



Draft Report for
Next Generation 9-1-1



Prepared for
The State of Michigan

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L.R. KimballSM
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EXECUTIVE SUMMARY

CDI-Infrastructure, LLC (a Delaware Limited Liability Company) d/b/a L.R. Kimball¹ (L.R. Kimball) is pleased to provide the State of Michigan (State) the following recommendation for implementing Next Generation 9-1-1 (NG9-1-1) throughout the state of Michigan.

This report is the result of focused input from Michigan's public safety answering points (PSAPs) on the *Next Generation 9-1-1 Feasibility Study* report as presented to the SNC in December 2009. This input was received during two face-to-face meetings held in September and October 2010.

During those meetings, L.R. Kimball received further information about ongoing efforts to deploy Internet protocol (IP) enabled networks to link PSAPs within a particular region. These networks are intended, at present, to handle traditional 9-1-1 calls leaving other aspects of the legacy enhanced 9-1-1 (E9-1-1) systems in place and operating. They are a step toward NG9-1-1, but are not NG9-1-1.

As a result of these discussions, L.R. Kimball makes the following recommendations to the SNC and Michigan 9-1-1 Program staff:

- Engage a prime contractor to provide the IP backbone infrastructure to all PSAPs
- Hire a contractor to provide the NG9-1-1 services to all regional networks and PSAPs

¹ L. Robert Kimball & Associates, Inc. was recently acquired by CDI Corporation, a publicly held company, through its wholly owned subsidiary Management Recruiters, Inc. and is now known as CDI-Infrastructure, LLC d/b/a L.R. Kimball.

1. INTRODUCTION

The current 9-1-1 networks are built on antiquated technologies that are unable to keep pace with consumer adoption of mobile, IP-based communication technologies. A new 9-1-1 network is needed, and this was clearly understood as far back as 2002, when the Federal Communications Commission (FCC) commissioned Dale Hatfield to prepare a report entitled, *Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 9-1-1 Services*; and 2004, when the FCC's Network Reliability and Interoperability Council VII (NRIC VII) Focus Group 1D report entitled, "*Communication Issues for Emergency Communications Beyond E9-1-1.*" This new network is known as Next Generation 9-1-1 (NG9-1-1).

NG9-1-1 is best described as a robust, interconnected IP-based system of systems that will allow the public to use any device to request help or send information to the appropriate public safety agency.

The underlying technology is in use today in many areas of the country for a variety of business purposes, including public safety. There are many vendors that offer systems that can provide most of the functions of NG9-1-1.

In 2009, L.R. Kimball performed a NG9-1-1 feasibility study for the Michigan State 9-1-1 Committee (SNC). As a part of this study, a survey of the PSAPs was completed. The PSAPs' responses were documented in the initial report. Based on the survey and information gathered during 16 PSAP onsite visits, L.R. Kimball provided four NG9-1-1 design options and two NG9-1-1 design recommendations.

During the December 8, 2009 presentation of the *Next Generation 9-1-1 Feasibility Study* report to the SNC, several attendees shared information that local IP networks were being planned in multiple locations. They expressed concern that implementation of a statewide network might have a detrimental impact on the development of their regional networks. With that new information, the SNC determined it needed to host a venue that would provide opportunity for the PSAP community to share their issues, concerns and information that may not have been made clear to the L.R. Kimball team during the feasibility study.

2. METHODOLOGY

On behalf of the SNC, the State 9-1-1 Office scheduled two (2) engagement sessions in different locations.

The engagement sessions were designed with two goals. The first was to explain where other states are on NG9-1-1 and what has been done in Michigan to date. The second goal was to hear from the PSAPs. While the survey for the feasibility study had been done in 2009, it was clear to SNC that there was more information on local IP network activities and general concerns that needed to be heard.

On September 21, 2010 the first session was held following an SNC meeting in Lansing. Attendance exceeded registration and numbered well over 50. The participants included both the PSAP and vendor community.

On October 28, 2010, during the Michigan Association of Public Safety Communications Officials (APCO) meetings, the second engagement session was held in Frankenmuth. Attendance again exceeded the reservations and consisted of over 50 attendees from both the PSAP and vendor community.

3. FINDINGS FROM ENGAGEMENT SESSIONS

L.R. Kimball found that there are a number of IP networks in both the planning and implementation stages. All of these networks are intended to provide IP connectivity and sharing of traditional 9-1-1 information. These networks will be able to transfer calls between PSAPs with additional information. Some include the sharing of resources such as routers and Customer Premise Equipment (CPE) between the PSAPs.

It is clear that none of these networks is designed to provide full Emergency Services IP Network (ESInet) functionality at the present time. All 9-1-1 calls will be delivered to each PSAP or network from the current 9-1-1 system service provider's selective router. Nevertheless, these IP networks represent a significant step forward on the path toward NG9-1-1.

There have been planning efforts in and around Oakland County for some time. Clinton County and at least three other surrounding counties are working on a regional network to back up their 9-1-1 system. Counties in the Upper Peninsula (UP) region are working with local providers toward a regional network that will have sufficient bandwidth to accommodate other applications. It appears that 9-1-1 will be just one of the uses planned for these networks. Operational timing was not discussed.

Discussion of IP networks included:

- IP networks will be more costly than current analog networks.
- IP networks are only part of a NG9-1-1 network. They provide the path for NG9-1-1 functions to operate.
- IP networks such as Oakland County can be used to distribute calls to PSAPs, as long as criteria assuring end-to-end call delivery are met. This includes an IP management view into the networks (such as Oakland County's) to make sure call delivery and call quality issues are met.

In conclusion, these sessions provided information from the PSAP community on current network plans and concerns.

4. ANALYSIS

The engagement sessions provided a clear message from the PSAP community that many were actively involved in pursuing IP connectivity between the PSAPs in their own regions. It was very clear the PSAPs involved in establishing these IP networks wanted these networks to be beneficial to the future establishment of a statewide ESInet, since the state network would only have to connect to their IP network, not each PSAP.

During the Frankenmuth session it was explained to several of the agencies that 9-1-1 calls have to be delivered every time. In order to guarantee that a 9-1-1 call over an IP network is delivered correctly and has an acceptable call quality, that IP call management needs to be in place end-to-end to monitor that call path. This will require each regional IP network to allow a management view through their networks. This management view will enable monitoring and management of calls end-to-end—guaranteeing call delivery to the PSAPs.

The PSAP community recognizes the requirement of an IP network in the development of ESInets. What the planning process for these networks has not recognized yet is the requirements placed on these networks when interconnecting to other IP networks. Management and security policies will need to be established to interconnect

these networks to another ESInet to make sure call delivery and additional call information occur with public safety best practices.

The transportation of a 9-1-1 call over an IP network does not mean it qualifies as a NG9-1-1 network. The IP transport provided by an IP network is simply that: a transport mechanism for information. After the establishment of an IP network with service levels that can guarantee end-to-end call and data delivery, next generation services can be added to the network.

As stated in the December 2009 presentation on the feasibility study report, the minimum functional elements that should apply in the Michigan IP-Based 9-1-1 Network include:

- Call Access
- Call Routing
- Call termination

These functions reflect the minimum requirements for an IP-based 9-1-1 network. The solution must support commonly used IP-based telecommunications, messaging, image and video protocols in order to maintain interoperability with IP applications

To establish these functional elements several steps must be taken. A public safety grade IP network must be implemented with the following features:

- IP Transport
 - Bandwidth
 - Network management
 - Service levels

Then these Next Generation services are logically functions that occur on servers connected to the IP network:

- NG9-1-1 services
 - Border control function
 - Emergency communications routing function (ECRF)
 - Location validation function (LVF)
 - Legacy gateway

5. RECOMENDATIONS

5.1 IP network

L.R. Kimball recommends a prime contractor to provide the IP backbone infrastructure to all regional networks and PSAPs not served by a regional IP network. Service levels would be set by the SNC and/or the 9-1-1 Office, and meeting them would be the responsibility of the prime contractor. The state would be the customer of record for the contract, and would hold the prime contractor responsible for all issues. The prime contractor would be the single point of contact for the state for all issues with the delivery of IP communications to each PSAP in the state.

This prime contractor will be responsible for integration with all regional networks and guaranteeing service levels for end-to-end IP connectivity for delivery of 9-1-1 call information.

This prime contractor for IP connectivity will serve as an agent of the state developing a communication infrastructure meeting the needs of the regional entities while providing oversight and management at a state level.

This drawing represents logical connections associated with an IP network. The locally developed regional networks can be used as part of this network. They must however meet agreed-upon standards to guarantee end-to-end call delivery.

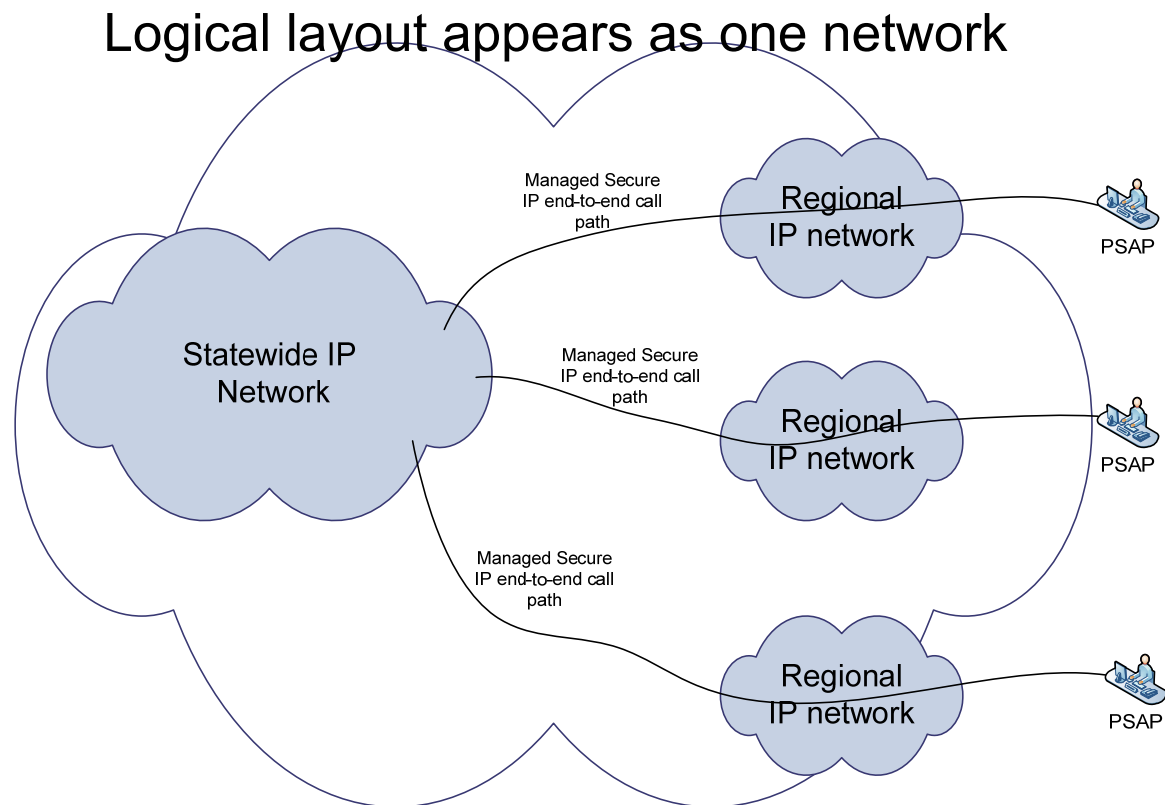


Figure 1—Logical IP Network Connections

After a secure, managed, and monitored IP network is in place NG9-1-1 services can be placed on the network. These NG9-1-1 services can be placed anywhere on the IP network, but the State should follow guidelines for resiliency and redundancy when determining locations to place the servers supporting these services.

Even though IP connectivity is established at a state level there are many NG9-1-1 services that have to occur at a local level. An example would be mapping (geographic information systems [GIS]) which may be maintained at the local level, but has to be uploaded to the State system for routing purposes. Policies and procedures regarding such will have to be developed.

L.R. Kimball believes that the costs for a State network will decrease using the existing regional networks.

In conclusion, L.R. Kimball recommends the state use the RFP process to determine the prime IP network contractor.

5.2 Next Generation Services

L.R. Kimball recommends using a contractor to provide the NG9-1-1 services to all regional networks and PSAPs. Service levels would be set by the SNC and/or the 9-1-1 Office, and meeting them would be the responsibility of the NG9-1-1 services contractor. As with the prime contractor for the IP backbone, the State would be the customer of record for the contract, and would hold the NG9-1-1 contractor responsible for all issues. The NG9-1-1 contractor would be the single point of contact for all issues with the delivery of NG9-1-1 voice and data services.

The contractor for NG9-1-1 services will be responsible for integration with all regional services and databases guaranteeing service levels for the accuracy of all data delivered to each region and PSAP. The NG9-1-1 contractor will provide redundant and resilient services with service levels meeting public safety standards.

5.3 Management of Network

Coordination between the contractor providing the IP backbone services and NG9-1-1 services is essential to the success of this project. The levels of coordination can be achieved in one of two methods. Either one of the contractors could be “prime” in charge of the other contractor providing the state with a single point of contact for issue resolution. Or, a management company could be engaged to oversee, monitor, coordinate and manage both the IP network contractor and the NG9-1-1 services contractor providing the same single point of contact to the SNC.

In review:

- An IP network needs to be established by using the RFP process. This IP network prime will coordinate with all regional networks and PSAPs.
- The State will need to use the RFP/RFI process to establish a NG9-1-1 services vendor. This vendor must closely integrate with the IP network vendor.
- The State will need to use the RFP/RFI process to establish a management company to oversee the entire function of the networks. This management company will monitor and enforce policies and service levels.

5.4 RISKS

As noted in our first report, the SNC’s role is advisory; therefore it does not have any real ability to effectively coordinate the statewide planning and migration of county-based or regional systems—something that is necessary to ultimately achieve a statewide, interconnected IP network. The 9-1-1 Program Office would be able to provide that coordinating function.

More is required than simply the ability to “coordinate.” As currently construed Michigan’s 9-1-1 statute does not authorize either the state 9-1-1 Program Office or the SNC to enter into contracts to provide a 9-1-1 network or the NG9-1-1 services that will utilize that network. If the statute is not modified to grant this authority, it will not be possible to implement these recommendations.

Additional staff with the requisite expertise will need to be available to the state 9-1-1 program office to manage these complex contracts. We understand the current political environment is driven in large part by the state’s economic circumstances, and that hiring new staff may not be possible in the near term. Nevertheless, oversight by qualified staff will need to occur and the state may need to be more creative than usual in ensuring that need is met.

The current funding mechanism poses an additional risk to progress. Under current statute, the Technical Charge allows the Local Exchange Carriers (LECs) to bill for and receive funds for providing 9-1-1 services. With the move to an IP network backbone, the opportunity exists for other network providers in addition to the LECs to compete to provide 9-1-1 services. However, since Michigan's 9-1-1 statute allows only LECs to recover their costs, the current funding model is a roadblock to competition and the ability of alternative providers to enter the market. While this funding model was effective in moving all of Michigan to E9-1-1, it will not be adequate in its current form nor will it be flexible enough to fund NG9-1-1.

Finally, neither the SNC nor the Michigan 9-1-1 Program Office has statutory authority to perform the state-level functions that will become necessary in the NG9-1-1 environment that is recommended for Michigan. Neither the SNC nor the Michigan 9-1-1 Program Office has rulemaking authority, something that is absolutely essential to the success of NG9-1-1 in Michigan. A change in the law will be required to give the Michigan 9-1-1 Program Office and/or the SNC this rulemaking authority, as well as the authority to provide necessary state-level functions inherent in NG9-1-1.

Ultimately, the stakeholders must be united in support of these changes in the interest of statewide NG9-1-1.