.

In addition to the traditional local exchange carrier (LEC) service providers, several non-traditional service providers were contacted, including public power districts; cable television providers; 4G long-term evolution (LTE) wireless service providers; a broadband satellite provider; and the Nebraska Regional Interoperable Network (NRIN), a statewide initiative.

Several smaller LEC service providers believe they are not staffed to support a public safety-grade network or that doing so would not fit their business model. Several other service providers do not have control over the outside plant their services traverse because they are leased or they do not operate any facilities.

For backup networks, several options were examined: the NRIN, hybrid fiber coax (HFC) (cable TV), 4G LTE wireless, point-to-point wireless, and satellite broadband providers.

2.1.3. GIS Services

Most of the Nebraska PSAPs, with the exception of a few of the largest counties, use one of two GIS service providers—GIS Workshop or GeoComm—for their mapping updates. The services that each County and PSAP utilize vary significantly, largely in part to the fact that the services provided are



priced separately. Most PSAPs work with the minimum services available for creating their mapping data.

3. FINDINGS – NEBRASKA STATUTORY AND REGULATORY FRAMEWORK

Responsibility for management and oversight of 9-1-1 service in Nebraska is shared between local entities and the PSC.

3.1. WIRELINE 9-1-1 SERVICE

9-1-1 service is viewed by many as a local matter. Local entities own and operate the communications centers or PSAPs that provide the interface between a caller and the emergency services that respond to a caller's request for assistance. Thus, they provide the voice to 9-1-1 service and are naturally the entity most closely associated with 9-1-1. The Emergency Telephone Communications Systems Act, or the Landline 911 Act, provides authority for governing bodies to reimburse service providers for providing 9-1-1 services and further authorizes governing bodies to impose and collect a surcharge on landline telephone service to supplement general revenue in paying for non-recurring or recurring charges for the installation, maintenance, and operation of 9-1-1 service. The Act defines a governing body as the county board, the city council of a city, the board of trustees of a village, or the board of directors of any rural or suburban fire protection district.

3.1.1. Wireline Funding

The Landline 911 Act permits governing bodies to impose a surcharge of up to \$1.00 (with the exception of Douglas County which is limited to \$.50) per telephone line or functional equivalent for the purpose of paying costs associated with the provision of enhanced 9-1-1 (E9-1-1) service. Funds generated by the surcharge are to be expended only for the purchase, installation, maintenance, and operation of telecommunications equipment and telecommunications-related services required for the provision of 9-1-1 service.

Landline surcharge revenue is remitted directly to local governing bodies by the LECs no later than 60 days after the close of a quarter. During 2012, LECs reported collecting and remitting approximately \$7.4 million in surcharges to local government bodies. Counties and municipalities have expressed concern regarding the impact of falling landline surcharge revenue on PSAP budgets. Information provided by the PSC indicates an average annual reduction of 8 percent in the number of residential access lines over the previous nine years. This is consistent with trends reported in other states. Primarily in response to budgetary pressures caused by reduced revenues, some local governing authorities have voluntarily regionalized service in varying degrees through inter-local agreements and the formation of regional authorities.



3.2. WIRELESS 9-1-1 SERVICE

Wireless 9-1-1 services are managed and overseen by the PSC, assisted by an advisory board created to advise the PSC concerning the implementation, development, administration, coordination, evaluation, and maintenance of enhanced wireless 9-1-1 services. Members of the advisory board are appointed by the governor for 3-year terms and must include a sheriff; two county officials or employees; two municipal officials or employees; one representative from the state's wireless telecommunications industry; one manager of a PSAP, not employed by a sheriff; one representative of the state's local exchange telecommunications service industry; and one member of the public. One commissioner and the state's chief information officer both sit on the advisory board as ex-officio members. The advisory board meets quarterly and makes recommendations regarding the surcharge, policies, funding requests from PSAPs, and wireless service provider grant applications.

The Enhanced Wireless 911 Services Act (Wireless 911 Act) assigns the following powers and duties to the PSC:

- Determine the amount of money to be deposited in the Enhanced Wireless 911 Fund (Fund) for the following year and set the surcharge
- Establish a mechanism for determining the level of funding available to each PSAP and wireless carrier for costs determined to be eligible by PSC
 - The PSC has adopted a permanent funding mechanism, the 911 Support Allocation Methodology (911-SAM), for wireless 9-1-1 service. The 911-SAM forecasts the future status of the Fund and assists in the allocation of annual support amounts to eligible PSAPs and wireless carriers.
- Receive, review and act on applications, including supporting documentation for compensation for allowable costs. May be limited based upon the mechanism established by PSC
- Compile and place PSAP information into its annual telecommunications report to the Legislature
- May administratively fine any person who violates the Emergency Telephone Communications Systems Act
- In consultation with the advisory board, adopt and promulgate rules and regulations necessary to carry out the Enhanced Wireless 911 Services Act

The PSC has adopted Enhanced Wireless 911 Services Rules and Regulations.

3.2.1. Wireless Funding

The Nebraska Enhanced Wireless 911 Fund was created in 2001 for the purpose of implementing wireless E9-1-1 services across the state. The Wireless 911 Act grants the PSC broad authority to carry out the Act's intent stating, "The commission shall have any powers necessary to carry out the intent and purposes of the act." However, the purpose for the program is limited to the implementation and provision of wireless E9-1-1 service as reflected in the eligible costs as defined by the PSC.



Wireless carriers are required to collect and remit a surcharge set by the commission. The surcharge may be up to seventy cents per month on all active telephone numbers or functional equivalents, except from users of wireless service whose primary place of use is in a county containing a city of the metropolitan class where the maximum surcharge is fifty cents per month.

Initially a \$.50 surcharge was collected on all active telephone numbers or functional equivalents every month from each subscriber with a billing address in Nebraska. The surcharge is reviewed and set annually. Effective January 1, 2013, the surcharge was reduced to \$.45 for each subscriber with a billing address in Nebraska. Wireless service providers remit the surcharge to the PSC 60 days after the last day of the month. PSC utilizes an on-line remittance system for the collection of the wireless 9-1-1 surcharge. For Fiscal Year (FY) 2012–13, the Wireless 911 Fund collected just over \$8.0 million. As of July 1, 2013, the balance of the Wireless 911 Fund was approximately \$16.6 million. Table 2 depicts the collections for the past five years.

Table 2 – FY Fund Collections

Fiscal Year	Amount Collected (in Millions)	Balance June 30 (in Millions)
2008–09	\$7.5	\$15.2
2009–10	\$7.0	\$14.4
2010–11	\$8.1	\$16.4
2011–12	\$8.0	\$17.5
2012–13	\$8.0	\$16.6

The Prepaid Wireless Surcharge Act (Prepaid Act) became effective July 19, 2012. Under the Prepaid Act, beginning January 1, 2013, each retail seller of prepaid wireless telecommunication services collects wireless 9-1-1 surcharges directly from the consumer at the point-of-sale. The amount of the surcharge collected per retail transaction is based on an annual determination by the Nebraska Department of Revenue.

Retail sellers are allowed to deduct and retain up to 3 percent of the surcharges collected. Amounts collected are remitted by retailers to the Department of Revenue, which remits the collected amounts, less administrative costs not to exceed 2 percent, to the State Treasurer for credit to the Wireless 911 Fund and TRS Fund. Table 3 reflects the revenue the PSC has received from prepaid wireless surcharges in 2013.



Table 3 – 2013 Prepaid Wireless Surcharges

Month	Amount
February	\$28,999.34
March	\$52,819.95
April	\$70,853.20
May	\$87,813.04
June	\$60,701.34
July	\$76,910.31
August	\$56,778.66
September	\$69,657.93

Current wireless remittance forecasts were updated to identify any effect due to the change in prepaid collection points. Results indicated a downward change to the forecast, indicating a further decrease in monthly fund remittances and the fund balance are expected.

The Wireless 911 Fund is to be used for the costs of administering the fund and for other eligible expenses as determined by the PSC with input from the Enhanced Wireless 911 Advisory Board.

For PSAPs, eligible expenses include costs for the provision of wireless E9-1-1 service related to equipment, software, GIS data, maintenance, telecommunications services, trunking, translation services, personnel, training and capital expenses. Enhanced Wireless 911 funds can only be used for the portion of expenses related to the provision of wireless E9-1-1 services. In the case of expenses that relate to the provision of both wireline and wireless 9-1-1, PSAPs can use enhanced wireless 9-1-1 funds for a percentage of the costs based upon their actual wireless 9-1-1 call volumes, filed with the PSC at the time of their annual application for funding or the PSC determined default of 55 percent, whichever is greater. In addition to the support paid directly to PSAPs, the PSC pays LEC charges on behalf of PSAPs based upon a tariffed rate per wireless subscriber.

For wireless service providers, eligible expenses include software and equipment necessary for the provision of enhanced wireless 9-1-1, database management, transportation, and facilities to carry wireless E9-1-1 calls to the selective router. Eligible expenses do not include personnel costs or the construction of towers; however, certain capital expenses related to tower equipment directly related to the provision of wireless E9-1-1 service are eligible.

The PSC sought and received an Attorney General's Opinion with respect to its jurisdiction as it relates to the implementation of NG9-1-1 as an eligible expense. The Attorney General found the PSC lacks the jurisdiction to utilize the Fund for NG9-1-1 implementation.

The PSC is assisted in its allocation of money from the Fund for annual support amounts to eligible PSAPs and wireless service providers by 911-SAM. Individual funding amounts for PSAPs are approved taking into account their allocation from the 911-SAM, deductions, and any advances for special circumstances. Individual funding amounts are also approved for wireless service providers. PSAPs and wireless service providers must submit an application for funding annually for the following



FY. The distribution of funding is released by an order entered by the PSC in May for the next funding year and outlines amounts for each PSAP and wireless service provider, as well as the amount of funding available through the Wireless Service Provider Grant Program.

Payments of annual funding amounts are made to PSAPs on a monthly basis over an 11 month period. Funding received must be used for eligible expenses incurred during that funding year and are accounted for in an annual audit filed on October 15. However, PSAPs may request alternate payment schedules to accommodate special circumstances.

The annual allocations for wireless service providers are paid no more than monthly in arrears based upon receipt of documentation filed by providers for eligible expenses incurred. Wireless service providers may request all or any portion of their annual allocation so long as documentation supporting expenditures is provided. Under no circumstances will the total payments made exceed the annual allocation.

Only one wireless service provider has applied for grant program funds to date and the grant program is being phased out over a 5-year period. Additional funding is being made available to wireless service providers through the annual allocation and the list of eligible expenses was amended to include the capital expenses that had previously been eligible for reimbursement through the grant program.

3.3. NG9-1-1 STATUTORY AND REGULATORY FRAMEWORK

In the course of preparing the February 2013 Report to Congress on the Legal and Regulatory Framework for Next Generation 911 Services, the Federal Communications Commission (FCC) sought public comment on the role of state governments in the transition to NG9-1-1.

The consensus view expressed by commenters is that state and local authorities should retain their primary role in the management and development of NG9-1-1 by PSAPs, and that general state and local oversight authority for these matters should not be supplanted by the federal government, even in light of the sweeping changes to networks and technology involved in the transition to NG9-1-1.

While there was general agreement on the importance of state and local authorities retaining their traditional PSAP oversight roles as NG9-1-1 develops, many commenters contend that the transition to NG9-1-1 will be achieved more quickly and cost-effectively where decision-making and oversight authority are focused at the state, as opposed to local, level. The National Emergency Number Association (NENA) stated that “[e]xtensive experience in the laboratory of the states has demonstrated that this type of oversight and coordination [at the state level] is most effective when undertaken by an independent body of representative stakeholders.”³ Commenters noted that about half the states have established state-level 9-1-1 boards or similar entities, and support action by Congress to increase the effectiveness of such boards and to encourage their establishment by states that have not yet done so.

³ <http://www.fcc.gov/document/legal-and-regulatory-framework-ng911-services-report-congress>, viewed January 2, 2014.



The NENA Next Generation Partner Program's Next Generation 9-1-1 Transition Policy Implementation Handbook provides an overview of the key policy, regulatory, and legislative issues that need to be considered to facilitate the transition to NG9-1-1.

According to the Handbook, although the staffing of PSAPs and handling of 9-1-1 calls (and associated emergency response) will generally remain a local function, subject primarily to local decisions, aspects of NG9-1-1 will require state-level planning and implementation coordination. For example, network and related information delivery functions will no longer be agency-specific, but will be shared by authorized emergency agencies. Such shared ESInets may be developed and managed locally or regionally, but need strong state-level leadership and coordination to ensure both operability and interoperability of state, local, and regional ESInets, and to ensure they conform to applicable policies and industry-based standards. Further, coordination with national entities to ensure statewide compliance with required standards, federal policies and the like is best accomplished when coordination occurs at the state level.

“Each state needs to have an organization, with appropriate authority, responsible for planning, coordinating and implementing the NG9-1-1 system that reflects the following:

- State-wide scope
- Coordination within the state and with adjacent states and federal authorities;
- Coordination with other emergency service functions and other relevant stakeholders involved in the development and implementation of seamless, end-to-end Next Generation emergency communication services;
- The appropriate adoption of industry-based standards, rules, policies and procedures by stakeholders necessary to support such deployment...”⁴

3.3.1. NG9-1-1 Funding

The current wireless 9-1-1 funding mechanism has produced a balance of \$16 million. Because transition will not be a flash cutover, initial stages of the implementation of NG9-1-1 could be accomplished utilizing those funding sources as operating data for NG9-1-1 is collected. It would be important that close monitoring and follow-up was done to ensure that future revenues are adequate to support and sustain NG9-1-1 service and funding legislation must allow for flexibility and the provisioning of all necessary elements for NG9-1-1.

3.4. CONCLUSION

While capable of supporting E9-1-1 service, the current statutory and regulatory framework for the management and funding of 9-1-1 services in Nebraska was not designed to support a statewide

⁴ http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_impl.pdf, page 7, viewed January 2, 2014.



NG9-1-1 system. However, it does form the basis for the development of a new framework that can support management and funding of a statewide next generation system.

4. FINDINGS – STATEWIDE 9-1-1 NETWORK CAPABILITIES

4.1. NETWORKS

There are several statewide networks in place, but each serves a specific function: education, healthcare, homeland security, land mobile radio (LMR) communications, etc. Currently roadblocks limit the use of these networks for the provision of voice services with the exception of the NRIN network (homeland security). For instance, the education network can only be used for educational purposes per the rules of the federal grant used to build it.

Currently, there are multiple networks across the state, but there is no coordinated effort for maximizing the availability of these networks and there are no statewide strategies for effectively and efficiently implementing these mixed media networks.

4.1.1. Fiber Optics

Survey results and subsequent discussions with responding service providers show a wealth of fiber optic transport exists in Nebraska, owned and operated by all sizes of LECs around the state. There is one consortium of seven incumbent local exchange carriers (ILECs) that not only coordinates the extensive network of its members, but also has inter-connection agreements with almost every LEC in the state. There are also fiber-to-the-premise (FTTP) deployments that would allow for a complete fiber optic, Ethernet-based connection to certain PSAPs. Many of these providers already provide some level of services to the PSAP(s) in their service areas. These services range from internet to delivering centralized automatic message accounting (CAMA) trunks and automatic location identification (ALI) links to their existing customer premise equipment (CPE). Most providers with an FTTP deployment have expressed a willingness to construct east-west facilities to PSAPs in order to provide physical redundancy. It was not unusual to see 1 gigabyte (GB) circuits offered to the premise and 10 GB backbone circuits offered on the transport.

4.1.2. Wireless Network

A statewide wireless network, NRIN, is being deployed to PSAPs around the state. At present, the NRIN network is a 100 MB microwave network with an effective bandwidth of 85 MB. For a backbone transport network, this is not sufficient to support a statewide NG9-1-1 network, but could be used in a backup role in an emergency.

Statewide, 4G LTE wireless coverage is expanding and is also a viable backup network for PSAPs, though there is the risk of losing towers in certain situations. LTE service offers some measure of portability and flexibility, characteristics which are especially important in the event of a disaster.



Satellite data network services, such as Hughes, are also available. Either LTE or satellite would be suitable for use with a mobile command post or communications unit.

4.1. 9-1-1 CALL ROUTING

Nebraska is served by two selective router providers: CenturyLink (former Qwest territory) and Windstream. CenturyLink operates six selective routers: Council Bluffs and Sioux City, Iowa; and Grand Island, Norfolk and Scottsbluff, Nebraska. Windstream operates one selective router in Lincoln, Nebraska.

Although ILECs across the state serve many PSAPs with CAMA trunks, ALI links, and internet/data service, the calls are routed to the selective routers and are then returned to the ILEC for transport to the PSAPs.

Wireless Phase II is currently implemented throughout most of the state; there are still a few remote areas where the PSAPs are only able to receive Phase I.

4.2. NETWORK MANAGEMENT SOLUTIONS

The Office of the Chief Information Officer (OCIO) sets network standards and guidelines, but has no rule-making authority. They perform a Network Operations Center (NOC) function for state networks, and provide performance statistics and outage reports.

5. FINDINGS – 9-1-1 OPERATIONS

As expected, 9-1-1 operations vary significantly across the state, depending on population and funding sources. Operations may be the area that is most impacted by the transition to NG9-1-1. To provide equal services to Nebraska citizens, no matter where in the state they are, the ability to understand and implement i3 services at the level of expectations documented by NENA, APCO and federal organizations will entail lots of changes in operations.

In some of the smaller PSAPs, MCP observed that 9-1-1 call handling is not the primary function of the call takers. The person receiving, handling, and dispatching calls may be a key person in jail management, bill collections, and other functions. There is concern that call handling and dispatch is tied to their jail services and if that PSAP were to be part of a consolidation effort, it could cause them to lose significant justification for their jail service.

Connectivity and 9-1-1 in-bound call services vary significantly across the state; in some remote areas in northern and eastern Nebraska, service providers do not provide reliable service or redundancy and resiliency options. There are efforts to implement fiber in some which have experienced prolonged outages. However, addressing these types of issues appears to be reactive to outages as opposed to a strategy.



In addition, some areas in the northern portion of the state appear to not have enough radio towers for triangulation of calls needed to obtain precise locations. This means that location may be within 1,700 meters or greater. This means that location of a wireless 9-1-1 call could be incorrect by over a mile, creating a high risk of loss of life..

5.1. CALL HANDLING

From the 44 PSAPs that provided information, nine vendors provide call handling solutions. Some products, such as the TCI, CS1000 and Rescue Star, are end-of-life. Emergency Call Works is gaining percentage, as all solutions have been installed in the last few years. Table 4 lists the vendor and their solution percentage of the PSAPs contacted.



Table 4 – Call Handling Vendors

9-1-1 Call Handling	
Vendor	%
Viper	26
Cassidian Pallas	16
Emergency CallWorks	13
Zetron	12
TCI	12
PlantCML Rescue Star	10
Solacom	7
Plant MAARs	2
CML1000	2

MCP found that many vendors have programs that “upgrade” the end-of-life systems by replacing everything. It is essentially a replacement of non-i3 compatible hardware and software with i3-compatible solutions. As an “upgrade,” it may be able to easier to negotiate purchasing requirements.

5.2. LOGGING RECORDERS

Call logging recorder solutions vary significantly across the state. Less than 10 percent of the PSAPs are considering upgrades or changes to their logging recorder solutions that will enable them to function in an i3 environment. Table 5 lists the vendor and their solution percentage of the PSAPs contacted.

Table 5 – Logging Recorder Vendors

Logging Recorders	
Vendor	%
Eventide	19
DSS Corporation	16
Red Box Recorders	16
NICE	12
WahITek	9
Stancil Solutions	7
OnviSource, Inc.	5
None	16

Most logging recorders will require replacement to function in an i3 solution. Some vendors have “upgrades” similar to those in 9-1-1 call handling, which requires a replacement of all components.

Of concern is some county attorneys have recommended that their county not use logging recorders, with the thought that their use increases the county’s exposure to risk of liability. A key function of 9-1-1 call logging recorders is to provide protection for those taking the calls. There are many documented



instances where callers have made claims against the way that a 9-1-1 call was handled, and the recording supported the professional manner in which the call was handled.

5.3. COMPUTER AIDED DISPATCH (CAD) SYSTEMS

CAD systems vary across the state. Approximately half of the PSAPs do not use a CAD system, relying on some form of paper recording. Table 6 lists the CAD system vendors and their solution of the PSAPs contacted.

Table 6 – CAD System Vendors

CAD	
Vendor	%
Sleuth	19
SunGuard	7
Motorola	7
A.L.E.I.R. (Automated Law Enforcement Incident Report)	5
Spillman	2
Emergency CallWorks	2
Information Technologies, Inc. (ITI)	2
Hunter ACS	2
Archonix Systems	2
Zuercher Technologies	2
None	50

5.4. MANAGEMENT INFORMATION SYSTEMS (MIS)

MIS solutions also vary across the state. It appears that some PSAPs with an MIS package lack the training or understanding required to generate reports. The primary reason many PSAPs did not provide information for the survey is that the agencies do not have an MIS solutions that tracks calls. The amount of time and effort to go through paper forms required more time than current workforces had available.

Paper documentation of calls will vary greatly in accuracy. When the logging of administrative calls was discussed, indications were that most were logged, especially “important ones.” This means that call volumes may be inaccurate.

As PSAPs move to NG9-1-1 successful use of MIS systems becomes imperative. The state of Nebraska has a couple of ways this can be addressed. One way would be to require that NG9-1-1 call handling systems meet MIS requirements for accurate and easy to use reports. Another option is for the state of Nebraska to use a software as a service (SaaS) solution such as ECATS.



6. NEBRASKA BROADBAND AND TELEPHONE INFRASTRUCTURE

The ESInet is one of three components that form the foundation of a successful NG9-1-1 deployment; the other two are clean GIS data and state-level governance and guidance. Probably the most important qualities of an ESInet are resiliency and redundancy as backup networks are critical in an ESInet deployment.

6.1. NETWORK FACILITIES AND SERVICES

Nebraska has a wealth of fiber optic transport and access facilities. NebraskaLink handles large-scale sales and service for their members' networks and has interconnection agreements with other LECs around the state. Presently, they are interconnected with all LECs operating in the state except for one. The only reason that one is not connected to the is that there has been no economic reason to do so. When or if that changes, they will interconnect. A second provider who was not connected to NebraskaLink is in the process of connecting to one of its members.

Depending on how one traces the routes, there are five or six rings overlaying the state. This number is likely to increase by the time ESInet implementation begins. There is currently access to long-haul interstate transport west to Denver, east to Chicago, and south to Kansas City. NebraskaLink can provide service to 1102 Grand, Kansas City, a carrier hotel. Additionally some service providers have interconnections with LECs in northern Kansas.

Given the extent of and interconnections between fiber optic networks in the state, the statewide ESInet design should include as much fiber as possible, not only on the transport side, but on the access side as well. Many providers have FTTP deployments using either Passive Optical Networking (PON) or Active Ethernet technology. Some offer both, using the Active Ethernet for business-class service and PON for residential. The only limitation with a fiber network is the equipment used to terminate the fiber. Depending on the equipment initially selected, upgrading from 1 GB to 10 GB may be a change of optic modules, an additional card and optics, or simply a few mouse clicks and keystrokes.

For backup networks, several options were examined: NRIN, HFC, 4G LTE wireless, point-to-point wireless broadband, and satellite broadband providers. LTE and satellite services offer some measure of portability and flexibility, characteristics which are especially important in the event of a disaster. Either would be suitable for use with a mobile command post or communications unit.

Cable TV providers typically have fairly extensive HFC networks, with a fiber backbone feeding distribution cabinets from which the coax runs to the premises. At present, the NRIN network is a 100 Megabit (Mb) microwave network, with an effective bandwidth of 85 MB. For a backbone transport network, this is not sufficient to support a statewide network, but could be used as a limited backup network in an emergency.



7. NG9-1-1 REQUIREMENTS

“NENA Baseline NG9-1-1 is a description of a basic set of features & functions that constitute a NENA Standards based Next Generation 9-1-1 solution, on the path to end-state i3 architecture. The i3 architecture components are only one aspect of NG9-1-1. There are more components that make up a complete NG9-1-1 ‘system’. As future needs are identified, overall NG9-1-1 standards will be updated.”⁵

A baseline NG9-1-1 system must include the functions of today's E9-1-1 system, which includes all network and PSAP system components, as well as capabilities beyond E9-1-1 functionality, such as the ability to support text and video. While these forms of communication may not be immediately available, baseline NG9-1-1 has the system functionality to support multi-media, perform routing, provide for call media logging, and enable PSAP/caller interactive communications.⁶

According to NENA, required components or capabilities of baseline NG9-1-1 include the following:

1. ESInets
2. GIS data creation to support NG9-1-1 validation-related databases and legacy originating services
3. Publication of authoritative NG9-1-1 validation-related databases
4. Geospatial-controlled IP software call routing functions
5. Publication of authoritative NG9-1-1 routing data for state and regional levels
6. Support for transfer of calls with accumulated call taker notes and added data, or an access key to such data, to any authorized entity interconnected by ESInets
7. Ability to interconnect with other NG9-1-1 systems and to interwork with other E9-1-1 systems
8. Support for system monitoring/logging/discrepancy reporting necessary to support troubleshooting and on-going operation and maintenance⁷

Additional information on baseline NG9-1-1 can be found at http://www.nena.org/?NG911_Baseline.

7.1. CALL HANDLING REQUIREMENTS

The state of Nebraska should, at a minimum, have requirements developed to ensure that when any upgrades or replacements are made, the PSAP or PSAP regional system can operate and interoperate to take advantage of NENA i3 functionality.

These requirements should require call handling system(s) will include Session Initiation Protocol (SIP)-based call handling equipment at the PSAPs and NG9-1-1-capable answering positions. This equipment must be capable of receiving and interpreting the data delivered with emergency calls

⁵ http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/Docs/NENA_Baseline_NG9-1-1.pdf, viewed January 2, 2014.

⁶ Ibid.

⁷ Ibid.



transported to the PSAP by the i3 services. The state of Nebraska should consider that their call handling CPE must also provide standard interfaces to the CAD system and mapping applications.

Currently, most equipment providers advise that they will include all new standards as they are developed, but many of the basic standards are already in place. The State of Nebraska will find that how those standards are defined and implemented will vary significantly. Vendors should be asked for their plans to implement NENA 54-750 *Human Machine Interface & PSAP Display Requirements*, jointly developed by NENA and the Association of Public-Safety Communications Officials, International (APCO).

7.2. LOGGING RECORDER REQUIREMENTS

Call logging recorders for i3 must have the ability to log/record SIP traffic, which most of the current logging recorder systems in Nebraska cannot perform.

7.3. INTERFACE CONNECTIVITY REQUIREMENTS

Vendors providing i3 call handling solutions should be able to easily provide information for how they incorporate NENA 04-001 *Generic Standards for E911 PSAP Equipment*. Vendors should be required to explain how they are implementing NENA 08-003 *Detailed Functional and Interface Specification for the NENA i3 Solution – Stage 3*; specific attention may be addressed toward the logging service in section 5.12.

7.4. CAD SYSTEM REQUIREMENTS

Many of the current major CAD system vendors have already been providing or working on NG9-1-1 CAD requirements. Some changes are in the interface to NG9-1-1 call handling. Legacy CAD systems have, most often, connected to the call handling solutions using RS-232. As CAD vendors move to NG9-1-1 platforms, connections utilizing IP are being offered. IP connections require security products and policies that protect both the CAD and the call handling equipment from viruses, trojans, denial of service (DoS), distributed denial of service (DDoS), and other security issues.

7.5. MIS SOLUTION REQUIREMENTS

MIS solutions should record every function in the NG9-1-1 call handling experience as an event. For example, if a call is answered by a 9-1-1 call taker, and that call is transferred, the call transfer should be an event and the MIS package should be able to provide the exact time that each call taker was active on the call for an accurate usage of each call taker's time. Most vendors have made this adjustment, but there are some exceptions.



7.6. OPERATIONS

Many PSAPs in Nebraska will be challenged to make the transition from E9-1-1 to NG9-1-1 in the area of operations. From an operations perspective, the ability to achieve the true potential of NG9-1-1 will require significant adjustment and change that will require oversight from the PSC significantly beyond what they perceive they are receiving currently.

The increased quantity of available multimedia data will enhance and expand existing call taking functions. It may also extend the time it takes to process 9-1-1 calls, increase the workload of the call taker, and significantly change the call taker's experience (e.g., seeing the incident versus hearing the incident). Revamped introductory training, as well as continuing education (retraining in some cases) for experienced staff, will be critical to the success of any NG9-1-1 implementation. Training programs, properly designed, can enable PSAP managers and supervisors to effectively prepare dispatchers and call takers to respond to the needs of an IP-enabled system, while maintaining the level of service expected by the public.

The PSAPS in the state of Nebraska will confront the challenge of managing a wider set of shared resources than is typical in the current system, enhancing and expanding capabilities while ensuring personnel, including call takers, expeditiously and correctly handle the new workload. Responsibilities will likely expand, particularly with regard to configuring and managing the NG9-1-1 system.

Currently, there is a perception from the PSAPs that the amount of communication and support by individuals with PSAP operational experience is lacking. Of importance will be clear communication plans with understood processes. The state of Nebraska has a multiple options for addressing communications.

7.7. DEAF AND HARD OF HEARING AND SPEECH-IMPAIRED

Addressing the needs of hearing and speech-impaired persons has been a foundation of NG9-1-1 strategy. On August 19, 2011, then FCC Chairman Genachowski spoke about a five-step action plan to chart the transition to NG9-1-1 services. In this meeting it was stated that Chairman Genachowski's goal was to ensure that effective emergency response is a critical element of the broadband environment. Chairman Genachowski said, "It's hard to imagine that airlines can send text messages if your flight is delayed, but you can't send a text message to 9-1-1 in an emergency. The unfortunate truth is that the capability of our emergency response communications has not kept pace with commercial innovation has not kept pace with what ordinary people now do every day with communications devices. The shift to NG9-1-1 can't be about if, but about when and how."⁸

In spite of this statement by Chairman Genachowski, these data services cannot yet be provided to 9-1-1 PSAPs.

⁸ <http://www.fcc.gov/document/genachowski-announces-plan-improve-next-generation-9-1-1>



MCP held discussions with John C. Wyvill, Executive Director, Nebraska Commission for the Deaf and Hard of Hearing. Insight was gained into the importance of Nebraska's NG9-1-1 strategy, including meeting the needs of this growing segment of the Nebraska population.

Studies show that one in every six adults has some level of hearing loss and one in three adults over the age of 60 has hearing loss. Hearing loss has many causes and may be inherited, caused by maternal rubella or complications at birth, certain infectious diseases such as meningitis, chronic ear infections, use of ototoxic drugs, exposure to excessive noise, and aging. Studies show that the number of people who are hearing-impaired, hard of hearing, or deaf is increasing at a significant rate. Some of the increase is due to "baby boomers" beginning to experience loss of hearing.

Many people with hearing loss are not open to discussing the challenges they face. Hear-it AISBL, an international non-profit and non-commercial organization, collects scientific and relevant information pertaining to hearing impairments and their human and socio-economic consequences.

"Less than half of all hearing impaired are open about their hearing loss."⁹

"Many post-9/11 military veterans have suffered injuries; often due to blast pressure and flying debris from explosive devices.

"These injuries could include missing limbs, post-traumatic stress disorder and traumatic brain injuries. Other more down-played injuries include hearing injuries and hearing loss is a common ailment among post-9/11 veterans.

"Among post-9/11-troops, 414,000 have returned home with auditory injuries, including hearing loss, tinnitus, or ringing in the ears. These hearing injuries are the most common disability among veterans."¹⁰

A person with a hearing loss may not be able to hear on the phone being used to call 9-1-1. Many people who rely on captioned telephone services do not realize that the captions will not automatically appear after dialing 9-1-1. Others never thought about the fact that even though they use text messaging to communicate, a text message cannot be sent to 9-1-1. The FCC is seeking to address these issues with NG9-1-1, which will enable the public to obtain emergency assistance by means of advanced communications technologies beyond traditional voice-centric devices. When that comes to pass, reaching 9-1-1 will be easier for all, whether it be through voice phones, text, email, or video.

Like the hearing-impaired, speech-impaired person will not necessarily share their loss, often for fear of labeling. In the same way that there are multiple reasons for hearing loss, there are many reasons why people have permanent or temporary loss of speech.

⁹ <http://www.hear-it.org/Less-than-half-of-all-hearing-impaired-are-open-about-their-hearing-loss--1>

¹⁰ <http://www.hear-it.org/Post-9-11-military-veterans-suffer-from-hearing-loss>



The results are that a person may be able to hear the phone call, but not be able to respond. An individual's speech problem may be caused from stuttering, temporary hoarseness, allergic reaction or other medical issues, to name a few.

Public service announcements may be necessary to educate the public, not just those with speech and hearing impediments, of the current inability of 9-1-1 resources to accept text messages from the public. Many people today do not realize that a text cannot yet be sent 9-1-1. The assumption often is that it can be done.

7.8. ADDITIONAL PSC STAFF

For effective communication to and from the PSAPs and the State will require additional staff members and support personnel at PSC. One of these individuals should be experienced in the current technology, NG9-1-1, and all elements required to make a transition.

A second individual will need experience in PSAP operations. As the technology person would be looking at the PSAPs from a "what" and "how" perspective, the individual who understands PSAP operations would be constantly looking at "why" PSAPs are currently being managed the way they are and communicate "why" NG9-1-1 will be of benefit to each PSAP.

Each individual will need to be in the field meeting with at least one PSAP a one week per month, in meetings that are separate from each other. Each PSAP should be visited at least three times per year by each individual.

The result will be two-fold. First, the PSAPs will have the perception that someone is listening. Secondly, information will be able to be received by the PSC in order to make necessary adjustments quickly.

7.8.1. Qualified Third-party Consultant

A single qualified third-party consultant can provide support to existing PSC staff. With people experienced in technology and operations within one entity, resources can be deployed as necessary.

7.9. GOVERNANCE STRUCTURE

The current state-level organizational structure for the management and funding of 9-1-1 services in Nebraska is capable of supporting current E9-1-1 services, but was not designed to support migration to a statewide 9-1-1 system. Yet it forms the basis for the development of a new framework that can support a statewide NG9-1-1 system. A new integrated governance structure is a "must have" if the state of Nebraska is going to transition to NG9-1-1. As NG9-1-1 deployment progresses from initial planning to fully operational status, current roles and responsibilities among all entities involved in providing 9-1-1 services will change and the current legal and regulatory environment will likely not effectively accommodate new technologies and arrangements. Planning and implementing an NG9-1-1



ESInet will require increased coordination and partnerships among government and public safety stakeholders, 9-1-1 authorities, service and equipment providers, and PSAP administrators.

As Nebraska looks at connectivity between PSAPs and regions of PSAPs for implementing NG9-1-1, structured governance and inter-relations governance processes, procedures, and policies move from being desirable to a necessity. For example, there is the potential for one location to become infected with a virus or trojan. Without structured governance and inter-relations policies, when a location requires attention, then one of the perceived strongest will make tough decisions. Going forward there is a potential for lingering feelings of dis-enfranchisement and lack of fairness that will inhibit implementation of NG9-1-1 with other entities, as a whole, working as effectively and efficiently as possible.

Pre-determined and documented policies on how a PSAP or region may be quarantined, remediation of the offending issue, and re-instatement, along with communication protocols and processes for these steps will allow the State and PSAPs to focus on solutions instead of blame. Thoughtful inter-relations policy puts the constituents of these PSAPs in the greatest possible position for their mission critical needs being addressed in a timely manner.

For connecting to other entities, some of Nebraska's governance strategy must include:

1. Governance plans
2. Detailed results-driven change management processes
3. Change Management Board
4. Change Manager

In an Information Technology Infrastructure Library (ITIL) format, the change management process is coordinated with like processes.



Figure 1 – Change Management Process

Multiple reasons support the requirement of having a strong governance plan; from a technical perspective it includes the following:

- Identification of statutory or regulatory constraints related to implementing an ESInet and the deployment of related technologies
- Establishment of policy authority to determine and oversee PSAP coordination of connectivity standards, utilization guidelines and system requirements
- Connectivity Standards – Setting of minimum technology standards for connectivity and sharing of information from one PSAP to another PSAP and from one ESInet to another ESInet
- Utilization guidelines – Defining the applications and services that can be accessed and utilized, and determining how these applications and services can be accessed and utilized
- System requirements – Defining security and other requirements for connectivity
 - Establishment of a contracting authority
 - Establishment of a procurement authority
 - Requirements for meeting Criminal Justice Information Services (CJIS) policy(s)
 - Requirements for meeting specific security policies



Inter-agency agreements must be in place for the following items:

- Emergency dispatch services
- IT Security Policy
 - Compliance requirements to connect
 - Terms, conditions, and procedures for disconnect
- CAD and CAD-related mobile applications
- LMR
- IT services
 - Hosting and co-location
 - Broadband wireless networking
 - Application development and maintenance

Such agreements would include, when appropriate, governance, funding, procurement, operational and support service level agreements (SLAs), roadmaps, etc. The group that would oversee the processes and procedures, and ensure that decisions are made using mutually beneficial methodology, would be a governance council. This council provides the important oversight elements for successful operations. Overarching areas that must be addressed include the following:

- Fairness – It will be critical for this governance council to be structured and conducted in a manner that provides fairness to all PSAPs to protect the interest of the constituents in smallest counties and equally protect the constituents of the largest counties.
- Tough Decisions – It is a matter of time before a decision will need to be made on whether to quarantine an entity, for the best of others, because of corrupted software or the entity is infected with a virus. There has to be a clear policy, processes and procedures for who will make those tough decisions, how that entity will be quarantined, what will be done to effectively address the problem, and what steps will be taken to bring that entity back on line, as soon as possible.

8. GEOGRAPHIC INFORMATION SYSTEMS (GIS)

8.1. CURRENT GIS

A high-level quality assessment on specific GIS data was performed on the data provided by the State. The GIS data used for the assessment was downloaded from the Nebraska PSC GIS Data Repository. The assessment performed a series of conformance tests with current and draft NENA standards and best practices. The street centerlines and emergency services boundaries were the primary data layers assessed.

Current NENA GIS data standards are in exhibit 22 of NENA 02-010 *Standard Data Formats for 911 Data Exchange & GIS Mapping*. Best practices were identified from NENA 71-501, *Information*



Document for Synchronizing Geographic Information System Databases with MSAG & ALI, and NENA 02-014, GIS Data Collection and Maintenance Standards.

There were 298,614 records in the road centerlines data, representing the estimated centerline of a roadway in the real world. Road centerlines are linear segments with a beginning point and an end point, called nodes. A road segment will have a beginning node and an ending node. The beginning and ending nodes are important for interpolating the estimated location for an address point.

Each road segment also has a left and right side. The left and right side of a road segment is defined relative to the beginning node. If a person were standing at the beginning node, the beginning point of the road centerline, and looking toward the end node, the left side of the street is on the same side as the person's left hand and the right side of the street is on the right hand side of the person.

Each road segment has left and right side attributes for emergency service numbers (ESNs), city, zip code, postal community, and Master Street Address Guide (MSAG) community. Each road segment also has four address ranges representing left low address, right low address, left high address, and right high address.

When an address is geocoded, the location of an address is interpolated by locating information contained in the GIS data including the street name and emergency service zone (ESZ). The four address range fields are used to derive an estimate of the address location.

The assessment indicated that the majority of the GIS road centerline data was of high quality. The road centerline assessed compliance with the NENA 02-010 standard using of a series of tests. Table 7 depicts the tests performed, the count of those records that failed the test criteria, the percentage of the failed to the total number of records, and an example of the errors detected.

Table 7 – Road Centerline Tests

Test Performed	Count	Percent of Total	Example of Error
Address Range = 0	13,077	4.38%	Zero_Range
Invalid Prefix Directional	2	0.00%	EB, WB
Street Name is blank	956	0.32%	Unnamed streets
Invalid Street Type	6,227	2.09%	91, AV
Invalid Post Directional	2,593	0.87%	Directionals (N,S,E,W) in Street Type flied
Invalid Road Classification	298,614	100.00%	Field not present in the data
Invalid One-Way	298,614	100.00%	Field not present in the data
Invalid Postal Community Left	298,614	100.00%	Field not present in the data
Invalid Postal Community Right	298,614	100.00%	Field not present in the data
Invalid ZIP Left	298,614	100.00%	Field not present in the data
Invalid ZIP Right	298,614	100.00%	Field not present in the data
Invalid MSAG Community Left	298,614	100.00%	Field not present in the data
Invalid MSAG Community Right	298,614	100.00%	Field not present in the data



Test Performed	Count	Percent of Total	Example of Error
Invalid ESN Left	15,637	5.24%	No value in Left ESN field
Invalid ESN Right	15,836	5.30%	No value in Right ESN field
County Name Left	298,614	100.00%	Field not present in the data
County Name Right	298,614	100.00%	Field not present in the data
State Left	298,614	100.00%	Field not present in the data
State Right	298,614	100.00%	Field not present in the data
Date record updated	0	0.00%	No issues
Source of data	298,614	100.00%	Field not present in the data

The “Address Range = 0” test selected all records in the road centerline data where the lower left, lower right, upper left, and upper right address ranges were all equal to zero. Slightly more than 4 percent of the total records had an address range of 0. Being able to locate the address of a 9-1-1 call or dispatching the proper emergency responders to the location of an incident depends on being able to interpolate the address from the address range data contained in the road centerline data. Certain road segments, such as entrance and exit ramps, do not require address ranges.

The road name prefix direction should be N, S, E, W, NE, NW, SE, SW, or blank. Any other characters in this field counted as an error. There was one EB and one WB in the road centerline data.

There were 932 records in the road centerline data that do not contain a street name. All streets, including entrance and exit ramps, should be named. The street type field contained 6,227 invalid entries. Street types are defined by NENA such as AVE for avenue, BLVD for boulevard and ST for street. The majority of the invalid street types in the data were due to highway numbers being incorrectly being placed in the street type field, such as 91 for Highway 91, or using the incorrect street type abbreviation, such as AV rather than AVE being used.

The street post directional field should be N, S, E, W, NE, NW, SE, SW, or blank. There were 2,593 invalid entries in this data field, the majority being street types, such as AVE or RD, being misplaced in the street post direction field.

Road centerlines are often the dividing feature between different counties, townships, municipalities, PSAPs and emergency service boundaries. Because of this, road centerline data has different attribute fields for the left and right side of a roadway.

The test indicating 100 percent error in Figure 7 is the result of these fields not being present in the road centerline data.

Road type classifications are useful for assigning different colors and line widths to the map display, so a major road looks different from a private road or a driveway on a telecommunicator’s map display. NENA recommends road types defined as Interstates, Freeway or Expressways, Minor Arterial, Major Collector, Minor Collector, Local streets and trails. Trails are restricted to non-vehicular traffic. There was no road classification in the road centerline data.



NENA standards require each road centerline contain information on the name of the county and state on each side of the road centerline. Left and right county, zip, postal community, MSAG community and state fields are missing from the road centerline data. It is vital when individual counties begin sharing GIS data with neighboring counties these fields are present in the data. The source of data field was also missing from the road centerline data. This field typically the name of the agency providing the in the data layer, which is useful for determining the contact for updated data.

The Left ESN field contained 15,637 blank values, while the Right ESN field contained 15,836 blank values. These fields are by PSAP maps displays to determine the correct ESN with which to geocode a civic address.

The date the record was updated was present in all records.

Many of the fields shown as not present in the road centerline data is relatively easy to correct. The county, state, and MSAG community information is in the MSAG databases. The postal communities and zip information is a bit more challenging to determine, but as one moves toward NG9-1-1 these data fields become increasingly more important.

The emergency services boundaries or ESZ data was also tested for conformance with NENA standards and best practices. ESZ are geographical representations of the ESNs used for selectively routing 9-1-1 calls to the proper PSAP. The ESN is defined by the PSAP authority in the MSAG. The MSAG contains address ranges, street names, communities, and other information that define each ESN. ESN and ESZ information are also associated with the correct law enforcement, fire or emergency medical services (EMS) responder to a given area.

The ESZ data was also of high quality, with only a few NENA standard fields missing from the data. Table 8 depicts the NENA 02-010 standard conformance test performed on the ESZ data layer. The test performed a count of records not meeting the test criteria, a percentage of the records not meeting the test criteria divided by the total number of records, and an example of the errors detected.

Table 8 – ESZ Tests

Test Performed	Count	Percent of Total	Example of Error
County Name Exist	994	100.00%	Not present in data
County FIPS Code Exist	0	0.00%	No issues
PSAP ID Exist	994	100.00%	Not present in data
Agency ID Exist	0	0.00%	No issues
ESN	0	0.00%	No issues
Date record updated Exist	0	0.00%	No issues
Source of Data Exist	994	100.00%	Not present in data



Several NENA fields do not exist in the data. The name of the county associated with the Federal Information Processing Standards (FIPS) code should exist in the data. The FIPS codes exist, but not the name of the county.

The PSAP ID field should be added and properly populated with the information given by the FCC Master PSAP Registry.

The source of the data field should be added to the data and properly populated with the agency or entity providing the data.

A review of the GIS data indicated that there are topology errors within the road centerline and the ESZ data. Topology errors occur when the geographical extent of a particular ESZ or municipal boundary is not congruent with adjacent boundaries. This non-congruency indicates areas of overlap or gaps within the data layer. Topology errors can be corrected by ensuring adjacent road centerlines and ESZ boundaries meet at a common point, such as a shared county boundary or an agreed to point.

NENA's draft NG9-1-1 GIS Data Model standard, expected to be published in the first quarter of 2014, is designed to meet the needs of an i3-compliant NG9-1-1 system and be backwards compatible with today's E9-1-1 systems. Within an NG9-1-1 system, the ability to validate locations and routing of an emergency call will depend on the standardization, quality, and accuracy of the GIS data being used.

8.2. NG9-1-1 GIS REQUIREMENTS

The GIS information needed for PSAP and responder jurisdictions will be a critical element in the state of Nebraska. This data will be replicated (mirrored) into the NG9-1-1 GIS data store. This data store, similar to today's GIS Data Repository, will provide updated GIS data to a Spatial Interface Function (SIF), which will convert the GIS data into a Location-to-Service Translation (LoST) data protocol. The SIF will update this LoST data into the Location Validation Function (LVF) and to the ECRF. Since this data store is providing updated data to critical NG9-1-1 components it must also be of a geographically diverse, high-availability design. The NG9-1-1 GIS system should be dedicated to the operation of the NG9-1-1 network, and should be implemented separately from other networks. The GIS data will be provisioned and used by the ECRF and LVF, both of which are LoST servers.

The GIS database system provides and updates the core databases for NG9-1-1. The GIS database system data is used for providing updated information, via the SIF, for location validation and emergency call routing functions in the NG9-1-1 system. Due to this, the GIS database and SIF should be secure, redundant, resilient and highly available. Operational processes should be in place to ensure that this GIS data is kept up to date and meets the rigorous data integrity and quality control checks required for 9-1-1 call routing and location validation.

NENA's designated core GIS data layers required for the NG9-1-1 system to perform are PSAP boundaries, authoritative service boundaries, emergency services boundaries, and road centerlines.



Emergency services boundaries and PSAP boundaries required for NG9-1-1 can be created for existing ESZ boundary data.

Recommended GIS data layers for NG9-1-1 include site structure address points, cell site and sector locations, and boundary layers for counties and municipalities. NENA does not consider address points to be a core GIS data layer for NG9-1-1 due to few entities having this GIS data layer. However, address points should be considered a core GIS data layer as they allow a more precise location than is afforded by geocoding an address using road centerline data. Other GIS data layers that are used in 911 call take and dispatch, such as hydrology and aerial imagery, do not require the high level of standardization required for the core GIS databases used in NG911 systems.

Each GIS layer used in NG9-1-1 requires the following:

- Data source field for the agency that last updated the record
- Updated date field for the last time a record within the data layer was updated
- Effective date for when the new or updated information goes into effect
- Unique feature ID for each road segment, address point or polygon within each data layer
- Country code (e.g., US) and county name (e.g., Custer County) associated with each feature

The emergency services layer also requires the following:

- Agency ID field, which will be the domain name used to uniquely identify each agency
- Route, which will identify the “route” in which to send the 911 call, such as sos.psap@city.psap.state.us
- Service name to identify the emergency service to which the call is routed, such as sos.law
- Agency VCARD field, which will contain the route to obtain the agency contact information
- Display name, which will contain the name of the service, such as York PD

9. NG9-1-1 EFFORTS AND INITIATIVES

9.1. NEBRASKA INITIATIVES

This study is a significant step by the Nebraska Legislature to implement NG9-1-1. Additionally, the PSC has undertaken two major statewide initiatives that will contribute to the implementation of NG9-1-1— the development of a statewide GIS data set and data repository, and the implementation of inter-tandem trunking.

9.1.1. GIS Data and Repository

Comprehensive, accurate, and timely GIS data for use in call routing is critical to NG9-1-1. The PSC found that development of proper GIS data and map databases or supplementation of existing map databases is necessary for Phase II services and would not be affected by possible consolidation of PSAPs. Furthermore, the PSC ordered that the development of GIS mapping databases proceed. Enhanced wireless 911 funds were used to pay for the development and maintenance of statewide GIS



data through two primary contractors; with the exception of Douglas, Lancaster, and Sarpy counties, which utilized in-house GIS staff rather than a contractor to develop and maintain the data. Counties contract with a GIS vendor for updates and maintenance of their data. Expenses related to GIS data, subject to the wireless/landline 9-1-1 call ratio, continue to be eligible expenses and can be paid using a County's allocation of enhanced wireless 911 funds. With respect to Douglas, Lancaster, and Sarpy counties, a portion of their in-house GIS personnel expenses are also eligible for funding.

Cell tower locations and coverage information are treated as proprietary information and disclosed only to the PSAPs for the purpose of providing 9-1-1 service. The remaining layers are treated as public documents.

The PSC has also approved funding for a centralized data repository for the GIS data to allow for maintenance of the data and access to the data by individual PSAPs and the PSC. The repository is maintained for the PSC by GIS Workshop, a private contractor. The PSC maintains security of the data repository through a formal access policy. All requests for access to the repository are processed accordingly and each entity is granted access through a username and password.

A PSC representative currently sits on the GIS Advisory Council. The council has been given access to all GIS data in the repository, with the exception of cell tower information.

9.1.2. Inter-tandem Trunking

Inter-tandem trunking enables the transfer of calls to another PSAP along with access to the associated caller and location data. Implementation has been completed between Council Bluffs, Iowa, to Des Moines, Iowa; Sioux City, South Dakota, to Council Bluffs, Iowa; Grand Island to Council Bluffs, Iowa; and Lincoln to Council Bluffs, Iowa. The PSC pursued and was awarded federal funding for the completion of inter-tandem trunking between Grand Island and Scottsbluff.

This project provided an increase in multiple state systems capabilities as well as the opportunity for interstate cooperation.

9.2. NEIGHBORING STATES

NG9-1-1 implementation in neighboring states varies from well underway to not planned or started. The following is a summary of progress in neighboring states.

9.2.1. Iowa

NG9-1-1 implementation is well underway in Iowa. An IP-based network is in place, provided by Iowa Communications Network (ICN), a state government network. All 119 PSAPs and the carriers have transitioned to the new network. Gateways were installed at each PSAP to convert data back to CAMA until all the PSAPs update their equipment. A contract is in place for a next generation solution



provider. Remaining work includes upgrades to PSAP equipment and improvements to GIS data. Matching state grants are available for procurement of PSAP equipment.

The contact is Barbara Vos, E911 Program Manager, Iowa Homeland Security and Emergency Management.

9.2.2. *Kansas*

Kansas is a neighboring state that Nebraska may want to observe. Like Nebraska, a significant portion of the population resides on the eastern side of the state, with the rest of the state being mostly rural. Kansas is ahead of Nebraska in that the Kansas 911 Coordinating Council has started creating strategies along with reviewing and testing proof of concept solutions since 2010.

The Kansas 911 Coordinating Council has developed an NG9-1-1 Strategic Plan as a roadmap for transitioning statewide 9-1-1 services to NG9-1-1 in fiscal years 2013–2017. The strategic plan is the result of a cooperative effort between the Coordinating Council, its stakeholders, and MCP.

The Council adopted a 2010 work plan that included oversight of a federally funded NG9-1-1 grant pilot project. On September 6, 2012, the Council accepted the final report on the results of the Federal ENHANCE 911 Grant pilot project, which involved a proof of concept implementation of NG9-1-1 with three PSAPs (one in a rural county, one in a medium-sized city and one in an urban county). The purpose of the pilot project was to identify viable approaches using existing resources that could be used to cost-effectively implement NG911 service in Kansas.

In the November of 2013, the Council Technical Sub Committee started the effort of taking their NG9-1-1 strategy and create a plan for implementation of NG9-1-1. In January 2014 the Council approved moving forward with creating a state-level ESInet backbone which will provide many of the i3 applications and services, with regional ESInets connected to that backbone.

The Council is planning on utilizing fiber already existing in Kansas for creating these ESInets. This fiber is available not only through traditional voice 9-1-1 service providers, but also other multiple carriers that can successfully carry meet the NENA i3 requirements for transporting and managing this data traffic including, Kansas Fiber Network, a consortium of 29 independent service providers. The goal is to provide equal service across the state of Kansas while being the best possible stewards of tax payer resources. The Strategic Plan is a “live” document and has been updated to support these advancements in transitioning toward NG9-1-1. Additional information concerning the Kansas 911 Coordinating Council and Kansas’ NG9-1-1 strategy can be found at <http://www.kansas911.org/>

Current Kansas effort is being invested in design, requirements and performance matrix documents for NG9-1-1 in Kansas.



Contact is Walter Way, Chairman of Kansas 911 Coordinating Council and Director of Johnson County Emergency Communications.

9.2.3. Colorado

In 2011, the Colorado 911 Resource Center contracted with MCP to conduct a study to determine options for the future transition to NG9-1-1 in Colorado. This study focused on three primary considerations:

- Technology
- Funding
- Governance

The recommendations and the next steps for Colorado were discussed at an NG9-1-1 Summit on January 30 and 31, 2012. Based on the results of that discussion, an NG9-1-1 Steering Committee was formed to further explore the options for a transition to NG9-1-1. Many of the discussions from the Steering Committee are incorporated into the Colorado State 911 Plan. In January 2013, CenturyLink presented a plan for the transition to NG9-1-1 in Colorado to the Public Utilities Commission's 911 Advisory Task Force.

In March 2013, Bandwidth presented their plan to the Task Force, and Level 3 presented its plan to the Task Force in July 2013. In July 2013, the Colorado Public Utilities Commission held an Informational Hearing on NG9-1-1.

The contact is Daryl Branson, Colorado 911 Resource Center.

9.2.4. Wyoming

Without statewide oversight, localities are taking a piecemeal approach to NG9-1-1 and the discussion is coming up on a statewide-level only tangentially and in conjunction with other projects (e.g., broadband).

A contact is Alyssa Watkins 911 Director, Teton County.

9.2.5. South Dakota

South Dakota has a 911 Master Plan. The South Dakota NG9-1-1 System will be initiated with the implementation of a statewide host-remote 9-1-1 platform. Several initial beta test PSAPs will be interconnected via IP-based facilities and systems. The beta test is intended to demonstrate the ability to form a statewide ESInet. The initial ESInet will be expanded to eventually provide all connectivity between individual PSAPs creating a fully functional statewide ESInet.

South Dakota is presently reviewing responses to an RFP for an NG9-1-1 consultant. The consultant will work with the State and the 911 Coordination Board over a period of about two years to transition to



an NG9-1-1 system. Step one is to finalize the State's 911 Master Plan, which is followed by an RFP for GIS data and maintenance system. An RFP for a centralized/hosted 9-1-1 system and CPE will be released, an RFP to transition legacy 9-1-1 networks to NG9-1-1 networks, and lastly the RFP for an NG9-1-1 ESInet.

The contact is Shawnie Rechtenbaugh, South Dakota 911 Coordinator, Department of Public Safety.

9.2.6. Missouri

Missouri has no state-level 9-1-1 focus or coordination mechanism in place.

Other States

Many of the other states are in the process of either planning or implementing Next Generation 9-1-1 services and their experiences could be of value. The National Association of State 911 Administrators (NASNA) is a non-profit organization that exists to assist state 9-1-1 administrators to enhance 9-1-1 services in their states. According to NASNA's website, the purpose of NASNA is to:

- A. Promote information sharing amongst those states with programs dedicated to implementing 9-1-1 emergency telephone systems
- B. Assist other states with resolving issues necessary to accomplish statewide implementation and maintenance
- C. Encourage the establishment of a coordination person within each state or province
- D. Identify and recommend minimum standards for 9-1-1 emergency telephone systems
- E. Identify and recommend appropriate legislation or rules concerning the administration of statewide 9-1-1 telephone system programs
- F. Serve as a knowledge resource for fulfilling the purposes described in this section
- G. Provide for membership in this Association in accordance with the language and intent of its Bylaws, which are now, and may later be, in effect. Membership shall not be limited other than by classification and good character, and shall have such rights and privileges by classifications as may be provided from time to time.

The Association holds two meetings per year in which members report the latest activities in their states and hear from national –level leaders on topics of interest. Active participation in by a designated NG911 program manager from Nebraska would provide ongoing direct access to useful information on NG9-1-1 implementation from the other states

9.3. LEGISLATIVE EFFORTS

Across the country, States are beginning to review statutes regarding networks that can carry 9-1-1 communications. Reasons for States to review legislation are often based on providing risk avoidance



and risk reductions, which include states such as Indiana; Vermont, which is using an Intrado-provided network; and Maine, which is using a FairPoint-provided network. Alabama with their Next Generation Emergency Network (ANGEN) is interesting in that they use the company Bandwidth to work with the Alabama Super Computer Authority to provide and manage services. These states perceive that they can provide more redundant and resilient networks by review and modification of statutes such that Voice over IP (VoIP) is recognized as an application; in NG9-1-1 that application is handled by SIP and is essentially data.

Indiana made the transition over several years. As one of the country's first, INdigital built a network for the state to handle wireless calls within Indiana. This solution demonstrated greater network reliability and redundancy than what was previously available. Time is critical when handling 9-1-1 calls, and INdigital's solution demonstrated quicker call setup. These enhancements were implemented while providing a four-fold cost reduction to the state's constituents. Partially based on the success of superior handling of wireless calls, statutes were changed in Indiana to allow INdigital to handle wireline calls.

The 9-1-1 system is designed to take information from general users and get that information to the correct entity. This is best accomplished in an environment that involves cooperation and communication between all parties.

At a national level, the draft report for National 9-1-1 Assessment Guidelines, dated June 2012, prepared for the U.S. Department of Transportation through the National 911 Program, does not have specific statutory or regulatory recommendations, but does provide guidance. Guideline SR15, for example, says that the statutory/regulatory environment should require all service providers, both originating and access, in a respective state that provide services to general users of telecommunications services to coordinate and cooperate with the State in the provision of 9-1-1 services. A registration process is recommended.

The State needs to understand various service providers and their respective capabilities to help integrate these services into the 9-1-1 system and to educate the public on the services' capabilities.

10. PARTICIPATION AND COOPERATION

10.1. FEDERAL

At the national level, Congress has expressed an interest in 9-1-1 services and passed legislation to advance 9-1-1 and NG9-1-1 services, as briefly summarized below. However, there is no single federal department or agency with single or ultimate authority for 9-1-1 governance and oversight. There are multiple agencies that address issues across the continuum of emergency communications: 1) caller access, 2) 9-1-1 services, and 3) emergency responders. The FCC exerts its regulatory authority over telecommunications providers who provide 9-1-1 services, but has no authority over state and local jurisdictions who implement that service and no authority for regulating PSAPs. The National 911



Program, housed within the U.S. Department of Transportation (DOT) is charged with facilitating coordination among public and private sector 9-1-1 stakeholders at the local, state, and federal levels, but has no jurisdiction to mandate policy. A number of federal agencies address other issues of federal interest, including the National Telecommunications and Information Administration (NTIA) at the U.S. Department of Commerce (DOC), and the U.S. Department of Justice, to name just a few.

10.1.1. *Americans with Disabilities Act (ADA)*

In 1990, Congress enacted the Americans with Disabilities Act (ADA), which, in part, prohibits state and local governmental programs from discriminating on the basis of disability. Legislative reports accompanying the ADA interpreted this prohibition, contained in Title II of the statute, to require that local governments “ensure that [their] telephone emergency number systems are equipped with technology that will give hearing impaired and speech impaired individuals a direct line to these emergency services.” While this mandate has initially required the installation of teletypewriter (TTY) capabilities by PSAPs, Congress made clear that “future technological advances – such as speech to text services – may offer other means of affording direct and equally effective access for these individuals.”

10.1.2. *ENHANCE 911 Act*

Congress enacted the Ensuring Needed Help Arrives Near Callers Employing 911 Act (ENHANCE 911 Act) in 2004. The act addressed numerous concerns that had been raised about 9-1-1 deployment, including compliance, coverage in rural areas, and the use of fees levied by states and localities to cover 9-1-1 service costs. The ENHANCE 911 Act also created the E9-1-1 Implementation Coordination Office (ICO), an office jointly administered by NTIA and the National Highway Traffic Safety Administration (NHTSA), to assist and coordinate with state and local 9-1-1 authorities in the development of 9-1-1 and E9-1-1 and to administer a grant program for the implementation and operation of Phase II E9-1-1 services and NG9-1-1 services. ICO helps to coordinate the efforts of states, technology providers, public safety officials, 9-1-1 professionals and other groups, and seeks to ensure a smooth, reliable and cost-effective transition to 9-1-1 systems that takes advantage of new communications technologies to enhance public safety nationwide.

10.1.3. *NET 911 Improvement Act*

In 2008, Congress enacted the New and Emerging Technologies 911 Improvement Act (NET 911 Act). The NET 911 Act confirmed the PSC’s authority to regulate the provision of 9-1-1 by VoIP service providers and took other steps to improve the delivery of 9-1-1 services nationwide. The key provisions of the NET 911 Act are as follows:

- Required VoIP providers to provide 9-1-1 and E9-1-1 in compliance with existing FCC regulations at the time of passage of the act or as modified in the future.
- Provided for equal access for VoIP providers to communications networks needed to complete 911 calls.



- Extended state liability protection for 9-1-1 and E9-1-1 to VoIP providers and other emergency service providers.
- Directed the ICO to develop a national migration plan for transition of 9-1-1 to an IP-enabled 9-1-1 network.
- Protected the rights of states and other political subdivisions to levy fees on 9-1-1 services.
- Required the FCC to report annually on collection of state fees and other levies on 9-1-1 and E9-1-1 services.

10.1.4. *Twenty-First Century Communications and Video Accessibility Act*

In October 2010, Congress enacted the Twenty-First Century Communications and Video Accessibility Act. Not later than one year after the date of the enactment of this Act, the FCC, in coordination with the Secretary of Homeland Security, the Administrator of NHTSA, and the Office, were to prepare and submit a report to Congress that contains recommendations for the legal and statutory framework for NG9-1-1 services, consistent with recommendations in the National Broadband Plan developed by the PSC pursuant to the American Recovery and Reinvestment Act of 2009, including the following:

- A legal and regulatory framework for the development of NG9-1-1 services and the transition from legacy 9-1-1 to NG9-1-1 networks.
- Legal mechanisms to ensure efficient and accurate transmission of 9-1-1 caller information to emergency response agencies.
- Recommendations for removing jurisdictional barriers and inconsistent legacy regulations including:
 - Proposals that would require States to remove regulatory roadblocks to NG9-1-1 services development, while recognizing existing State authority over 9-1-1 services;
 - Eliminating outdated 9-1-1 regulations at the Federal level; and
 - Preempting inconsistent State regulations

10.1.5. *FCC*

In October 1999, the Wireless Communications and Public Safety Act of 1999 (911 Act) took effect with the purpose of improving public safety by encouraging and facilitating the prompt deployment of a nationwide, seamless communications infrastructure for emergency services. One provision of the 911 Act directs the FCC to make 911 the universal emergency number for all telephone services.

In recent years, the FCC has taken steps to facilitate the transition to NG9-1-1. In the National Broadband Plan, the FCC made several recommendations to “bridge the gap” to NG9-1-1. In order to encourage innovation in the development and deployment of Next Generation 911 (NG 911) networks and emergency alert systems, those recommendations included:

- The National Highway Traffic Safety Administration (NHTSA) should prepare a report to identify the costs of deploying a nationwide NG 911 system and recommend that Congress consider providing public funding.
- Congress should consider enacting a federal regulatory framework.
- The FCC should address IP-based communications devices, applications and services.



- The FCC should launch comprehensive next-generation alert system inquiry.
- The Executive Branch should clarify agency roles on the implementation and maintenance of a next-generation alert and warning system.¹¹

In December 2010, following up on the National Broadband Plan recommendation to “address IP-based NG9-1-1 communications devices, applications, and services, the FCC issued a Notice of Inquiry on facilitating the transition to NG9-1-1, exploring issues of federal oversight or governance of state deployments of NG9-1-1, improving the accuracy of technologies that supply PSAPs with critical location data, as well as near-term and long-term solutions for providing consumers the ability to send text messages to 9-1-1.

In August 2011, then FCC Chairman Genachowski announced a five-step action plan for accelerating NG9-1-1 deployment. Among other things, the Chairman’s plan called for the FCC to initiate rulemaking proceedings on NG9-1-1 location accuracy and enabling the public to transmit emergency communications to PSAPs via text, data, and video in addition to voice. The FCC has subsequently initiated rulemaking proceedings in both areas. The plan also called for the FCC to work with “state 911 authorities, other Federal agencies, and other governing entities” to provide technical expertise and develop a coordinated approach to NG9-1-1 governance.

In December 2012, as part of its rulemaking proceeding on communicating with PSAPs via text, data, and video, the FCC adopted a Further Notice of Proposed Rulemaking in which it proposed to require all wireless carriers and providers of “interconnected” text messaging applications to enable their customers to send text messages to 9-1-1 in areas where PSAPs are also prepared to receive the texts. The Further Notice reflected a voluntary commitment by the four largest wireless carriers – Sprint, AT&T, Verizon, and T-Mobile – to support text messaging to 9-1-1 to text-capable PSAPs by May 15, 2014.

On November 18, 2013, the FCC’s Public Safety and Homeland Security Bureau (Bureau) hosted a public workshop to discuss recent developments in the use of wireless technology to contact emergency services. The workshop explored current trends that may be affecting the provision and quality of 9-1-1 location information delivered to PSAPs, including the increased volume of wireless 9-1-1 calls and the increase in wireless calls originating from indoor locations. The issues raised at the workshop should lead to further rulemaking and the FCC is expected to consider proposed rules in the spring of 2014.

On December 12, 2013, the FCC issued new rules to improve 9-1-1 reliability as a result of the derecho, severe storms, last year that disrupted service to millions. In general, the FCC chose not to impose very strict rules on the telecommunications service providers (phone companies), but rather allow them to “self certify” that they had reliable, diverse networks. Some new requirements have been imposed to ensure that critical circuits follow diverse routes, and that those routes are checked

¹¹ Federal Communications Commission, **Connecting America: The National Broadband Plan** (2010), Chapter 16 PUBLIC SAFETY



annually. However, the FCC is not convinced that NG9-1-1 networks should be part of the new rules. “...we are not persuaded that NG911 technologies have evolved to the point that reliability certification rules should apply to entities beyond those that offer core services functionally equivalent to current 911 and E911 capabilities.”

The FCC has established a Technology Transitions Policy Task Force to examine issues associated with the transition from legacy circuit-switched networks to fully IP-enabled networks. The task force made a presentation at the December 12, 2013, meeting and while their efforts appear to focus on the impact of technology transitions on consumers through diverse experiments and open-data initiatives, they are considering a NG9-1-1 trial that would take place in areas where public safety authorities are transitioning or have taken initial steps to prepare for transition of their legacy systems to NG9-1-1 and where providers, including landline, wireless, and interconnected VoIP, are able to deliver VoIP-based 9-1-1 calls (and potentially other IP-based traffic) to an ESI-net, either “natively” or, if necessary, initially through LNGs. The task force is a cross-agency working group charged with presenting an Order to the FCC at its January Open Meeting.

The recent appointment of a new FCC Chairman, Tom Wheeler, will probably result in some realignment and reprioritization of the efforts of the FCC to facilitate the transition to NG9-1-1.

10.1.6. *National 911 Program Office*

Congress formed the National 911 Office because it recognized the critical importance of the 9-1-1 system in protecting public safety and security; now it is known as the National 911 Program, and is housed within the Office of Emergency Medical Services at NHTSA.

The mission of the National 911 Program is to provide federal leadership in supporting and promoting optimal 9-1-1 services. It was created as a point of coordination for activities among 9-1-1 stakeholders and to provide information that can be used to improve the 9-1-1 system. This is done by developing a variety of tools and resources that can be used to plan and implement NG9-1-1.

The National 911 Program, in coordinating the efforts of states, technology providers, public safety officials, 9-1-1 professionals and other groups, seeks to ensure a smooth, reliable, and cost-effective transition to a 9-1-1 system that takes advantage of new communications technologies to enhance public safety nationwide.

The program office administered the ENHANCE 911 Act grants and has worked in cooperation with stakeholders to produce several resource documents such as the *Model State 9-1-1 Plan*, *A National Plan for Migrating to IP-Enabled 9-1-1 Systems*, *Guidelines for State NG9-1-1 Legislative Language*, and a Blue Ribbon Panel on 911 Funding report: *Current State of 9-1-1 Funding and Oversight*.

10.1.7. *NTIA*



Pursuant to Section 6210 of the Middle Class Tax Relief and Job Creation Act of 2012 (Act), the First Responder Network Authority (FirstNet) was established as an independent authority within NTIA. FirstNet is authorized to take all actions necessary to ensure the building, deployment, and operation of a nationwide public safety broadband network based on single, national network architecture.

The FirstNet Statement of Requirements (SOR) acknowledges NG9-1-1 as incorporated in the Public Safety Enterprise Network (PSEN). This is because FirstNet secondary users make emergency calls and those are delivered to a PSAP. Currently, the discussion regarding the interaction between NG9-1-1 and FirstNet services is only beginning, although an NG9-1-1 PSAP may obtain information that is forwarded on to first responders.

10.1.8. *Department of Justice*

The Department of Justice (Department) is considering revising the regulation implementing Title II of the ADA to address in what manner public entities that operate PSAPs should be required to make changes in telecommunication technology to reflect developments that have occurred since the publication of the Department's 1991 regulation. Under its existing Title II regulation, the Department requires that PSAPs provide direct, equal access to telephone emergency centers for individuals with disabilities who use analog text telephones (TTYs). Many individuals with disabilities now use the Internet and wireless text devices as their primary modes of telecommunications. Many PSAPs are considering and planning to transition from analog telecommunications technology to IP-enabled 9-1-1 services that will provide voice and data (text, pictures, and video) capabilities. The Department seeks information on possible revisions to the Department's regulation to ensure direct access to NG9-1-1 services for individuals with disabilities. Any action resulting from this activity could influence the timing of NG9-1-1 implementation in the states.

10.2. STATE

At the state level, the PSC is experienced in the management and oversight of a critical state-level public safety communication program. Their experience in managing wireless funding and rulemaking will be critical as the State's 9-1-1 program moves to a new age. The PSC's work in GIS and inter-tandem trunking has been productive and instructive.

The OCIO could provide a broad range of technology services that will be required to implement NG9-1-1 services. The office develops, implements, and supports the technologies employed in IP-enabled networks that are the foundational elements for NG9-1-1. Their planning and project management services, as well as information systems operations, business continuity, and disaster recovery experience could be very helpful. The OCIO has worked to create partnerships with entities both internal and external to Nebraska State Government and many of their successful projects have been made possible through collaborative efforts. The partnership with Nebraska Public Power District (NPPD), State Patrol, State Fire Marshal, and Game and Parks to establish the statewide radio system has provided them with valuable experience in public safety communications.



10.3. LOCAL

Local entities retain significant responsibility for emergency communications and response in the NG9-1-1 environment. Governing bodies should retain control over their respective 9-1-1 and emergency response functions, including call processing, and are encouraged to participate in state and regional initiatives. Local jurisdictions will also retain responsibility for managing their respective daily PSAP operations, staffing, training, and scheduling in accordance with current and future standards.

11. ESTIMATED HIGH-LEVEL COST

MCP is providing some high-level cost estimates. It is MCPs desire to provide as accurate pricing information as possible. But, there are many variables, and as more states are implementing state and regional ESInets, some of these prices, especially in areas such as i3 services are changing significantly.

11.1. NG9-1-1 CALL HANDLING

There are a lot of variables in pricing cost of NG9-1-1 call handling. The pricing shown below includes assumptions that are listed. Pricing is based on a five year transition model. Pricing does not include cost of maintenance for the NG9-1-1 call handling, as that variance will be too great, without added assumptions. Pricing does not include logging and logging interfaces, CAD, and other ancillary connectivity. Additional regionalization within Nebraska can provide cost reductions, especially after initial implementations, as cost for upgrades can be spread over multiple PSAPs.

More and more, PSAPs, regions and states are looking at NG9-1-1 as a software solution provided by service providers. Names for this can be “service provider hosted solutions” “cloud based solutions” or a form of software as a service (SaaS). Cost models show that it is approximately five years, before those cost become about equal. These service provider hosted solutions can make it easier to budget a cost per PSAP or PSAP seat, they can simplify network management. Care must be given for understanding requirements for connections to various logging systems, Computer Aided Dispatch systems, and other ancillary devices.

Capital Expenditure	1 Year	3 Year	5 Year
NG9-1-1 call handling systems purchase (estimate 52 systems replaced. 10 year 1, 22 years 2 and 3 and 20 years 4 and 5 @2.3 stations per PSAP average)	\$690,000.00	\$1,518,000.00	\$1,380,000.00
CPE Upgrades for i3, (15 systems, 7 year 1 and 8 year 2 and 3) (9 PSAPs no upgrade) which includes a majority of larger systems and hosted systems	\$154,000.00	\$176,000.00	
Total Capital Expenditure	\$844,000.00	\$1,694,000.00	\$1,380,000.00



Total Capital Cost	\$3,918,000.00
Capital Cost average per year over 5 years	\$168,800.00

11.2. NETWORK COST

Network cost can vary across the country, depending on state-level contracts that may be available. Network connections, such as T1 connectivity are typically based on two cost elements. One portion is the T1 service itself, which is usually a flat rate. The other is a charge based on distance, and can vary significantly. To meet NENA standards for resilience and reliability, it is recommended that these circuits be managed circuits, with strong service level agreements (SLAs).

Local Exchange Carrier (LEC) pricing will vary, but MCP often sees managed T1s prices between \$1,000 per month and \$1,300 per month, from LECs. A good rule-of-thumb may be approximately \$1,150.00 per month average across the State of Nebraska, per managed circuit. It must be kept in mind that in some parts of the state, there may be some large mileage cost. And, It must be also kept in mind, that NENA, APCO, and national organizations all recommend as much redundancy and resiliency as can be afforded.

Many states have considered multiple backup network options, including LTE, microwave and other options, where there is not sufficient fiber to have redundant and resilient fiber rings.

11.3. GIS DATA

In reviewing cost that other states are expending to bring their GIS data up to NENA i3 standards, and verify that data, it is estimated that cost for Nebraska would be approximately \$2,000,000.00. The timing of this effort should be timed with implementation of networks and NG9-1-1 call handling, in that once this information is verified at NENA i3 standards; it must be maintained at that standard.

11.4. I3 COST

The cost of i3 services has changed significantly from prices we were receiving as little as two years ago. To develop more precise i3 cost Nebraska would need to determine choices such as how many replications of data will be desired and other information. But, the below pricing provides a view of expected cost ranges.

Operating Expenditure	1 Year	3 Years	5 Years
BCF Maintenance - \$362 per month	\$4,344.00	\$13,032.00	\$21,720.00
LNG Maintenance \$332 per month	\$3,984.00	\$11,952.00	\$19,920.00
ECRF Support and Maintenance \$27,004	\$324,048.00	\$972,144.00	\$1,620,240.00
LVF Support and Maintenance \$793	\$9,516.00	\$28,548.00	\$47,580.00
LoST Routing Support and Maintenance \$ 2,377	\$28,524.00	\$85,572.00	\$142,620.00
EGDBMS WFS Interface Support and Maintenance \$686	\$8,232.00	\$24,696.00	\$41,160.00



Total Operating Expenditure	\$378,648.00	\$1,135,944.00	\$1,893,240.00
Capital Expenditure	1 Year	3 Year	5 Year
BCF	\$126,473.00	\$0.00	\$0.00
LNG	\$62,532.00	\$0.00	\$0.00
ECRF	\$879,940.00	\$0.00	\$0.00
LVF	\$116,447.00	\$0.00	\$0.00
LoST Routing	\$213,075.00	\$0.00	\$0.00
EGDBMS WFS Interface	\$80,249.00		
Tier One Support Engineer	\$200,000.00		
Consultant Expense	\$225,000.00	\$0.00	\$0.00
Total Capital Expenditure	\$1,903,716.00	\$0.00	\$0.00

Total Capital Cost	\$1,903,716.00
Capital Cost average per year over 5 years	\$380,743.20

i3 Services and Routing	Cost
Operating Exp. plus 1/5 Capital Exp. Per year	\$759,391.20
Operating Exp. plus Capital Exp. Per week	\$14,603.68
Operating Exp. plus Capital Exp. Per day	\$2,080.52
Operating Exp. plus Capital Exp. Per hour	\$86.69



Definitions

Automatic Location Identification (ALI) - The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone and supplementary emergency services information of the location from which a call originates

Border Gateway Protocol (BGP) – A standardized exterior gateway protocol designed to exchange routing and reachability information between autonomous systems (AS) on the Internet. The protocol is often classified as a path vector protocol, but is sometimes also classed as a distance vector routing protocol. BGP does not use Interior Gateway Protocol (IGP) metrics, but makes routing decisions based on paths, network policies and/or rule-sets configured by a network administrator. BGP plays a key role in the overall operation of the Internet and is involved in making core routing decisions.

Centralized Automated Message Accounting (CAMA) trunks - A type of in-band analog transmission protocol that transmits telephone numbers via multi-frequency encoding. Originally designed for billing purposes. CAMA lines are used to provide 9-1-1 calls to the PSAPs.

Carrier Hotel - A type of data center where equipment, space, and bandwidth are available for rent to retail customers. Co-location facilities provide space, power, cooling, and physical security for the server, storage, and networking equipment of other firms—and connect them to a variety of telecommunications and network service providers—with a minimum of cost and complexity.

Computer Aided Dispatch (CAD) - A computer based system that aids PSAP telecommunicators by automating selected dispatching and record keeping activities.

Emergency Call Routing Function (ECRF) - A functional element in an ESInet which is a LoST protocol server where location information (either civic address or geo-coordinates) and a service URN serve as input to a mapping function that returns a URI used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency.

Emergency Service Zone (ESZ) - A geographical area that represents a unique combination of emergency service agencies (e.g., Law Enforcement, Fire and Emergency Medical Services) that are within a specified 9-1-1 governing authority's jurisdiction. An ESZ can be represented by an Emergency Service Number (ESN) to identify the ESZ.

Emergency Services IP 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. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks).



Emergency Services Routing Proxy (ESRP) - An i3 functional element that is a SIP proxy server that selects the next hop routing within the ESInet based on location and policy. There is an ESRP on the edge of the ESInet. There is usually an ESRP at the entrance to an NG9-1-1 PSAP. There may be one or more intermediate ESRPs between them.

Enhanced 9-1-1 (E9-1-1) - A telephone system that includes network switching, database and PSAP premise elements capable of providing ALI 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 FCC in its Report and Order in WC Docket Nos. 04-36 and 05-196, or any successor proceeding.

Geographic Information Systems (GIS) - A computer software system that enables one to visualize geographic aspects of a body of data. It contains the ability to translate implicit geographic data (such as a street address) into an explicit map location. It has the ability to query and analyze data in order to receive the results in the form of a map. It also can be used to graphically display coordinates on a map i.e. Latitude/Longitude from a wireless 9-1-1 call.

i3 – i3 is a NENA term. The i3 solution supports end-to-end IP connectivity; gateways are used to accommodate legacy wireline and wireless origination networks that are not IP. NENA introduces the concept of ESInet, which is designed as an IP-based inter-network (network of networks) that can be shared by all public safety agencies that may be involved with an emergency. The i3 PSAP is capable of receiving IP-based signaling and media for emergency calls conformant to the i3 standard

IPv4 - A 32-bit address assigned to hosts using TCP/IP. An IP address belongs to one of five classes (A, B, C, D, or E) and is written as 4 octets separated by periods (dotted decimal format). Each address consists of a network number, an optional sub network number, and a host number. The network and sub network numbers together are used for routing, while the host number is used to address an individual host within the network or sub network.

IPv6 - is the latest revision of IP, the communications protocol that provides an identification and location system for computers on networks and routes traffic across the Internet. IPv6 was developed by the Internet Engineering Task Force (IETF) to deal with the long-anticipated problem of IPv4 address exhaustion. IPv6 is intended to replace IPv4, which still carries the vast majority of Internet traffic as of 2014.

Land Mobile Radio (LMR) – LMR service is regulated in the United States by the FCC in CFR 47 Part 90 for non-federal government wireless use between land-based mobile and fixed stations. The National Telecommunications and Information Administration (NTIA) performs similar functions for federal government spectrum users.

Legacy Network Gateway (LNG) - A signaling and media interconnection point between callers in legacy wireline/wireless originating networks and the i3 architecture, so that i3 PSAPs are able to receive emergency calls from such legacy networks.



Legacy PSAP gateway (LPG) - An NG9-1-1 functional element that provides an interface between an ESInet and an un-upgraded PSAP

Legacy Selective Router Gateway (LSRG) – Uses tandem to tandem transfers to allow ESInet originated call to terminate/transfer to selective router PSAP and selective router originated call to terminate/transfer to ESInet terminated PSAP. LSRG uses ALI with E2 to network location.

Local Exchange Carrier (LEC) - A Telecommunications Carrier (TC) under the state/local Public Utilities Act that provide local exchange telecommunications services. Also known as Incumbent Local Exchange Carriers (ILECs), Alternate Local Exchange Carriers (ALECs), Competitive Local Exchange Carriers (CLECs), Competitive Access Providers (CAPs), Certified Local Exchange Carriers (CLECs), and Local Service Providers (LSPs)

Location-to-service Translation (LoST) - A protocol that takes location information and a Service URN and returns a URI. Used generally for location-based call routing. In NG9-1-1, it is used as the protocol for the ECRF and LVF.

Location Validation Function (LVF) - Refers to the action of ensuring that a civic address can be used to discern a route to a PSAP.

Logger/Recorders - A device that records, stores and is capable of playing back all communication media within the domain to which it is assigned. Media can include, but is not limited to voice, radio, text and network elements involved with routing a 9-1-1 call. Logging recorders should have the capability to simultaneously record from several sources

Long-term Evolution (LTE) - A standard for wireless communication of high-speed data for mobile phones and data terminals. It is based on the GSM/EDGE and UMTS/HSPA network technologies, increasing the capacity and speed using a different radio interface together with core network improvements. The standard is developed by the 3GPP (3rd Generation Partnership Project) and is specified in its Release 8 document series, with minor enhancements described in Release 9.

Master Street Address Guide (MSAG) - . MSAG addresses are used to route 9-1-1 calls and for ALI display. Address recognized by public safety for the dispatch of emergency first responders. It is an absolute and unique address in that variants for directions, street spelling, street suffixes, and community names are not allowed. It is preferred that MSAG Addresses be in Civic Address format. The community name associated with this address format is assigned by the Addressing Authority in cooperation with the 9-1-1 Administrator and may or may not be the same as the community name assigned by the USPS

National Emergency Number Association (NENA) – NENA is a not-for-profit corporation established in 1982 to further the goal of “One Nation-One Number.” NENA is a networking source and promotes research, planning and training. NENA strives to educate, set standards and provide certification



programs, legislative representation and technical assistance for implementing and managing 9-1-1 systems.

Next Generation 9-1-1 (NG9-1-1) - NG9-1-1 is an IP-based system comprised of managed ESInets, 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 PSAPs and other emergency service organizations.

Open System Interconnection (OSI) - A 7-layer hierarchical reference model structure developed by the International Standards Organization for defining, specifying, and relating communications protocols; not a standard or a protocol. Layer descriptions are as follows:

- (7) Application - Provides interface with network users,
- (6) Presentation - Performs format and code conversion,
- (5) Session - Manages connections for application programs,
- (4) Transport - Ensures end-to-end delivery,
- (3) Network - Handles network addressing and routing,
- (2) Data Link - Performs local addressing and error detection
- (1) Physical - Includes physical signaling and interfaces

Point of Interconnect (POI) - The geographical location where two networks interconnect and exchange traffic.

Point of Presence (POP) - An artificial demarcation point or interface point between communicating entities.

Public Safety Answering Point (PSAP) - An entity operating under common management that receives 9-1-1 calls from a defined geographic area and processes those calls according to a specific operational policy.

Quality of Service (QoS) - As related to data transmission, a measurement of packet latency, packet loss and jitter.

Selective Router (SR) - The process in which 9-1-1 calls are routed to the proper PSAP or other designated destination, based on the caller's location information, and may also be impacted by other factors, such as time-of-day, call type, etc. Location may be provided in the form of a MSAG-valid civic address or in the form of geo-coordinates (longitude and latitude). Location may be conveyed to the system performing the selective routing function in the form of ANI or pseudo-ANI associated with a pre-loaded database record (in Legacy 9-1-1 systems) or in real time in the form of Presence Information Data Format – Location Object (PIDF-LO) (in NG9-1-1 system) or whatever forms are developed as 9-1-1 continues to evolve.



Session Border Controller (SBC) - A commonly available functional element that provides security, NAT traversal, protocol repair and other functions to VoIP signaling such as SIP. A component of a Border Control Function.

Session Initiation Protocol (SIP) - An IETF-defined protocol that defines a method for establishing multimedia sessions over the Internet. Used as the call signaling protocol in VoIP i2 and i3.

Spatial Interface Function (SIF) – The database for NG9-1-1. The primary function of SIF is to supply data for the LVF/ECRF.

T1 - T1 or T-1 is the most commonly used digital transmission service in the United States, Canada, and Japan. In these countries, it consists of 24 separate channels using pulse code modulation (PCM) signals with time-division multiplexing (TDM) at an overall rate of 1.544 million bits per second (Mbps). T1 lines originally used copper wire but now also include optical and wireless media. A T1 Outstate System has been developed for longer distances between cities. It is common for an Internet access provider to be connected to the Internet as a point-of-presence (POP) on a T1 line owned by a major telephone network. Many businesses also use T1 lines to connect to an Internet access provider.



Appendix A – PSAP Questionnaire

PSAP STATISTICS – (*Enter PSAP Name Here*)

INTRODUCTION

This document assists Mission Critical Partners (MCP) in gathering information for the State of Nebraska Next Generation Communications Study. We would ask you begin collecting this information prior to our on-site visit(s). You may not have all the requested information, but please provide what you have on this form or preferably in softcopy (Burn to a CD/DVD, thumb drive, etc.). The items below will be collected during the MCP Information Gathering visit(s) or you may email to maurahickey@mcp911.com.

1 – CALL STATS

2012 EMERGENCY LINES

Month	911 Trunks					Non 911 Trunks		
	Landline	Land Line Abandoned	Wireless	Wireless Abandoned	Inbound Other	10 Digit	10 Digit Abandoned	
January								
February								
March								
April								
May								
June								
July								
August								
September								
October								
November								
December								
TOTALS								
Grand Total	<i>911 Landline + 911 Wireless + 911 Inbound Other (i.e. VoIP)</i>							

2011 EMERGENCY LINES

	911 Trunks					Non 911 Trunks		
	Landline	Land Line Abandoned	Wireless	Wireless Abandoned	Inbound Other	10 Digit	10 Digit Abandoned	
TOTALS								
Grand Total	<i>911 Landline + 911 Wireless + 911 Inbound Other (i.e. VoIP)</i>							



2010 EMERGENCY LINES

	911 Trunks					Non 911 Trunks	
	Landline	Land Line Abandoned	Wireless	Wireless Abandoned	Inbound Other	10 Digit	10 Digit Abandoned
TOTALS							
Grand Total	<i>911 Landline + 911 Wireless + 911 Inbound Other (i.e. VoIP)</i>						

ADMINISTRATIVE LINES

YEAR	Admin Line Inbound	In-bldg Lines Inbound	Misc. Equipment Inbound	Admin Line Outbound
2012				
2011				
2010				

DISPATCHED CALLS FOR SERVICE

YEAR	Law	Fire / Rescue	EMS	Other (Animal Control, Parks, Streets...)	Officer Initiated (if not counted in Law totals)
2012					
2011					
2010					

HIGH ACTIVITY PATTERNS (i.e. Busy Day / Time) based upon Call Volume and Calls for Service

Busy Hour: _____

Busy Day of Week: _____

Busy Month of Year: _____

2 – YOUR PSAP EQUIPMENT

Please provide the information below, as well as **System Network Diagrams** when possible.

	911 System	CAD System	Logging Recorder	Radio System/Console	Time Source	Mapping System
Vendor Name						
Application(s)						
Version						
Date of Install						
Date of Latest Upgrade						



	NCIC/State Warrants	MIS System(s)	Camera(s)	Door(s)		
Vendor Name						
Application(s)						
Version						
Date of Install						
Date of Latest Upgrade						

GIS Data – Which 911 Systems in your organization use GIS data?	
Phone Mapping	
AVL	
CAD	
Other (Please Specify)	

Maintenance – Who Maintains Your - ---	
911 System	
CAD System	
Logging Recorder	
Radio System/Console	
Time Source	
Mapping System	
GIS Database	

Scheduled Replacement – Do you have any of your 911 Systems scheduled to replace? If you have it scheduled, please provide scheduled date and vendor.		
Scheduled Date	Upgrade or Replacement	Vendor
911 System		
CAD System		
Logging Recorder		
Radio System/Console		
Time Source		
Mapping System		
GIS Database		



3 – CAD Questions

Does your CAD software have map display capabilities?

- Yes
- No

If yes, then are you using these capabilities?

- Yes
- No

4 - GIS Questions

Which of the following GIS layers do you currently have and/or use in your PSAP systems?			
	Have	Use	Want
Road Centerlines			
Structure layer with assigned addresses (point or building footprints)			
Updated Postal data			
Old Postal data			
Emergency Service zone boundaries			
Zip Code boundaries			
Municipal and county boundaries			
Neighborhood and unincorporated community boundaries			
PSAP boundaries			
Response Areas/Zones			
Recently updated aerial Imagery (1-5 years old)			
Landmarks (common place names or frequent call areas that people reference)			
Railroads			
Hydrology (above ground rivers, streams, lakes, etc.)			
On-site ALI database			
MABAS Box #			
Cell towers and coverage areas			
Any Other			

Road Centerline Data – If you indicated need or desire for road centerline data		
	Partial	Complete
Road Names		
Address Ranges		
Address Points		
Linear Referencing		



Which of the following potential issues with GIS data concern you the most? (All that apply)	
	Check
Inaccuracies within you GIS data	
Lack of regular GIS data maintenance	
Lack of data standardization	
No structure address layer	
GIS data not synchronized with MSAG and ALI	
Lack of GIS staff resources	
Lack of GIS data sharing across jurisdictions	
Other	

GIS Questions – (The GIS Council wants to know who completed the GIS Section of information)

- a. If your jurisdiction has address points, where are the typically placed?
 - i. Rooftop
 - ii. Primary entry point of building
 - iii. Driveway street entrance
 - iv. Other street location
 - v. Parcel centroid
 - vi. Other (please explain)
- b. Approximately how many total address points are in your jurisdiction?
- c. Does this number include sub-addresses (apartment numbers suites, etc.)?
 - i. If yes, then how many are sub addresses?
- d. Did you use a contractor to build the address point database?
 - i. If yes, who was the contractor?
- e. What is the approximate cost for building your database?
- f. What is the status of your address point layer?
 - i. Complete
 - ii. Work in Progress
 - iii. Planned
 - iv. No plans for a Structure Address Point Layer
 - v. Other (please specify)
- g. How often are updates made to your 911 system data?
- h. If you have an address structure layer, how is it updated?
 - i. Field GPS Collection
 - ii. On-Screen “Heads-up” Digitizing
 - iii. Unsure
 - iv. Other (please specify)
- i. Who assigns new addresses to your jurisdiction?
- j. Is there an ordinance that specifies a standard process for assigning addresses and/or an address schema?
- k. Estimated percentage of completion for your structures address layer?
- l. Where does the responsibility of GIS data maintenance fall?
- m. How often is the GIS data in the 911 Mapping System normally updated?
- n. What is the level of publically available GIS data within your jurisdiction?



- o. Do you have any GIS sharing agreements (e.g. between GIS Dept. and PSAP County and City)?
 - i. We provide GIS data to neighboring PSAPs
 - ii. We received GIS data from neighboring PSAPs
 - iii. We provide and receive GIS data between neighboring PSAPs
 - iv. No exchange is occurring
 - v. Other (please specify)
- p. How often do you share updated road centerline and address points GIS data with neighboring counties/PSAPs?

5 - YOUR PSAP ORGANIZATION

Please be prepared to provide / discuss the following information:

- Funding Sources
- Organizational Chart
- Job Descriptions
- Salary Ranges
- Authorized and Current Staffing Levels
- Number of positions
- Personnel Scheduling/Software Utilized

6 - YOUR PSAP OPERATIONS

Please be prepared to provide / discuss the following information:

- Performance Measures (Communications Section specific)
- Hiring Process
- Entry Level Training Program Description and Syllabus
- Telecommunicator Certifications and Recertification's
- Pre Arrival Instruction or Protocol Systems (EMD, EFD, EPD, etc)
- Standard Operating Procedure Manual
- Description of Call Processing Methods and Practices (*may be covered in Training material*)
- Description of Dispatching Methods and Practices (*may be covered in Training material*)
- Quality Assurance Program Methods and Procedures
- Mutual/Auto Aid Agreements for Communications Centers and Response Agencies
- Continuity of Operations/Disaster Planning for Communications
 - Backup Site(s)
 - Roll Over Site
 - Make-Busy Switch
 - Tandem(s)
 - Wireline Trunks
 - Wireless Trunks
 - ALI circuits

Other duties performed by PSAP personnel (i.e. answering after hours for City/County departments, Warrants, Prisoner checks, etc.):



7 – NETWORK QUESTIONS

Please be prepared to provide and discuss the following information:

Network Questions	Response
Please provide your FCC PSAP ID number.	
Please provide the facility’s exact street address (no P.O. Box numbers).	
Is the PSAP a primary or secondary?	
If secondary, what is the Primary PSAP it is attached to?	
What area (county or other geographic area) do you serve?	
How many monitors (systems) per positions do you have in your PSAP? Please list all systems.	
Do you currently have IP (data) connectivity into your center? (Check all that apply)	
None	
T1 (1.5 Mb/s)	
T3 (45 Mb/s)	
DSL	
Fiber	
Metro Ethernet	
MPLS	
Satellite	
Other (please explain)	
What rated (nominal) speed is your data connection? (Check one)	
1.5 Mb/s or less download	
between 1.6 and 5 Mb/s	
between 5 and 10 Mb/s	
between 10 and 20 Mb/s	
more than 20 Mb/s	
What do you currently use your data connection for? (check all that apply)	
ALI	
Access to the Internet	
VoIP	
Traffic or other CCTV cameras	



Network Questions	Response
Access to public safety, law enforcement, public health or similar databases	
Other (please explain)	
Are you connected to a state or county-wide IP network? Please describe briefly.	
How do you get your ALI feed?	
Modem	
Dedicated data connection (private network)	
Internet connection	
Other (please explain)	
If you do not have data connectivity, indicate your main reason(s):	
Currently no need	
Not available in my location	
Too expensive	
I don't have a local PSAP network (LAN)	
Other (please explain)	

8 – ADDITIONAL COMMENTS

Please add any additional comments you feel are relevant for this study. You may add additional sheets as necessary.

9 – CONTACT INFORMATION FOR YOUR PSAP:

Name:
Title:
Phone:
Cell:
Email:
Physical address:



Appendix B – Wireless Service Provider Questionnaire

WIRELESS SERVICE PROVIDER DATA SHEET – (*Enter SP Name Here*)

INTRODUCTION

This document assists Mission Critical Partners (MCP) in gathering information for the State of Nebraska Next Generation Communications Study. We would ask that you begin collecting this information prior to our conference calls. You may not have all the requested information, but please provide what you have on this form. Feel free to also include any drawings, charts, and tables that might provide some additional insight into your written answers. Please return this via email to miltoschober@mcp911.com.

1 – COMPANY INFORMATION

Name:

Address 1:

City:

Phone Number:

Type of Service Provider:

Company Organization:

If Corporation, state in which incorporated:

2 – YOUR ORGANIZATION

- a. How long have you been in business?
- b. If you are not wireless only, how long have you offered wireless service?
- c. Are you a member of a consortium, or owned by another company?

3 – YOUR NETWORK & EQUIPMENT

- a. Do you currently provide both Phase 1 and Phase 2 data on 911 calls?
- b. Are there any spots in your coverage areas that do not offer Phase 2 data?
- c. Do you have any omnidirectional towers?
- d. On your sector towers, how do you location for each sector?
- e. How do you currently deliver 911 traffic to the selective router or PSAP
- f. If you don't currently deliver calls via IP, do you have plans to do so?

4 – YOUR OPERATIONS

- a. Do you have a NOC?
- b. Do you operate the NOC yourself or is it outsourced to another company?
- c. If outsourced, is that company a wholly owned subsidiary?
- d. How many field techs, network engineers, and other technical staff do you have?
- e. If your technical staff is outsourced, is the company a wholly owned subsidiary?
- f. What is the average length of employment of your technical staff?



5 – NETWORK SERVICES QUESTIONS

Please be prepared to provide and discuss the following information:

- a. What data service options do you offer (3G, 4G LTE, etc.)?
- b. Do you currently perform 911 selective routing services or simply hand the traffic off to the tandem?
- c. If so, who is your database provider?
- d. If needed can you provide coverage maps?
- e. For internet services, who are your upstream providers?
- f. What size pipe(s) do you have to your upstream providers?

6 – ADDITIONAL COMMENTS

Please add any additional comments you feel are relevant for this study. You may add additional sheets as necessary.

7 – CONTACT INFORMATION FOR YOUR COMPANY:

Name:
Title:
Phone:
Cell:
Email:
Physical address: