



Report for
NG9-1-1 Transition Plans

NG9-1-1 Transition/Implementation Plan

NG9-1-1 Governance Plan and Regulatory Review

submitted to
**California Governor's Office
of Emergency Services**
Sacramento, California

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EXECUTIVE SUMMARY

The California Office of Emergency Services' (Cal OES) 9-1-1 Emergency Communications Branch (CA 9-1-1 Branch) has a mission to deliver 9-1-1 calls to California's PSAPs in the most efficient and effective manner possible. Public driven demands and expectations for communicating with today's Public Safety Answering Points (PSAPs) introduce unique challenges to California's 9-1-1 systems. California's 9-1-1 system has served the citizens and visitors of the State well as it evolved over the last 40 years, however, changes in the way people communicate and the technologies used to communicate are placing demands on the existing "legacy" 9-1-1 systems beyond what they were designed and built to support. Next generation 9-1-1 (NG9-1-1) is a fundamental change in the technology used to deliver and process today's 9-1-1 call and is the standards-based solution being deployed to address the growing gap between expectations and services.

The CA 9-1-1 Branch understands that robust planning for the implementation of NG9-1-1 will make for a more efficient and effective transition. Toward its mission, Cal OES contracted with L.R. Kimball to provide a NG9-1-1 Transition/Implementation Plan, Governance Plan and Funding Plan to further successful NG9-1-1 implementations across California. The CA 9-1-1 Branch will define a standardized approach to execute the statewide strategy for NG9-1-1 so that all PSAPs benefit from the NG9-1-1 system. The CA 9-1-1 Branch will coordinate stakeholder engagement to promote the transition and educate stakeholders on system implementation. While the CA 9-1-1 Branch will be the primary contract manager for regional ESInets and NG9 1-1 systems, the PSAPs will have input. The vendor(s) will be required to deliver a system that meets technical specifications established by the CA 9-1-1 Branch that have been developed with input from the PSAPs. The CA 9-1-1 Branch will assure that call delivery to the PSAPs meets statutory requirements and that current service levels are supported once the system is operational.

The goal of the NG9-1-1 Transition/Implementation Plan is to implement NG9-1-1 service statewide in a phased approach that will ensure that every PSAP receives the complete range of NG9-1-1 services. The NG9-1-1 System in California will need to meet and exceed all industry standards for a diverse PSAP community, including 58 Counties over a wide-ranging geography. NG9-1-1 core services must meet the highest level of resiliency and availability to process all 9-1-1 requests for services that are expected to exceed the current 28 million (28,000,000) calls per year. A robust and diverse core network must be able to handle the large 9-1-1 call volume, text, video, pictures, and email in an IP-based environment. The network must provide remote tracking for all information that is processed from insertion to delivery in the network with a 99.999 percent reliability. The CA 9-1-1 Branch will oversee and approve all purchases made under the Contract for NG9-1-1 Core Services, will leverage existing CPE and hosted solutions, and will work with the PSAPs to design California's NG9-1-1 System.

The Governance Plan and Regulatory Review provides a review of the current statutory and governance structures for 9-1-1 in California and defines related requirements for a successful transition to NG9-1-1. The planning and implementation of NG9-1-1 requires this review of existing statutes to identify potential roadblocks to implementation. An effective NG9-1-1 Governance Model establishes the means of achieving the coordination of new and complex NG9-1-1 considerations consistently. These new complexities necessitate formal coordination of system users and vendors regarding requirements, interconnections and other considerations to effectively operate and manage it. Legacy 9-1-1 governance structures and statutes have been known to inhibit the successful implementation of NG9-1-1 and should be amended to permit and facilitate NG9-1-1. The Funding Plan for the NG9-1-1 transition is attached as the Appendix.



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1. OVERVIEW

The 9-1-1 system in place in California comprises one of the largest 9-1-1 systems in the United States. There are 441 PSAPs in California that handle 9-1-1 calls. Each PSAP is sized to ensure that 9-1-1 calls are answered in a timely fashion. As a result, the data associated with each PSAP can help define the technical characteristics and scope for how transition to Next Generation 9-1-1 (NG9-1-1) will occur across the state.

- 9-1-1 service in California is delivered through 45 Selective routers that are owned and maintained by the telecommunications providers throughout the state.
- Service areas follow 11 legacy Local Access Transport Area (LATA) boundaries.
- On average, annual 9-1-1 call volume is 28,507,534 9-1-1.
- Between 2014 and 2016, annual 9-1-1 call volume exceeded 28 million calls.
- In 2016, 80 percent of all 9-1-1 calls in California were from wireless telephones, using a technology that had not been invented when California's 9-1-1 system was designed and placed into operation.

PSAP information that will be used to refine the strategic scope for transition to NG9-1-1 includes the following:

- Number of PSAPs
- Location of PSAPs
- Current number of call taker positions at the PSAP
- Annual call volume of the PSAP
 - Wireless
 - Wireline
 - Admin
- Current Call Processing Equipment (CPE)
- Current network provider and configuration
- Database management capabilities

The 441 PSAPs operate and maintain approximately 2,750 9-1-1 call answering positions or workstations that use specialized Call Processing Equipment (CPE). Knowing the approximate position count for all PSAPs in California will help to determine the requirements for the future NG9-1-1 system.

Since 2012, 241 PSAPs have purchased CPE that is NG9-1-1-capable by using the Cal OES-administered master contract. While the number of NG9-1-1-capable PSAPs continues to rise, there are PSAPs that will need to replace or upgrade their CPE in order to be NG9-1-1 capable.

The goal of this strategic transition plan is to implement NG9-1-1 service statewide in a phased approach, which will ensure that every PSAP receives the complete range of NG9-1-1 services.

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1.1 Project Objectives

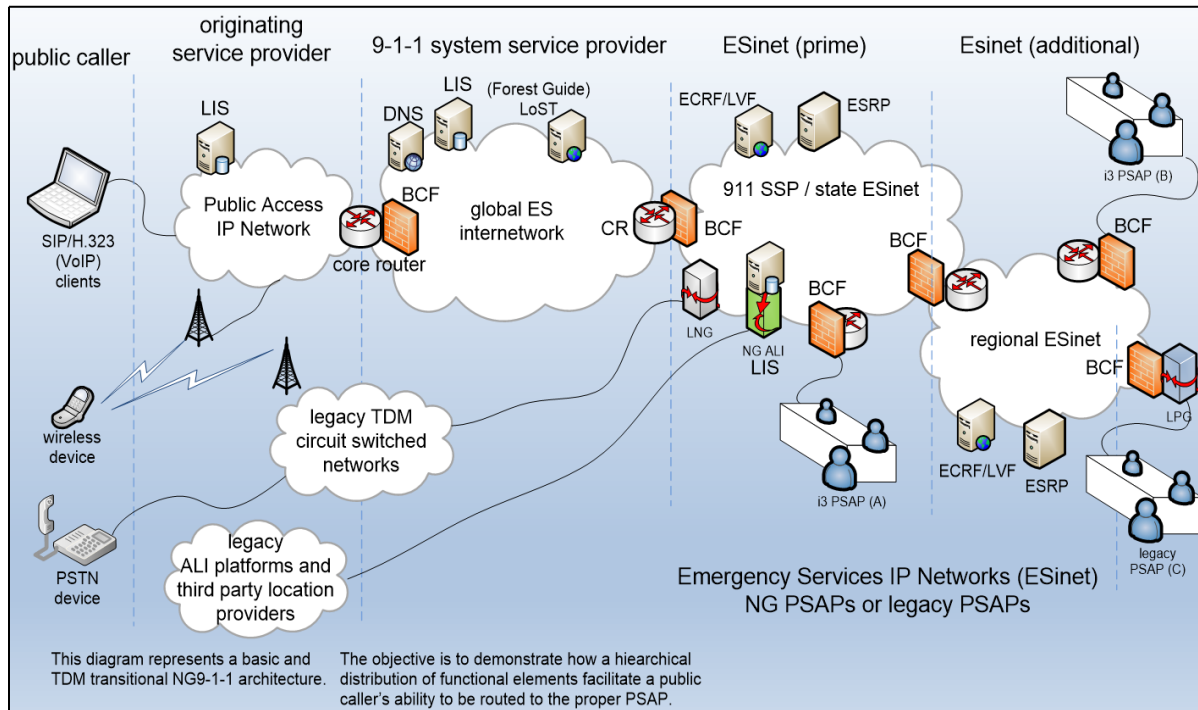


Figure 1 - Desired Cal OES NG9-1-1 End State

The NG9-1-1 System in California will need to meet and exceed all industry standards for a diverse PSAP community, including 58 Counties over a wide ranging geography. NG9-1-1 core services must meet the highest level of resiliency and availability to process all 9-1-1 requests for services that are expected to exceed the current 28 million (28,000,000) calls per year.

The robust and diverse core network must be able to handle the large 9-1-1 call volume, text, video, pictures, and email in an IP-based environment. The network must also be able to provide remote tracking for all information that is processed from insertion to delivery in the network with a 99.999 percent reliability. Rapidly advancing technologies that support NG9-1-1 services most likely will include interfaces to high speed broadband access; evergreen network turnkey solutions; specialized, configurable policy routing functions; and evolving text, multi-media, and other data modalities.

The CA 9-1-1 Branch will oversee and approve all purchases made under the Contract for NG9-1-1 Core Services, will leverage existing CPE and hosted solutions, and will work with the PSAPs to design California's NG 9-1-1 System.

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1.2 Transition Plan Assumptions and Constraints

The transition plan for NG9-1-1 has several assumptions and constraints, which are identified below. The assumptions and constraints are listed below to clearly define the roles and responsibilities of the State, PSAPs, and Vendor, and to maintain the current relationship that exists between and among the three parties.

From the Cal OES / State perspective:

- Cal OES will be the primary contract manager for the ESInet and NG9-1-1 System, but will require the Vendor to adhere to all PSAP policies and procedures so that consistency of service is maintained.
- Cal OES will work with PSAPs to develop a migration plan to join the ESInet.
- Cal OES will work with the PSAPs and Vendor to minimize any infrastructure changes needed to support NG9-1-1 efforts.
- The Vendor will be responsible for any inventory or site survey efforts that may be required. During any such meetings or events, the State will assist and ensure that local PSAP policies will be followed.
- Cal OES will work with secondary PSAPs to join the ESInet.
- Backup PSAP locations will not be required to achieve local diversity. The Vendor will identify where diversity is not available, and will offer a budgetary estimate for overcoming the lack of diversity with an alternate service, or combination of services to aid in creating diversity.
- Cal OES will work with other non-PSAP locations to join the ESInet, such as the data centers used to support NG9-1-1 core services and call handling.
- Cal OES expects that there will be a minimum port speed of 10 Mbps at all PSAP locations.
- The actual bandwidth at each PSAP will be based upon the expected requirement at that PSAP, within the 10 Mbps port requirement. If a PSAP has a larger, or smaller bandwidth requirement, the Vendor may propose alternatives to ensure that the port architecture will not be exceeded.
- The State will provide oversight of the ESInet implementation to maintain communication and collaboration between the Vendor and each PSAP.
- The Vendor will be responsible for connections to all System Service Providers (SSPs), including any Text Control Centers (TCCs), that are needed to provide service. Cal OES will require the Vendor to be responsible for meeting the service requirements for ESInet and NG9-1-1.
- The State will require all future bandwidth increases to limit substantial or fork-lift upgrades of CPE.

From the PSAP perspective:

- Each PSAP will assist Cal OES in the implementation process as a stakeholder and customer of the eventual NG9-1-1 System.
- Each PSAP will work with Cal OES and the Vendor to migrate functions to the ESInet in phases that coincide with the overall project schedule.
- Each PSAP will identify the functional components and implementation items that can expedite its transition to NG9-1-1.
- Each PSAP will assist in the development of Memorandums of Understanding (MOUs) or other interagency agreements to create a common process for sharing resources.

The design, implementation, and operation of the ESInet will be standards-based and will contain specific functional areas. There are many characteristics associated with standards-based implementation of core functional areas.

These characteristics are listed below:

- Standards based:
 - Legacy 9-1-1 integration and transfer between legacy and NG9-1-1 Systems.
 - All solutions allow for the inclusion and integration of existing NG9-1-1 services and solutions that have been implemented already at the PSAP and regional level.
 - The ESInet meets the NENA i3 standard for core functions and capabilities.
 - Text to and from 9-1-1 is based upon the Message Session Relay Protocol (MSRP)
 - Utilization of a highly reliable and redundant architecture
 - Elimination of any single point of failure where possible, or the provision of an alternative solution to minimize the effect of a single point of failure.
 - Availability, diversity, redundancy, and resiliency.
 - Automatic adjustment of traffic priorities to meet established quality of service (QoS) levels as defined in the NENA i3 standard.
 - System and component level monitoring, alarming, diagnostics and reporting services, disaster recovery and system restoration services including a 24/7/365 help desk, trouble ticketing, and customer facing support services.
 - 24/7/365 Network Operations Center (NOC) monitoring services that include a Security Operations Center (SOC) in accordance with NENA standards and State of California policies.
 - Ability to integrate with existing NG9-1-1 stand-alone or hosted CPE solutions.
- Functional areas:
 - Fully redundant ESInet connections to all locations and other key network nodes.
 - Minimum level of bandwidth to support delivery of calls and associated data from originating service providers or other integrated ESInets to PSAPs.
 - Scalability without adverse effects on performance or costs.
 - Ability to ensure performance through the use of traffic shaping and traffic policing.
 - Ability to prioritize critical traffic at multiple levels by importance of applications or users.
 - Ability to automatically reroute traffic to alternate routes or systems in instances of network outages and system failures.
 - Ability to allow peering arrangements, interagency agreements, or mutual aid agreements between and among PSAPs, using documented policies, or dynamically through custom changes to the routing policy within the network.

1.3 Reference Documents

Transition will be governed by industry best practices. The entities that will be referred to include the following:

- The Association of Public Safety Communications Officials (APCO)
- The National Emergency Number Association (NENA)
- The Project Management Institute (PMI)
- The Information Technology Infrastructure Library (ITIL)
- The International Standards Organization (ISO)
- The American National Standards Institute (ANSI)
- The National Institute of Standards and Technology (NIST)
- The Alliance for Telecommunications Industry Solutions / Emergency Services Interconnection Forum (ATIS-ESIF)

- State of California Best Practices and guidelines for:
 - Project Management
 - Contract Management
 - Legal authority and jurisdictional guidance
 - Technology Implementation
 - Service Level Management
 - Cybersecurity
 - Financial and Budgetary Management

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2. TRANSITION PLANNING

The concepts that were used to provide a framework for transition are documented within the PMI best practices and the Information Technology Infrastructure Library (ITIL). Best practices recommended by these two entities serve as a guideline for any transition and contain processes and procedures that can be used to achieve the end results.

Transition Overview

Cal OES adopted a best-practices approach to NG9-1-1 implementation because of the scale of the implementation. Adopting best practices for every aspect of the implementation, including this transition plan, ensures that the final outcome is achieved in the most cost effective and efficient manner possible. Using ITIL and PMI best practices for the transition will ensure that benefits to the state and the PSAPs will be maximized, and that NG9-1-1 implementation will be successful.

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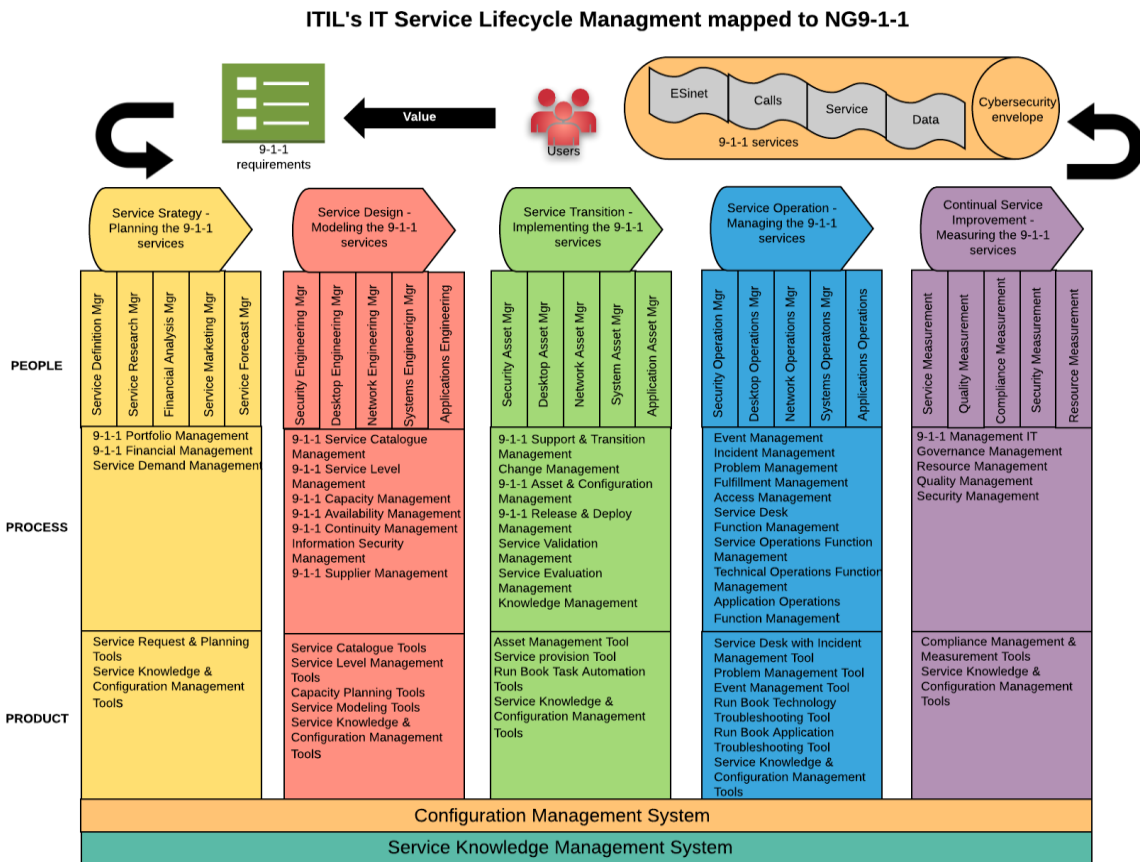


Figure 2 NG9-1-1 ITIL IT Service Lifecycle Management

Using the best practices defined by ITIL as a guide the value of the NG9-1-1 system is based upon the operational goals defined by Cal OES and the PSAPs. In this context, 9-1-1 calls and the ability of the PSAPs to receive calls for emergency assistance will be prioritized across the network. The value of the service equates to the system being operational and capable of meeting standards for 9-1-1 call delivery.

Figure 2 shows ITIL's Service Transition framework, which governs the best practices for all aspects of an Information Technology transition. The lifecycle model shown in Figure 2 outlines the five stages in ITIL's management lifecycle: service strategy; service design; service transition; service operation; and continual service improvement. Each stage relies on service principles, processes, roles, and performance measures. Each stage is dependent on the other lifecycle stages for inputs and feedback. A constant set of checks and balances throughout the service lifecycle ensures that the service is performing as required.

The lifecycle is a guide for Cal OES and the PSAPs to bridge the gap between the technical components that are delivered as part of the system, and the operation of the NG9-1-1 service for the duration of the contract. Within the lifecycle constant interaction and collaboration between Cal OES and the PSAPs will provide the basis for managing and maintain the service.

The transition to the new statewide NG9-1-1 System will follow the statutory guidelines and be managed through these additional practices. During the transition, Cal OES will:

- assist PSAPs to ensure that guidelines and best practices will be followed by all vendors during all transition and implementation activities;
- develop and implement a standard change management process that PSAPs will use if the vendor requests any changes during migration;
- assist PSAPs in the implementation of and transition to NG9-1-1 within statutory guidelines;
- create a stakeholder engagement and management framework to support migration;
- establish controls on all assets, resources, responsibilities, and activities during transition and implementation;
- guidelines to ensure that the knowledge transfer from the vendor to PSAPs occurs in an efficient and effective manner;
- assist PSAPs in the establishment or modification of any rules for any releases, version updates; or changes to the System; and
- assist PSAPs in ensuring that quality assurance and quality control measures performed by the vendor are met for all components of the NG9-1-1 system.

Roles and Responsibilities:

Transition to NG9-1-1 will begin with the implementation of an ESInet capable of providing the NG core services. The entire NG core will be available to PSAPs to migrate to a common infrastructure to support 9-1-1 call delivery. In this scenario, there are three primary stakeholders, each of which has specific roles and responsibilities. The three stakeholders are Cal OES, the PSAPs, and the ESInet/NG9-1-1 Vendor. Following is a brief discussion of the stakeholders and their respective roles.

Cal OES

Cal OES will provide the guidance and framework for ensuring that call delivery to each PSAP will meet current statutory requirements. In addition, Cal OES will be instrumental in providing management and oversight of the implementation of the statewide ESInet and NG core services. In this capacity, Cal OES will maintain the focus on call delivery to ensure that PSAPs will be able to meet their requirements once the System is operational.

PSAPs

The state's PSAPs will be the customers of the ESInet / NG core services. In this role, each PSAP will be a stakeholder and will collaborate with Cal OES at various stages of implementation. PSAPs will be responsible for ensuring that their requirements are relayed accurately to the vendor such that the NG9-1-1 System is operationally focused on their mission. PSAPs will be supported by Cal OES and will be encouraged to submit their strategic goals to Cal OES to perfect the roadmap.

ESInet / NG9-1-1 Vendor

The ESInet / NG9-1-1 Vendor(s) will be under the direction of Cal OES, but Cal OES will be influenced heavily by the PSAPs. In other words, the Vendor will be required to deliver a NG9-1-1 System that meets the technical specifications of Cal OES, which will be developed in conjunction with the PSAPs. The Vendor will be required to support the transition from legacy to NG9-1-1 and for maintaining the System to ensure that 9-1-1 service is available 99.999 percent of the time.

The relationships that exist among the three stakeholders is shown below in Figure 3. While this diagram presents a high level view, it is meant to show that the roles of the stakeholders often overlap. The overlapping of roles and responsibilities requires clear consistent communication and coordination by all parties.

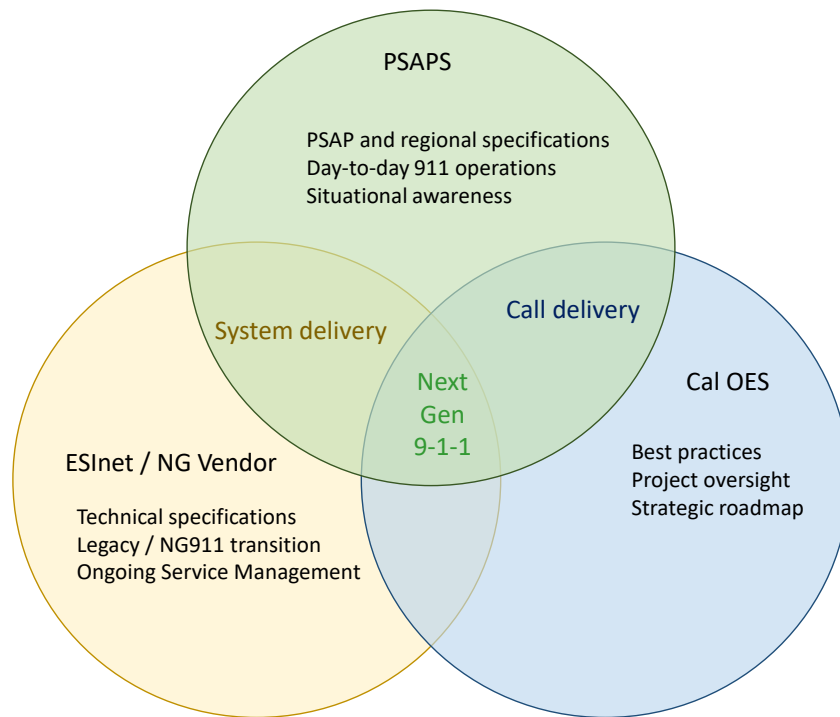


Figure 3 Overlap of primary stakeholders

2.1 Transition Scope

Any future NG9-1-1 system design in California will be complex because of the combination of large population and large geographic area. While sharing design characteristics with other systems in states such as Texas or Indiana, there will be challenges in the design, deployment, management, and implementation of the NG9-1-1 transition that will be unique to California. In this section of the report, many of those areas are explored in the context of NG9-1-1 system design options that will ultimately result in an operational NG9-1-1 system depicted in the diagram below.

Cal OES has identified the following strategy for transition to NG9-1-1:

- ESInet configured to reach all PSAPs
 - ESInets already in place
 - New ESInets built by regions
 - New statewide ESInet connectivity
- Database services
 - ALI transactions moved into state ESInet core
 - PSAP by PSAP migration of ALI, MSAG information
 - Creation of normalized data sets for GIS

- Transition of wireless carriers to ESInet
 - Wireless trunks migrated to ESInet by PSAP
 - Ongoing transition of wireless carriers into the ESInet for services
- Migration of Over the Top Text to MSRP (J-STD 110) standard
- Implementation of NG core services
 - ECRF
 - ESRP
 - BCF
 - LNG / LSRG / LPG
- Transition to geographic call routing
 - Selective routers begin to move to LIS / LVF
 - Wireline carriers transition to ECRF routing
- Monitoring, Management, and Coordination

2.2 Transition Scope Areas

The primary areas that need to move to NG9-1-1 are identified below. In conjunction with the procurement and delivery of an ESInet, services will be migrated to the ESInet in preparation for the operation phases, which are described in Section 3. The table below shows five areas of transition that affect PSAPs. To streamline the transition scope with the vendor, PSAPs may need to provide additional information.

Scope Area	Definition
Carrier Transition	Cal OES will coordinate the transition of carriers to the NG9-1-1 System. During transition, collaboration with each PSAP will be necessary to ensure that PSAP services, particularly call handling, are implemented to support the delivery of 9-1-1 calls across the NG9-1-1 platform. Doing so will allow call transfer between PSAPs and others, but will not allow full NG9-1-1 call delivery until a particular PSAP's carriers have made a complete migration.
System Service Provider (SSP) Transition	Cal OES will ensure that each PSAP's existing 9-1-1 capabilities are provided in the NG9-1-1 System. The objective is to allow PSAPs who have deployed NG9-1-1 capable equipment or services to migrate to the NG9-1-1 System without purchasing new CPE or systems. Doing so enables PSAPs using the same equipment to link their services together across the ESInet. SSP transition scope is defined as the process of migrating all existing SSPs into the ESInet and migrating the service onto the ESInet and eventually the final NG9-1-1 System. SSPs include those providing 9-1-1 service to PSAPs that may be integrated into the state system without fully replacing the current system.
Database Transition	The long term goal is to move all ALI services to the ESInet and use the NG9-1-1 call routing framework to replace ALI. This functional requirement includes ensuring that the current database components will be normalized to meet the geo-location and GIS-based data management expectations of NG9-1-1. Database transition includes the normalization of ALI, MSAG, and GIS information into a complete spatial data set for NG9-1-1.

Scope Area	Definition
Legacy to NG Services	PSAPs will be directly involved in coordinating the migration of legacy 9-1-1 services to the ESInet. Such services will use the NG core functional elements such as the LNG / LSRG and LPG. In addition, legacy services at the PSAP that are continued will be integrated with the ESInet if a PSAP needs to have those services to function. The vendor must coordinate the scope of transition elements, but the scope is also tied directly to PSAP requirements.
Monitoring and Management Transition	Many PSAPs currently have monitoring and management functions delivered through an existing provider. The Vendor will be responsible for including the transition from the current monitoring and management function to the ESInet and NG9-1-1 System. As a result, the Vendor will be required to support a framework for PSAPs as their contracts require.

2.3 Risk Management

Because the PSAPs are the primary users of NG9-1-1 services, the PSAPs will be instrumental in ensuring that the ESInet and NG9-1-1 core services meet their requirements. Transition to a new system always carries risk. Risks may arise at any point during the transition, and will affect PSAPs more so than others. That being the case, PSAPs play an important role with respect to minimizing transition risks. Cal OES and the PSAPs will collaborate with the Vendor to manage and minimize risks throughout the process. PSAPs will be required to assist with:

- Risk identification, assessment, and review
- Risk documentation and identification of triggers
- Risk prioritization
- Risk response planning
- Risk management
- Risk mitigation

2.4 Change Management

To effectively prepare for potential changes to the NG9-1-1 System, a change management process must be developed early, prior to transition. Changes to the System are sure to occur. A formal change management policy provides an assurance that changes are documented, coordinated, evaluated, prioritized, planned, tested, approved, and implemented as planned. PSAPs will work in conjunction with Cal OES to manage changes to their PSAP operations, and the ESInet. PSAPs will identify the changes required in accordance with the three primary types of change and coordinate the process of completing the change with the Vendor.

Typically three types of changes can occur:

- Standard Change
- Normal Change
- Urgent/Emergency Change

Appendix B contains a matrix that offers some descriptions of various changes that may occur during transition and operation of the NG9-1-1 System. Cal OES will collaborate with each PSAP to create change requests and to complete any documentation of changes required by the Vendor.

Change management contains multiple perspectives to be effective. From the Cal OES perspective, the initial focus is on the NG9-1-1 transition and the creation of the infrastructure to support the PSAPs. For the PSAPs, the change management process becomes an essential management function that each PSAP uses to arrange the network to suit its individual missions and goals. The following diagram / swim lane shows the breakdown by role and responsibility during the change management process.

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CHANGE MANAGEMENT PROCESS

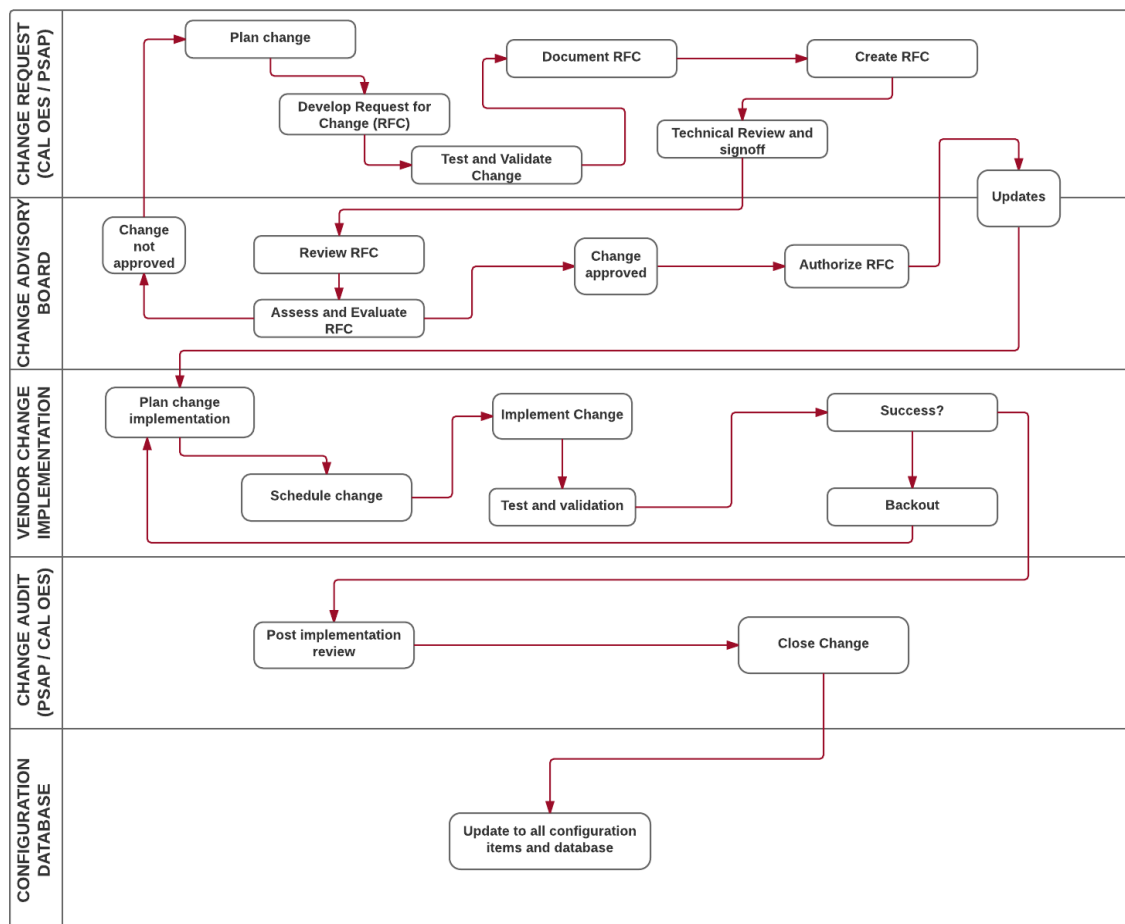


Figure 4 Change management by responsibility

3. TRANSITION SCOPE

The scope of the transition to NG9-1-1 is a coordinated effort between Cal OES, the PSAPs, and the service providers. Cal OES will be instrumental in defining a standardized approach that executes successfully the statewide deployment of NG9-1-1 service. This approach will ensure that no PSAP will be left behind and that all PSAPs will benefit from the NG9-1-1 System.

The phases presented in this section are not always completed in a serial or consecutive manner. For example, once the ESInet is implemented, the wireless transition and the database transition will begin, in a parallel path. Subsequently, the Selective Routing and Wireline transition will begin, in a parallel path. Figure 5 below provides a description of the transition roadmap, along with the parallel migrations that will take place.

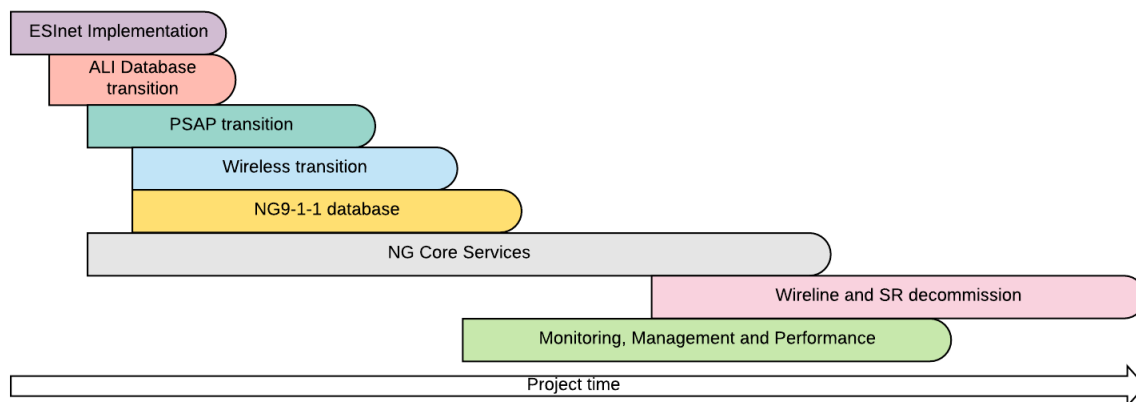


Figure 5 NG9-1-1 Transition Roadmap

3.1 Transition Management and Coordination

The transition from Legacy 9-1-1 services into NG9-1-1 will be completed in a phased approach that will allow the PSAPs to use the ESInet and NG core services as they are ready. The scope of transition is defined by Cal OES to establish the strategic direction toward NG9-1-1. The elements presented in the scope represent the goals for each item during migration. In the context presented here, the assumption is for the PSAPs to gain the benefit of the ESInet by rolling specific traffic sets onto the ESInet initially, then gradually continuing to add applications and services to the ESInet over time.

The main areas that Cal OES is planning for include the following eight phases:

Phases	Definition
Phase 1	ESInet
Phase 2	ALI database migration
Phase 3	PSAP transition
Phase 4	Wireless transition
Phase 5	Database transition
Phase 6	Selective Router decommission
Phase 7	Wireline transition
Phase 8	Monitoring, Management, and Performance

3.2 Transition Management and Coordination

In the following subsections, more detailed information will be provided regarding the transition phases identified earlier. Each phase is defined from the perspective of Cal OES and its mission to impact how calls are delivered to the PSAP. To be implemented effectively, some phases may require additional support and strategic insight from the PSAPs. These phases are identified as key areas that will directly impact the 9-1-1 program and the technical, operational, and financial aspects across the state.

3.2.1 Phase 1 ESInet Deployment

During the first phase of the project, Cal OES and the PSAPs will coordinate the deployment of the ESInet infrastructure to support all the services that will follow. The ESInet infrastructure will be designed through collaboration with Cal OES, the PSAPs, and the associated Vendors. The ESInet will be comprised of new deployments and existing ESInet implementations. Because ESInets are based upon the NENA standards, the ability to join the ESInets and allow traffic to be merged onto the infrastructure enables benefits for the PSAPs as the ESInets are built.

During Phase 1, Cal OES will identify where ESInets are currently operating, and how they may be integrated into the Phase 1 architecture. In addition, the assessment will include determination on how these ESInets may be combined with others to create a larger or regional ESInet. To the fullest extent possible, Cal OES will integrate existing ESInets into the statewide plan and will provide guidance to those PSAPs that are already operating on an ESInet to ensure that their existing platform is preserved. The chart below provides more detailed information regarding Phase 1.

Scope Area	Definition
ESInet architecture	Development of an ESInet architecture to support the state's 441 PSAPs. This area will seek to include existing ESInets and provide interconnection to a larger ESInet for greater interoperability among PSAPs.
Telecommunications Provider assessment	This assessment will be used to identify the local telecommunications providers and their ability to connect to the ESInet. The ESInet will be designed to (at a minimum) provide the same level of service that these telecommunications providers currently deliver.
Management, Monitoring, Cybersecurity	The ESInet monitoring and management system will be established to ensure that all activities that use the ESInet are properly managed and maintained, and are secure. This includes providing guidance for standardized security measures for all PSAPs.
Legacy to ESInet	Legacy 9-1-1 services that can be migrated to the ESInet in the near term will be documented. These services may allow for an increase in interconnection, and interoperation among PSAPs; while also allowing efficiency to improve.

3.2.2 Phase 2 ALI Database Migration to the State ESInet

Once the ESInet is implemented and operational, Cal OES will migrate the existing ALI database services onto the ESInet. This effort will allow Cal OES to better serve the PSAPs and decrease the current cost of ALI management for all 441 PSAPs. This effort will require coordination between and among Cal OES, PSAPs, ALI database providers, and the Vendor to create a cloud-based ALI database that uses the ESInet for access. The ALI data will be managed in collaboration with a Vendor that provides the cloud-based service and integrates its platform with the ESInet. The chart below provides more detailed information on this phase.

Scope Area	Definition
Automatic Location Information (ALI)	ALI database transition into the ESInet / NG9-1-1 core will require coordination with PSAPs that may already have an ESInet and NG9-1-1 core services. The State ESInet may allow for some ALI database services to be consolidated and provide redundancy. Each PSAP will need to be "audited" independently to determine which ALI services can be migrated. This type of ALI audit is typically done as part of the development of a Location Information Server (LIS).
Master Street Address Guide (MSAG)	The MSAG process will be used to ensure that the ALI data can be matched to a street address range. PSAPs will continue to use the existing MSAG update process; however, the update process will use the ESInet during the update process to ensure the cloud-based ALI data remains current.
PSAP ALI Services	Migrating the ALI database to the ESInet will require coordination with the PSAPs to fully integrate their processes with the newly migrated database. Cal OES will ensure that the migration of the database to the ESInet will not disrupt or alter the current level of support that is provided to the PSAPs. Moving the ALI database to the ESInet has the potential to decrease the costs associated with the provision of ALI services.

3.2.3 Phase 3 PSAP Migration to the State ESInet

Once the ESInet(s) is implemented and operational, PSAPs can begin migrating services to the ESInet. This will allow a gradual migration for telecommunications provided services that PSAP currently use. Cal OES will assist in developing minimum standard criteria for PSAPs to join the ESInet. Services that will be migrated will be coordinated between Cal OES and the PSAP to determine the impacts on technology, operations, and funding before and after migration. As PSAPs migrate to the ESInet, the delivery of 9-1-1 calls will change. During this phase, a transition of the existing carriers and some system service providers will be necessary. Cal OES will assist PSAPs in ensuring that the transition occurs with minimal impact on their current operations.

PSAPs will have several options endorsed by Cal OES for using the ESInet and NG core services to maximize the benefits to their jurisdictions. The scope for PSAP integration will require an evaluation of existing systems to determine what PSAP capabilities will be transitioned to, or replaced by the ESInet. Some PSAP capabilities will not move to the ESInet at all, while other capabilities may become fully hosted over time. For example, CPE that is i3-compliant and NG9-1-1 capable may use the ESInet for enhancing connectivity to other NG9-1-1 capable systems. Other PSAPs that are operating with an existing NG9-1-1 system may be able to attach their system to the State ESInet to enhance the operation, but not replace it. Finally, some PSAPs may be at a stage where they need to upgrade or replace CPE or other systems that can use the ESInet to strengthen their infrastructure. For PSAPs that need to replace or upgrade CPE the options are as follows:

- PSAPs procure an on premise CPE and connect to the ESInet;
- PSAPs participate in a hosted CPE solution that resides either on premise, at another PSAP, or is collocated with a data center with access to the ESInet (but is owned by a PSAP);
- PSAPs can create services that are integrated into the ESInet and use the NG core services; or
- Smaller PSAPs (less than 1y200 calls per month) can work with other PSAPs on the ESInet to move to a hosted solution.

It should be noted that there may be stand-alone services such as logging and recording that may require modifications to accommodate PSAPs that need to keep logging local. The chart below provides more detailed information on this phase.

Scope Area	Definition
Carrier Coordination	Carrier coordination will encompass the transition of legacy services into the ESInet and NG9-1-1 System. The Transition Plan will be used to guide how carriers of telecommunications services will connect to, and use the network for 9-1-1 call delivery. Such coordination includes all carriers within the State of California that provide a service that may be capable of originating a 9-1-1 call.
SSP Transition	SSPs may already have an ESInet and NG9-1-1 core services. These services may be installed at the PSAP and be integrated into the NG9-1-1 system to take advantage of the benefits of NG core services. The integration between the SSPs may require additional configuration between the parties to migrate seamlessly between the NG core service elements.
PSAP Routing Infrastructure	As PSAPs transition, Cal OES will coordinate the documentation of the routing infrastructure that each PSAP will use to connect to the ESInet. This documentation will ensure a standardized approach for routing to, from, and across the ESInet for all PSAPs.

Scope Area	Definition
Region Coordination	Transition of regional networks that are serving multiple PSAPs will be coordinated through Cal OES. Coordination between the regions and the service providers will be necessary to determine the scope, goals, and strategy for integrating the regions into the state ESInet.

3.2.4 Phase 4 Wireless Transition

Wireless networks may migrate to the NG9-1-1 Systems more quickly than wireline networks. During Phase 4, the objective is for wireless carriers to deliver wireless 9-1-1 calls to the PSAP through the ESInet. This effort will allow for all wireless calls (presently 80 percent of all 9-1-1 calls) to migrate to the ESInet and be delivered to the PSAP using the ESInet network instead of existing CAMA based trunks. CAMA trunks can be eliminated as PSAPs and wireless carriers migrate to the ESInet. Typically, wireless carriers are receptive to migrating because their current 9-1-1 call routing arrangements can be costly, and complex. The chart below provides more detailed information on this phase.

Scope Area	Definition
Wireless Carrier Identification	Identification of wireless carriers by PSAP, by Region, and by State will provide the documentation required of the ESInet Vendor to begin coordinating migration.
Wireless carrier coordination	Cal OES will collaborate with the ESInet Vendor(s) to implement the wireless carrier migration plan. This plan will be comprised of the technical and operational tasks that will need to be completed before, during, and after migration.

3.2.5 Phase 5 NG9-1-1 Database transition

One of the areas that requires additional support and leadership during transition is the oversight of how the various 9-1-1 databases are standardized or “normalized” for use in the NG9-1-1 System. This transition typically involves the following steps:

- Collection of datasets
 - ALI database
 - MSAG
 - GIS land base files
- Analysis of datasets
 - ALI to MSAG match
 - ALI to GIS data match
 - MSAG to GIS match
 - Feature set match (streets, boundaries, points, etc.)

Cal OES may include other GIS professionals from the state to ensure that efforts to develop the GIS maintenance capabilities required by NG9-1-1 are consistent with existing state policies. In some cases, the GIS departments have access to additional data that may prove useful in NG9-1-1, which in turn can be used to enhance the call location determination. Examples are Interstate mile markers or other landmark points that may not be readily available in 9-1-1 GIS today. The chart below provides more detailed information on this phase.

Scope Area	Definition
ALI Database	For NG9-1-1 database development efforts, the ALI information that is being used to route calls in a legacy system is an important starting point. The ALI extracts will be used to match against the MSAG and the chosen GIS files to determine the overall “potential” success rate for routing all calls by geo-location. Because ALI records are used currently by Selective Routers and will be in place for some time; the ALI data update and management process will continue. Cal OES will seek to lower costs by using the ESInet to connect to the ALI database.
Geographic Information Systems (GIS)	In the NENA i3 standard, GIS is the main function for managing the database information used for routing 9-1-1 calls. GIS is used for normalization of the ALI and MSAG databases with the geographic map data. The result is a synchronized set of databases with a direct relationship to the geo-database within the GIS. ALI and MSAG updates will continue to be used in the near term, but GIS for database management will be transitioned as those tools become obsolete. In addition, the boundary identification and maintenance from a call routing perspective will be a key element for Cal OES and the PSAPs to coordinate. Boundaries for call routing may not be the same as the jurisdictional boundaries. In these cases, care will be taken to ensure that the assumptions are understood by all involved to avoid a potential conflict over a legal boundary vs a 9-1-1 derived boundary.
Emergency Call Routing Function (ECRF)	The ECRF uses the data that is presented to it from the LIS to validate calls and present the information to an ESRP. Currently, this type of data is specific to a PSAP. It will be necessary to coordinate efforts to ensure that all data will be able to route calls properly within the ESInet / NG9-1-1 System.
Master Street Address Guide (MSAG)	The MSAG is typically used by the PSAP to manage and correct the ALI database used to route 9-1-1 calls. While the MSAG process will largely become a function of the GIS system, MSAG validation will remain a key process within the initial normalization of all GIS and tabular data.
Other Data	Additional data (such as elevation, mile markers, or other supplemental situational data) may be available at some PSAPs throughout the state, and will need to be identified. The data may be relevant for that PSAP alone, or the data may be used among several PSAPs that are configured similarly. The scope will consider the additional data requirements and plan for their transition as necessary.

3.2.6 Phase 6 NG Core Services Transition

Phase 6 ensures that the NG core service functional elements are implemented to support further migration to NG9-1-1. This transition is typically completed in two parts. One part is the NG core and turn up of the functional elements that create the NG9-1-1 capabilities that can be delivered to the PSAP. The second part is the migration of PSAPs from legacy services to the NG9-1-1 core services. Figure 6 below shows the desired NG9-1-1 end state.

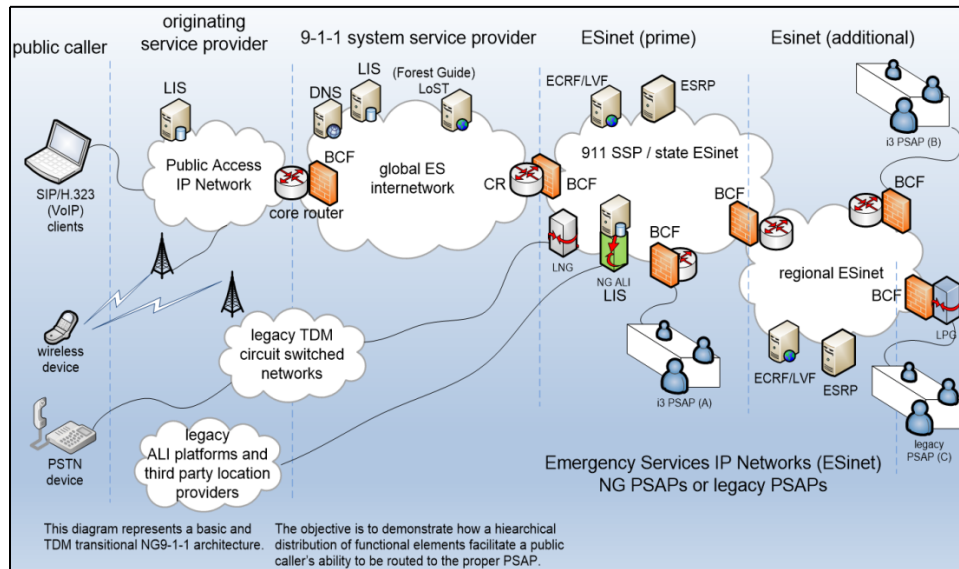


Figure 6 - Cal OES Desired NG9-1-1 End State

In conjunction with NG core services implementation and turn-up, Cal OES will need to define and specify the potential data center locations and host site locations, for example. NG9-1-1 core services are in essence a cloud-based network of functional elements. As a result, Cal OES may decide to place the NG core services at strategic areas located within the state, or Cal OES may allow a hybrid, with some locations in the state and others outside of the state.

The potential exists that some PSAPs may not be capable of supporting NG9-1-1 functions and will therefore require the use of specific legacy interface solutions. NENA identifies three primary gateways that can aid the transition: the Legacy Network Gateway (LNG); the Legacy Selective Router Gateway (LSRG); and the Legacy PSAP Gateway (LPG). The LNG provides protocol conversion from legacy networks into an ESInet IP-routing framework. The LNG provides Location Interwork Functions, NG9-1-1 Interwork Functions, and Protocol Interwork Functions. The LIF, NIF, and PIF are needed to provide an interface between a non-NG PSAP and the ESInet / NG9-1-1 System, until the PSAP is capable of IP-routing. In some instances, a similar device that interfaces directly to a Selective Router (the LSRG) is required. The LSRG adds the interface needed for non-NG selective routing if it is necessary. An LPG is specifically used for PSAPs that interface to legacy equipment on site. The LPG essentially reverses the process of an LNG for those PSAPs so that they can continue operation and still gain the benefit of the ESInet. In other words, the LPG converts the IP-based data to analog. As soon as a PSAP upgrades its CPE or moves to a hosted solution, the LPG can be removed.

Cal OES will refer to the NG9-1-1 standards for guidance in what functional elements will be deployed and how they will integrate to the network, carriers and PSAPs. The chart below contains a description of the functional elements of NG9-1-1.

Scope Area	Definition
BCF	The Border Control Function (BCF) is provided primarily through Session Border Controllers (SBCs). These devices ensure that the network is secure and that all calls are delivered across the network in a secure manner. The BCF is also instrumental in providing cybersecurity for the network by defining the clear demarcation between trusted and un-trusted networks. For the transition to NG core services, there may be multiple BCFs located between ESInets to protect the PSAPs on either side.
ESRP	The Emergency Services Routing Proxy (ESRP) essentially replaces the Selective Routers in NG9-1-1. The ESRP is the routing proxy that uses the Session Initiation Protocol (SIP) instructions to select the route to a PSAP from a predefined routing framework. The ESRP uses “intelligent” routing to determine what routes are available and selects the best route to a PSAP. The ESRP is also where default, alternate, contingent, and emergency routes are located. The Policy Routing Function (PRF) is the specific functionality regarding how those routes are changed. The PRF is a method of dynamically changing how the ESRP operates. For instance, if a PSAP goes offline, a PRF entry will instruct the ESRP to route traffic to another PSAP. The PRF will enable Cal OES to proactively re-route calls in situations where a PSAP may be overloaded with calls.
ECRF	As mentioned in Phase 5, the ECRF is the functional element where caller location and routing information for that call is stored. In the transition to NG core services, the ECRF is populated with the data from Phase 5 and attaches to the call entry process. The ECRF connects to the LIS to determine location and validates it through a Location Validation Function (LVF). The NG core services will establish and verify the location of the caller earlier in the process than current legacy calls. In addition, the ECRF is designed with mobility and location in mind, rather than a fixed location. The ECRF is in many ways similar to the current legacy ALI to MSAG validation that occurs when a 9-1-1 call is presented to a call-taker.
LNG / LSRG	PSAPs that require legacy 9-1-1 calling will require an LNG and possibly an LSRG function from the NG core services. The LNG / LSRG usage is dependent upon the PSAP services required for NG9-1-1 operation. The gateways may be placed at each edge that interfaces to a carrier or a system service provider (SSP) to provide a common interface and ingress / egress point.
LPG	Each PSAP will be assessed to determine if an LPG is necessary. LPGs are common functional elements where a PSAP uses non-NG9-1-1 capable CPE. Of the 441 PSAPs in the state, LPGs are expected to be sprinkled throughout the network to allow the transition to NG9-1-1 to occur in a seamless manner.

3.2.7 Phase 7 Wireline Transition and Selective Router Decommission

Phase 7 will encompass the migration of the wireline carriers to the NG9-1-1 System. During this phase, the existing carriers will migrate the existing SR network to the ECRF and ESRP routing platforms within the NG9-1-1 System. To reach this phase the entire ESInet and NG core services need to have been implemented already. Wireline services can be transitioned to the NG9-1-1 System and begin routing with the NG core services after this transition is completed. PSAPs will receive all wireline calls from the NG core services and the ESInet once this phase is completed.

At some point during this process, the potential exists for the 45 Selective Routers throughout the state to begin a decommission process. This process will be largely carrier-, PSAP-, and region-dependent. However, once the entire

NG9-1-1 System is operational, decommissioning the legacy Selective Routers is a logical progression to fully functional NG9-1-1. The chart below provides more detailed information on this phase.

Scope Area	Definition
PSAP only services	PSAP services may be designed and implemented to work in only that specific PSAP. Configuration changes within the ESInet may be required for some services. These services should be documented to determine if / and how they should be migrated to the ESInet. The ESInet will enable the ability for PSAPs to select how much or how little migration of services occurs.
Carrier Coordination	Coordination among the carriers of the 45 existing Selective Routers will be necessary to schedule, rollout, and test the operation of the NG core services in place of each Selective Router. Test plans and acceptance testing of the NG routing process will ensure that the carriers can deliver 9-1-1 calls to the NG core services for proper and timely delivery to the appropriate PSAP.
Regional Services	Within the transition of wireline carriers and decommission of the selective routers, Cal OES will support PSAPs that already operate as a region. Regional ESInets will have many of the capabilities for call delivery; using the NG core services for the routing infrastructure can be beneficial by enabling greater efficiency. Cal OES will coordinate with the regions to ensure that the interconnections between and among the region, the PSAPs, and the NG core services meet goals.
Selective Router Decommission	After the NG core services are operational, decommission of Selective Routers can begin. This task will require a coordinated effort to ensure that 9-1-1 call delivery will not be disrupted or limited as the Selective Routers are removed.

3.2.8 Phase 8 Monitoring, Management, and Service Performance

Transition of all PSAPs throughout the state will require an assessment of the current monitoring and management capabilities at each PSAP. In addition, as transition begins, attention must be given to the existing contracts for monitoring and management services that PSAPs use. Some of these contracts will require direct coordination and contract administration tasks with the Vendor to ensure that the contracted services are not disrupted or that the transition itself does not create a contract violation. The chart below provides more details on this phase.

Scope Area	Definition
Logging and Reporting	System logging and the relationship to overall system health must be considered and evaluated on a PSAP by PSAP basis. The cohesiveness of all system logs must be considered when migrating to an ESInet / NG9 1 1 system. PSAPs may have several different iterations of system logging capability, which will be maintained and perhaps improved after transition.
Service level reporting	As the transition is in progress, service level reporting may be impacted. Care will be taken during the transition planning process to ensure that service levels are maintained as the network is migrated. In addition, planning must specifically address how service levels and Service Level Agreements (SLAs) map across the ESInet / NG9-1-1 system and individual PSAPs. All SLAs will be evaluated to ensure that one SLA does not limit another.

Scope Area	Definition
Disaster recovery and failover	Disaster recovery and a failover framework is a crucial component of 9-1-1 service, and is extremely important with NG9-1-1 systems. The intent during transition planning and implementation is to ensure that all events and incidents that could cause a routing change, network recovery event, or failover reaction are monitored and reviewed. During this audit, PSAPs will be able to select a methodology similar to the current hierarchy used in legacy 9-1-1. Primary, Alternate, and Contingent rules are defined within the PRF to instruct the ESRP to route calls as necessary.
Continuity of operations and alternate routing	Ensuring that continuity of operations (COOP) is maintained during any disruption in service is another crucial component of NG9-1-1 service. Ensuring COOP may require alternate and contingency routing designs to ensure that all of the systems can serve the PSAPs and deliver the functions required if a loss of connectivity is experienced.

3.3 Transition Schedule

The Transition Plan will be used to align the migration activities with PSAP and regional objectives for NG9-1-1 service. The transition schedule will provide a roadmap and timeline to migrate PSAPs to the ESInet. The schedule will outline the timeline from the perspective of individual PSAPs to join the ESInet and prepare for NG9-1-1. There are actually two separate timelines in the transition schedule. They are the system transition timeline and the cutover and migration timeline. The figure below provides a graphical representation of the transition timeline.

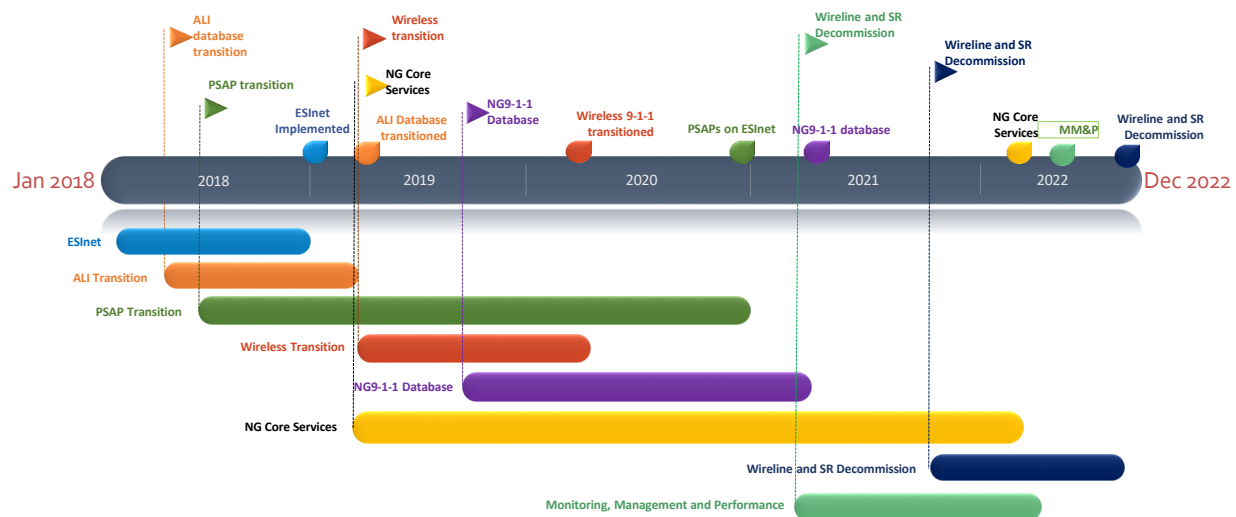


Figure 7 Transition timeline

3.4 Elements of Strategic Transition

Cal OES has identified the following list of technical requirements to summarize the objectives for the ESInet functionality. This list is not meant to be all inclusive, but it is a guide for PSAPs and their vendors to use as a perspective for how an ESInet may allow an increase in the benefits as described in Section 2.

- The network between the PSAP and an ESInet will be a private or virtual private network (VPN) based upon TCP/IP and will be considered part of the ESInet with Vendor edge router located at PSAP.
- The ESInet shall have scalable bandwidth to support new enhanced services.
- The ESInet shall be a conventional routed IP-based network.
- The ESInet demarcation is an edge router placed at the PSAP.
- The ESInet responsibility will be from the Core to the PSAP edge router.
- Multi-Protocol Label Switching (MPLS) or other sub-IP mechanisms are permitted as appropriate.
- The ESInet to the PSAP shall use redundant TCP/IP connections for reliability.
- The PSAP connection to the ESInet must be resilient, secure, physically diverse, and logically separate.
- The ESInet shall be engineered to sustain real time traffic, including data, audio, and video.
- The connections between the PSAP and an ESInet WAN shall be secure TCP/IP connections.
- The ESInet shall be capable of operating on IPv4 and IPv6 network infrastructures.
- The ESInet shall consider how the Domain Name System (DNS) is designed and managed.
- The ESInet implementation should consider coordination efforts to understand Autonomous System (AS) number implications for statewide deployments.
- The ESInet configurations should not impact voice quality.

3.4.1 ESInet Transition

In addition to the requirements listed above, all ESInet configurations will be designed to meet NENA i3 standards. An ESInet is most often designed using the legacy network system operation as a guide. For example, to size an ESInet connection to a PSAP, it is customary to collect and use the following information to determine a minimal expected bandwidth:

- Number of agencies served
- Call volume
- Additional services and transactions necessary at the PSAP
- Growth factors

The ESInet configuration and the bandwidth to a PSAP is further refined through the use of additional PSAP or regional operational information that can be applied to the baseline bandwidth factor. Scenarios for how PSAPs and regions operate will be used to adjust the baseline configuration to ensure that all possible situations can be met. This process will involve a review of PSAP-to-PSAP communications and will establish a desired metric based upon performance for:

- PSAP to PSAP transfer
- PSAP backup scenarios
- PSAP ESInet to PSAP ESInet
- Regional ESInet to Regional ESInet
- Emergency interconnections that may be required

Using this approach, Cal OES and the PSAPs will define the minimum use cases for a baseline bandwidth at all 441 PSAPs that support all legacy PSAPs, NG9-1-1 failover, and disaster recovery scenarios. Regardless of the bandwidth used for 9-1-1, the baseline ESInet will be designed to achieve the NENA i3 requirements that include the following:

- **Network Availability and Reliability**
 - The ESInet must provide 99.999 percent (five-9's) availability of access to the i3 functional elements.
 - The ESInet must maintain a reliable and available platform for all PSAPs to use and to interoperate with the i3 functional elements at the core of the ESInet to enable NG9-1-1 service.
- **ESInet Interconnections**
 - The ESInet should allow the ability to connect to all resources inside and outside the ESInet to create a seamless infrastructure.
 - The ESInet demarcation includes a PSAP edge router.
- **Survivability**
 - The infrastructure must be able to survive the total destruction, such as by fire or flood, of any one core network node or site, switching center, data center, or interconnection site.
- **Diversity**
 - The ESInet and i3 functional elements will include physically diverse routes and physically diverse building entrances where possible.
- **Disaster Recovery / Business Continuity**
 - In the event of unplanned system or network outages, the ESInet and critical 9-1-1 systems must continue operating while mitigation and recovery processes are engaged to identify and resolve problems so that operations are fully restored.
- **Network Monitoring**
 - The infrastructure must be monitored on a 24x7x365 basis. All services including the ESInet and i3 functions require network, system, and service monitoring to ensure proper operation and performance.
- **Service Level Agreements**
 - Service Level Agreements (SLAs) are used to outline the thresholds, metrics, and delivery parameters for a Vendor. An SLA specifies the performance requirements for the ESInet within a baseline that encompasses all components as deployed at any time to provide the guaranteed level of service.
- **Configuration and Network Change**
 - The configuration of the ESInet will be a constantly changing infrastructure that will require that all configuration information is documented and updated as the ESInet grows and evolves.
 - Establishing a formal change process that Cal OES and the PSAPs can use to manage changes to the NG9-1-1 service during the duration of the contract.
- **Network Operations Center**
 - An interface to a fully functioning 24x7x365 Network Operations Center (NOC) designed to support the ESInet and i3 functions is necessary. The NOC must be responsible for restoration or mitigation of all incidents that could affect the reliable delivery of 9-1-1 calls to the appropriate PSAP.
 - The NOC must push data to the state, which includes high level statistics needed to monitor the network's health.
- **Data Centers**
 - All data centers that are used for 9-1-1 must be Tier 3 or better.
- **GIS and ECRF**
 - The ESInet and NG9-1-1 core architecture shall support migration of the existing ALI database services to the ESInet to decrease the current cost of ALI management.
 - GIS capabilities will be needed to perform location based data maintenance.

- **Cybersecurity**

- The ESInet must be monitored to detect and mitigate suspicious activity and prevent unauthorized access to critical systems. Cybersecurity monitoring includes the logging of all users who attempt to access the network and resources. The management and monitoring system should allow the refusal of access to prevent inappropriate or malicious access. Detection and intrusion prevention to network resources, recognition, and elimination of threats to the network will be required to protect the integrity of the entire system.

Through this process, Cal OES will ensure that the ESInet is sized correctly to support the PSAPs, the logical transactions that occur across the network, and offer a growth factor to allow for an increase in bandwidth as needed.

3.4.2 NG Core Services Transition

NG Core services operate in conjunction with the ESInet and are important considerations beyond the logical infrastructure level. While the ESInet includes the physical interfaces to many of the devices listed below, it is important to distinguish the subtlety between the functions these provide in NG9-1-1. The ESInet must include the ability to provide the functions required by the following equipment prior to transition. These factors will influence the overall bandwidth calculation, and may be implemented as part of a smaller subset or regional approach if desired.

- **Border Control Function (BCF)**

- According to the NENA i3 standard, all networks that will be used for NG9-1-1 services will be configured with a Border Control Function (BCF). The BCF is provided through a Session Border Controller (SBC). The BCF also supports a variety of direct IP interconnection arrangements between the ESInet and external IP networks, depending on the level of mutual trust that exists between the respective networks.

- **Emergency Call Routing Function / Location Validation Function (ECRF / LVF)**

- In the process of delivering a 9-1-1 call, an origination network may use an Emergency Call Routing Function (ECRF), or a similar function within its own network to determine an appropriate route to a PSAP or another ESInet.
- The Location Validation Function (LVF) in NG9-1-1 systems usually only verifies civic (street address) location. The LVF uses the Location Information Server (LIS) to determine the geographical location of a 9-1-1 call. The LVF must be designed to determine rapidly the validity of an address and respond. The LVF data and its interfaces are similar to those used by an ECRF representing the same geographic area(s).

- **Emergency Services Routing Proxy (ESRP)**

- An Emergency Service Routing Proxy (ESRP) is required for call delivery to the appropriate PSAP based upon location and routing rules. According to the NENA i3 standard, the ESRP evaluates a policy "rule set" for the queue the call arrives on to build the route from the caller to the PSAP. For operational purposes, the ESRP performs a query of the location based routing instructions from the ECRF to determine the "normal" next hop by Uniform Resource Identifier (URI).

- **Policy Routing Function (PRF)**

- The Policy Routing Function (PRF) is the primary routing component of the ESRP. The ESRP uses the rules defined within the PRF to augment or modify the query information outlined above to further direct the call to a PSAP. The PRF itself requires an ESRP to assist in dynamic call routing and re-routing based upon other policy rules beyond normal operation.

- **Legacy Network Gateways (LNGs)**

- LNGs are necessary for PSAPs that are ready for NG9-1-1 but still rely on a legacy 9-1-1 network for call origination. The expectation is that LNGs will facilitate a more efficient migration to NG9-1-1. The LNG is a gateway located between the legacy 9-1-1 network and the ESInet.
- **Legacy PSAP Gateway (LPG)**
 - The LPG is a signaling and media interconnection point between an ESInet and a legacy PSAP, which allows for the delivery of 9-1-1 calls that traverse an i3 ESInet to get to a legacy PSAP. The legacy PSAP gateway (LPG) provides a seamless connection to PSAPs that have not upgraded their CPE to NG-capable.
- **Legacy Selective Router Gateway (LSRG)**
 - The Legacy Selective Router Gateway (LSRG) must serve as the interface for legacy selective routers to terminate trunks utilizing an inter-tandem trunk group method of termination. The LSRG converts a 9-1-1 call signaling to SIP/RTP then queries the existing ALI data management system to retrieve location information for the call.
- **Location Information Services (LIS)**
 - Location Information Services are external to the ESInet, and the functional entity which provides location is a Location Information Server (LIS). While the LIS is an external database, the Vendor must supply an interface from the network to the LIS.
- **Text to 9-1-1 requirements**
 - The Text to 911 solution must comply with the Alliance for Telecommunications Industry Solutions (ATIS) / Telecommunication Industry Association (TIA) J STD 110, Joint ATIS/TIA Native SMS to 9-1-1 Requirements & Architecture Specification A J STD 110 Standard.

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3.4.3 Regionalization Approach

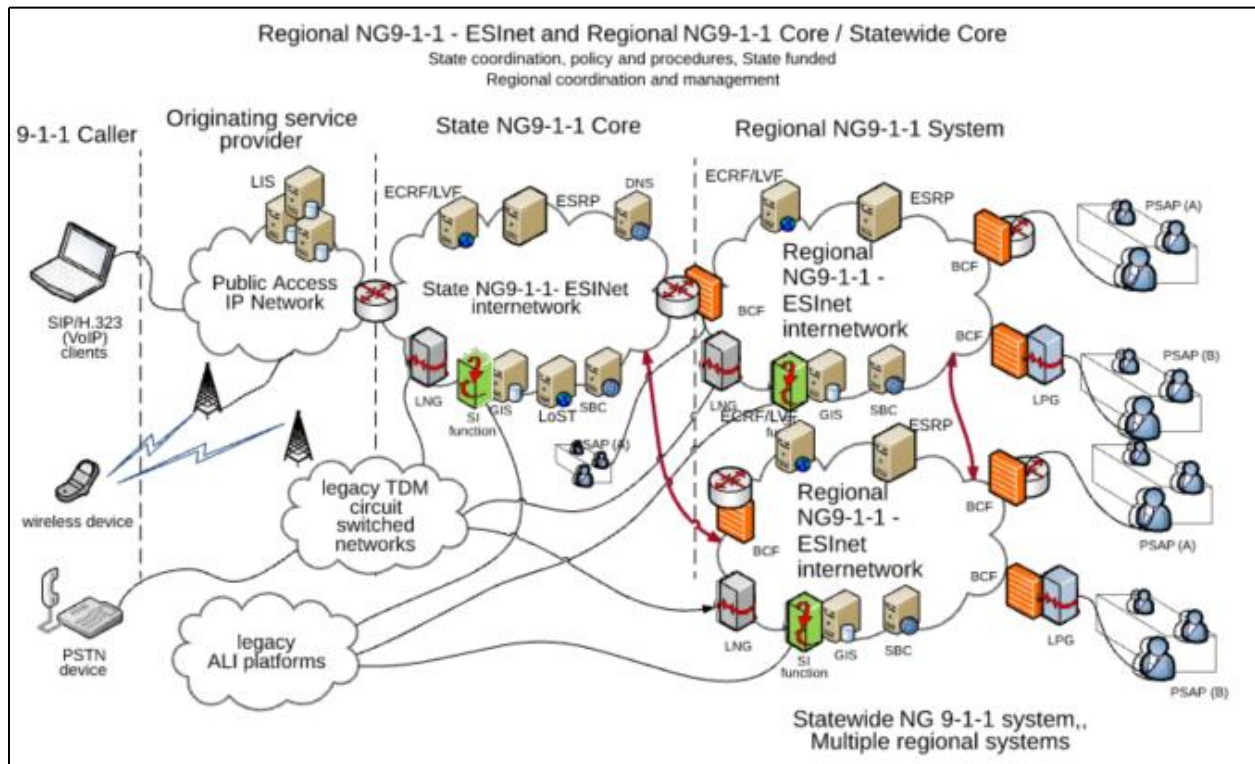


Figure 8 State NG9-1-1 and Regional NG9-1-1 Diagram

NG9-1-1 core services will be designed to support regionalization among groups of PSAPs. Transition to this model can lead to a coordination and management alternative. Regionalization can be strategically beneficial by utilizing resources and funding more efficiently while achieving the benefits associated with NG9-1-1 at the local-level. Regionalization also allows for a more streamlined and efficient transition by allowing PSAPs to join the network as it fits their needs rather than forcing a change.

The regional infrastructure that Cal OES will transition to will be introduce the NG9-1-1 services required by PSAPs and increase the services defined throughout this plan.

3.5 Transition Coordination Activities

One of the primary goals of NG9-1-1 transition from the state is to ensure financial efficiency. With 441 PSAPs in the state that are planning for NG9-1-1, cost is a critical consideration. Therefore, it is necessary to plan strategically for implementing NG9-1-1 services and coordinate how those services are implemented to:

- Assess and control the costs of implementing an ESInet and the related NG9-1-1 services.
- Ensure that standards for NG9-1-1 are met, and that best practices of implementation are followed to streamline efforts and minimize costs.
- Avoid the risk of configuring and deploying disparate systems that may complicate or disregard the strategic integration of a statewide NG9-1-1 System.
- Reduce the duplication of hardware, software, and implementations that may be developed in isolation for a single PSAP, service, or operational requirement without regard to future technologies.
- Increase the ability of PSAPs to interoperate by reducing the restriction on existing technology boundaries while aiding the development of new agreements so that each PSAP maintain its administrative and operational policies and procedures.
- Assist in increasing the ability for PSAPs to gain greater technical and operational support regardless of CPE vendor.
- Support the PSAPs while delivering an ESInet / NG9-1-1 System that can minimize disruption, enhance capability, and increase efficiency during and after migration.

Cal OES has determined that the technology framework is the foundation for all PSAPs. Using the NENA i3 standards as a guide, the primary areas can be further defined into specific focus areas that Cal OES has the ability to bring to fruition.

3.5.1 Transition Administration

Cal OES has introduced a strategic plan for transition that encompasses PSAP requirements as well as the NG Core services. The long-term objective is to allow PSAPs to become NG9-1-1 enabled with assistance from Cal OES. Cal OES currently directs and advises activities associated with 9-1-1 call delivery for all 441 PSAPs. Cal OES accomplishes its goals primarily through the distribution of 9-1-1 funds to enhance 9-1-1 call delivery to ensure that all PSAPs are aligned throughout the state. Ensuring PSAP alignment throughout the state ensures a consistent level of 9-1-1 service regardless of the caller's location when 9-1-1 is accessed.

It may be necessary to make changes to current administrative tasks to ensure a successful NG9-1-1 implementation. This purpose of this document is not to address those changes specifically, but merely point out the potential areas where Cal OES could make changes. Examples are as follows:

- **Administrative support framework for the design, implementation, and operation of an ESInet that reaches all 441 PSAPs.**
 - Cal OES will play a vital role in creating the framework to allow PSAPs to take advantage of all the benefits of a statewide ESInet. Of particular importance is the ability to create interconnected regional solutions that will allow greater sharing among the PSAPs while using a common infrastructure specifically designed for 9-1-1 service. Cal OES will be responsible for ensuring that

the requirements of the ESInet meet the existing obligations of every PSAP throughout the state. In addition, the ESInet will be used to support the transition to NG9-1-1.

- **Administrative support framework for the PSAPs and the establishment of an NG9-1-1 system once the ESInet is operational.**
 - Cal OES will provide the guidance to ensure that all NG9-1-1 functionality is deployed according to standards and that the functional elements meet the custom requirements of the PSAPs. Once the ESInet is deployed, the functionality for NG9-1-1 statewide will be dependent solely upon the capabilities required by the PSAPs.
- **Administration and oversight of a governance model that supports the ability of PSAPs to regionalize through a consistent manner.**
 - Call OES will provide guidance and oversight to assist PSAPs in the creation of a regional system that includes NG9-1-1 functionality. Governance will include the framework required to increase the interoperability and interagency collaboration for all services. In this sense, the governance is focused upon how the PSAPs will interact as well as how the overall program will be managed.
- **Analysis of and support for potential legislative changes that would be needed to advance the framework for NG9-1-1.**
 - Legislative changes may be required to enhance the support for NG9-1-1. Legacy models that are currently used to provide traditional 9-1-1 services may not be capable of supporting NG9-1-1 or may limit the ability of PSAPs to create their own interconnected, regional networks. Cal OES will review the statutory and regulatory framework to identify items that could be restrictive in terms of administration and operation of an NG9-1-1 system.
- **Enhance the ability of the program to determine, document, and audit eligible expenses in an NG9-1-1 environment.**
 - The effective and efficient transition to NG9-1-1 requires the ability to control disbursements to PSAPs that will speed or enhance the migration to NG9-1-1. Cal OES will consider how all items are documented and determine if an audit of expenses by PSAP is necessary. The audit and cost control will allow Cal OES to control costs and efficiently manage how the system achieves its goals.
- **Alignment of the State of California NG9-1-1 Program with National 9-1-1 Program efforts.**
 - NG9-1-1 is not restricted to a single state. Therefore, Cal OES must support the alignment of the statewide solution as a function of meeting the National NG9-1-1 program efforts. Doing so will ensure that NG9-1-1 in California will be installed to interoperate and allow integration into a nationwide NG9-1-1 framework.

3.6 Operations Coordination

The existing PSAP operational environment within California is based upon legacy practices, technology, and administrative functions. The following key areas are listed below.

- **Establish best practices and oversight for all NG9-1-1 activities across the state, including design and documentation support, regionalization of PSAPs, network operation, and service management.**
 - Using a set of policies built around the implementation of NG9-1-1 as an ecosystem is commonly a method that can encourage participation by PSAPs. Policies built with the understanding that Cal OES is interested in collaborating with PSAPs to offer greater interaction that is not available today

will increase the alignment of all PSAPs as the NG9-1-1 system is implemented. Cal OES policies and best practices will recommend and deliver additional coordination to the PSAPs that are moving toward or have already implemented fully functional or partially functional NG9 1 1 systems.

- **Implement the capabilities for NG9-1-1 statewide while stressing the functional areas to include cybersecurity, continuity of operations, avoidance and recognition of trouble, mitigation, and recovery of outages.**
 - Cal OES is implementing an NG9-1-1 strategy to enhance the capabilities for all 441 PSAPs. The technical components of the system are governed by the standards developed by NENA that define the complete NG9-1-1 core services from a functional level. Cal OES will be responsible for ensuring that these standards are met. This responsibility includes the entire specification set for the ESInet, NG9-1-1 core services, interconnection, cybersecurity, avoidance and recognition of trouble, mitigation, and recovery of outages. Cal OES will assist PSAPs in administering the capabilities required to complete transition to the NG9-1-1 System.
- **Conduct periodic technical and operational audits on the NGCS and PSAPs to ensure that the statewide services are meeting PSAP requirements in terms of performance and service.**
 - Cal OES will assist PSAPs in establishing an audit framework in which the 9-1-1 technical and operational environment across the state will be reviewed periodically. An audit is useful to document all operational characteristics that may be activated in the NG9-1-1 system. Some services may be activated that can aid other PSAPs and that can be expanded across the entire system to maintain cohesiveness across the state.
- **Increase the ability for PSAPs to share resources, enhance call transfer capability, and create greater opportunities for interoperability across the NG9-1-1 platform.**
 - Cal OES policies and best practices for migration will include the framework to increase the sharing of all resources, including existing technology that may be modified for use among PSAPs. Conceptually, increasing the sharing among PSAPs may result in greater efficiency from both a financial and a technical perspective. The collaboration among the PSAPs may also allow for enhanced interoperability that minimizes the current boundary limitations within legacy 9-1-1 implementations. By focusing on a collaborative ecosystem best practice, Cal OES can support an NG9 1 1 system that supports ground up regionalization among multiple PSAPs across the NG9-1-1 system.

3.7 NG9-1-1 Transition

Cal OES views NG9-1-1 as a long-term investment that will increase the capabilities for 9-1-1 at the PSAP and serve the entire population of California by advancing the 9-1-1 technology landscape. The perspective is that the transition to NG9-1-1 will provide greater benefits than the legacy systems, such as:

- **Increasing situational awareness**
 - NG9-1-1 can increase the time it takes for a PSAP to collect and monitor information about all events. The ability for users to quickly share more data about a situation may improve the ability of first responders to gain control of an incident or event, while heightening public safety awareness.
- **Greater interconnection**

- 441 individual PSAP systems can be difficult to manage efficiently or effectively. Often the ability to interconnect among PSAPs is dependent upon a PSAP's service providers. NG9-1-1 service will allow PSAPs to connect to and with every other PSAP in the state.
- **Advancing interoperability**
 - Interoperability is a common goal for all NG9-1-1 deployments. While some PSAPs have created interoperable solutions without an NG9-1-1 network, such solutions can be costly. Sharing of resources and technology is an important consideration as transition to NG9-1-1 takes place. NG9-1-1 removes many of the historical restrictions such as geographic boundaries built on legacy telecommunications.
- **Reducing risk through equipment upgrades**
 - The existing 9-1-1 network relies on technology that was developed in the late 1970s. Some of this equipment has been in place since its installation, and the equipment is well beyond its end of life. An increasing number of 9-1-1 outages have involved failures in this older equipment. Replacement parts are no longer available and telecommunication service providers are looking for newer technology to replace the old equipment. Replacing the existing infrastructure with NG9-1-1 infrastructure will reduce the risk associated with relying upon the outdated technology and equipment.
- **Technology Convergence**
 - The existing 9-1-1 system relies upon several point-to-point connections into each PSAP. These point-to-point connections form the network that is used to route 9-1-1 calls and location information to the PSAP. Many of these technologies are nearing end of life and telecommunications providers are looking to MPLS and IP connections as a replacement. The transition to NG9-1-1 will facilitate a convergence of technologies over a public safety grade IP connection to each PSAP, which can be used to support existing 9-1-1 services as well as providing NG9-1-1 service.
- **Enabling 9-1-1 service based on the technology that the public uses**
 - The public relies upon 9-1-1 to aid in an emergency. It is critical that the 9-1-1 system keeps pace with the same technology used by a caller. When cellular phones were introduced, the legacy 9-1-1 system was modified to route wireless 9-1-1 calls to the appropriate PSAP with the caller's approximate location. While that modification to the system worked, the current technology offers greater capability than ever before, but the patchwork analog 9-1-1 system is unable to take advantage of those capabilities. NG9-1-1 service focuses more on the end user and how the network treats the 9-1-1 call. Conversely, there is little change at the PSAP initially. Of course, over time, 9-1-1 call-takers will need to be trained in how to effectively process the additional data that will arrive with a 9-1-1 request for service.

4. TESTING AND VALIDATION

4.1 Test Preparation

Test preparation and planning has been included in this scenario to document that all preparations and plans are completed. Many of these tests will be performed in the lab setting and within a controlled environment. Tests will be selected that will effectively test the primary components that make up the ESInet and NG9-1-1 system. The results of those tests will validate that the system is configured properly and meets state and PSAP requirements. In addition to testing the primary components of the ESInet, other tests must be prepared to verify the transmission and delivery of calls and data across the configuration. Following are verification tests that must be conducted.

1. Network Routing
 - a. Voice and Data
 - i. Primary
 - ii. Alternate
 - iii. Defaults
 - b. Text
 - i. Primary
 - ii. Alternate
 - iii. Defaults
 - c. Core
 - i. BCF
 - ii. ECRF/LVF
 - iii. ESRP
 - iv. LNG
 - v. PRF
 - d. Carrier
 - i. Inbound
 - ii. Outbound
 - iii. LIS
 - iv. ALI
 - e. PSAP
 - i. Hosted
 - ii. Non-Hosted
 - iii. LPG
 - iv. CAD
 - v. Logging / recording
 - vi. Statistics
2. Disaster Recovery
 - a. Edge to Core
 - b. Core to Edge
 - c. Regional

- d. Carrier
- e. Hosted/non-hosted

3. Restoration Procedures

Application of Test Procedures

Test procedures will be applied as agreed upon to verify and validate the service, software, and system from a capability, functionality, and application basis. Following are the documentation requirements associated with test procedures.

- Document all test results and any additional findings.
 - Note any findings deemed not applicable or not desired.
 - Note any fixes performed by the Vendor and ensure that the fixes are documented.
 - Note any findings deemed as false positives.
 - These results and findings may lead to a change request or other potential configuration modifications prior to transition. In addition, regression testing will need to be done in the event the modifications do not meet the desired specifications.
- Document the control mechanisms as needed to a scorecard or list.
- Document test limitations.
- Determine that all components, system functions, and services provided are operational and conduct functionality checks after completion of assessment.

Data Analysis and Report Results

All results will be documented during the tests. Doing so will verify that all results are vetted, especially false positive results. Following are the documentation requirements associated with data analysis.

- Highlight and categorize findings according to their level of importance, whether vulnerabilities are high, medium, or low.
- Provide recommendations to remediate or mitigate the risks.
- Document the controls and mechanisms as compliant.

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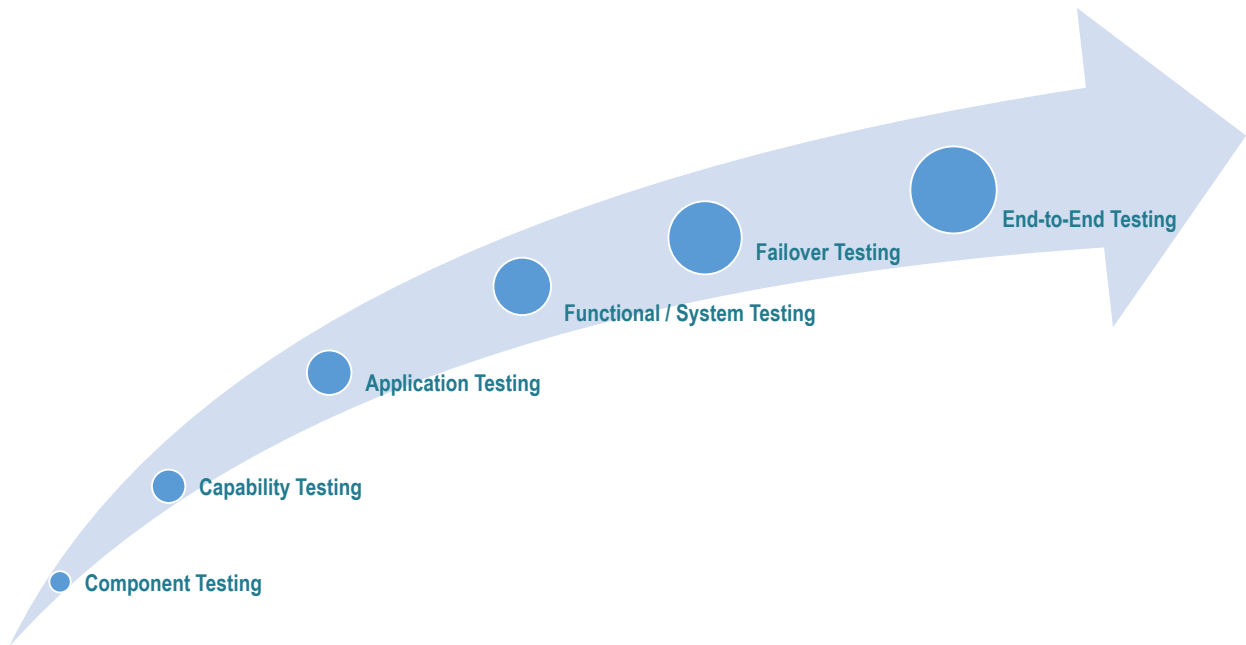


Figure 9 Testing phases

4.2 Component Testing

Figure 9 above provides a depiction of the various testing phases. Component testing involves verifying and validating that all of the components of the ESInet and NG9-1-1 system are configured properly and are fully operational. Component testing is essentially the first turn-on and initial turn-up of each device. During component testing, Cal OES will verify that all of the components are using the same software revision, operating system, and any toolsets required by the system. If there are discrepancies found, they must be rectified before any capabilities or applications are configured on the system. Component testing is often done during system burn-in or staging and may need a Vendor to certify that the components meet the requirements prior to shipping to the location.

Initial turn up and test of software / hardware will validate that the components are capable of operation. All components will be tested against the performance metrics of pass or fail. There are three steps:

- Turn-on and initial boot up of all components
- Verification of software revisions and operation

4.3 Capability Testing

Capability testing involves verifying and validating that all of the components used in the system are properly configured to meet requirements and capabilities of the ESInet and NG9-1-1. Capability testing is done once the primary routing infrastructure has been deployed, but before the routing protocols have been established. At this stage, the components have been tested and validated. The intent of capability testing is to ensure that the routers, switches, and servers have been interconnected properly, and that all of the devices can be reached and can respond in a manner that is expected. If any device is not responding or is responding intermittently, troubleshooting will be done

to determine where the problem may be. Capability testing seeks to validate that the infrastructure is capable of supporting the infrastructure for the ESInet and NG9-1-1. Figure 10 provides a flow chart of capability testing.

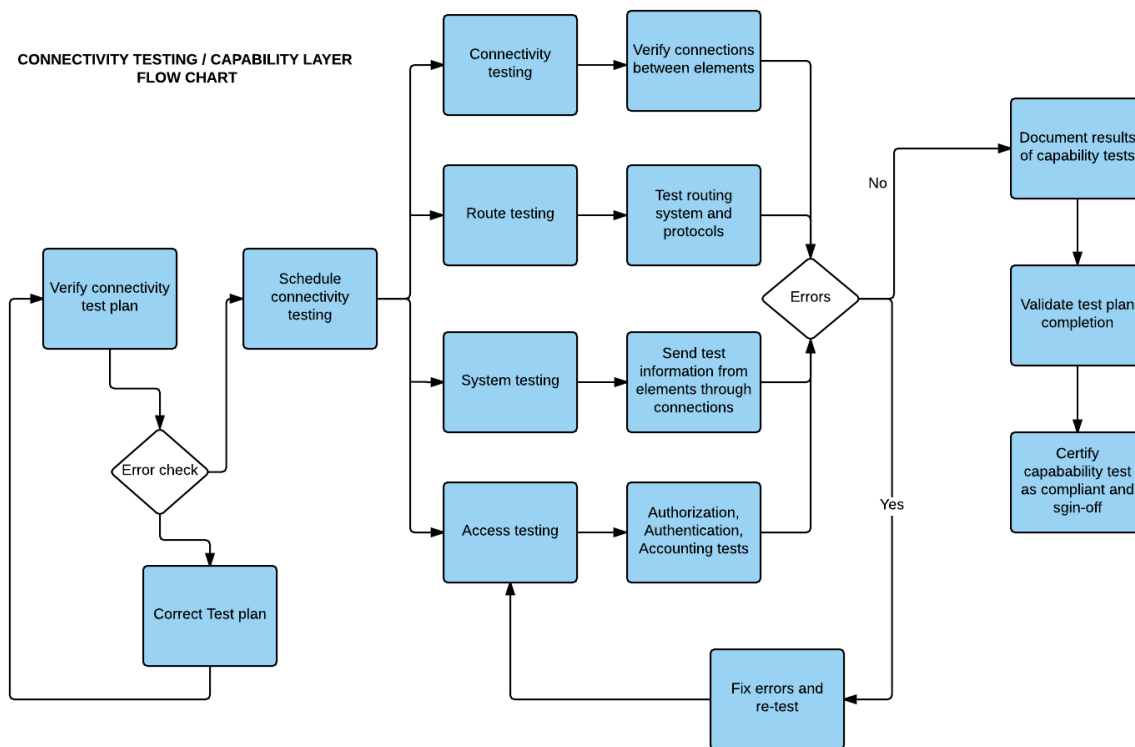


Figure 10 Capability Testing

4.4 Application Testing

Application testing is involved with verifying and validating that all the system applications used for the NG9-1-1 operation are configured and certified. Application testing ensures that all the NG9-1-1 functional elements are configured to support the requirements and are in compliance with NENA i3 standards. Figure 11 on the following page provides a flow chart for application testing.

Application testing verifies that each individual functional element is ready for service and can support the functions that are required. Testing includes the validation of the initial service readiness of the following system components:

- Application platform
 - IP routing
 - Protocol operation
 - SIP setup and operation
 - Logging setup
 - Data delivery setup
 - Service integration components

- Functional element initial tests
 - ECRF
 - ESRP
 - BCF
 - LNG / LSRG / LPG

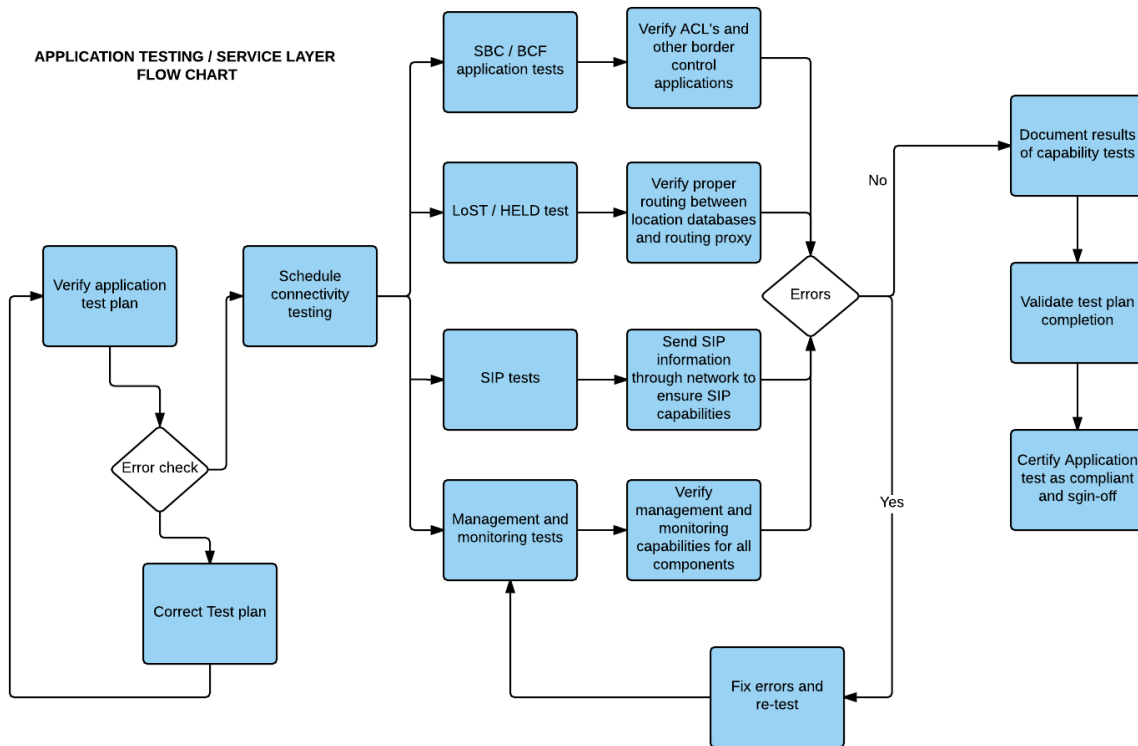


Figure 11 Application Testing

In addition to the application testing, the initial cybersecurity tests will occur during this stage. Cybersecurity testing at this stage will validate that the system has been designed to perform the level of security by implementing the functional elements necessary for the delivered system. Cybersecurity will be tested again once the entire service platform has been deployed. Cybersecurity tests will also be conducted on an ongoing basis to maintain the baseline and to check the health of the system at regular intervals. Figure 12 below depicts the flow chart associated with cybersecurity testing.

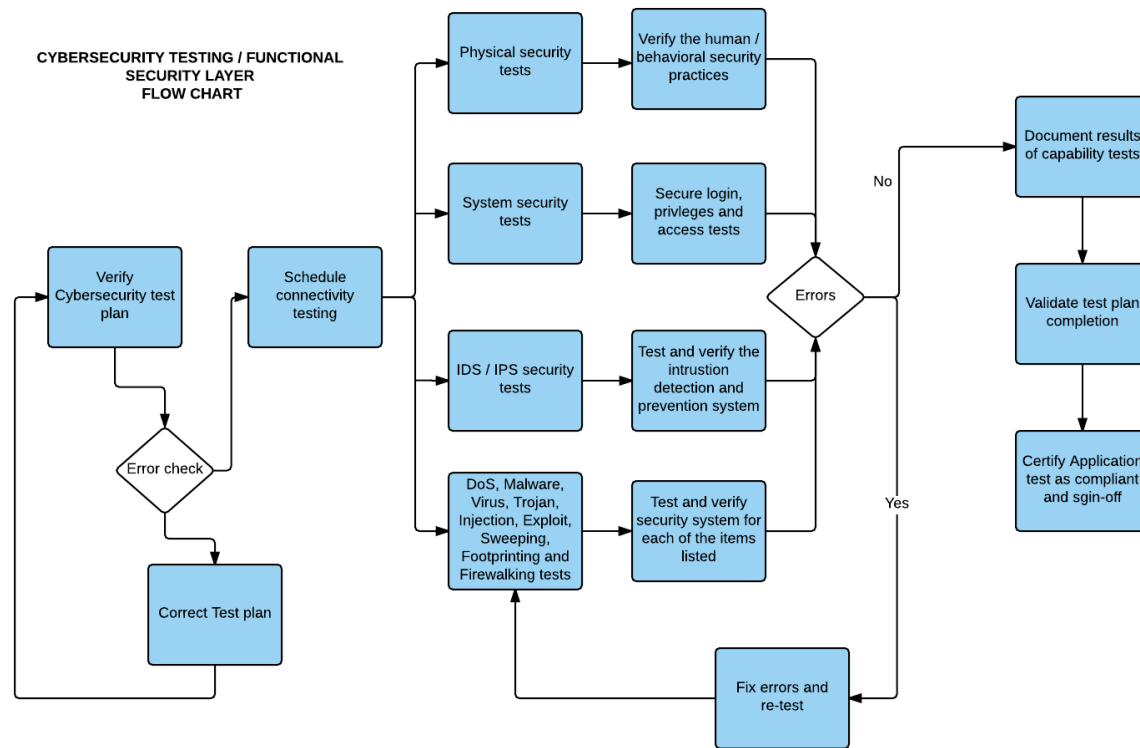


Figure 12 Cybersecurity Testing

4.5 Functional / System Testing

Functional / System testing is completed to certify that all of the NG9-1-1 systems are performing the functions required to serve the PSAPs. At this stage, the entire NG9-1-1 service platform is created for service. The functional elements have passed the initial application testing and are now communicating with each other and ready for NG9-1-1. Often called the Next Generation Core Services (NGCS) these devices are a critical component for NG9-1-1 operation. This process will ensure that the NGCS is configured properly to support the operational services provided by the ECRF, ESRP including the PRF, LNG, LPG, and LSRG testing to ensure that the operation is performing functions as specified.

Functional / System testing also includes the operation at the PSAP as a service. System level items such as the interface to CAD, local CPE, logging recorders and potentially administrative telephone system(s) will need to be tested to verify the entire end to end service. Figure 13 on the following page depicts the flowchart for system testing of the following:

- BCF / SBC
 - Cybersecurity and firewall tests
- ESRP
 - SIP testing
 - Call delivery

- Data delivery
- Call transfer
- ECRF interaction
- Policy Routing Function (PRF)
- LNG / LSRG / LPG
- ECRF/LVF
 - LIS
- CAD
- Local CPE
- Logging Recorders
- Administrative phone system
- ALI management
 - GIS
 - MSAG
 - Data maintenance
- Other local systems

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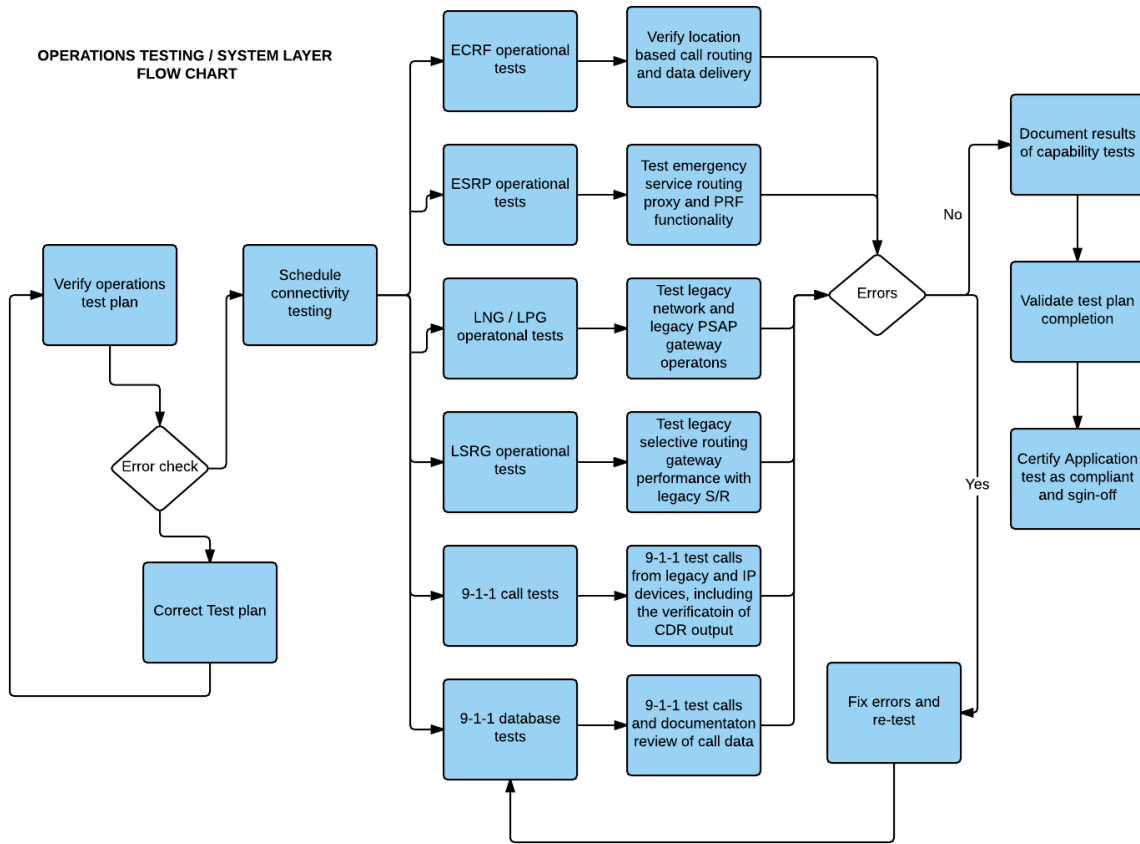


Figure 13 Functional / System Testing

4.6 Failover Testing

Failover testing can be conducted many times during the installation and turn up of NG9-1-1 service. However, it is recommended that failover testing be conducted on the entire system as it is prepared to function fully. Failover testing of the entire system will ensure that the components themselves, as well as the applications and functions are capable of failover within the system and without error. Figure 14 shows a flowchart for failover testing, which may include the following:

- The failover test will be used to automatically or manually fail a component, network node, or the functionality to assess and document the results.
- Failover / Disaster Recovery
 - BCF
 - SBC
 - BCF to ESRP
 - ESRP to BCF

- ESRP to ECRF
- ESRP failure
- ECRF to ALI
- ECRF to GIS / Spatial Interface
- ECRF to LIS
- ECRF failure
- LIS failure or disruption
- LVF failure
- LNG to ESRP
- LNG to Carrier
- LNG failure
- LPG failure
- SRDB failure

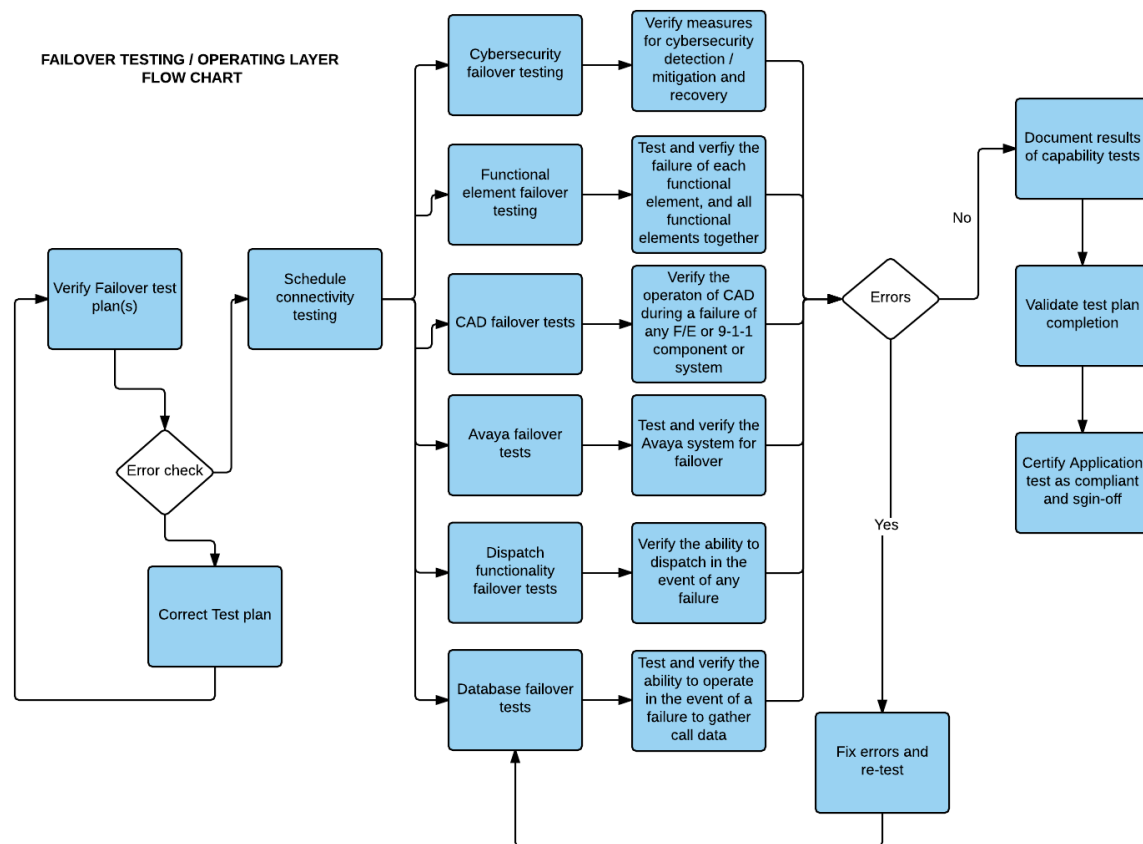


Figure 14 Failover Testing

4.7 End to End Testing

At this stage of testing, the NG9-1-1 system has passed all of the validation and certification metrics. End-to-end testing is used to create exercises within the NGCS and from the PSAP to fully test the functionality from end-to-end across the system. End-to-end testing is used as a final validation that the installed system is in compliance with and performs according to specifications. End-to-end testing includes the following areas to ensure that the system is ready for live traffic and final migration and cutover.

Stability Testing (software / hardware)

Stability testing is a suite of tests meant to ensure that the system and/or hardware being used for the solution meets the specifications dictated by the service requirements. Stability tests include the performance criteria defined by the business requirements document and the SLA. It is important that the collection of data that can be used for reporting can be gathered and used. In addition, stability testing verifies the quality assurance and quality control measures for performance based operations. Finally, stability testing validates that the system has been designed and implemented to meet the high availability parameters for 9-1-1 service.

Performance Tests

Performance tests will monitor system performance during normal to high usage and compare to expected metrics detailed in the requirements. Simulated loads will be placed upon the system to verify that as performance increases or decreases, the system responds appropriately. These measurements will be included in the performance requirements listed in the functional specifications.

- Performance of the system should be measured with a level of simulated traffic, or system operation. Simulated traffic should be presented to the system to validate that the system operates within the metrics during normal and high usage.
- Performance tests are completed at each link, and each node within the system.
- NENA standard metrics will be used for call delivery, as well as for packet loss, jitter, and latency figures presented in the ESInet design documentation.
- Performance testing is essential to support NG9-1-1 system performance.

Load Tests

Load testing is meant to exercise the solution using a predefined load level, usually the highest load that the system can accept while still functioning properly. These tests are often completed in conjunction with the performance tests to establish any baselines for meeting the metrics defined in the requirements.

- The load test will be performed through a simulation based on the highest load that a system can take. The intent is to determine the metric for each component within the topology and document and verify the result.
- Load testing will be performed across the network nodes, and the network itself.

Stress Tests

Stress tests allow observers to verify how the NG9-1-1 system responds to a simulated stress. Stressors may include the loss of an ESRP, or disruption in service. Not to be confused with failover testing; stress tests seek to identify a potential pattern that is repeated during a stress against any service-affecting component. Stress testing tries to break the application, capability, and functionality of the System by overwhelming its resources or by taking resources away from it.

- Stress testing will test each of the links and all components attached to that link to evaluate and document how the components react.
- These tests will include a failure of a particular item (software or hardware) and may also extend to testing items such as buffer overflow or incorrect packet size.

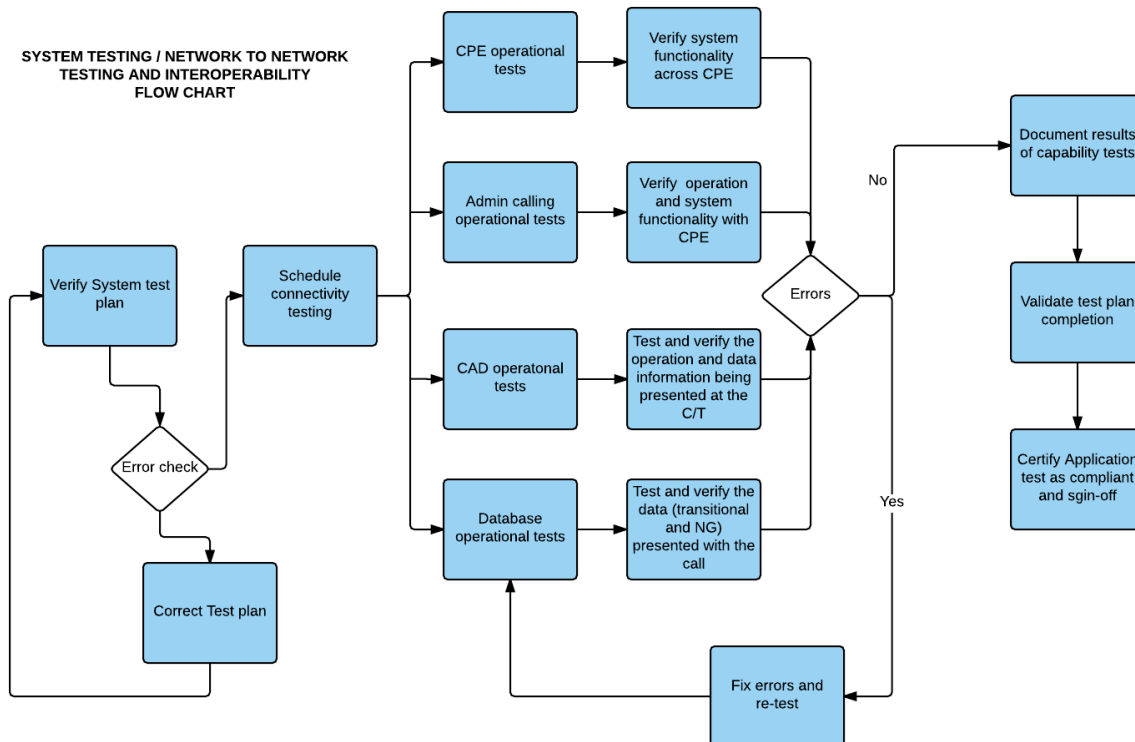


Figure 15 System Testing

4.8 Regression Testing

Regression testing is performed to retest portions of the solution after modifications are made to ensure no other errors were introduced through the fixes. Regression tests are designed to allow for specific fixes, patches, and debugging of the final product. Regression tests are often needed to eliminate specific discrepancies between the functional

specification and final operational system. In addition, regression testing is used to re-test areas that may have been changed through a change request process.

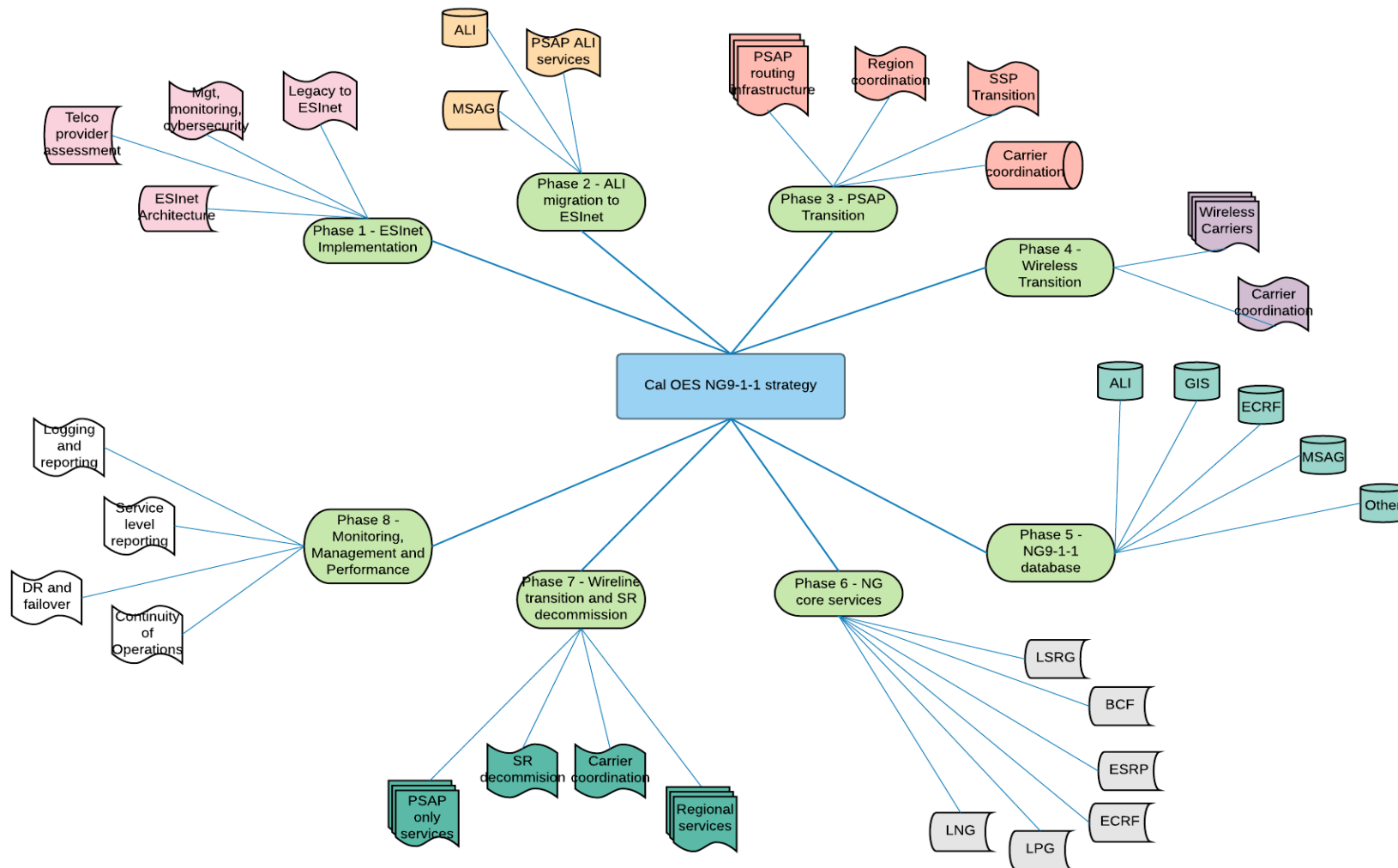
APPENDIX A

DATA STRUCTURES DOCUMENTS (including NG9-1-1)		
02-010	Standard Legacy Data Formats For 9-1-1 Data Exchange GIS Mapping	2011/03/28
02-501	Wireless (Pre-XML) Static and Dynamic ALI Data Content Information Document	2006/10/16
02-503	XML Namespaces Information Document	2007/02/23
04-005	ALI Query Service Standard	2006/11/21
71-001	NG9-1-1 Additional Data Standard	2009/09/17
NENA-STA-004.1-2014	NENA Next Generation United States Civic Location Data Exchange Format (CLDXF)	2014/03/23
NENA-STA-008.2-2014 (originally 70-001)	NENA Registry System (NRS) Standard	2014/10/06
NENA/APCO-INF-005	NENA/APCO Emergency Incident Data Document (EIDD) Information Document	2014/02/21
DATA MANAGEMENT DOCUMENT (including NG9-1-1)		
02-011	Data Standards For Local Exchange Carriers, ALI Service Providers & 9-1-1 Jurisdictions	2012/05/12
02-013	Data Standards for the Provisioning and Maintenance of MSAG Files to VDBs and ERDBs	2008/06/07
		Reviewed 9/12/2014
02-014	GIS Data Collection and Maintenance Standards	2007/06/17
02-015	Standard for Reporting and Resolving ANI/ALI Discrepancies and No Records Found for Wireline, Wireless and VoIP Technologies	2009/06/06
02-502	NENA Company ID Registration Service Information Document	2008/11/12
06-001	Standards for Local Service Provider Interconnection Information Sharing	2004/08/01
71-501	Synchronizing Geographic Information System Databases with MSAG & ALI Information Document	2009/09/08
71-502	An Overview of Policy Rules for Call Routing and Handling in NG9-1-1 Information Document	2010/08/24
NENA-INF-011.1-2014	NENA NG9-1-1 Policy Routing Rules Operations Guide	2014/10/06
NENA-INF-014.1-2015	NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1	2015/09/18

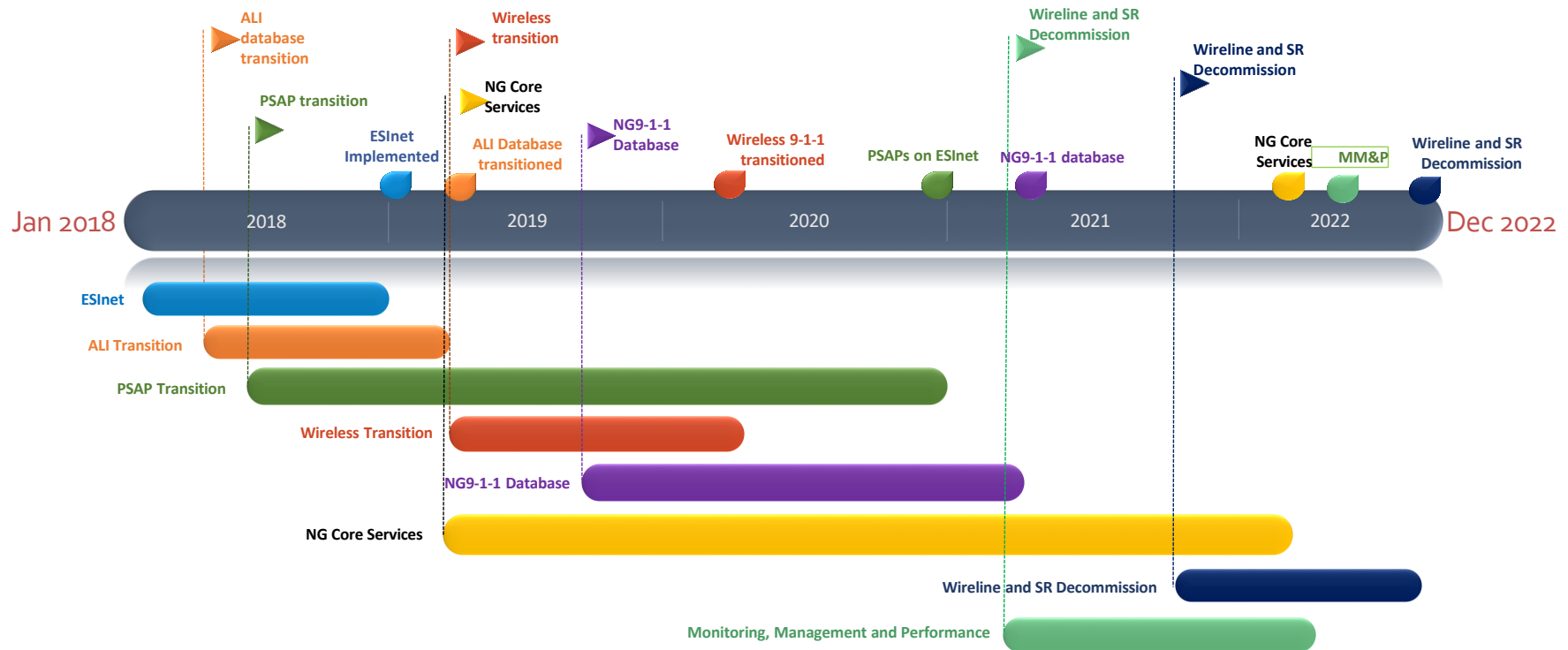
NENA-STA-003.1.1-2014	NENA Standard for NG9-1-1 Policy Routing Rules	2014/12/01
NENA-REQ-002.1-2016	NENA Next Generation 9-1-1 Data Management Requirements	2016/03/10
NG9-1-1 TRANSITION PLANNING DOCUMENTS		
NENA-INF-008.2-2014 (originally 77-501)	NG9-1-1 Transition Plan Considerations Information Document	2013/11/20
SECURITY DOCUMENTS		
04-503	Network/System Access Security Information Document	2005/12/01
75-001	Security for Next-Generation 9-1-1 Standard	2010/02/06
75-502	Next Generation 9-1-1 Security Audit Checklist Information Document	2011/12/14
VOICE OVER INTERNET PROTOCOL (VoIP) DOCUMENTS		
08-001	Interim VoIP Architecture for Enhanced 9-1-1 Services (i2) Standard	2010/08/11
08-503	VoIP Characteristics Information Document	2004/06/10
08-504	VoIP Standards Development Organization Information Document	2004/06/08
57-503	Procedures for Notification of ERDB & VPC Operators of ESN Changes by 9-1-1 Administrator Information Document	2008/01/08
58-502	VoIP Funding and Regulatory Issues Information Document	2006/06/06
NEXT GENERATION 9-1-1 (NG9-1-1) DOCUMENTS		
08-002	Functional and Interface Standards for Next Generation 9-1-1 Version	2007/12/18
08-003	Detailed Functional and Interface Standards for the NENA i3 Solution	2011/06/14
08-501	Interface between the E9-1-1 Service Provider Network and the Internet Protocol (IP) PSAP Information Document	2004/06/15
08-505	Methods for Location Determination to Support IP-Based Emergency Services Information Document	2006/12/21
08-506	Emergency Services IP Network Design for NG9-1-1 Information Document	2011/12/14
08-751	NENA i3 Requirements Document	2006/09/28
08-752	Location Information to Support IP-Based Emergency Services Requirements Document	2006/12/21
57-750	NG9-1-1 System and PSAP Operational Features and Capabilities Requirements Document	2011/06/14

NENA-INF-003.1-2013	Potential Points of Demarcation in NG9-1-1 Networks Information Document	2013/03/21
NENA-INF-006.1-2014	NG9-1-1 Planning Guidelines Information Document	2014/01/08
NENA-INF-009.1-2014	Requirements for a National Forest Guide Information Document	2014/08/14
NENA/APCO-REQ-001.1.1-2016	NENA/APCO NG9-1-1 PSAP Requirements Document	2016/01/15
WIRELESS 9-1-1 INTEGRATION DOCUMENTS		
57-001	Wireless E9-1-1 Overflow, Default and Diverse Routing Standard & A PSAP Managers' Guide to GIS & Wireless 9-1-1	2004/11/18
57-002	E9-1-1 Wireless Maintenance Call Routing & Testing Validation Standard including Call Routing & Testing Validation Worksheet & Sample Non-Disclosure Agreement	2007/06/09

APPENDIX B



APPENDIX C





Report for
**California OES
Governance Plan
And
Regulatory Review**

submitted to
**California Governor's Office
of Emergency Services**
Sacramento, California

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1. OVERVIEW

California understands that robust planning for the implementation of NG9-1-1 will make for a more efficient and effective transition and contracted with L.R. Kimball to complete this statutory review and governance plan to prepare California for the transition. Legacy 9-1-1 governance structures and statutes have been known to inhibit the successful implementation of NG9-1-1. This Report reviews the current statutory and governance structures for 9-1-1 in California and defines related requirements for a successful transition to NG9-1-1.

It is important for State statutes to permit and facilitate NG9-1-1 implementation. Many legacy 9-1-1 statutes establish legacy systems and are tied to outdated technologies. The planning and implementation of NG9-1-1 requires a review of existing statutes to identify potential roadblocks to implementation and identify necessary amendments to facilitate the continuing evolution of NG9-1-1.

Additionally, a successful NG9-1-1 Governance Model establishes the means of achieving the coordination of new and complex NG9-1-1 considerations consistently. These new complexities necessitate formal coordination of system users and vendors regarding requirements, interconnections and other considerations to effectively operate and manage it.

For California's transition to NG9-1-1, the CA 9-1-1 Branch will define a standardized approach to execute the statewide strategy for NG9-1-1 so that all PSAPs benefit from the NG9-1-1 system. The CA 9-1-1 Branch should coordinate stakeholder engagement to promote the transition and educate stakeholders on system implementation. While the CA 9-1-1 Branch will be the primary contract manager for the ESInet and NG9 1-1 system, the PSAPs will have input. The Vendor(s) will be required to deliver a system that meets technical specifications established by the CA 9-1-1 Branch that have been developed with input from the PSAPs. The CA 9-1-1 Branch will assure that call delivery to the PSAP meets statutory requirements and that current service levels are supported once the system is operational.

California's current 9-1-1 governance structure is effectively positioned to take on the policy, procedural and operational roles required for NG9-1-1 governance at the State and local levels. The current State-level governance structure encompasses leadership, organization and stakeholder representation, all the necessary components for an effective governance structure. Because California's plan for NG9-1-1 introduces a regional component that is not needed for current 9-1-1 governance, the State should develop Regional Task Forces to create a venue and a means for the appropriate representatives from each region to make region-level decisions for each ESInet.

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2. STATUTORY REVIEW

2.1 Current CA 9-1-1 Statutory Environment

The Warren 9-1-1 Emergency Assistance Act (Warren Act),¹ established 9-1-1 as the primary means to notify emergency services. The Warren Act creates the State 911 Advisory Board and defines 9-1-1 service and transfer methods for the initial implementation of 9-1-1 systems in the State.

The Warren Act directs the Governor's Office of Emergency Services (Cal OES) to coordinate the implementation of systems established pursuant to the Warren Act and directs the Public Safety Communications Division to coordinate with related State agencies to perform its duties. The Warren Act directs the Cal OES to update technical and operational standards for public agency systems biennially and monitor compliance with those standards.

California Civil code section 1714.55 provides liability protection for 9-1-1 service providers. Both the Warren Act and California civil code section 1714.55 are attached as the Appendix to this Report for reference.

2.2 Statutory Requirements

2.2.1 Legislative Intent

It is important for State statutes to permit and facilitate NG9-1-1 implementation. Most legacy 9-1-1 statutes establish legacy systems and are tied to outdated technologies and systems. Section 53100 of the Warren Act establishes the legislative intent for the establishment of a uniform, statewide emergency number for quick response to people who call the telephone number "911."

The intent for the Warren Act should be updated to convey the modern goals and capabilities for the NG9-1-1 enabled system to include the potential for increased interoperability between PSAPs, regions, states and even countries; the robust redundancy that the interoperability allows and how these new capabilities will result in a more efficient emergency response and preparedness, and therefore, more lives saved. Additionally, the eventual interconnections with first responder networks could allow for sharing emergency data with first responders, not only increasing the efficiency of the communication, but also, the response. The goals should not be tied to the "telephone" technologies of yesterday and shouldn't be limited to "calls" for service unless call is defined broadly to include any request to 9-1-1.

2.2.2 Outdated Definitions and Terminology

Outdated terminology in existing 9-1-1 statutes can be a roadblock to the implementation of NG9-1-1. Definitions of outdated terminology can be problematic when they represent a snapshot in time. 9-1-1 statutes should be technology

¹ The Warren Emergency 9-1-1 Assistance Act, California Government Code, §§ 53100-53121.

neutral and “timeless” so that regulatory overhauls are not required for every new technology. NG9-1-1 requests for help will likely include data requests like texts, photographs and videos that come from devices other than traditional telephones, so statutes and rules need to be broad enough to address those new types of requests that are known, as well as emerging technologies that are unknown. It is important for California’s 9-1-1 Statutes to be technology neutral and include broad definitions for 9-1-1 service, 9-1-1 service provider and 9-1-1 requests or calls that include any mechanism capable of contacting 9-1-1.

Current Warren Act definitions for “Direct dispatch method,” “Relay method,” “Transfer method,” “Referral method,” “Basic system,” and “Sophisticated system” are tied to legacy telephone technology and are not applicable in the next generation of 9-1-1.² California should consider a universal definition of 9-1-1 system or service that is broad enough to include all technologies capable of accessing 9-1-1.

Additionally, sections 53111 and 53112 should be updated to remove references to “telephone” and should be amended to update the system design language to reflect NG9-1-1 system capabilities. Section 53118 should be amended to remove outdated methods and reflect the interconnected environment of the NG9-1-1 system. Sections 53119 and 53120 are outdated and should be amended or repealed to promote the efficient transition to NG9-1-1.

2.2.3 Authority

Generally, it is recommended that a coordinating entity for 9-1-1 should be established in statute. It is best practice for a State-level 9-1-1 coordinating entity to be established in relation to a state-level agency and be given the statutory authority to coordinate the system with related state entities that have authority for GIS, public safety, radio systems and public safety networks such as FirstNet because these systems will require the need to interconnect and interoperate in the NG9-1-1 environment. The Coordinating Entity’s statutory authority should include:

- Facilitating the 9-1-1 System across the State
- Operating functional components of the 9-1-1 system
- Procuring 9-1-1 components
- Promulgating rules related to the operation of the 9-1-1 System
- Establishing NG9-1-1 training standards for telecommunicators
- Coordinating interconnection

Section 53114 of the Warren Act establishes Cal OES as the coordinating entity for 9-1-1 in California. Along with directing Cal OES to assist local agencies with obtaining funding, section 53114 charges Cal OES to, “aid agencies in the formulation of concepts, methods, and procedures that will improve the operation of systems required by this article that will increase cooperation between public safety agencies.” This section could be amended to more clearly give Cal OES the authority to procure system components and coordinate interconnections.

Section 53114.1 goes on to require Cal OES to coordinate with other entities involved in the provision of 9-1-1 and related components. This list should be revisited to assure that it includes all related entities involved in the provision

² Warren Act, §§ 53103 – 53108.

of NG9-1-1 components including cybersecurity, GIS, networks, NG9-1-1 services and public safety network coordinators and providers.

Section 53115.1 should be reviewed to consider whether additional representatives should be added for the next generation of 9-1-1. The California Emergency Medical Services Authority should be considered as an additional member represented on the Board. New types of NG9-1-1 data and information will have an impact on emergency medical services so it will be important for EMSA to be represented on the Board.

Section 53115.5 should be updated to require regular audits of the network, services and PSAPs for compliance with system and performance objectives.

Section 53115.2(a)(6) should be amended to update the section to expedite the rollout of new technologies in order to maintain technical neutrality and eliminate the need to continually amend it.

2.2.4 Confidentiality

NG9-1-1 applications will allow for the sharing of new types of data from all kinds of devices such as medical monitors and automotive telematics and cell phones. These new types of data have the potential to improve emergency response and should be readily available to emergency response agencies during real time emergency response and shareable between agencies.

The legacy 9-1-1 system is dedicated, closed and has a single purpose. The information delivered over the system is limited and is generally stored in a single, restricted location. In contrast, NG9-1-1 is a shared system with the potential to be just one part of a network shared with other public safety services and agencies. There will be an influx of the amount and type of data shared in the NG9-1-1 environment including NG9-1-1 system data and PSAP operational data.

NG9-1-1 system data will be documented, collected and stored on the NG9-1-1 system. This data includes call processing data and transactional details, like when it was received, what routes it took thru the system, the time stamps of different action.

PSAP operational data at the PSAP will be used by first responders for use or capture and will be housed locally in a CAD or similar system. PSAPs will have to establish operational policies on the processing of the supplemental call data. But, as the industry moves to embrace multimedia, which will drive this new data paradigm, this data will likely need to be maintained on the NG9-1-1 system due to the new capability that NG9-1-1 will bring, which is the transfer of the call with all appropriate data.

Not only will this additional data be useful in emergency situations, but the aggregated supplemental and supportive data will allow Cal OES to research and analyze trends in emergency response in order to improve it. The Warren Act should be amended to allow for the analysis of aggregate data while protecting sensitive information that is specific to a particular emergency. Confidentiality provisions should not limit the use of these new types of data in emergency situations.

2.2.5 Liability

NG9-1-1 involves the complex delivery of 9-1-1 calls potentially involving many entities and vendors that deliver individual components of 9-1-1 service at any point in the call process. It is important that all players in NG9-1-1 systems are assured that their good faith efforts to deliver 9-1-1 service will not expose them to liability. Specifically providing all potential players liability protection will cause more entities to participate in the migration to NG9-1-1. Lack of legal clarity on the issue of liability can lead to significant issues, including delays in provisioning critical NG9-1-1 services.

While Federal Laws have addressed liability, those provisions are still based on the liability protections that are provisioned in state statute. In 2008, Congress passed the New and Emerging Technologies 911 Improvement Act of 2008 (Net 911 Act).³ Section 201(a) of the NET 911 Act extends state-law liability protection afforded local exchange companies to all communications services that are required by the FCC to provide 9-1-1/E9-1-1. Additionally, the Act extends liability protection to new types of service enabled by NG9-1-1 where there is state 9-1-1 liability protection. The NG9-1-1 Advancement Act of 2012 went further to extend immunity from liability to NG9-1-1 service providers specifically and to PSAPs; however, it is still important to provide for liability protection within state statute.

California Civil code section 1714.55 provides liability protection for 9-1-1 service providers but should be updated to match an amended definition of 9-1-1 service in the Warren Act that does not refer to dated technologies and is broad enough to include all types of 9-1-1 service providers.

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3. GOVERNANCE REVIEW

3.1 Current Governance Environment

3.1.1 CA 9-1-1 Branch

The California 9-1-1 Emergency Communications Branch (CA 9-1-1 Branch) of the Governor's Office of Emergency Services (Cal OES) administers California's statewide 9-1-1 program. The goal of the CA 9-1-1 Branch is to enable Public Safety Answering Points (PSAPs) to provide the fastest, most reliable, and cost-effective access to emergency services for any 9-1-1 caller in California. The 9-1-1 Branch responds to legislative changes, reviews federal regulations, policies and procedures that affect 9-1-1 and remains current by researching and implementing standards that support the 9-1-1 mission. Cal OES currently serves to advise and direct activities associated with 9-1-1 call delivery for all 441 PSAPs. Cal OES distributes 9-1-1 funds to enhance 9-1-1 call delivery to ensure that all PSAPs are aligned throughout the state.

3.1.1.1 Resources

The CA 9-1-1 Branch has a staff of 18 dedicated to the administration of 9-1-1 in the State. Current job descriptions and staffing levels for the 9-1-1 Branch are listed below.

- Administrative Support
- State Emergency Telephone Number Account (SETNA) / Special Projects
 - Tracks budget, procurements, and appropriations for Branch
 - Completes annual 9-1-1 review
 - Tracks all budget forms and interface with CalOES procurement, finance and budgets on all fiscal matters.
- Division Chief
 - 9-1-1 Advisory Unit
 - Supervisor
 - Act as administrator of the 9-1-1 call tracking system (ECaTS) used by state, regional and local 9-1-1 stakeholders – including identification of business requirements, enhancements, user verification and accountability, service level agreement review and enforcement, adds/moves/changes, training, vendor management, troubleshooting, and system oversight.
 - Provide contract management for multi-vendor, multi-year Multiple Award Contract for 9-1-1 call handling customer premise equipment.
 - Supervise 9-1-1 Advisors – including training, management, oversight, guidance, and leadership to ensure proper execution of duties as described above.
 - Review, develop, modify, and compose policies and procedures governing the use of State Emergency Telephone Number Account funds by state and local agencies, standards for PSAP funding eligibility, network requirements, and emerging technology deployment.
 - Four 9-1-1 Advisors
 - Advise PSAPS through managing, planning, budgeting, and oversight on the processes and procedures for the identification and procurement of network, database, and 9-1-1 call handling customer premise equipment – including Scope

- of Work review, and compliance with California Law; defining requirements; establishment of and adherence to funding methodology and procedures; and the analysis and interpretation of 9-1-1 emergency call traffic reports.
- Ensure compliance with State and national standards and requirements by performing Fiscal and Operational Reviews at all CA PSAPs on a tri-annual cycle (once every 3 years).
 - Develop materials for, present at, facilitate, and represent the CA 9-1-1 Branch at meetings, conferences, training sessions with regard to policies, procedures, funding, systems and services, emerging technologies, and other 9-1-1 related information and issues.
 - Reconciliation Unit – Supervisor and three staff.
 - Ensure that Reimbursement claims as well as current invoices from various vendors are verified and paid. Dispute incorrect invoices.
 - Work with other Management as well as staff to ensure the work flow continues without delay. Resolve service and invoice issues for PSAPs and work with vendor community. Manage and train staff to meet goals in a timely manner and comply with all rules and regulations.
 - Technology Division
 - Supervisor - Oversee staff in the Program Development Section in planning, organizing and directing technical telecommunications projects. Guide and facilitate the development of the State's strategic 9-1-1 Network vision.
 - State 9-1-1 Regional coordinator – Oversee the facilitation of PSAP regionalization. Manage NG9-1-1 ESInet regional deployment program. Represent Cal OES on the County Coordinator Task Force.
 - Wireless Coordinator - Manage and coordinate wireless 9-1-1 network activities statewide. Manage NG9-1-1 ESInet regional deployment program.
 - Text to 9-1-1 and NG9-1-1 Services Coordinator: Manage and coordinate Text-to-911 services for all California PSAPs. Manage NG9-1-1 ESInet regional deployment program and oversight.
 - VoIP / Standards Coordinator - Manage and coordinate all VOIP, FCC standards, contracts, telematics.

3.1.2 9-1-1 Advisory Board

The advisory board is established by the Warren Act and is comprised of the following members appointed by the Governor:

- (1) The Chief of the Public Safety Communications Division shall serve as the nonvoting chair of the board.
- (2) One representative from the Department of the California Highway Patrol.
- (3) Two representatives on the recommendation of the California Police Chiefs Association.
- (4) Two representatives on the recommendation of the California State Sheriffs' Association.
- (5) Two representatives on the recommendation of the California Fire Chiefs Association.
- (6) Two representatives on the recommendation of the CalNENA Executive Board.
- (7) One representative on the joint recommendation of the executive boards of the state chapters of the Association of Public-Safety Communications Officials-International, Inc.⁴

⁴ Warren Act, § 53115.1(b).

The State 911 Advisory Board advises the office on all of the following subjects:

- (a)(1) Policies, practices, and procedures for the California 911 Emergency Communications Office.
- (2) Technical and operational standards for the California 911 system consistent with the National Emergency Number Association (NENA) standards.
- (3) Training standards for county coordinators and Public Safety Answering Point (PSAP) managers.
- (4) Budget, funding, and reimbursement decisions related to the State Emergency Number Account.
- (5) Proposed projects and studies conducted or funded by the State Emergency Number Account.
- (6) Expediting the rollout of Enhanced 911 Phase II technology.

(b) Upon request of a local public agency, the board shall conduct a hearing on any conflict between a local public agency and the office regarding a final plan that has not been approved by the office pursuant to Section 53114. The board shall meet within 30 days following the request, and shall make a recommendation to resolve the conflict to the office within 90 days following the initial hearing by the board pursuant to the request.⁵

3.1.2.1 Long Range Planning Committee

The Long Range Planning Committee (LRPC) assists the 9-1-1 Advisory Board in making recommendations to the CA 9-1-1 Branch for the development and implementation of Long-Range Plans for elements that are essential to maintaining 9-1-1.

The LRPC undertakes special long-range planning assignments as directed by the Board. These assignments may include, but will not be limited to the following: (1) clarification of the vision and values, assessments of the external and internal environments to identify strengths, weaknesses, opportunities, and threats; (2) identification of the strategic issues facing 9-1-1; (3) identify and recommend actionable items to assist the CA 9-1-1 Branch in meeting the goals and objectives set forth in the Strategic Plan and Roadmap. The LRPC carries out its charges by:

- Conducting studies and facilitate discussions among potential stakeholders.
- Establishing a planning horizon for recommendations.
- Acting as a facilitator in considering new projects by sharing such information with the Board and stakeholders.
- Assisting other committees and stakeholders in achieving the quarterly increments of the long-range goals.
- Acting as a resource for the Board when information and recommendations are requested on issues that pertain to the Long-Range Plan.

The LRPC is tasked by the Board, but also advises the Board on issues and items for the Board and the LRPC to address. The LRPC oversees and tasks the Work group.

The LRPC is made up of representatives from:

- California Association of Public-Safety Communications Officials (APCO),
- California Chapter of the National Emergency Number Association (CALNENA),
- California Fire Chiefs' Association (CFCA),

⁵ Warren Act §§ 53115.2(a) & (b).

- California Highway Patrol (CHP),
- California Police Chiefs' Association (CPCA), and,
- California State Sheriffs' Association (CSSA).

Additional members may be appointed for specific work as needed at the direction of the Chair. No more than five Board members may serve on the committee at any one time. The committee is made up of a combination of Board members and their designees.

3.1.2.2 Work group

The LRPC oversees the Work group assignments and activities. Work group members do not have to be members of the Board or LRPC and typically represent PSAPs at the operational level. Presently, there is one active workgroup that is tasked by both the Board and the LRPC. While the workgroup is tasked with specific assignments from both the Board and the LRPC as needed, the workgroup also advises the Board and LRPC on operational issues and items that should be addressed by the Board, the LRPC and/or the Work group.

3.1.3 County Coordinator Task force

The County Coordinator Task force represents the collective interests of California 9-1-1 County Coordinators and PSAPs, and advises and assists the CA 9-1-1 Branch in carrying out its responsibilities and mission. The Task force is made up of six 9-1-1 County Coordinators and one CA 9-1-1 Branch representative. The Task force reports out to the 9-1-1 Advisory Board but are not governed by them. They also coordinate regional efforts such as MSAG updates and text to 911 implementations.

3.1.4 PSAPs

While the CA 9-1-1 Branch administers the delivery of 9-1-1 calls in the State, the State's 441 PSAPs oversee the operational administration of answering and processing the 9-1-1 calls.

3.2 Governance Requirements

This section addresses governance requirements to ensure proper management of the transition to and operation of NG9-1-1 across the State to:

- Establish the means of achieving the coordination of new and complex NG9-1-1 considerations consistently.
- Establish the roles and responsibilities related to the system and a process for executing shared responsibilities.
- Maintain a consistent approach that assures that all technical and operational capabilities can be managed in a cost efficient and technically effective manner.

3.2.1 Cal OES NG9-1-1 Vision

In the Task B: Operational Requirements & System Design Options Report, the Kimball team recommended a regional implementation approach to provide Cal OES with the best fit with the current funding and management structure in

place today in California. It provides the most flexibility to Cal OES, especially with regard to 9-1-1 call transfers, redundancy, reliability, and disaster recovery options.

The regional approach for NG9-1-1 implementation fosters shared coordination and management. Regionalization promotes greater local and regional support for NG9-1-1 as regions are implemented and interconnected because responsibilities can be shared. A regional network can serve as a proof of concept for a larger NG9-1-1 system by creating smaller, standardized core systems that can be joined together to form a statewide solution. It utilizes resources and funding efficiently while achieving the benefits associated with deploying NG9-1-1 at the local-level.

The Regional NG9-1-1 model fits within the existing Cal OES operational framework. In this model, Cal OES specifies, designs procures and supports the management through oversight for all PSAPs. The CA 9-1-1 Branch will oversee and approve all purchases made under the Contract for NG9-1-1 Core Services, but will leverage existing CPE and hosted solutions and will work with the PSAPs to design California's NG9-1-1 system. Local PSAPs share in how regions are defined, created and operated in conjunction with Cal OES policies. This model allows for Cal OES to oversee and guide the NG9-1-1 progress for all PSAPs. In turn, it allows local PSAPs to maintain the accountability for their local NG9-1-1 implementation; while being included in a larger strategy. In a regional model, NG9-1-1 core services are designed and implemented, by region, to meet the requirements of a group of PSAPs. Cal OES can control the level of duplication at the PSAPs by coordinating efforts to remove duplication and silos that can decrease financial and technical efficiency. This model also allows Cal OES to:

- Utilize the current 9-1-1 Branch staffing until additional positions can be added to support NG9-1-1
- Limit the replacement of sub-standard systems due to contract expiration
- Coordinate the management of sub-state level systems to maintain progress to strategy and continuous improvement
- Centralize administration and management functions
- Drive the strategy, policies and procedures to align with NG9-1-1 standards
- Administer support for service delivery
- Enable call transfer statewide

The transitional phase of NG9-1-1 implementation can require different considerations than those necessary for a fully operational NG9-1-1 system. Those considerations include:

- Establish guidelines and best practices to be followed by all providers for transition and implementation activities
- Implement a standard process for all changes to the service
- Coordinate transition and implementation activities
- Create and maintain relationships with stakeholders
- Establish effective controls on all assets, resources, responsibilities and activities during transition and implementation
- Ensure that knowledge transfer is handled in an effective manner
- Establish rules for releases, version updates or changes to the solution
- Implement proactive change control and change management processes
- Assure quality of any new release, component or changed service
- Proactively improve service quality during transition or modification

NG9-1-1 requires a greater emphasis on operational management than a typical legacy 9-1-1 solution. Legacy 9-1-1 solutions operate within boundaries that allow segments of the network to be treated individually. County or local networks often only impact a single geographic area. An NG9-1-1 infrastructure removes these boundaries and shifts into a virtual environment which necessitates a change in how management of the solution is handled. NG9-1-1 can allow access from anywhere to anything creating a need to continually improve the service.

In order to generate the intended value from the NG9-1-1 network it is important to have a method to regularly review the service and understand where preventative and corrective action may be required. Continuous operation management is a proactive approach to managing a system that can pinpoint potential issues and plan for adjustments in a structured fashion.

Managing the continuous operation can include:

- Compliance to processes
- Quality
- Performance reviews
- Measuring the value of particular service components

3.2.2 State-level Coordination of NG9-1-1

The NG9-1-1 environment is a system of interoperable systems where resources are shared to provide the highest level of emergency response, and will require centralized State-level coordination of regional and interstate systems. Seamless statewide and interstate NG9-1-1 interconnectivity and interoperability is not possible without coordination. As the State-level NG9-1-1 coordinating entity, Cal OES should plan, coordinate and implement NG9-1-1. Additionally, Cal OES should monitor uniform statewide adherence to established technical and operational standards for the system. Uniform standards for all PSAPs establish the level playing field needed for interconnection and interoperability in the NG9-1-1 environment.

National public safety agencies and the Federal government have encouraged State-level coordination for NG9-1-1.⁶ Statewide coordination of NG9-1-1 has been a prerequisite for Federal grant funding in the past and is likely to be a requirement for upcoming Federal NG9-1-1 funding.

Coordination of California's NG9-1-1 implementation will be more challenging than the coordination required in smaller States. The sheer number of jurisdictions in California and the local nature of the current 9-1-1 system will require stakeholder education, buy-in and involvement during the duration of the migration to NG9-1-1. It is crucial that these various stakeholders and future NG9-1-1 system users be involved in NG9-1-1 planning to assure that the system is planned with consideration given to the unique needs of the system users.

⁶ Legal and Regulatory Framework for Next Generation 911 Services, Report to Congress and Recommendations, February 22, 2013, Federal Communications Commission, Sections 2 and 4.1.

3.2.3 NG9-1-1 Governance Considerations

A successful statewide NG9-1-1 transition requires that all policies, procedures and operational methods are consistent and support the mission critical communications. An effective NG9-1-1 Governance model maintains a consistent approach that assures that all technical and operational capabilities can be managed in a cost efficient and technically effective manner.

A successful NG9-1-1 Governance Model establishes the means of achieving the coordination of new and complex NG9-1-1 considerations consistently. System requirements and operational capabilities need to be consistent and manageable in the NG9-1-1 environment's complex and interconnected system of systems. These new complexities necessitate formal coordination of system users and vendors regarding requirements, interconnections and other considerations to effectively operate and manage it.

NG9-1-1 governance models formally establish roles and responsibilities related to the system and a process for executing shared responsibilities. While current 9-1-1 governance structures are a good place to start when developing an NG9-1-1 Governance Model, these legacy structures often need to be expanded or changed to support the coordination of NG9-1-1 system considerations and components.

While the ESInet is the 9-1-1 transport network, it could eventually be used to connect 9-1-1 with other emergency services and applications to revolutionize emergency response. New interconnections with additional systems and the eventual addition of other applications are examples of considerations that most legacy 9-1-1 governance structures are not prepared to address. Workgroups or subcommittees of California's subject matter experts will be considered to facilitate the incorporation of these new considerations into current structures.

3.2.4 Roles and Responsibilities

This section discusses the responsibilities related to the implementation and operation of NG9-1-1 for the State, Regions and PSAPs. Each governance participant has responsibilities that overlap. This requires clear, consistent communication and coordination by all participants.

3.2.4.1 CA 9-1-1 Branch

The CA 9-1-1 Branch will provide strategic direction, leadership, oversight and monitoring for the transition to and operation of NG9-1-1 in the State. The CA 9-1-1 Branch will work with the Board, Regions and PSAPs to assure the consistent and efficient operation of the NG9-1-1 system statewide.

3.2.4.2 Transition

During the transition to NG9-1-1, the CA 9-1-1 Branch will be responsible for the NG9-1-1 procurement and oversight of the vendor during the implementation process. This includes the communication, coordination and configuration of the PSAPs to operate with the network. Changes to current responsibilities and additional CA 9-1-1 Branch resources may be required to effectively implement the transition to NG9-1-1 in the State. Any additional resources added for the transition should have a plan to move into operational roles once the NG9-1-1 system is implemented. CA 9-1-1 should plan for the following roles during the transition:

- Responsibility for procurement, design, implementation and operation of an ESInet that reaches all 441 PSAPs statewide.

- CA 9-1-1 Branch should play a vital role in creating the framework necessary for PSAPs to successfully realize the benefits of the ESInet. Of importance, is the ability to create interconnected regional solutions that promote sharing among the PSAPs while utilizing a common infrastructure specifically designed for 9-1-1. CA 9-1-1 Branch should be responsible for ensuring the requirements of the ESInet meet the existing obligations of every PSAP throughout the State including the regionalization of applications, systems and services
- Develop policies and standards for the system based on PSAP service requirements.
 - CA 9-1-1 Branch policies should be developed to assure that all NG9-1-1 functionality is deployed according to standards and that the functional elements are capable of meeting the custom requirements of the PSAPs. Once the ESInet(s) are deployed the functionality for NG9-1-1 statewide will be based on the needs of the PSAPs.
- Manage the consistent and efficient regionalization of PSAPs.
 - CA 9-1-1 Branch will plan and oversee the regionalization of PSAPs for the purpose of implementing ESInets by region in the State and deploying NG9-1-1 services regionally. This includes a Regional ESInet Plan for interoperability and interagency collaboration for all services and the deployment of hosted CPE solutions that meet the operational needs of the PSAPs in each Regional ESInet.
- Align California NG9-1-1 program with National efforts and vision for a nationwide system.
 - NG9-1-1 brings the possibility of nationwide interoperability of NG9-1-1 systems. It is important to plan with this nationwide vision in mind and coordinate with neighboring states on potential interconnections. CA 9-1-1 Branch should align the statewide solution with current National NG9-1-1 initiatives from the National 9-1-1 Program, the National Association of State 9-1-1 Administrators and other applicable government and industry leaders in NG9-1-1 planning and deployment. This will ensure that NG9-1-1 in California will be installed to interoperate and allow integration into nationwide NG9-1-1 framework in addition to assuring that the State qualifies for any future Federal funding.

CA 9-1-1 Branch will define a standardized approach to execute the statewide strategy for NG9-1-1 so that all PSAPs benefit from the NG9-1-1 system. CA 9-1-1 Branch should coordinate stakeholder engagement to promote the transition and educate stakeholders on system implementation to achieve buy in and facilitate an efficient and effective transition. CA 9-1-1 Branch will be the primary contract manager for the ESInet and NG9-1-1 system. While the ESInet and NG9-1-1 Vendor(s) will be under the direction of CA 9-1-1 Branch, PSAPs will have input. The Vendor(s) will be required to deliver a system that meets the technical specifications presented by CA 9-1-1 Branch that have been developed with input from the PSAPs. CA 9-1-1 Branch will assure that call delivery to the PSAP will meet statutory requirements and that current service levels will be supported once the system is operational.

CA 9-1-1 Branch will coordinate the deployment of the ESInet infrastructure. The ESInet infrastructure will be designed collaboratively with the vendor and with PSAP and regional input. Strategically, the ESInet will be comprised of new deployments and existing ESInet implementations.

CA 9-1-1 Branch will provide implementation oversight to maintain communication, collaboration and adherence to best practices. CA 9-1-1 Branch will work with PSAPs and regions to develop a migration plan to join the ESInet and will work with both the PSAPs and the vendor to minimize any infrastructure changes needed to transition. CA 9-1-1 Branch will assist in developing a minimal standard criteria for PSAPs to join the regional ESInet and for regional ESInets to interconnect. Services that will be migrated will be coordinated between CA 9-1-1 Branch and the PSAPs and regions to determine the impacts on technology, operations and funding before and after migration. CA 9-1-1 Branch should establish guidelines to ensure that knowledge transfer from the vendor to the PSAP occurs in an efficient and effective manner. CA 9-1-1 Branch will assure that quality assurance and quality control measures performed by the vendor are met for all components of the NG9-1-1 system and that the transition occurs with minimal impact on the current operation.

CA 9-1-1 Branch should utilize the established change management process for vendor initiated changes. CA 9-1-1 Branch should collaborate with the PSAPs to create change requests and complete any documentation of changes required by the Vendor.

In conjunction with NGCS implementation and turn-up, there will be things that CA 9-1-1 Branch will be instrumental in defining including potential data center locations and host site locations. CA 9-1-1 Branch will refer to NG9-1-1 standards for guidance in what functional elements will be deployed and how they will integrate to the network, carriers and PSAPs. CA 9-1-1 Branch will assure that the interconnections between the regions, the PSAPs and the NGCS meet the goals.

CA 9-1-1 Branch should plan to assure that service levels are maintained as the network is migrated. In addition, planning must specifically address how service levels and service level agreements map across the ESInet / NG9-1-1 system and the individual PSAPs. All Service Level Agreements (SLAs) should be evaluated to assure that one SLA does not limit another.

3.2.4.3 Operations

3.2.4.3.1 Policy

CA 9-1-1 Branch will establish policies and best practices for NG9-1-1 activities across the State including network operation, monitoring and service management in order to establish performance and service objectives. Establishing a foundational set of policies built around the implementation of NG9-1-1 as an ecosystem encourages collaboration with PSAPs and regions resulting in the alignment of local, regional and state-level goals for the system. CA 9-1-1 Branch will apply NG9-1-1 standards to the strategic objectives for the State including the ESInet specifications, NG9-1-1 core services, interconnection, cybersecurity, avoidance and recognition of trouble, mitigation and recovery of outages.

By focusing on a collaborative ecosystem, the CA 9-1-1 Branch can effectively support ground up regionalization of PSAPs across the NG9-1-1 system. CA 9-1-1 Branch will provide policy support to expand interagency cooperation. State policies should include a framework for sharing resources, including existing technology that may be modified for use among PSAPs. Shared resources result in technical and financial efficiency and can enhance interoperability and minimize current boundary limitations within legacy 9-1-1 implementations.

3.2.4.3.2 Operation

After the network transitions to a service operational stage CA9-1-1 Branch will continue to provide Vendor oversight, service management and strategic direction. The vendor will supply service management capabilities to CA 9-1-1 Branch and be responsible for system reliability, availability and scalability.

CA 9-1-1 Branch will implement the capabilities for NG9-1-1 statewide and conduct periodic technical and operational audits on the ESInet, the Next Generation Core Services (NGCS) and the PSAPs to ensure that the statewide services are meeting performance and service objectives. CA 9-1-1 Branch should establish an audit framework that periodically reviews the 9-1-1 technical and operational environment across the state. An audit is useful to document all operational characteristics of the NG9-1-1 system. Some services may be deployed across the entire system to maintain cohesiveness across the State.

3.2.4.3.3 Resources

To provide the strategic direction, leadership, oversight and monitoring for the transition to and operation of NG9-1-1 in the State, the CA 9-1-1 Branch will need staff and resources to support the NG9-1-1 transition as well as the ongoing operation of the system. The following is a list of the staffing requirements for NG9-1-1 that could be satisfied by additional staff or a form of staff augmentation for the one-time requirements that are not ongoing. Details on the forecast and costs associated with these requirements can be found in the Funding Plan.

Future NG9-1-1 Staffing requirements:

- Manage State NG9-1-1 Contracts - ongoing
 - NG9-1-1 System Procurement
 - Statewide Prime
 - Six regional systems
 - CPE Procurement
- Program and Project Management for NG9-1-1 System Deployments – discrete, one-time
 - Statewide Prime
 - Six regional systems
- GIS development – ongoing
 - Statewide Prime
 - Six regional systems
- ESInet to ESInet and region to region interoperability and coordination – ongoing
 - Statewide Prime
 - Six regional systems
- Network Operations Center – ongoing
 - Statewide Prime
 - Six regional systems
 - ESInet and NGCS system monitoring
 - Interface with California State Warning Center and with State Threat Assessment Center

3.2.5 PSAPs

3.2.5.1 Transition

The PSAPs will assist CA 9-1-1 Branch in the implementation process as a stakeholder and customer of the eventual NG9-1-1 system. The PSAPs are the primary stakeholders and should have input regarding network configurations and NGCS. PSAPs will be responsible for ensuring that their requirements are accurately reflected to the vendor so that the system is operationally and tactically focused on their mission and meet their requirements.

CA 9-1-1 Branch will coordinate with PSAPs to deploy the ESInet infrastructure to support existing services and future services. Strategically, the ESInet will be comprised of new deployments and existing ESInet implementations. PSAPs will utilize State provided policies and standards to utilize the ESInet and NGCS to benefit their jurisdictions.

CA 9-1-1 Branch and the PSAPs will collaborate with the vendor to create and manage risk throughout the process. Transition to a new system always carries risk. Risks may arise at any point during the project but can be magnified at the PSAP. So, PSAPs are an important key for minimizing risks to transition.

The PSAPs will work with the State and the vendor to migrate functions to the ESInet / NG9-1-1 system in phases that coincide with the overall project schedule and will identify the functional components and implementation items that can expedite their transition. Boundary identification and maintenance from a call routing perspective will be a key element for CA 9-1-1 Branch and the PSAPs to coordinate.

Transition of all PSAPs throughout the State will require an assessment of the current monitoring and management capabilities at the PSAP. As transition begins, attention must be given to the existing contracts for monitoring and management services that PSAPs utilize. These contracts may require direct coordination and contract administration tasks with the vendor to ensure that the contracted services are not disrupted or that a violation of a contract is not created by the transition.

Depending on specific regional ESInet arrangements, PSAPs may have to enter into memorandums of understanding or Joint Powers Agreements pursuant to California Government Code sections 6500 - 6599.3 in order to share resources or jointly provide 9-1-1 service.

3.2.5.2 Operations

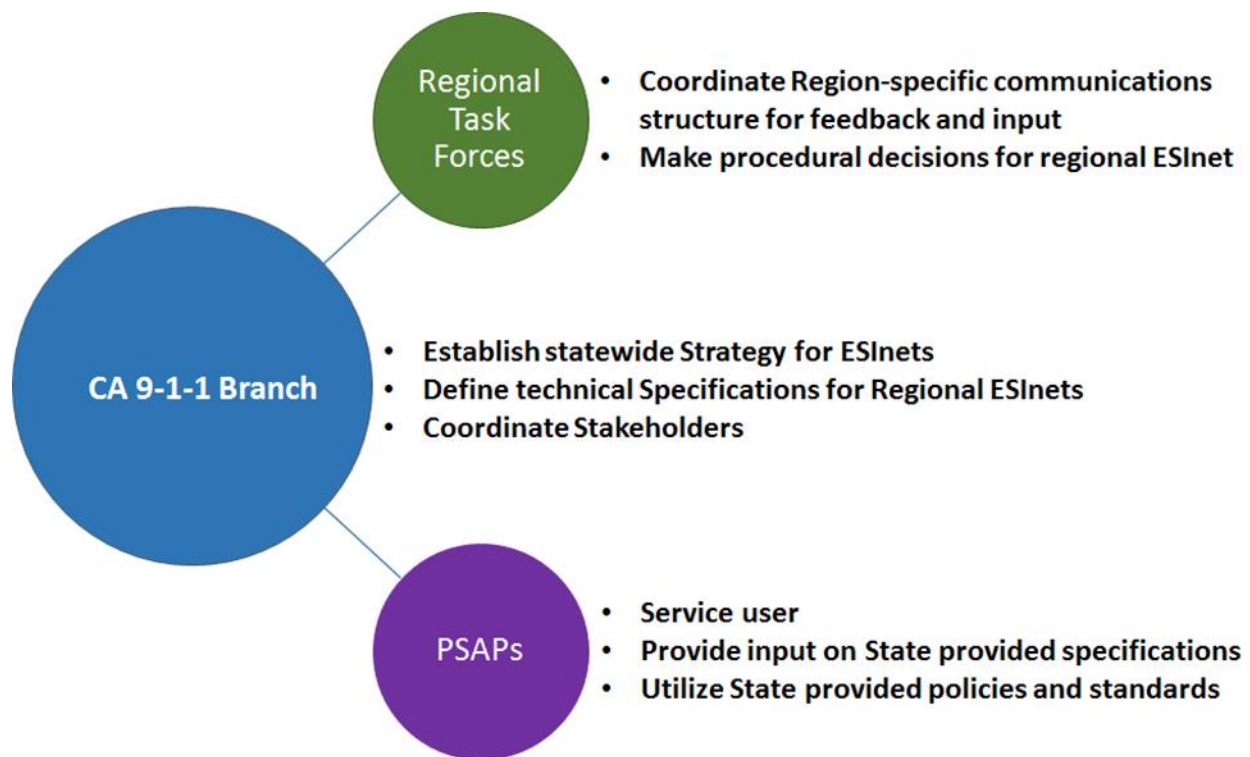
PSAPs will work in conjunction with the State and the Vendor to manage changes to their PSAP operation and the ESInet. The change management process becomes an essential management function that each PSAP uses to arrange the network to suit their goals.

Local operational responsibilities include:

- Communication with State
- Providing network performance feedback on a regular basis
- Trouble reporting to the vendor and CA 9-1-1 Branch in a timely fashion
- Cooperation to resolve problems.

3.3 Governance Roles and Interactions

California's current 9-1-1 governance structure is effectively positioned to take on the policy, procedural and operational roles required for NG9-1-1 governance at the State and local levels. The current State-level governance structure encompasses leadership, organization and stakeholder representation, all the necessary components for an effective governance structure. Because California's plan for NG9-1-1 introduces a regional component that is not needed for current 9-1-1 governance, the State should develop Regional Task Forces to create a venue and a means for the appropriate representatives from each region to make region-level decisions for each ESInet.



While the State will manage the deployment, operation and procurement of the regional ESInets and the NG9-1-1 system, a venue should exist for coordination at the regional level to address region-level decision making for the ESInet between the participating PSAPs and the State.

Regional Task Forces should be formed by the CA 9-1-1 Branch. Each task force should be aligned with a CA 9-1-1 Branch Regional Advisor. The Regional Advisors should lead and facilitate the Regional Task Forces. Regional Task Forces should be made up of County Coordinators in each Region along with key PSAP call handling managers within each region.

The following decision tree summarizes the CA 9-1-1 governance mechanism.

- Participants
 - Q: Which system participants should have established roles and responsibilities?
 - A: Cal OES, CA 9-1-1 Branch
 - County Coordinator Taskforce

- Regional Task Forces
- PSAPs
- 9-1-1 Advisory Board
 - Work Group
 - Long Range Planning Committee
- Q: Who will carry out system objectives?
 - A: CA 9-1-1 Branch will carry out system objectives by establishing service and performance objectives for the system.
 - A: PSAPs will carry out system objectives by providing input to CA 9-1-1 Branch and implementing the state-established objectives for the system.
- Process
 - Q: Macro-level - What should the overall governance process look like?
 - A: CA 9-1-1 Branch
 - define a standardized approach to execute the statewide strategy for NG9-1-1
 - coordinate stakeholder engagement and input
 - manage for the ESInet and NG9 1-1 system contracts
 - seek advice from the Board, LRPC, Work Group and County Coordinators as needed through current governance mechanisms and channels.
 - A: PSAPs
 - Have input into approach and strategy
 - Locally implement system objectives
 - Q: Who will make what decisions?
 - A: Interconnection decisions for 9-1-1 authorities.
 - Regional Task Forces
 - Interconnection decisions for other services.
 - Regional Task Forces
 - Change Management.
 - CA 9-1-1 Branch
 - Q: How will participants needs be represented in the process?
 - PSAPs will have representatives at the regional-level on the Regional Task Forces and the standing representatives that sit on the County Coordinator Task Force and the Work Group. As they do now, PSAPs can raise issues and provide input and feedback through those channels.
- Tasks
 - Q: How will activities be tasked?
 - A: The CA 9-1-1 Branch will task Regional Task Forces and County Coordinators Task Force as need and the Board will task the LRPC and Work Group as needed to effectively advise the CA 9-1-1 Branch pursuant to the Warren Act.
- Planning
 - Q: How will NG9-1-1 planning be conducted?
 - A: The CA 9-1-1 Branch should seek advice from the Board and LRPC to institute a regular planning cycle for the NG9-1-1 system and services.
 - Examples of types of planning:
 - Strategic Planning
 - Network Operation Planning
 - Security Operation Planning

- Future Planning for the system at large
- Measurement and Reporting
 - Q: How will success be measured?
 - A: The CA 9-1-1 Branch should conduct audits of the network, services and PSAPs to assure performance and service objectives are being met.

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APPENDIX – RELEVANT STATUTES**CA Government Code - GOV****TITLE 5. LOCAL AGENCIES [50001 - 57550]***(Title 5 added by Stats. 1949, Ch. 81.)***DIVISION 2. CITIES, COUNTIES, AND OTHER AGENCIES [53000 - 55821]***(Division 2 added by Stats. 1949, Ch. 81.)***PART 1. POWERS AND DUTIES COMMON TO CITIES, COUNTIES, AND OTHER AGENCIES [53000 - 54999.7]***(Part 1 added by Stats. 1949, Ch. 81.)***CHAPTER 1. General [53000 - 53166]***(Chapter 1 added by Stats. 1949, Ch. 81.)***ARTICLE 6. Local Emergency Telephone Systems [53100 - 53121]***(Article 6 added by Stats. 1972, Ch. 1005.)*[53100.](#)

(a) This article shall be known and may be cited as the Warren-911-Emergency Assistance Act.

(b) The Legislature hereby finds and declares that it is in the public interest to shorten the time required for a citizen to request and receive emergency aid. There currently exist thousands of different emergency phone numbers throughout the state, and present telephone exchange boundaries and central office service areas do not necessarily correspond to public safety and political boundaries. Provision of a single, primary three-digit emergency number through which emergency services can be quickly and efficiently obtained would provide a significant contribution to law enforcement and other public service efforts by making it less difficult to quickly notify public safety personnel. Such a simplified means of procuring emergency services will result in the saving of life, a reduction in the destruction of property, quicker apprehension of criminals, and ultimately the saving of money. The Legislature further finds and declares that the establishment of a uniform, statewide emergency number is a matter of statewide concern and interest to all inhabitants and citizens of this state. It is the purpose of this act to establish the number "911" as the primary emergency telephone number for use in this state and to encourage units of local government and combinations of such units to develop and improve emergency communication procedures and facilities in such a manner as to be able to quickly respond to any person calling the telephone number "911" seeking police, fire, medical, rescue, and other emergency services.

(Amended by Stats. 1976, Ch. 443.)

[53101.](#)

"Public agency," as used in this article, means the state, and any city, county, city and county, municipal corporation, public district, or public authority located in whole or in part within this state which provides or has authority to provide firefighting, police, ambulance, medical, or other emergency services.

(Added by Stats. 1972, Ch. 1005.)

[53102.](#)

"Public safety agency," as used in this article, means a functional division of a public agency which provides firefighting, police, medical, or other emergency services.

(Added by Stats. 1972, Ch. 1005.)

53103.

“Direct dispatch method,” as used in this article, means a telephone service providing for the dispatch of an appropriate emergency service unit upon receipt of a telephone request for such services and a decision as to the proper action to be taken.

(Added by Stats. 1972, Ch. 1005.)

53104.

“Relay method,” as used in this article, means a telephone service whereby pertinent information is noted by the recipient of a telephone request for emergency services, and is relayed to appropriate public safety agencies or other providers of emergency services for dispatch of an emergency service unit.

(Added by Stats. 1972, Ch. 1005.)

53105.

“Transfer method,” as used in this article, means a telephone service which receives telephone requests for emergency services and directly transfers such requests to an appropriate public safety agency or other provider of emergency services.

(Added by Stats. 1972, Ch. 1005.)

53106.

“Referral method,” as used in this article, means a telephone service which, upon the receipt of a telephone request for emergency services, provides the requesting party with the telephone number of the appropriate public safety agency or other provider of emergency services. The use of the referral method shall only be used for nonemergency situations.

(Amended by Stats. 1976, Ch. 443.)

53107.

“Basic system,” as used in this article, means a telephone service which automatically connects a person dialing the digits “911” to an established public safety answering point through normal telephone service facilities.

(Added by Stats. 1972, Ch. 1005.)

53108.

“Sophisticated system,” as used in this article, means a basic system with the additional capability of automatic identification of the caller’s number, holding the incoming call, reconnection on the same telephone line, clearing a telephone line, or automatic call routing or combinations of such capabilities.

(Added by Stats. 1972, Ch. 1005.)

53108.1.

“Incremental costs,” as used in this article, mean any costs necessary for the establishment of a system required by this article and recommended for reimbursement by the advisory committee established by Section 53115.1 other than costs for (1) a basic system, (2) a basic system with telephone central office identification, or (3) a system

employing automatic call routing, which are reasonable, necessary and unique for the planning and efficient implementation of a local agency's 911 system.

(Added by Stats. 1976, Ch. 443.)

53108.5.

"Division," as used in this article, means the Public Safety Communications Division within the Office of Emergency Services.

(Amended by Stats. 2013, Ch. 353, Sec. 96. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53109.

Every local public agency within its respective jurisdiction shall establish and have in operation by December 31, 1985, a basic system as provided in this article, or be part of such a system.

The establishment of such systems shall be centralized to the extent feasible. Nothing in this article shall be construed to prohibit or discourage in any way the formation of multijurisdictional or regional systems, and any system established pursuant to this article may include the territory of more than one public agency or may include a segment of the territory of a public agency.

(Amended by Stats. 1978, Ch. 352.)

53109.5.

The Legislature finds and declares that environmental considerations in the Tahoe region have halted or delayed the development of facilities necessary for the establishment of a local emergency telephone system in that area.

Accordingly, local public agencies in the Tahoe region, as defined in subdivision (a) of Article II of Section 66801 of the Government Code, shall comply with Section 53109 by December 31, 1986, rather than by December 31, 1985.

(Added by Stats. 1984, Ch. 928, Sec. 1.)

53110.

Every system shall include police, firefighting, and emergency medical and ambulance services, and may include other emergency services, in the discretion of the affected local public agency, such as poison control services, suicide prevention services, and civil defense services. The system may incorporate private ambulance service. In those areas in which a public safety agency of the state provides such emergency services, the system shall include such public safety agencies.

(Added by Stats. 1972, Ch. 1005.)

53111.

The digits "911" shall be the primary emergency telephone number within the system, but a public agency or public safety agency may maintain a separate secondary backup number, and shall maintain a separate number for nonemergency telephone calls.

(Added by Stats. 1972, Ch. 1005.)

53112.

(a) All systems shall be designed to meet the specific requirements of each community and public agency served by the system. Every system, whether basic or sophisticated, shall be designed to have the capability of using at least three of the methods specified in Sections 53103 to 53106, inclusive, in response to emergency calls. The Legislature finds and declares that the most critical aspect of the design of any system is the procedure established for handling a telephone request for emergency services.

(b) In addition, to maximize efficiency and use of the system, all pay telephones within each system shall enable a caller to dial "911" for emergency services, and to reach an operator by dialing "0", without the necessity of inserting a coin. At those "911" public safety answering points serving an area where 5 percent or more of the population, in accordance with the latest United States census information, speak a specific primary language other than English, operators who speak each such other language, in addition to English, shall be on duty or available through interagency telephone conference procedures at all times for "911" emergency services.

(c) In addition, all systems shall require installation of a telecommunications device capable of servicing the needs of the deaf or severely hard of hearing at the "911" public safety answering point or points. The device shall be compatible with devices furnished by telephone corporations pursuant to Section 2881 of the Public Utilities Code. *(Amended by Stats. 2016, Ch. 94, Sec. 13. Effective January 1, 2017.)*

53113.

The Legislature finds that, because of overlapping jurisdiction of public agencies, public safety agencies, and telephone service areas, a general overview or plan should be developed prior to the establishment of any system. In order to ensure that proper preparation and implementation of those systems is accomplished by all public agencies by December 31, 1985, the office, with the advice and assistance of the Attorney General, shall secure compliance by public agencies as provided in this article.

(Amended by Stats. 2013, Ch. 353, Sec. 97. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53114.

The office, with the advice and assistance of the Attorney General, shall coordinate the implementation of systems established pursuant to the provisions of this article. The office, with the advice and assistance of the Attorney General, shall assist local public agencies and local public safety agencies in obtaining financial help to establish emergency telephone service, and shall aid agencies in the formulation of concepts, methods, and procedures that will improve the operation of systems required by this article and that will increase cooperation between public safety agencies.

(Amended by Stats. 2013, Ch. 353, Sec. 98. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53114.1.

To accomplish the responsibilities specified in this article, the division is directed to consult at regular intervals with the State Fire Marshal, the State Department of Public Health, the Office of Traffic Safety, a local representative from a city, a local representative from a county, the public utilities in this state providing telephone service, the Association of Public-Safety Communications Officials, the Emergency Medical Services Authority, the Department of the California Highway Patrol, and the Department of Forestry and Fire Protection. These agencies shall provide all necessary assistance and consultation to the division to enable it to perform its duties specified in this article.

(Amended by Stats. 2013, Ch. 28, Sec. 29. Effective June 27, 2013. Operative July 1, 2013, by Sec. 93 of Ch. 28.)

53114.2.

On or before December 31, 1976, and each even-numbered year thereafter, after consultation with all agencies specified in Section 53114.1, the office shall review and update technical and operational standards for public agency systems.

(Amended by Stats. 2013, Ch. 353, Sec. 99. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53115.

The office shall monitor all emergency telephone systems to ensure they comply with minimal operational and technical standards as established by the office. If any system does not comply the office shall notify in writing the public agency or agencies operating the system of its deficiencies. The public agency shall bring the system into compliance with the operational and technical standards within 60 days of notice by the office. Failure to comply within this time shall subject the public agency to action by the Attorney General pursuant to Section 53116.

(Amended by Stats. 2013, Ch. 353, Sec. 100. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53115.1.

(a) There is in state government the State 911 Advisory Board.

(b) The advisory board shall be comprised of the following members appointed by the Governor who shall serve at the pleasure of the Governor.

(1) The Chief of the Public Safety Communications Division shall serve as the nonvoting chair of the board.

(2) One representative from the Department of the California Highway Patrol.

(3) Two representatives on the recommendation of the California Police Chiefs Association.

(4) Two representatives on the recommendation of the California State Sheriffs' Association.

(5) Two representatives on the recommendation of the California Fire Chiefs Association.

(6) Two representatives on the recommendation of the CalNENA Executive Board.

(7) One representative on the joint recommendation of the executive boards of the state chapters of the Association of Public-Safety Communications Officials-International, Inc.

(c) Recommending authorities shall give great weight and consideration to the knowledge, training, and expertise of the appointee with respect to their experience within the California 911 system. Board members should have at least two years of experience as a Public Safety Answering Point (PSAP) manager or county coordinator, except where a specific person is designated as a member.

(d) Members of the advisory board shall serve at the pleasure of the Governor, but may not serve more than two consecutive two-year terms, except as follows:

(1) The presiding Chief of the Public Safety Communications Division shall serve for the duration of his or her tenure.

(2) Four of the members shall serve an initial term of three years.

(e) Advisory board members shall not receive compensation for their service on the board, but may be reimbursed for travel and per diem for time spent in attending meetings of the board.

(f) The advisory board shall meet quarterly in public sessions in accordance with the Bagley-Keene Open Meeting Act (Article 9 (commencing with Section 11120) of Chapter 2 of Part 1 of Division 3 of Title 2). The division shall provide administrative support to the State 911 Advisory Board. The State 911 Advisory Board, at its first meeting, shall adopt bylaws and operating procedures consistent with this article and establish committees as necessary.

(g) Notwithstanding any other provision of law, any member of the advisory board may designate a person to act as that member in his or her place and stead for all purposes, as though the member were personally present.

(Amended by Stats. 2013, Ch. 28, Sec. 30. Effective June 27, 2013. Operative July 1, 2013, by Sec. 93 of Ch. 28.)

[53115.2.](#)

- (a) The State 911 Advisory Board shall advise the office on all of the following subjects:
- (1) Policies, practices, and procedures for the California 911 Emergency Communications Office.
 - (2) Technical and operational standards for the California 911 system consistent with the National Emergency Number Association (NENA) standards.
 - (3) Training standards for county coordinators and Public Safety Answering Point (PSAP) managers.
 - (4) Budget, funding, and reimbursement decisions related to the State Emergency Number Account.
 - (5) Proposed projects and studies conducted or funded by the State Emergency Number Account.
 - (6) Expediting the rollout of Enhanced 911 Phase II technology.
- (b) Upon request of a local public agency, the board shall conduct a hearing on any conflict between a local public agency and the office regarding a final plan that has not been approved by the office pursuant to Section 53114. The board shall meet within 30 days following the request, and shall make a recommendation to resolve the conflict to the office within 90 days following the initial hearing by the board pursuant to the request.
- (Amended by Stats. 2013, Ch. 353, Sec. 101. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)*

[53115.3.](#)

When proposed implementation of the 911 system by a single public agency within its jurisdiction may adversely affect the implementation of the system by a neighboring public agency or agencies, such neighboring public agency may request that the office evaluate the impact of implementation by the proposing public agency and evaluate and weigh that impact in its decision to approve or disapprove the proposing public agency's final plan pursuant to Section 53115. In order to effectuate this process, each city shall file a notice of filing of its final plan with each adjacent city and with the county in which the proposing public agency is located at the same time such final plan is filed with the office and each county shall file a notice of filing of its final plan with each city within the county and each adjacent county at the time the final plan is filed with the office. Any public agency wishing to request review pursuant to this section shall file its request with the office within 30 days of filing of the final plan for which review is sought.

(Amended by Stats. 2013, Ch. 353, Sec. 102. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

[53116.](#)

The Attorney General may, on behalf of the office or on his or her own initiative, commence judicial proceedings to enforce compliance by any public agency or public utility providing telephone service with the provisions of this article.

(Amended by Stats. 2013, Ch. 353, Sec. 103. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

[53118.](#)

The Legislature declares that a major purpose in enacting this article is to eliminate instances in which a responding emergency service refuses to render aid to the requester because the requester is outside of the jurisdictional boundaries of the emergency service. A public safety agency which receives a request through the system for emergency services outside its jurisdictional boundaries shall transmit the request to the proper public safety answering point or public safety agency utilizing the methods described in Sections 53103 to 53105, inclusive. In the event an emergency unit is dispatched in response to a request through the system, such unit shall render its

services to the requesting party without regard to whether the unit is operating outside its normal jurisdictional boundaries until properly relieved by the public safety agency responsible for that geographical area. Public agencies within a single system and public agencies in different systems but whose jurisdictional boundaries are contiguous are authorized to enter into joint powers agreements or any other form of written cooperative agreement to implement this requirement. These agreements may further provide for a public safety agency to render aid outside its normal jurisdictional boundaries when need arises on a day-to-day basis.
(Repealed and added by Stats. 1976, Ch. 443.)

53119.

Any telephone corporation serving rural telephone areas that cannot currently provide enhanced “911” emergency telephone service capable of selective routing, automatic number identification, or automatic location identification shall present to the office a comprehensive plan detailing a schedule by which those facilities will be converted to be compatible with the enhanced emergency telephone system.
(Amended by Stats. 2013, Ch. 353, Sec. 104. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53120.

The office shall not delay implementation of the enhanced “911” emergency telephone system in those portions of cities or counties, or both, served by a local telephone corporation that has equipment compatible with the enhanced “911” emergency telephone system.
(Amended by Stats. 2013, Ch. 353, Sec. 105. Effective September 26, 2013. Operative July 1, 2013, by Sec. 129 of Ch. 353.)

53121.

(a) The Office of Emergency Services shall develop a plan and timeline of target dates for the testing, implementation, and operation of a Next Generation 911 emergency communication system, including text to 911 service, throughout California.

(b) In order to maximize efficiency and contain costs, the Next Generation 911 emergency communication system shall incorporate, where consistent with public safety and technologically feasible, shared infrastructure and elements of other public safety and emergency communications networks, including, but not limited to, all of the following:

- (1) Public safety communications identified in the annual plan required by subdivision (b) of Section 15277.
- (2) Local and regional public safety broadband networks authorized by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).
- (3) Public safety broadband networks authorized by the federal Middle Class Tax Relief and Job Creation Act of 2012 (Public Law 112-96).
- (4) Public safety radio and communications facilities used for the purpose of public warnings pursuant to Section 15254.

(Added by Stats. 2014, Ch. 926, Sec. 1. Effective January 1, 2015.)

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CA CIVIL CODE – CIV**DIVISION 3. OBLIGATIONS [1427 - 3272.9]**

(Heading of Division 3 amended by Stats. 1988, Ch. 160, Sec. 14.)

PART 3. OBLIGATIONS IMPOSED BY LAW [1708 - 1725]

(Part 3 enacted 1872.)

1714.55.

(a) A retail or wholesale service provider of telecommunications service, or other service, involved in providing 9-1-1 service in accordance with the Warren-911-Emergency Assistance Act (Article 6 (commencing with Section 53100) of Chapter 1 of Part 1 of Division 2 of Title 5 of the Government Code), shall not be liable for any civil claim, damage, or loss caused by an act or omission in the design, development, installation, maintenance, or provision of 9-1-1 service, unless the act or omission that proximately caused the claim, damage, or loss constituted gross negligence, wanton or willful misconduct, or intentional misconduct.

(b) For purposes of this section:

(1) "Public safety agency" means a public safety agency as defined in accordance with the Warren-911-Emergency Assistance Act (Article 6 (commencing with Section 53100) of Chapter 1 of Part 1 of Division 2 of Title 5 of the Government Code).

(2) "9-1-1 service" means a telecommunications service, or other wireline or wireless service, that provides to the user of the public telephone system the ability to reach a public safety agency by utilizing the digits 9-1-1 or otherwise facilitates the provision of emergency services pursuant to the Warren-911-Emergency Assistance Act (Article 6 (commencing with Section 53100) of Chapter 1 of Part 1 of Division 2 of Title 5 of the Government Code). "9-1-1 service" includes a 9-1-1 service that utilizes in whole or in part an Internet Protocol.

(c) This section shall not apply to services provided under tariff.

(d) This section shall not be construed to modify the liability of a manufacturer, distributor, or other person arising from a claim, damage, or loss, related to the operation or performance of an end-user device that is not related to the provision of 9-1-1 service.

(Added by Stats. 2011, Ch. 297, Sec. 1. Effective September 21, 2011.)

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Appendix A



Report for
Task F-Cal OES NG9-1-1 Funding Plan and
Analysis

submitted to
California Governor's Office
of Emergency Services
Sacramento, California

June 2017©

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1. OVERVIEW

This Task F NG9-1-1 Funding Plan and Analysis is a companion document to the Task C – Cal OES NG9-1-1 Transition Plan document. The funding elements presented in this plan align with the strategy recommended in the Task B – Cal OES Task B: Operational Requirements & System Design Options and provides a basis for the estimation of operational and technical costs of transitioning California to Next Generation 9-1-1 (NG9-1-1).

The Task C Transition Plan provides the technical overview of each of the NG9-1-1 funding elements considered here and describes the functionality desired. That Plan outlines the implementation process of NG9-1-1 services through the procurement of systems, services and components that create the capabilities and functionality for NG9-1-1 in California.

This document utilizes the Task C Transition Plan as a guide for establishing a Rough Order of Magnitude (ROM) cost model for those NG9-1-1 systems detailed in the Task C Transition Plan.

1.1 Background

The 9-1-1 system in place in California comprises one of the largest 9-1-1 systems in the United States. There are 441 Public Safety Answering Points (PSAP) in California that handle 9-1-1 calls. Each PSAP is sized to ensure that 9-1-1 calls are answered in a timely fashion. As a result, the data associated with each PSAP can help define the technical characteristics and scope for how the transition to Next Generation 9-1-1 (NG9-1-1) will occur across the state. The data associated with each PSAP and the overall transition will also identify the funding necessary to complete the transition to NG9-1-1. Relevant 9-1-1 data includes:

- 9-1-1 service in California is delivered through 45 Selective routers that are owned and maintained by two telecommunications service providers throughout the State.
- Service areas include 11 legacy Local Access Transport Area (LATA) boundaries.
- In 2016, 9-1-1 call volume in California was 28,507,534 calls.
- In 2016, 80 percent of all 9-1-1 calls in California were from wireless telephones.
- The 441 PSAPs operate and maintain approximately 2,750 9-1-1 call answering positions or workstations that use specialized Customer Premise Equipment (CPE).

Knowing the approximate call answering position count for all PSAPs in California will help to determine the requirements for the future NG9-1-1 systems. Since 2012, 241 PSAPs have purchased CPE that is NG9-1-1-capable using the Cal OES-administered master contract. While the number of NG9-1-1-capable PSAPs continues to increase, there are PSAPs that will need to replace or upgrade their CPE to be fully NG9-1-1 capable. That said, this effort will not require PSAPs to upgrade their existing CPE and any legacy CPE equipped PSAPs will interface to the NG9-1-1 system via a Cal OES provided Legacy PSAP Gateway. This will allow for the continuation of the current CPE replacement life cycle for all PSAPs. NG9-1-1 CPE replacement at the PSAPs will occur independent of the transition to NG9-1-1.

The Funding plan focuses on the following areas:

1. Identification of Cal OES NG9-1-1 Funding Elements
2. Estimation of rough order of magnitude costs (ROM) for
 - a. Transition and Implementation of NG9-1-1
 - i. Statewide Prime

- ii. Six regional systems
- b. Ongoing NG9-1-1 operations
 - i. Statewide Prime
 - ii. Six regional systems
- c. Cal OES NG9-1-1 staffing impacts
 - i. Statewide Prime
 - ii. Six regional systems

1.2 Methodology

Based on the 9-1-1 environment in California, a high-level design was used to develop the ROM pricing provided in Section 4. The model is based on a statewide system that would accelerate the transition to NG9-1-1 systems and services and achieve the objectives outlined in the Cal OES Task C Transition Plan.

The data used to develop the information provided in this funding plan was obtained in cooperation with the Cal OES 9-1-1 Branch staff and is consistent with the other documents developed in this series, Cal OES NG9-1-1 planning documents Tasks A thru E.

The number of PSAPs or end connection points will impact total NG9-1-1 system costs. This figure will be referred to frequently during the course of this analysis and will be a primary driver of costs in the NG9-1-1 environment.

# of California PSAPs	441
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The total 9-1-1 calls in 2016 are reflected in the table below and are important for establishing the size and scope necessary to estimate the capacities and capability levels of core equipment in the NG9-1-1 systems. This will also impact total NG9-1-1 system costs.

Total 9-1-1 calls		28,507,534
% wireless	80%	22,806,027
% Landline	16%	4,561,205
% VoIP	3%	855,226
% Other including Telematics	1%	285,075
Approximate Texts		~5,000

1.3 NG9-1-1 Funding Assumptions

The Funding Plan and Cost Analysis follows a common set of assumptions that are also shared in the Transition plan document. These include:

- Basis of 441 PSAPs with no change in the size and makeup of the current PSAPs.
- Statewide Prime NG9-1-1 system Prime and six regional NG9-1-1 systems.
- Leased NG9-1-1 systems and services.
- Minimize special implementation and deployment costs.
- Payment for NG9-1-1 services will commence only after the first PSAP comes online.

- Use of existing state infrastructure (e.g., microwave networks) that meets system requirements for transport may also reduce system costs.
- Includes costs related to security equipment (e.g., firewalls, border control functions, etc).
- Network costs are based on Cal OES IFB pricing.
- Excludes training costs.
- As Text messaging and other new forms of communicating with PSAPs are adopted, costs for those services and capabilities will grow as well.

2. CURRENT CAL OES FUNDING ELEMENTS

Based upon our team's analysis of Cal OES funding plans, Cal OES currently pays for or reimburses PSAPs for costs in the following categories.

Current Cal OES Funding Elements	% of SETNA	SETNA Amount
Database	31.2%	\$30,709,386
CPE- Maintenance	30.1%	\$29,589,673
9 -1-1 Network	17.6%	\$17,343,109
NG-9-1-1 Network	5.3%	\$5,248,740
CalFIRE	4.1%	\$4,051,000
Network - Wireless	3.0%	\$2,940,969
9-1-1 Branch	2.6%	\$2,486,000
BOE	1.8%	\$1,783,000
Geographic Info Sys.	1.3%	\$1,288,441
ECaTS	1.0%	\$1,020,541
County Coordinator	0.5%	\$483,677
CLEC	0.4%	\$380,692
CHP	0.4%	\$352,348
Foreign Language	0.3%	\$322,255
Annual Training Allotment	0.2%	\$182,554
TEXTto911	0.0%	\$35,000
Other Reimbursements	0.0%	\$23,522
Dollar amounts reflect 2015-16 data	TOTAL	\$98,240,907

Many of the costs currently paid by Cal OES will be impacted or have the potential to be impacted by options put forth in the Transition Plan and how Cal OES chooses to implement NG9-1-1 services.

- The use of the existing legacy network and systems will continue for roughly three years while the procurement, implementation and transition of the NG9-1-1 statewide Prime and six regional NG9-1-1 systems takes place.
- It could take up to three years to bring the first PSAP online in the NG9-1-1 system.
 - Contract options may be used to manage any potential costs required during build out and transition to a new service provider.

- For example, as connections are installed and accepted on the NG9-1-1 system PSAPs may begin to roll to the system and be removed from the current system. (cost replacement).

3. NG9-1-1 FUNDING ELEMENTS

As the transition to NG9-1-1 begins, new and different funding elements will come into play. The factors that will impact, drive and influence funding for NG9-1-1 in California include:

- Prime and Regional NG9-1-1 Systems
- ESInet and Network Costs
- NG9-1-1 Core Services/i3
- NG9-1-1 Transition Phases and Schedules
- Cal OES NG9-1-1 Staffing
- Geographic Information System

3.1 Prime and Regional NG9-1-1 Systems

The costs presented in Section 4 below are partially derived from the qualified responses to the Cal OES issued Request for Offer (RFO) for the NorthEast Region and the Pasadena Ring and relate to the network and hardware required to implement the ESInet and other services related to NG9-1-1.

In addition, costs are projected across the six regions and a Prime established in the Cal OES Task B System Design Options document. The six regions are:

- Northern Region
- Coastal Region
- Central Region
- Los Angeles Region
- LA City Region
- Southern Region

3.2 ESInet and Network Costs

The ESInet hardware components that will be required in each region include:

- Core Routers
- Edge Routers
- Switches
- NGCS stack x2

These elements will be new costs and will be incurred in addition to the existing expenses that Cal OES is responsible for like CPE and ECaTS.

The ESInet network connectivity components common to all regions include:

- Redundant connections regional NGCS to PSAP
- Redundant connections regional NGCS to NGCS

- Redundant connections regional NGCS to Prime NGCS
- Potential redundant connections Prime NGCS to PSAPs
- Potential redundant connections Prime NGCS to External NG9-1-1 systems

The ESInet portion will directly affect the costs of network connectivity at the PSAPs. Depending upon the transition and migration into the ESInet, these costs may be phased in. In addition, the ESInet costs may be used to offset some other charges that are currently being paid for out of the 9-1-1 fund like analog 9-1-1 trunks or ALI.

The costs of the ESInet will allow some recovery of costs once fully functioning NG9-1-1 is operational.

3.3 NG9-1-1 Core Services/i3

The NGCS are implemented to configure NG9-1-1 across the ESInet and the state. These functional elements and service components are necessary for transition into a fully functional NG9-1-1 network.

NG9-1-1 functional elements and services, as defined in the Cal OES Task C Transition Plan, will drive costs for Cal OES in the transition to and operation of the Prime and regional NG9-1-1 systems. The NG9-1-1 functional elements include:

- ESRP – will eventually be shared by regional NGCS and PSAP CPE
- LIS / ALI and DB service – can be centralized and aggregated in the Prime
- ECRF/LVF – would be replicated across all regions, but could be centralized and aggregated in the Prime
- LSRG – Legacy Selective Router Gateway – will decrease over time
- LNG – Legacy Network Gateway – will decrease over time
- LPG – Legacy PSAP Gateway – will decrease over time

3.4 NG9-1-1 Transition

The main transition areas as identified in the Task C Transition Plan are shown below. Each phase of the transition to NG9-1-1 has the potential to impact funding and costs carried by the current system. The Prime NG9-1-1 system and each of the regional NG9-1-1 systems will essentially follow this same progression and timeline until full deployment is established.

Phases	Definition
Phase 1	ESInet
Phase 2	ALI database migration
Phase 3	PSAP transition
Phase 4	Wireless transition
Phase 5	Database transition
Phase 6	Selective Router decommission
Phase 7	Wireline transition
Phase 8	Monitoring, Management, and Performance

As the Prime NG9-1-1 system deployment progresses through these transition phases, economies of scale and consolidation of fragmented services like ALI should allow for cost savings in subsequent regional deployments.

It is likely that not all of the anticipated NG9-1-1 systems will be implemented and deployed simultaneously. Each will follow the timeline and schedule defined in the Task C NG9-1-1 Transition Plan and shown below.

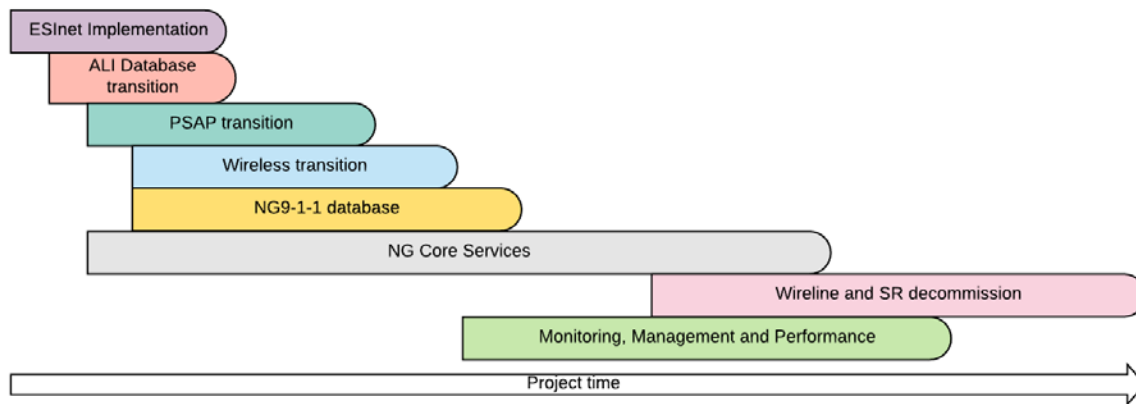


Figure 5 NG9-1-1 Transition Roadmap

Future NG9-1-1 costs will vary by region and over time as each system is procured, designed, deployed, implemented and deemed operational by going through these phases.

3.5 Cal OES NG9-1-1 Staffing

Future NG9-1-1 Staffing requirements that will be impacted by the transition to NG9-1-1 are identified as follows:

- Staff to Manage State NG9-1-1 Contracts - ongoing
 - NG9-1-1 System Procurement
 - Statewide Prime
 - Six regional systems
 - CPE Procurement
- Staff to Program and Project Manage the NG9-1-1 System Deployments – discrete, one time
 - Statewide Prime
 - Six regional systems
- Staff to support and coordinate GIS development – ongoing
 - Statewide Prime
 - Six regional systems
- Staff to coordinate ESInet to ESInet and region to region interoperability – ongoing
 - Statewide Prime
 - Six regional systems
- Staff to operate a Network Operations Center – ongoing
 - Statewide Prime
 - Six regional systems
 - ESInet and NGCS system monitoring
 - Interface with California State Warning Center and with State Threat Assessment Center

3.6 Geographic Information System

The Geographic Information System (GIS) / Geo-based routing estimate is based upon the size of California's, expected bandwidth and ECRF / LVF requirements for call routing. The costs are typical of a similar sized state and

are for implementing a third party to operate the ECRF and remediate the GIS data to ensure that it is correct and can route calls. In addition, this cost includes a level of redundancy within the call routing framework to provide reliability.

- Data normalization services
- Back Office
- Hardware

4. ROM NG9-1-1 COST ESTIMATES

The table below shows those current Cal OES funding elements that will be impacted by the transition to NG9-1-1 in California and their current costs.

Current Cal OES Funding Elements	% of SETNA	SETNA Amount	Potential Impact Thru Transition
Note Green shading indicates current funding elements impacted by the transition to NG9-1-1			
Database	31.2%	\$30,709,386	This cost will reduce and consolidate as early as the deployment of the Prime NG9-1-1 system
9 -1-1 Network	17.6%	\$17,343,109	These costs reduce and will shift to the NG9-1-1 category
NG-9-1-1 Network	5.3%	\$5,248,740	These costs will increase over time and with each regional deployment
Network - Wireless	3.0%	\$2,940,969	These costs will shift and consolidate, but may not reduce
9-1-1 Branch	2.6%	\$2,486,000	Staffing costs required to manage the new systems will increase these costs
Geographic Info Sys.	1.3%	\$1,288,441	As the GIS strategy develops and the transition occurs, GIS costs will increase over time.
ECaTS	1.0%	\$1,020,541	These costs will remain consistent
County Coordinator	0.5%	\$483,677	These costs may increase due to the anticipated increase in regional and PSAP coordination
CLEC	0.4%	\$380,692	These costs will remain consistent
Foreign Language	0.3%	\$322,255	These costs may reduce as services consolidate into the core
TEXTto911	0.0%	\$35,000	These costs will increase as the service is adopted by PSAPs
Total of Impacted	63.2%	\$62,258,810	Overall these costs will likely remain constant and may even temporarily increase as the pace of transition increases by region and until legacy costs elements are removed from the current systems
Non Impacted Current Funding Elements			
CPE- Maintenance	30.1%	\$29,589,673	NA
CalFIRE	4.1%	\$4,051,000	NA
BOE	1.8%	\$1,783,000	NA
CHP	0.4%	\$352,348	NA
Annual Training Allotment	0.2%	\$182,554	NA
Other Reimbursements	0.0%	\$23,522	NA
Total of Non Impacted	36.6%	\$35,982,097	These costs will likely remain constant regardless of the transition to NG9-1-1
Dollar amounts reflect 2015-16 data			

The table below calculates the total costs using the elements identified above and represents a ROM cost estimate for the annual cost of operating the planned NG9-1-1 system in the State of California.

Consistent with the assumptions above the total operational costs assume:

- One fully functional NGCS core system
- Six operational regional systems
- All PSAPs are online
- All PSAP's have connectivity to NGCS
- All PSAP's are utilizing an ECRF / LVF function for call routing

Order of Magnitude:

Since costs of the regional systems may fluctuate based upon the call volume, positions and bandwidth utilized the table is designed from an overall program impact basis.

The intent of the table is to demonstrate the overall impact of transition to NG9-1-1. Some of the costs that are presented will be dependent upon the strategy of transition and the ability to rapidly move services that are paid for by the fund today. In addition, the model can be influenced by greater sharing of resources that can occur during the operation of NG9-1-1. It is presented from a conservative standpoint, with the methodology being only to replace costs that are "known" to be replaced.

Structure of Table:

- Row 1 of the table shows items paid for by the fund that will be impacted by NG9-1-1. These funds are drawn down based upon the number of PSAPs accepted
- Row 2 of the table shows funds that are not impacted from NG9-1-1 and will remain
- Row 3 shows funds that are unknown at this time. These funds present a variable of increase or decrease depending upon the execution of the transition strategy. Some may increase others may decrease.
- Row 4 shows the existing program funds, and demonstrates funds moving from that existing fund and into the NG9-1-1 costs over time.
- Row 5 is a break point in the table
- Row 6 is the new costs of NG9-1-1 annually, demonstrating the increase of NG9-1-1 as PSAPs are accepted over time
- Row 7 is the cumulative number of PSAPs cut over to the Prime and regional NG9-1-1 systems
- Row 8 is the total impact on the fund (Row 4 + Row 6)

	Current (baseline)	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	Note
Impacted funds	\$48,050,000	\$48,050,000	\$26,269,000	\$15,369,000	\$4,469,000	\$0	<i>Current costs that will be replaced by NG9-1-1 services</i>
Non-impacted funds	\$56,200,000	\$54,200,000	\$50,200,000	\$50,200,000	\$50,200,000	\$50,200,000	<i>Current costs that will not be impacted by NG9-1-1 transition phase unless there are operational policy changes</i>
Legacy 9-1-1 costs	\$104,250,000	\$102,250,000	\$76,469,000	\$65,569,000	\$54,669,000	\$50,200,000	<i>Costs include both impacted and non-impacted funds</i>
NG9-1-1 costs	\$10,000,000	\$25,000,000	\$44,000,000	\$66,000,000	\$88,000,000	\$97,020,000	<i>NG9-1-1 costs</i>
NG9-1-1 PSAPs cut over	50	100	200	300	380	441	<i>PSAPs cut over to the NG9-1-1 system</i>
Total fund costs for Legacy 9-1-1 and NG9-1-1.	\$114,250,000	\$127,250,000	\$120,469,000	\$131,569,000	\$142,669,000	\$147,220,000	<i>Financial Impact on overall program</i>

