ITS

Intelligent Transportation Systems
U.S. Department of Transportation

NG9-1-1

Next Generation 9-1-1 (NG9-1-1) System Initiative

System Description and Requirements Document

Washington D.C.

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Document Change History

Version	Publication Date	Description of Change
V1.0	June 2007	Draft Version
V1.1	July 2007	New Section 2.2, Appendix E and minor changes
V2.0	October 2007	Final Verson. Updated Section 3 use cases. Added additional detail to sections 5.1, 5.2, 5.3, and 7.1

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Section 1: Introduction

1.1 Executive Summary

The Next Generation 9-1-1 Initiative (NG9-1-1) is a U.S. Department of Transportation (USDOT) research and development project that will help define the system architecture and develop a transition plan that considers responsibilities, costs, schedule, and benefits for deploying Internet Protocol (IP)-based emergency services across the Nation.[1] USDOT understands that access to emergency services provided by Public Safety Answering Points (PSAPs) in today's world of evolving technology will ultimately occur within a broader array of

1 *It is assumed that emergency service networks will be IP based, operating on IP networks shared with other emergency services and government services, in concert with existing and evolving communication technology and related services that will ultimately support much of the access to emergency services, along with the interconnection required to allow them to interrelate. Because of its purpose, NG9-1-1 service must be a priority service on the shared IP networks. Likewise, it is assumed that the emergency service network architecture driven by this document will generally follow the Internet Protocol Suite, including transport layer protocols like Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). Consequently, requirements are not specifically identified herein for such matters.*

interconnected networks comprehensively supporting emergency services—from public access to those services, to the facilitation of those services, to the delivery of the emergency information to dispatchers and first responders.

The NG9-1-1 System is an emergency call[2] delivery and response system (or "system of systems") that will capitalize on advances in information and communications technologies, and will enable—

- Quicker and more robust information as the result of making a 9-1-1 call
- Better and more useful forms of information (text, images, and video) from any networked communications device
- Transfer of 9-1-1 calls between geographically dispersed PSAPs (and from PSAP to remote public safety dispatchers) if necessary
- Increased aggregation and sharing of data, resources, procedures, and standards to improve emergency response
- Maximized use of available public capital and operating costs for emergency communication services.

While NG9-1-1 will result in these benefits to nationwide emergency services, it will also allow the flexibility necessary to allow operational standards, protocols, and best practices to be adopted and implemented to meet unique local circumstances and needs. For example, not all PSAPs will provide emergency medical pre-arrival instructions to callers. Likewise, it is not necessary for NG9-1-1 to have identical technological capabilities nationwide. Availability of some technologies (e.g., CAD, GIS mapping) will be determined based on local circumstances and needs. Where this document refers to accepted standards and best practices, the intent is to refer to accepted standards and best practices employed by the supporting jurisdiction or PSAP. It is expected that a variation in operational and technical practices and capabilities will exist across jurisdictions and PSAPs.

This document, the NG9-1-1 System Description & Requirements Document, is the enterprise level successor to the NG9-1-1 High-Level System Requirements Document[3] and includes the analytical output of a long-term 9-1-1 community stakeholder outreach effort. In addition, this document leverages work from USDOT's earlier Wireless E9-1-1 Initiative and builds on IP-based 9-1-1 work already underway within a variety of related efforts. This initial version includes top-level functional requirements, identifies capability use cases, and specifies enterprise-wide requirements. Also included is a Community Model (Figure 2-1) that allows stakeholders to visualize how the requirements fit into the NG9-1-1 community and how stakeholder concerns are being addressed. This document is a means of capturing, synthesizing, and representing the operational concepts and functional requirements for the NG9-1-1 System.

1.2 Vision/Statement of Need

1.2.1 Vision

The core vision for NG9-1-1 is that a nationally interoperable emergency services internetwork (system of systems) will provide the foundation for emergency services in an increasingly mobile and technologically diverse society and ultimately enable Enhanced 9-1-1 (E9-1-1) calls from most types of communication devices.

1.2.2 Goals and Objectives

The primary goal of the NG9-1-1 System is to save lives, ensure health, and protect property by improving emergency services access and response in the United States. The state of the NG9-1-1 System also has a major effect on transportation security, mobility, and efficiency.

The NG9-1-1 System objectives that will lead to this goal include—

- Enable E9-1-1 calls from any networked communication device
- Enable geographically independent call access, transfer, and backup among PSAPs and between PSAPs and other authorized emergency organizations
- Encourage a flexible, open, non-proprietary, and secure architecture to facilitate the implementation of an interoperable internetwork (system of systems)
- Foster increased coordination and partnerships within the public safety community
- Encourage standards coordination and interoperability across the United States and with other emergency services network providers within North America (Canada and Mexico), recognizing the global impacts of routing emergency calls in an IP environment
- Maximized use of available emergency services capital, operating and maintenance cost savings.

1.2.3 Statement of Need

There appears to be consensus within the 9-1-1 community on the shortcomings of the present 9-1-1 system and the need for a new, more capable system to allow the general public to send text, images, video, and other data to PSAPs, in addition to making 9-1-1 calls—capabilities that are increasingly common in mobile communications devices and vehicles. There is general agreement on the need to transition legacy technology and systems into an advanced nationwide emergency communications internetwork. There is also agreement that NG9-1-1 must provide all the capability and quality of service that currently exists in E9-1-1 systems. Understanding that our Nation's E9-1-1 systems vary in the level of service they provide, we define "must provide all the capability that currently exists" as meaning that NG9-1-1 must, at a minimum, equal the current state of the operations for traditional 9-1-1 systems.

2 *The term "call" is used in this document to indicate any real-time communication—voice, text, or video—between a person needing assistance and a PSAP call taker. This term also includes non-human-initiated automatic event alerts, such as alarms, telematics, or sensor data, which may also include real-time communications.*

3 *The NG9-1-1 Detailed System Requirements document decomposes NG9-1-1 System Description & High-Level Requirements to identify lower-level NG9-1-1 user and system needs. Operational, systems and data behaviors to support NG9-1-1 required activities are detailed in the NG9-1-1 Detailed System Requirements.*

1.3 Document Overview

This document contains the NG9-1-1 system requirements, as well as a description of the NG9-1-1 System. The remainder of this NG9-1-1 System Description & Requirements Document is organized into the following numbered sections:

2) Enterprise Overview
3) Capability Use Cases
4) Functional Activity and Requirements Overview
5) NG9-1-1 PSAP Operations Segment
6) NG9-1-1 System Administration Segment
7) NG9-1-1 System Operations Segment
8) Technical System Requirements
9) Source References

The ***Enterprise Overview section*** contains several analytical and illustrative presentations that provide an overall enterprise view of NG9-1-1 stakeholder needs and describe the key system capabilities that will fulfill these needs.

The ***Capability Use Cases section*** illustrates the use of the NG9-1-1 System from a user's perspective and provides context for the various ways NG9-1-1 functional activities enable users to complete complex tasks.

The ***Functional Activity and Requirements section*** describes the layout and structure of the activities and system requirements in this document.

The next three sections discuss the NG9-1-1 services and system requirements, grouped into three NG9-1-1 System Segments: ***PSAP Operations***, ***System Administration Support***, and ***System Operations***. The sections on these system service segments provide detailed goals, descriptions, and requirements defining the needed functional capabilities for the NG9-1-1 services and activities.

The ***Technical System Requirements section*** presents NG9-1-1 system requirements that help ensure the NG9-1-1 System is fully supported and capable of processing the required workload.

The ***Source References section*** identifies sources of information used in the gathering and development of the system description and requirements presented in this document.

Notes

Section 2: Enterprise Overview

2.1 Community Model

2.1.1 Why Develop a "Community Model"?

When the analysis of the NG9-1-1 System was initiated, USDOT worked with 9-1-1 stakeholders throughout the Nation to analyze the mission and operation in the context of serving the emergency services community. Through this analysis, the diverse group of stakeholders that comprises the 9-1-1 community was identified, including 9-1-1 and public safety agencies and related industries; information standards organizations; consumer, research, academic, and consortia communities; technology and consulting industries; telematics, third-party, Internet, and wireless service providers; and transportation, government, regulatory, and professional associations. In addition, USDOT identified the high-level system interfaces and transactional information flows among these stakeholders. To communicate the findings associated with this analysis, a Community Model, which serves to build understanding at the technical, operations, and policy levels, was developed. The purpose of the Community Model

is to provide an overall enterprise view to capture and analyze the needs of system stakeholders in the context of the work activities they perform and the services the enterprise provides to them.

Stakeholders can use this model to see how they fit into the "community" as a whole and how their concerns are addressed within the NG9-1-1 enterprise. The high-level concepts depicted in the Community Model are specifically tailored to an enterprise-level audience through the use of a graphically rich diagram. However, the Community Model is also directly linked to more technical documents, for example, the Internet Engineering Task Force (IETF) Emergency Context Resolution and Internet Technologies (ECRIT) Requirements and the National Emergency Number Association (NENA) i3 Technical Requirements, as well as this NG9-1-1 System Description & Requirements Document. The Community Model provides the unique ability to bridge the gap among technical, operations, and policy oriented audiences.

The Community Model is not intended to replace traditional conceptual or logical models of a system. These types of models provide a greater level of detail about the system being defined, including the common data stores, user interfaces, and applications, and the relationships among these components. These models are used as a baseline for future direction. The Community Model abstracts these details and instead provides a high-level depiction of the community members and how they will interact with the system's services.

2.1.2 NG9-1-1 Community Model

The USDOT NG9-1-1 Community Model, presented in Figure 2-1, is a graphical representation of the operational and support elements that comprise the NG9-1-1 system of systems. The NG9-1-1 Community Model illustrates how the NG9-1-1 System interacts with various stakeholders and how these stakeholders fit into the emergency services community as a whole. Thus, the Community Model provides an overall enterprise view to capture and analyze the needs and operations of the various stakeholders in the context of the services the NG9-1-1 System provides to them. The layers of this model are meant to show the NG9-1-1 geographic coverage, the operational elements of the emergency services community, and the operational elements of the NG9-1-1 System.

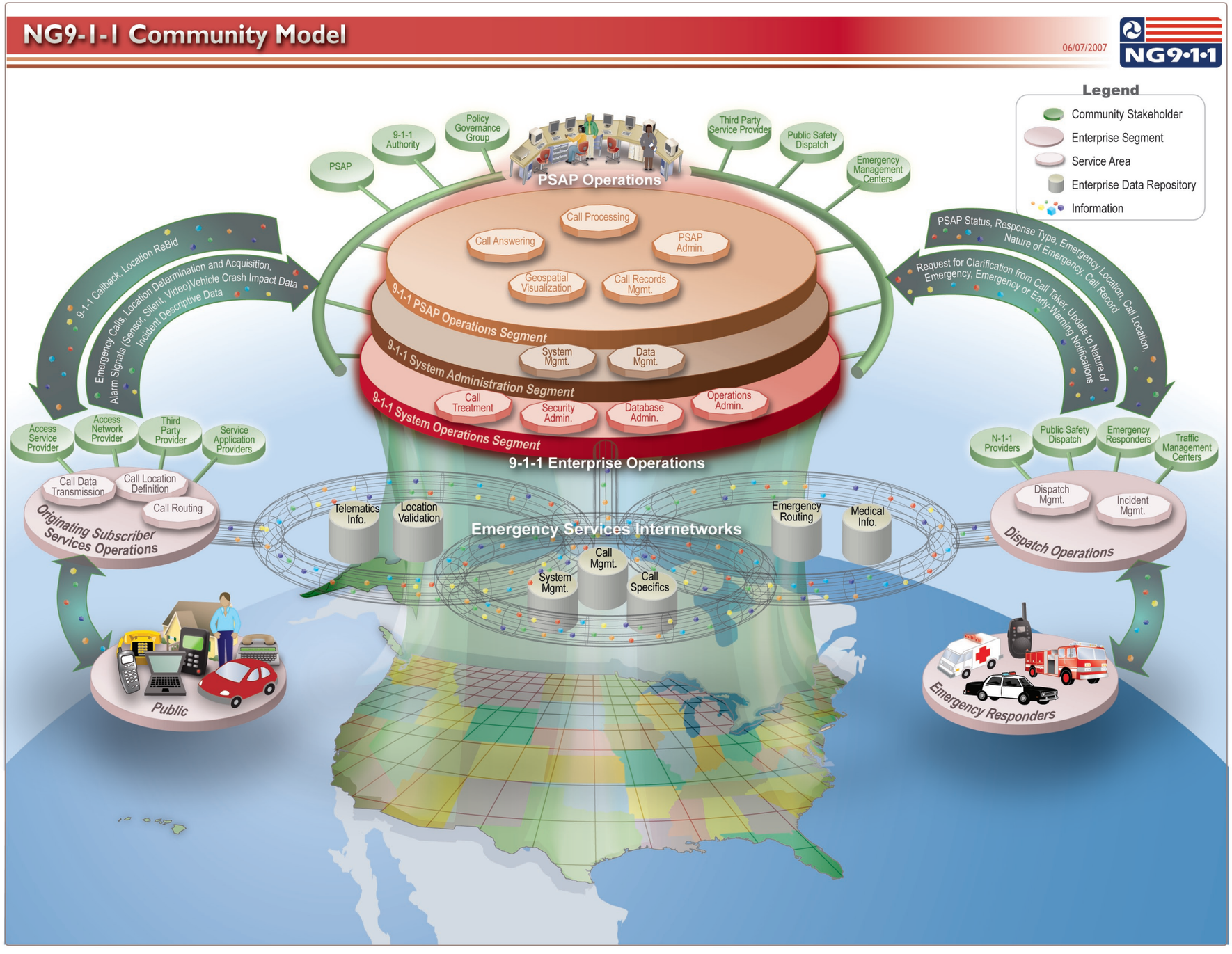

Figure 2–1: NG9-1-1Community Model

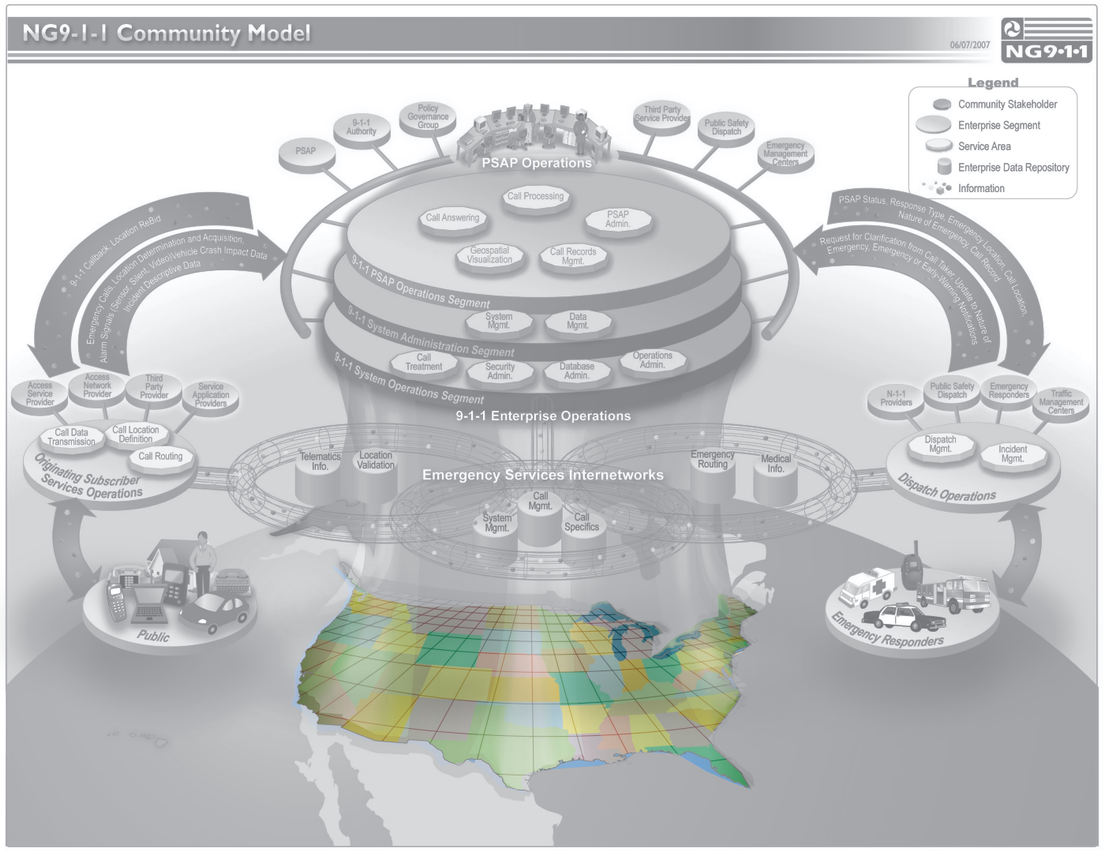

Figure 2–2: Geographic Layer

The ***Geographic Layer***, depicted in the lower portion of the graphic as a map of the United States, illustrates the decentralized nature of NG9-1-1 and serves as a visual foundation for the requirements and needs of the NG9-1-1 System. The NG9-1-1 System is an interconnected system of local and regional emergency services networks (system of systems). The boundaries of emergency service networks vary, depending on geography, local emergency management requirements, and organizational frameworks. The overlapping boundaries of existing emergency services providers' areas of responsibility and their varying operational missions require that they work in a coordinated and collaborative context. One of the goals of NG9-1-1 is to provide the components to enable this collaboration, including the strategic communications capabilities and enhanced data aggregation and sharing technologies for carrying out the NG9-1-1 mission.

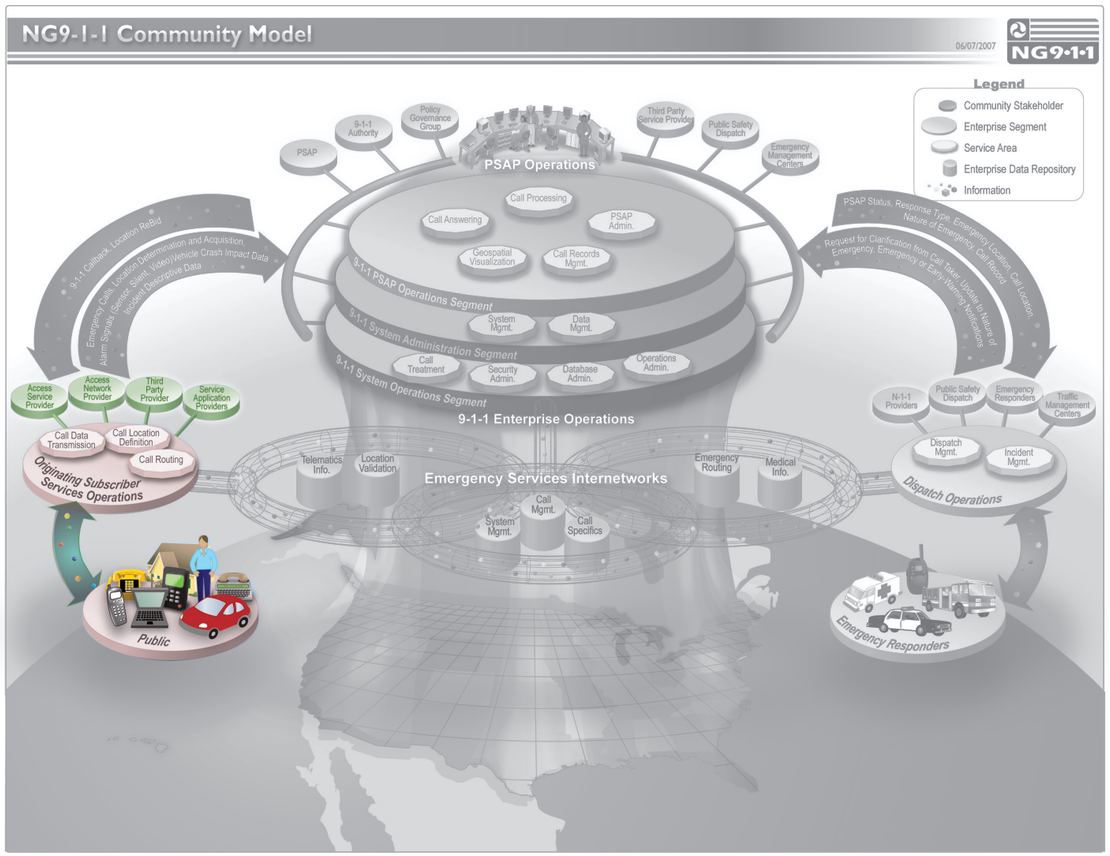

Figure 2–3: Originating Subscriber Service Operations Layer

The ***Originating Subscriber Service Operations Layer***, depicted on the left side of the graphic, illustrates how calls from the public enter the system through various communication devices and how these calls are routed to the appropriate PSAP through commercial networks. These devices and networks are key to identifying the information types and formats to be transferred throughout the NG9-1-1 System. The NG9-1-1 stakeholder groups that make up the originating subscriber service providers are shown in green and include access service providers, access network providers, third-party providers, and service application providers. The Originating Subscriber Service Operations layer is the essential first component of the emergency response continuum in NG9-1-1, just as it is in today's 9-1-1. At this layer, an emergency call is distinguished from all other traffic and given different treatment. Nevertheless, this layer is outside the scope of this project except for the functional handoff between it and the 9-1-1 enterprise.

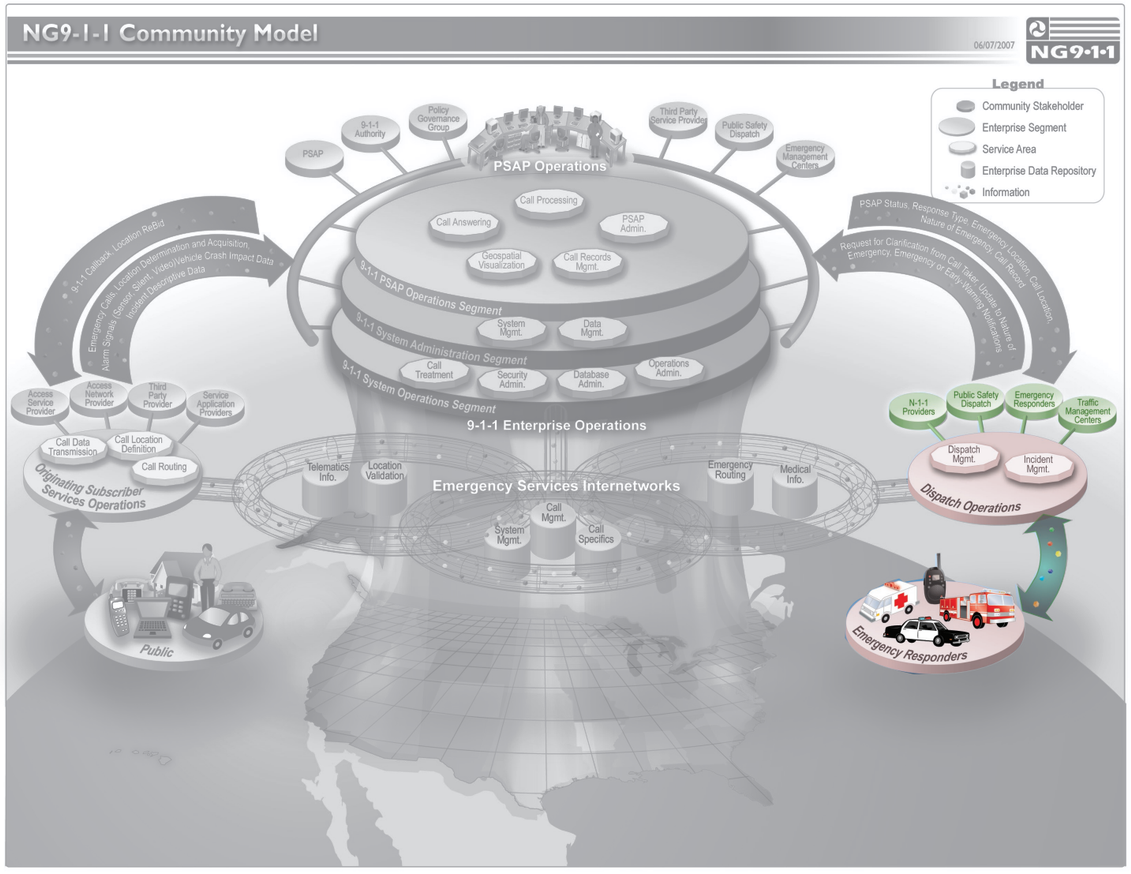

Figure 2–4: Dispatch Operations Layer

The ***Dispatch Operations Layer***, depicted on the right side of the graphic, illustrates the various dispatch, public safety communications, and emergency responder organizations responsible for dispatching emergency service to the public in response to 9-1-1 calls. The NG9-1-1 stakeholder groups associated with the *Dispatch Operations layer* are N-1-1 providers, public safety dispatch groups, and emergency responders. The Dispatch Operations layer reflects an essential aspect of the emergency response continuum in NG9-1-1 just as it does in today's 9-1-1. Nevertheless, this layer is outside the scope of this project except for the functional handoff between it and the 9-1-1 enterprise.

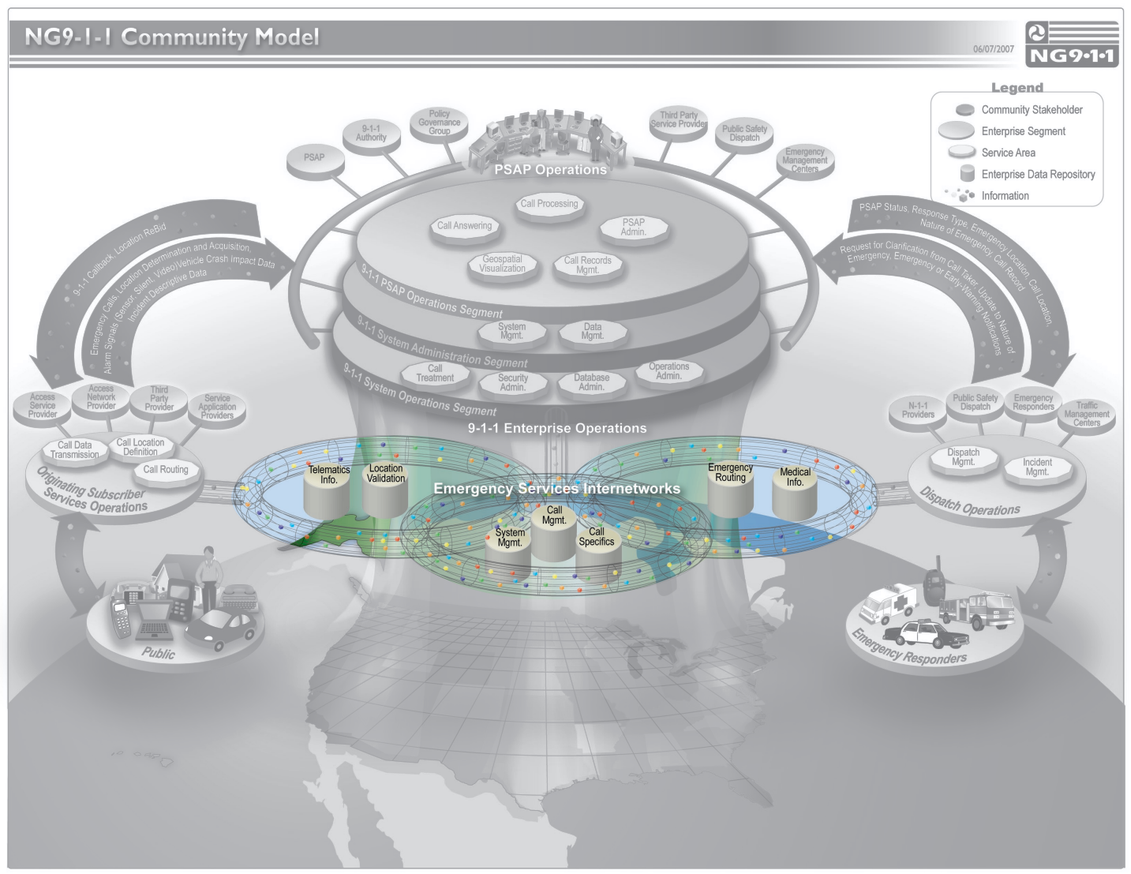

Figure 2–5: Emergency Services Internetwork Layer

The ***Emergency Services Internetwork***, depicted near the center of the graphic as a set of interconnected, shared IP networks, information streams, and data stores, is a set of coordinated and shared applications and information repositories that serve multiple governmental and non-governmental functions and seamlessly interface voice and electronic data, thereby improving response for emergencies.

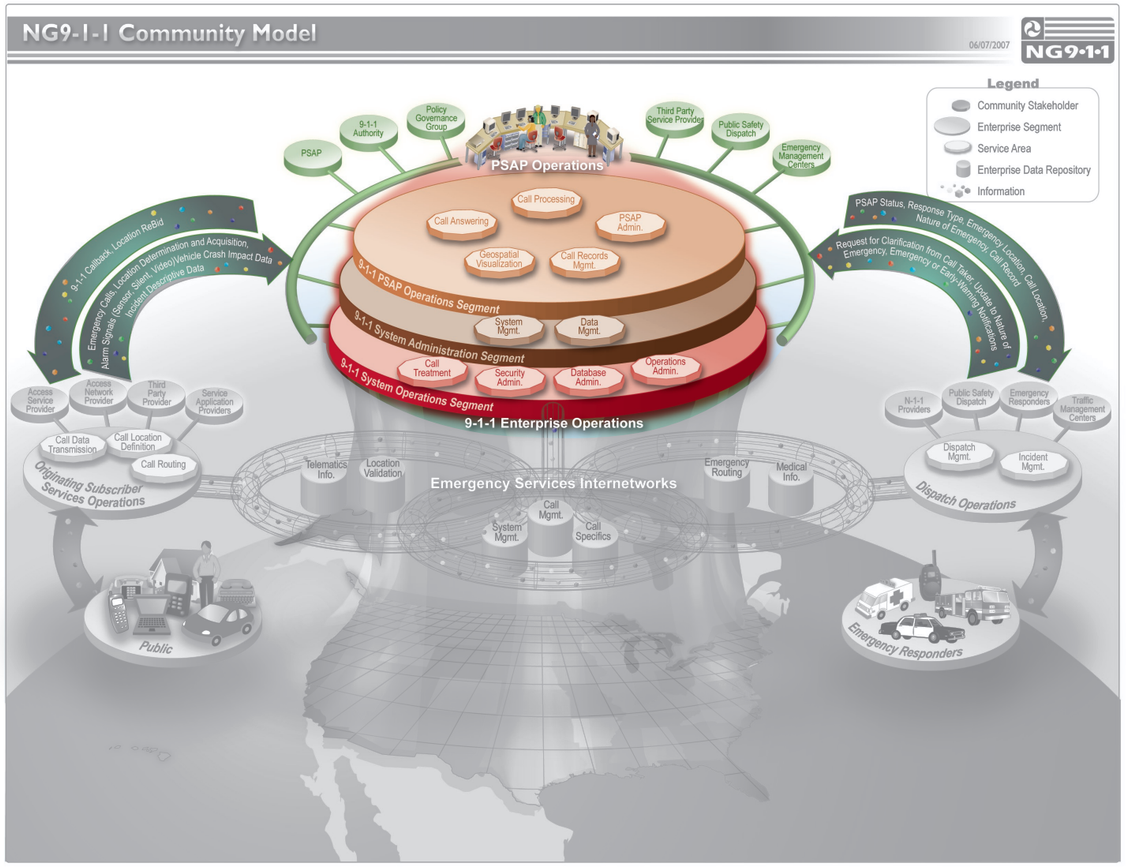

Figure 2–6: NG9-1-1 Enterprise Operations Layer

The ***9-1-1 Enterprise Operations Layer*** is at the core of the NG9-1-1 community, comprising the activities, systems, resources, and processes performed within the 9-1-1 enterprise. It serves as a broker of information from the public caller through to the emergency responder. The 9-1-1 enterprise gathers information about the emergency, such as the nature and location of the emergency, alarm signals, vehicle crash impact data, and other incident-descriptive data, from the public via the originating subscriber services. The 9-1-1 enterprise then disseminates information, such as PSAP status, caller location, nature and location of the emergency, response type, and other incident descriptive data, to the appropriate responder dispatch services.

To support this brokering of information, the ***9-1-1 Enterprise Operations Layer*** is composed of three enterprise segments: the **9-1-1 PSAP Operations Segment**, the **9-1-1 System Administration Segment**, and the **9-1-1 System Operations Segment**. The **9-1-1 PSAP Operations Segment** is primarily used by PSAP call takers to receive calls from the public, determine the nature of the emergency, and relay the call to the appropriate public safety dispatch center for response. The **9-1-1 System Administration Segment** describes the capabilities needed for sharing information, collaborating, assigning work tasks, maintaining security standards, training, and configuring the 9-1-1 enterprise. The **9-1-1 System Operations Segment** consists of activities, systems, and network resources to manage, protect, administer, and operate the technology infrastructure supporting the 9-1-1 mission. These NG9-1-1 enterprise segments represent some of the primary requirements that NG9-1-1 must support in order to advance the level of efficiency, collaboration, and coordination among the 9-1-1 community to the next generation of 9-1-1. The intent of these segments is to provide stakeholders with common descriptions of the functionality provided within NG9-1-1—not a policy statement on how that functionality must be implemented for each locality within NG9-1-1.

2.2 NG9-1-1 System Boundaries

For a system as broad and complex as NG9-1-1, it becomes necessary to define the scope of the project by indicating the technology that is considered "part of the system." With a well-defined delimitation of the system, a smoother transition and a clearer understanding of the interfaces needed will result.

Figure 2-7, the NG9-1-1 Boundary area indicates the components that are included as part of NG9-1-1. Items outside of this area are those components that are elements of the more larger public safety communications system, and are not included in this initiative's scope.

Main components of the NG9-1-1 System include:

- Devices used by call takers to process the input (voice, text, data, images, and video) from other systems;
- Telephony switches and automatic call distributor (ACD) systems, typically residing within a PSAP;
- Call detail logging devices;
- Map displays and geographic information systems (GIS);
- Emergency call routing functions (emergency communications routing proxies and legacy selective routers);
- Databases including routing, identity and access, selective router and ANI/ALI databases; and
- Interfaces that provide connectivity between the NG9-1-1 components and those supporting systems that deliver critical information, including the actual "call."

Notable components outside the NG9-1-1 System include:

- Access devices (wireline, wireless, text/video/data, sensors, etc.);
- Access networks (utilities, service providers, and the Internet);
- Emergency call routing functions for mobile, voice over IP (VoIP) providers and Internet service providers (ISP);
- Location validation and routing databases for location acquisition;
- Third-party call centers, including telematics service providers; and
- Public safety dispatch and responder agency systems.

As a separate document, the USDOT will publish a NG9-1-1 Architecture Analysis Report document that provides a more in-depth and descriptive view of the proposed architecture for a NG9-1-1 system. The report presents an architecture able to support next generation technologies, access methods, and operational capabilities. Key architectural considerations are discussed to draw attention to the characteristics and issues most key to the successful operation of the NG9-1-1 System.

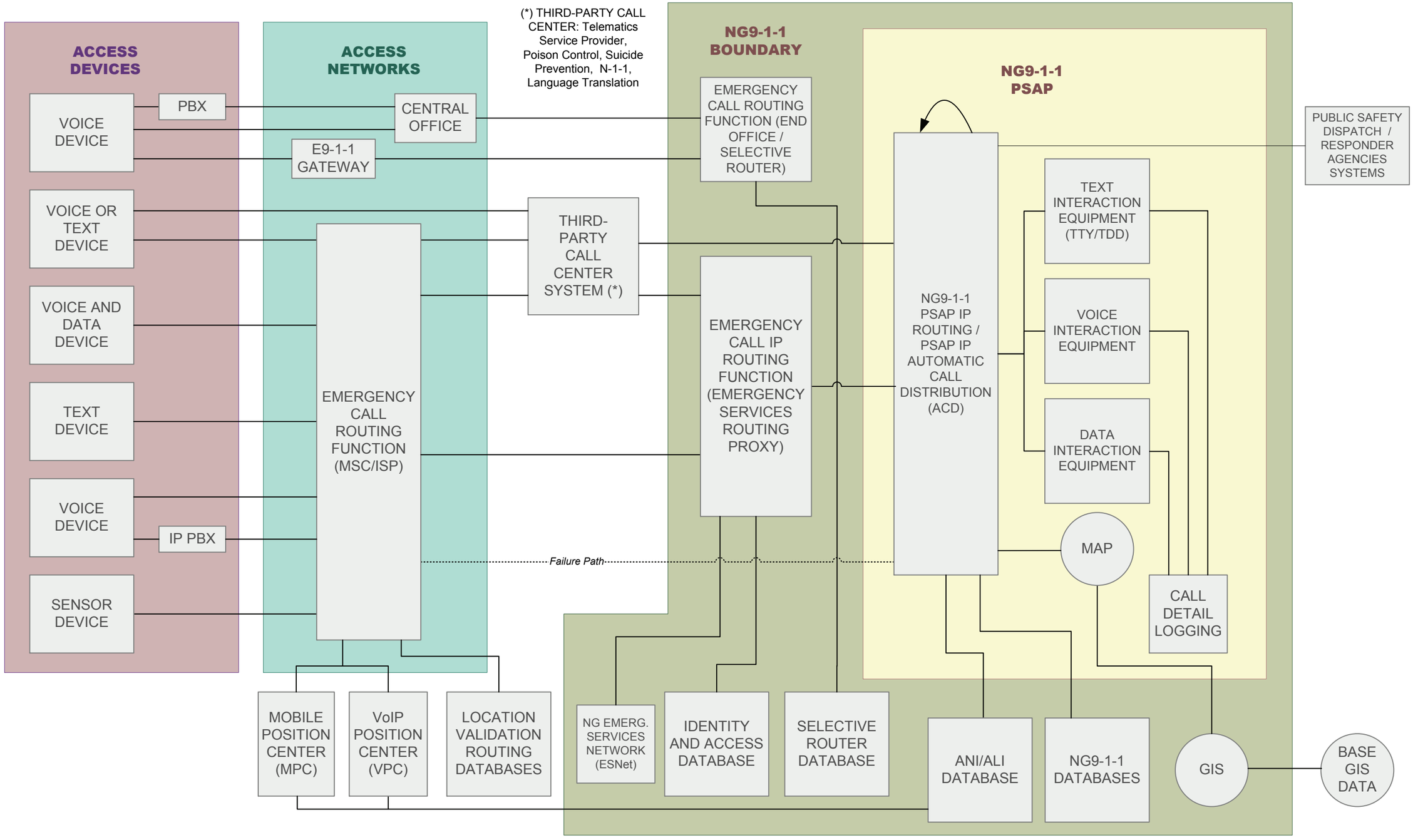

Figure 2–7: NG9-1-1 System Boundaries Diagram

2.3 Enterprise Segment Activity Roadmap

The Enterprise Segment Activity Roadmap (ESAR) consists of a table of functions, or activities, for each of the enterprise segments discussed in Section 2.1 and illustrated in the Community Model (see Figure 2-1). The ESAR provides an index that defines the scope of activities, mapped to enterprise segments that need to be supported by developed (or purchased) NG9-1-1 applications. Within each enterprise segment are group identifiers, or service areas (shown as a colored header to the enterprise segment table), for the functional activities below them. The activities within each service area are the component work functions that will be performed within the NG9-1-1 System.

Each activity within the ESAR represents a unique function the NG9-1-1 System should perform. These activities are defined by the set of attributes listed below:

- Activity Name: The name of the Activity being described
- Activity Code: A unique code used to identify the Activity name and its associated service area name
- Role: A name of the job role of the person or the functional role of a technology that performs the Activity
- Proof-of-Concept: Yes/No—A recommendation on whether the Activity should be demonstrated in the Proof-of-Concept
- References: Abbreviations of the documents used as references when defining the Activity
- Goal: A brief description of the end result of the Activity.

The ESAR plays an important role in ensuring that stakeholders, users, and developers, fully understand the activities required to support the new operational functions or business processes. A review of each service area—prioritizing activities by project need, complexity, and cost—can be completed to determine how component activities should be allocated as part of the NG9-1-1 System development.

Role Descriptions. Roles comprise the collective characteristics of the persons or systems that perform work within the NG9-1-1 System. Jurisdictional boundaries and community agreements may impact the specific implementation of these roles within NG9-1-1. The role descriptions listed here provide the general characteristics of the role within the system. The staff that perform their work within NG9-1-1 are characterized in the Table 2-1 role descriptions. It is important to note that one human user of the system can and will take on multiple roles within the system. Also, for many of the activities described within this System Description & Requirements Document, a human may not be involved with the execution of the role within an activity.

The ESAR that follows in Figure 2-9, Figure 2-10, and Figure 2-11 presents the enterprise segments, service areas and, functional activities of the NG9-1-1 System.

Table 2–1: NG9-1-1 Role Descriptions

Role Code	Role Name	Role Description
DBA	Database Administrator	The Database Administrator is responsible for the environmental aspects of the NG9-1-1 data stores. In general, these include: ensuring that database backups are created and tested for recoverability, verifying data integrity, defining and/or implementing security access controls to the data, and ensuring maximum availability and performance. The database administrator manages the database in an administrative manner and consequently requires the technical skills to troubleshoot problems and maintain the overall health of the database.
DM	Data Manager	The Data Manager is responsible for creating, maintaining and correcting the data content within the NG9-1-1 information stores.
CT	Call Taker	The call taker receives and processes 9-1-1 emergency and non-emergency calls from the public or third-party notification agencies. The call taker may also dispatch emergency services or conference/transfer 9-1-1 callers with/to the appropriate emergency service agency. The call taker may perform location validation discrepancy reporting. The call taker may be required to give emergency medical pre-arrival instructions to 9-1-1 callers. The call taker may be required to answer non-emergency and administrative calls, and monitor alarms.
SYS	NG9-1-1 System	The system role is used when the primary functions of an activity have been automated.
NTA	Network Administrator	The Network Administrator has the responsibility to maintain the network by providing any necessary updates, performing routine maintenance, and by managing access to the network.
9-1-1AUTH	9-1-1 Authority	The 9-1-1 Authority provides oversight for city, county, region, or statewide PSAP operations. The 9-1-1 Authority may promulgate rules, set standards, manage change, and administer funds. The 9-1-1 Authority typically determines the level of funding available to PSAPs for training, technology upgrades, and staffing.
PA	PSAP Administrator	The PSAP Administrator directs the overall operation of a PSAP and is responsible for the direct supervision, training, and administration of the PSAP's staff. The PSAP Administrator may be responsible for the maintenance of PSAP call-taking equipment and supporting peripherals. The PSAP Administrator may be responsible for the PSAP's budget and staff support.
SA	System Administrator	The System Administrator is responsible for software installation, system upgrades, and problem resolution. The System Administrator also performs system backups and recovery, while maintaining data files and monitoring system configuration to ensure data integrity. This role manages accounts, system monitoring, and system maintenance.

Service Areas:

A contextual grouping of like functional activities. Also thought of as the 'bins' of work being performed. Service areas can cross Enterprise Segments

9-1-1 PSAP Operations [PSAP]

Enterprise Segment:

An Enterprise Segment is a high level grouping of related business services that address major and distinct portions of the system or enterprise.

5.1 Call Answering [CA]	5.2 Call Processing [CP]		5.3 Call Records Management [CR]	5.4 Geospatial Visualization [GV]	5.5 PSAP Administration [PA]
[CA-MNQUE] Manage Call Queues Role: CT, PA Proof-of-Concept: Yes References: NENA 56-005, NENA 58-001 Goal: Provide the capability to manage call queues and deliver the caller to a call taker workstation.	[CP-DTNAT] Determine Nature of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine the nature of the emergency and provide an initial assessment of the situation.	[CP-IDRES] Identify Appropriate Responding Agency or Service Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Select appropriate responders based on the nature and location of emergency, incident management procedures, and standard operating procedures (SOP).	[CR-RCCAL] Record Call Role: CT, SYS Proof-of-Concept: Yes References: NENA 08-501, NENA 58-001 Goal: Preserve a detailed record of the interactive communications occurring during a call.	[GV-DSGEO] Display Geospatial Data Role: CT Proof-of-Concept: Yes References: N/A Goal: Display location and geospatial information on a map.	[PA-DECHP] Define and Establish Call Handling Protocols Role: PA, SA Proof-of-Concept: Yes References: NENA 08-501, NRIC VII-1B Goal: Ensure proper and efficient call handling and compliance with PSAP processes and best practices through the creation and automation of protocols and procedures.
[CA-ANSCL] Answer Call Role: CT, PA Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B Goal: Provide the capability to answer a 9-1-1 call.	[CP-VFLOC] Determine and Verify Location of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine whether an emergency is located at the caller's location or elsewhere. Ensure responders are directed to the correct location.	[CP-PRINS] Provide Pre-Arrival Instructions to Caller Role: CT Proof-of-Concept: No References: NENA-i3, NRIC VII-1B Goal: Provide appropriate pre-arrival instructions to call taker. A call taker may distribute pre-arrival instructions to a caller as necessary.	[CR-SDPT] Obtain Supportive or Supplemental Data Post Delivery Role: CT, PA Proof-of-Concept: Yes References: NENA 02-011, NENA 58-001 Goal: Obtain supportive or supplemental data after call delivery to facilitate call processing.	[GV-MPGEO] Manipulate Geospatial Data Role: CT, PA Proof-of-Concept: No References: N/A Goal: Manipulate location and geospatial information.	[PA-SCHST] Schedule Staff Role: PA Proof-of-Concept: No References: NENA 08-501, NRIC VII-1B Goal: Ensure the staffing level is set to handle the call volume.
[CA-INTCB] Initiate Call Back Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Establish communications circuit between call taker and receiving party.	[CP-UCLOC] Update Mobile Caller's Location Information Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Receive location information for mobile callers.	[CP-ECONF] Establish Conference Call Role: CT, PA Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Establish communication among the call taker, caller, third-party (e.g., telematics) service provider, and appropriate public safety entities.	[CR-ENDCL] End Call Role: CT, PA Proof-of-Concept: Yes References: NENA 08-501, NRIC VII-1B Goal: Terminate existing call and return to ready to accept next call.		
			[CR-TRCIN] Transfer Call Records Role: CT, PA Proof-of-Concept: Yes References: Goal: Transfer all Essential, Supportive, Supplemental, and/or manually-entered data concerning the call to the appropriate responding agency dispatch or other authorized entity.		

[Activity Code] Activity Name
Role:
Proof-of-Concept:
References:

Goal:

Goal: Create, manage, and distribute rules and policies governing the distribution of incoming 9-1-1 calls and automatic event alerts, along with the associated data to call takers.

Functional Activities:

Bounded piece of work to be performed that describes the people, processes, and technology used.

Activity Attributes:

Communicates the specific business rules and technical functions for each activity.

Figure 2–8: Example Enterprise Segment Activity Roadmap (ESAR)

9-1-1 PSAP Operations [PSAP]

5.1 Call Answering [CA]	5.2 Call Processing [CP]		5.3 Call Records Management [CR]	5.4 Geospatial Visualization [GV]	5.5 PSAP Administration [PA]
[CA-MNQUE] Manage Call Queues Role: CT, PA Proof-of-Concept: Yes References: NENA 56-005, NENA 58-001 Goal: Provide the capability to manage call queues and deliver the caller to a call taker workstation.	[CP-DTNAT] Determine Nature of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine the nature of the emergency and provide an initial assessment of the situation.	[CP-IDRES] Identify Appropriate Responding Agency or Service Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Select appropriate responders based on the nature and location of emergency, incident management procedures, and standard operating procedures (SOP).	[CR-RCCAL] Record Call Role: CT, SYS Proof-of-Concept: Yes References: NENA 08-501, NENA 58-001 Goal: Preserve a detailed record of the interactive communications occurring during a call.	[GV-DSGEO] Display Geospatial Data Role: CT Proof-of-Concept: Yes References: N/A Goal: Display location and geospatial information on a map.	[PA-DECHP] Define and Establish Call Handling Protocols Role: PA, SA Proof-of-Concept: Yes References: NENA 08-501, NRIC VII-1B Goal: Ensure proper and efficient call handling and compliance with PSAP processes and best practices through the creation and automation of protocols and procedures.
[CA-ANSCL] Answer Call Role: CT, PA Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B Goal: Provide the capability to answer a 9-1-1 call.	[CP-VFLOC] Determine and Verify Location of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine whether an emergency is located at the caller's location or elsewhere. Ensure responders are directed to the correct location.	[CP-PRINS] Provide Pre-Arrival Instructions to Caller Role: CT Proof-of-Concept: No References: NENA-i3, NRIC VII-1B Goal: Provide appropriate pre-arrival instructions to call taker. A call taker may distribute pre-arrival instructions to a caller as necessary.	[CR-OSSDT] Obtain Supportive or Supplemental Data Post Call Delivery Role: CT, PA Proof-of-Concept: Yes References: NENA 02-011, NENA 58-001 Goal: Obtain supportive or supplemental data after call delivery to facilitate call processing.	[GV-MPGEO] Manipulate Geospatial Data Role: CT, PA Proof-of-Concept: No References: N/A Goal: Manipulate location and geospatial information.	[PA-SCHST] Schedule Staff Role: PA Proof-of-Concept: No References: NENA 08-501, NRIC VII-1B Goal: Ensure the staffing level is set to handle the call volume.
[CA-INTCB] Initiate Call Back Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Establish communications circuit between call taker and receiving party.	[CP-UCLOC] Update Mobile Caller's Location Information Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Receive location information for mobile callers.	[CP-ECONF] Establish Conference Call Role: CT, PA Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Establish communication among the call taker, caller, third-party (e.g., telematics) service provider, and appropriate public safety entities.	[CR-ENDCL] End Call Role: CT, PA Proof-of-Concept: Yes References: NENA 08-501, NRIC VII-1B Goal: Terminate existing call and return to ready to accept next call.		[PA-CSCTG] Create Specialized Call Taker Groups Role: PA Proof-of-Concept: No References: NENA 08-501, NENA 58-001, NRIC VII-1B Goal: Create specialized call taker groups to be used in conjunction with call distribution rules.
			[CR-TRCIN] Transfer Call Records Role: CT, PA Proof-of-Concept: Yes References: Goal: Transfer all Essential, Supportive, Supplemental, and/or manually-entered data concerning the call to the appropriate responding agency dispatch or other authorized entity.		[PA-MACDR] Manage Automatic Call Distributor Rules Role: PA, SA Proof-of-Concept: No References: NENA 08-501, NENA 58-001, NRIC VII-1B Goal: Create, manage, and distribute rules and policies governing the distribution of incoming 9-1-1 calls and automatic event alerts, along with the associated data to call takers.

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Reference Legend:
ECRIT - Requirements for Emergency Context Resolution with Internet Technologies. Internet Engineering Task Force.
NENA 02-010 - NENA Standard Formats & Protocols for ALI Data Exchange, ALI Response & GIS Mapping
NENA 02-011 - NENA Data Standards for Local Exchange Carriers, ALI Service Providers & 9-1-1 Jurisdictions
NENA 02-013 - NENA Data Standards for the Provisioning and Maintenance of MSAG Files to VDBs and ERDBs
NENA 08-501 - NENA Technical Information Document on the Network Interface to IP Capable PSAP
NENA 58-001 - NENA IP Capable PSAP Features and Capabilties Standard
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NRIC VII-1B - Network Architecture Properties in 2010, Extending E9 1 1 to Satellites, and Generic Architectures to Support Video and Advanced Service. NRIC VII Focus Group 1B
NRIC VII-1D - Communication Issues for Emergency Communications Beyond E911: Final Report—Properties and network architectures for communications between PSAPs and emergency services organizations and personnel. NRIC VII Focus Group 1D

Figure 2–9: NG9-1-1 PSAP Operations ESAR

9-1-1 System Administration [SYAD]

6.1 System Management [SM]	6.2 Data Management [DM]	
[SM-CRROL] Create and Define Roles Role: PA, SA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Create, manage, and assign roles within the system.	[DM-MNDBA] Manage Database Access Role: DBA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide, support, and manage the capability to access the enterprise database(s) and to allow the distribution of data contained within those database(s).	[DM-MNDBT] Manage Database Auditing Role: DBA Proof-of-Concept: No References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to audit the specified user and maintenance activities against the enterprise database.
[SM-MUSER] Manage User Accounts Role: SA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to enable the creation, modification, suspension, and deletion of system accounts. Provide the capability to build user permissions/views with appropriate access to allowable systems, networks, and databases. Provide the capability for only those system administrators with proper authority to create and modify/update user accounts.	[DM-MNDBP] Manage Database Performance Role: DBA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to monitor and report on the operational performance of the enterprise databases.	[DM-MNDBI] Manage 9-1-1 Interface and Protocol Availability and Usage Role: SA Proof-of-Concept: Yes References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Ensure the availability of necessary and beneficial data interfaces and communication protocols to support call processing and emergency response.
[SM-PLCFC] Planning Configuration Changes Role: DBA, SA Proof-of-Concept: No References: N/A Goal: Ensure that the system and necessary network configurations adequately support the system and network desired functions and capabilities.	[DM-PDBSR] Perform Database Save & Recovery Role: DBA Proof-of-Concept: No References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to back up and save enterprise database(s), along with the archiving of appropriate system data. Provide the capability to recover and restore the enterprise databases based on previous backups.	[DM-SCIER] Submit Caller Information Error Report Role: CT, DBA Proof-of-Concept: No References: N/A Goal: Submit caller information error report to the originating data provider for correction.

Recommended for Proof-of-Concept

Role Key
- ALL - ALL Roles
- CT - Call Taker
- DB - Database Administrator
- NA - Network Adminstrator
- PA - PSAP Adminstrator
- SA - System Administrator
- SYS - NG9-1-1 System
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Figure 2–10: NG9-1-1 System Administration ESAR

9-1-1 Systems Operations [SNSP]

7.1 Call Treatment [CT]		7.2 Security Administration [SC]	7.3 Database Administration [DA]	7.4 Operations Administration [OA]	
[CT-ROLOC] Recognize Originating Location Role: SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Receive and electronically validate location-originating caller location information (civic or geospatial).	[CT-LGCAL] Document Call Detail Information Role: SYS Proof-of-Concept: No References: NENA-i3 Goal: Preserve a record of call information in a data file.	[SC-MNSEC] Manage Network Security Role: NTA, SA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Ensure managed access to network resources, ensure data integrity, and provide usage auditability.	[DA-MTDBC] Manage Database Content Role: DBA, SA Proof-of-Concept: Yes References: NENA 02-010, NENA 02-011, NENA 02-013, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to manage and maintain the logical database structure supporting the NG9-1-1 enterprise database environment.	[OA-MOSRE] Monitor System Resources Role: NTA, SA Proof-of-Concept: No References: NENA-i3, NRIC VII-1B Goal: Provide the ability to monitor and manage system and subsystem usage and reliability.	[OA-MNCLR] Manage Call Records Role: ALL Proof-of-Concept: Yes References: N/A Goal: Create and maintain call records
[CT-REGCT] Identify Call Type Role: SYS Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Receive and validate call type information (e.g., telematics, silent alarm) from telecommunications devices and recalculate call type and default priority based on supporting data.	[CT-PNWBS] Provide Network Bridging Services Role: SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3 Goal: Ensure that all system and network entities are able to conference and share data as appropriate and beneficial to call treatment and processing.	[SC-LOGIN] Login Role: ALL Proof-of-Concept: No References: N/A Goal: Authenticate and provide system access to users.	[DA-MTDBI] Populate and Maintain 9-1-1 Data Interfaces Role: DBA Proof-of-Concept: No References: NENA 02-010, NENA 02-011, NENA 02-013, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to update and modify the metadata database based on changes in data standards or enterprise databases.	[OA-MNFTR] Manage Network Faults and Recovery Role: NTA, SA Proof-of-Concept: Yes References: NRIC VII-1B, NRIC VII-1D Goal: Provide network capability to identify, isolate, and correct network faults.	[OA-MCHRQ] Manage Change Requests Role: NTA, SA Proof-of-Concept: No References: N/A Goal: Provide the administrative and analytical resources to support management decisions affecting system configuration and operation.
[CT-RTPSP] Route Call to PSAP Role: NTA, SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Route call from the initiator and call-originating service to the appropriate destination based on identified call treatment including location information received (civic or geospatial).	[CT-CAUTH] Call Authentication Role: SYS Proof-of-Concept: Yes References: IETF RFC-3647, IETF RFC-4474, NENA 02-502, NENA 04-503, NENA 08-001, NENA 58-001 Goal: The call authentication process ensures that only appropriate entities are granted permission through to the system.		[DA-PADCT] Publish Authoritative Data Content Role: DBA Proof-of-Concept: Yes References: N/A Goal: Establish and publish to authenticated users various data content related to system databases supporting functions such as location validation, call routing, rights management, and data routing.	[OA-MANSP] Manage System Performance Role: NTA, SA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Ensure network and system operation and reliability to meet acceptable and adopted standards. Provide the capability to monitor, record, and analyze system performance data against predefined metrics (i.e., establish system norms and flag exceptions).	[OA-MNSRE] Manage System Resources and Configuration Role: NTA, SA Proof-of-Concept: Yes References: NRIC VII-1B Goal: Provide management and control of network system resources and configurations.
			[DA-PFDBT] Perform Database Auditing Role: SA Proof-of-Concept: No References: NRIC VII-1B, NRIC VII-1D Goal: Audit the accuracy of the NG9-1-1 database(s).		

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
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Figure 2–11: NG9-1-1 System Operations ESAR

Section 3: Capability Use Cases

Capability use cases are connected activities extracted from the ESAR to create an overarching system goal. Each sequence of connected activities identifies a required capability for the NG9-1-1 System. Capability use cases illustrate use of the NG9-1-1 System from a user's perspective and provide context for the various ways NG9-1-1 functional activities will enable users to complete typical tasks. The following descriptions are not intended to represent a comprehensive or exhaustive list of use cases, but rather provide a high-level characterization of the major use cases involved.

9-1-1 calls reflect either 9-1-1 calls placed by individuals, or automatic event alerts sent by sensors or similar initiating devices. In either case, an emergency notification occurs, event-related descriptive or mitigating data are distributed and shared, and some type of response or follow-up occurs (which may not always be an emergency response).[3] PSAP, in this case, either refers to an appropriate single PSAP (as event circumstances warrant), or PSAP "arrangements" that may include more than one PSAP, or virtual PSAP constructs.[4]

Table 3–1: Operational Capability Use Cases

Capability Use Case	Figure	Description
Call Initiation	3-1	Provides the ability for calls from various access methods (e.g., telematics, wireless, instant messages/e-mail, VoIP, Teletypewriter/Telecommunications Device for the Deaf [TTY/TTD], wireline, event sensors) along with some "callback" and location-related information, to be delivered to the PSAP through the emergency services internetworks.
Call Routing	3-2	Provides the ability for the call to be routed to the most appropriate PSAP based on caller and/or event location and PSAP operational status. Provides the ability for the system to manage call treatment in overload, error, and out-of-service situations, including, but not limited to, dynamically rerouting to other suitable and available PSAPs, using interactive voice response, providing a busy tone, or generating other automatic, informative replies to callers. Provides the ability to deliver Essential and Supportive Call Data (i.e., location of caller and/or event, call-back number, call type, telematics data, etc.) along with the call to the appropriate PSAP(s).
Call Back Ability	3-3	Provides the ability for the call taker to call back to the caller, regardless of device, in the event the original connection is lost, and/or circumstances warrant follow-up. Call back may occur either immediately or at some later point in time. Call-back information may not be a telephone number and may be for any nation or domain (as a result of roaming and nomadic operation).
Interactive Call Processing	3-4	Provides the ability to receive a call (which may be a transferred call), along with necessary call data, and process that call as appropriate. Provides the ability to add and/or enhance delivered call descriptive data for the sake of improving call processing and emergency response. Provides the ability to accept calls from, maintain calls with, and/or engage third parties in response to calls, where the third party may be able to contribute to the processing of the calls involved.

Table 3–2: System Support Capability Use Cases

Capability Use Case	Figure	Description
Data Interaction with Emergency Entities	3-5	Provides the ability for alternate call takers or distant PSAPs to capture basic call information and make it accessible to local PSAPs and/or public safety dispatch centers. This capability also supports providing data access to other emergency entities.
Publish Validated Physical Location	3-6	Provides the ability for the 9-1-1 authority to publish validated location information that can be used by communication application service providers and/or access service providers to ensure proper call routing and emergency response is provided for their subscribers. Service providers are able to download authoritative location addresses and submit error correction requests.
Add New PSAP to NG9-1-1 System	3-7	Provides the ability for a PSAP to be added to the NG9-1-1 system, including both physical and logical connectivity. Security, authentication, identify management and network access must be established. Geographical coverage areas for primary PSAP service must be defined. Routing and failover rules and methodologies must be documented.

3 *Calls may be characterized by multimedia data streams. Also, some automatic event alerts may not warrant an emergency response, just as some calls placed by individuals may not always warrant an emergency response. For example, sensor devices may be defective and/or require service, and automatically call attention to that fact. Some type of follow-up may occur, and data may be collected, but the response does not denote an emergency.*

4 *NG9-1-1 will allow the deployment of virtual PSAPs, constructed through the aggregation of PSAP resources (i.e., call-taker resources, etc.) through system and network functions. The mitigation of some types of emergency events (like disaster events) may benefit from such arrangements.*

Capability Use Case: Call Initiation

Roles: SYS

Purpose: Provides the ability to start the call processing and transport, while also acquiring the appropriate initial location and initial essential data to correctly handle the call routing function. This use case also forwards the initial location data and other initial essential data to improve the call answering and handling processes. The use case provides for human-activation of any appropriate communications device/service which is capable of such routing and call delivery.

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: John Chiaramonte, Roger Hixson, Rick Jones, Jim Lockard

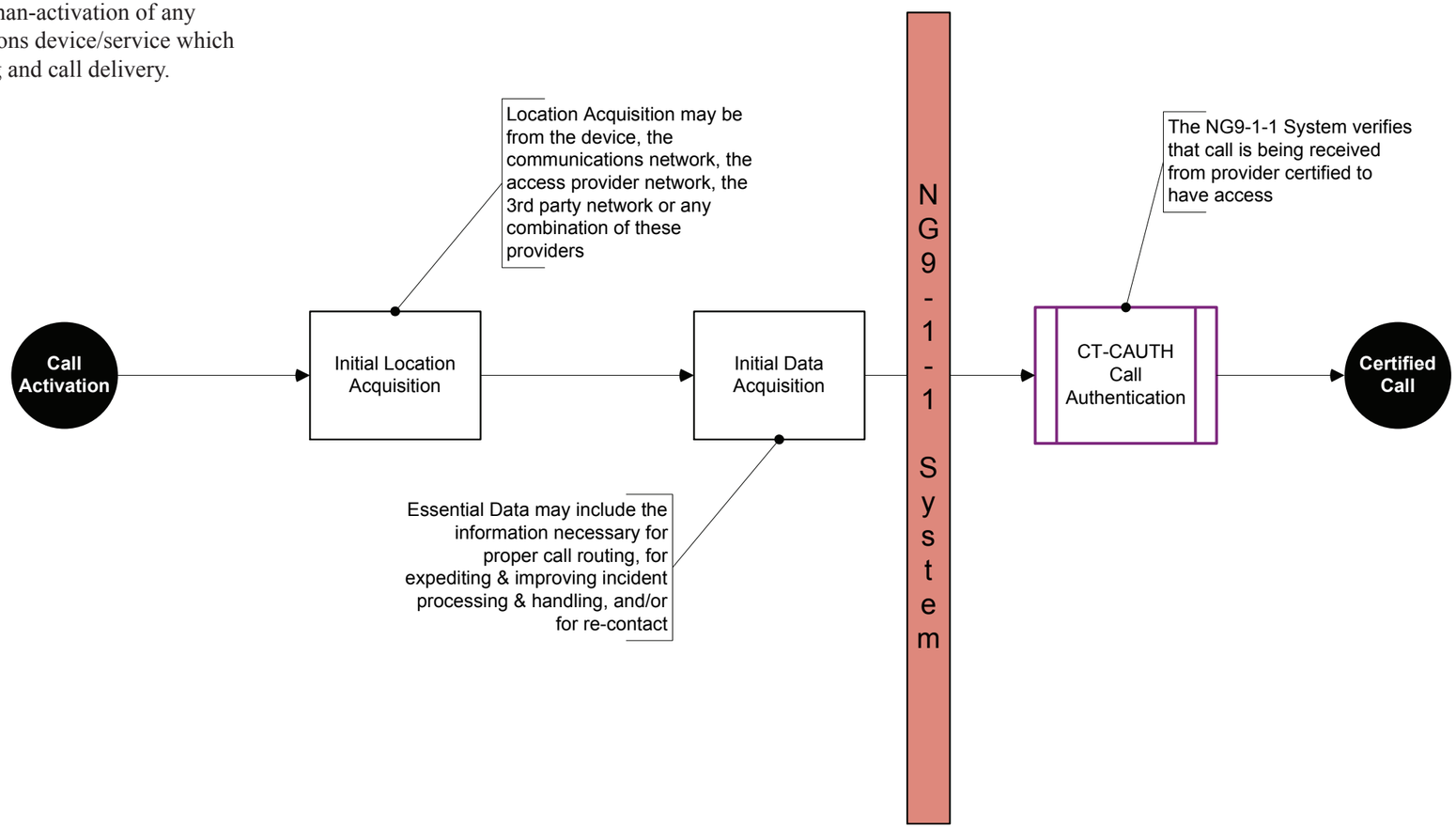

Figure 3–1: Call Initiation Capability Use Case

Capability Use Case: Call Routing

Roles: SYS

Purpose: Provides the information required for a 9-1-1 or other emergency initiated event to be sent through the system. While calls are routed through the system, data is collected and appended to the call stream. The delivery of the call, as well as associated data, is a system capability that allows for specific information about the call, caller, and event to be delivered through the same route as the call. The particular route can be chosen by the system, based on criteria determined by specific rules within the system itself.

Calls can be based on any media access method. The system must be able to determine where the call is from, and how it should be routed through the network to appear at the correct PSAP.

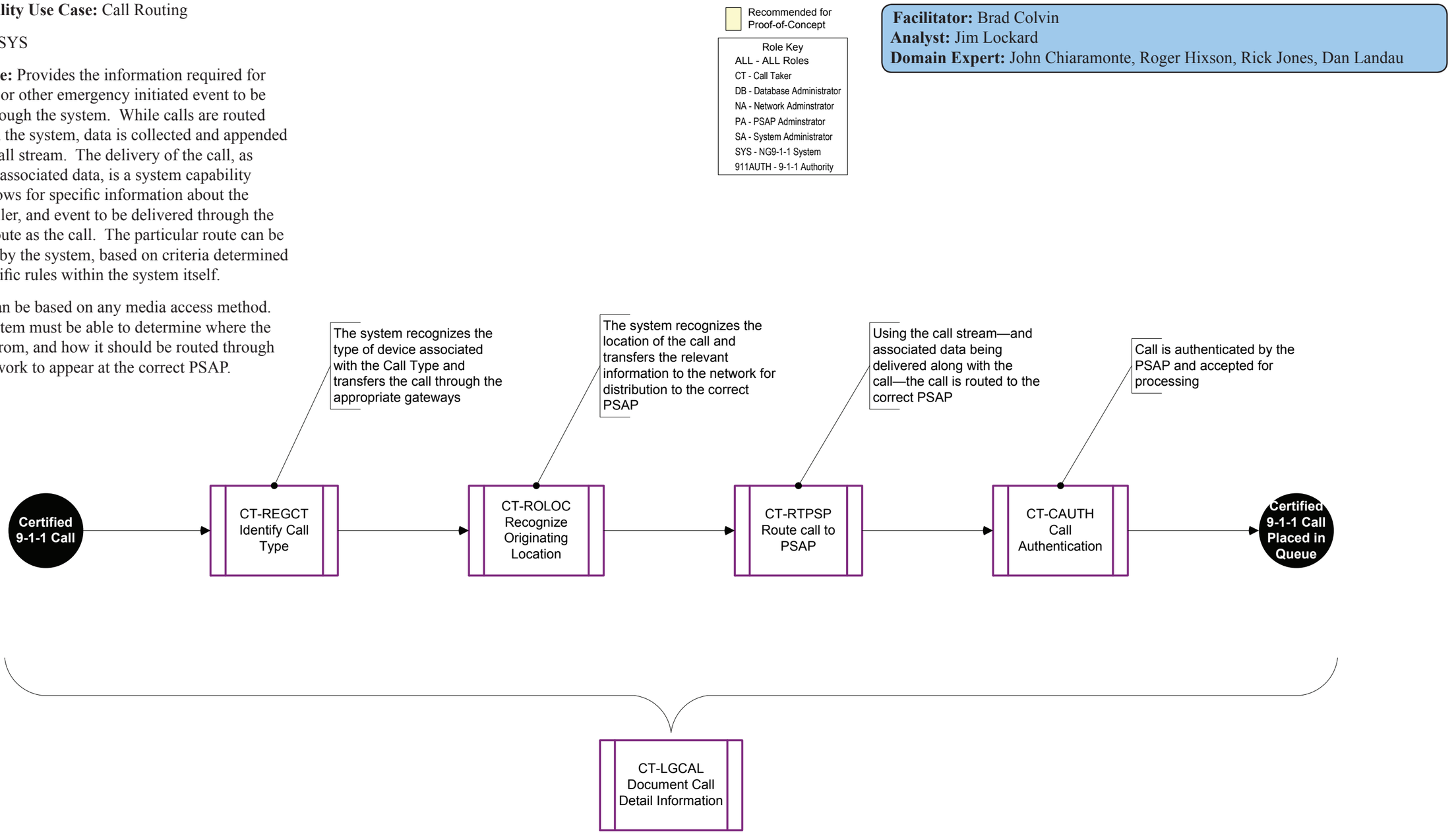

Figure 3–2: Call Routing Capability Use Case

Capability Use Case: Call Back Ability

Roles: CT

Purpose: Provides the capability for the call taker to automatically call a party back after a call has been lost. A call can be lost at any point during the process and local policy will dictate how the Call Taker will respond. The NG9-1-1 System logs caller information so that a call taker can recover from a situation such as forced disconnect, or unintentional hang-up or other situation. The use case enables any potential media interface capable of initiating a 9-1-1 call. The nature of the call, type of device initiating the call, ANI (or other recognizable Identification), URI, IP address, and/or geo-location of the device will be used to facilitate a call back in the event of a disconnection. The call back capability provides wireline, wireless, IP-based, and telematics interfaces within the system to terminate each type of call and collect the appropriate data.

Recommended for Proof-of-Concept

Role Key
- ALL - ALL Roles
- CT - Call Taker
- DB - Database Administrator
- NA - Network Adminstrator
- PA - PSAP Adminstrator
- SA - System Administrator
- SYS - NG9-1-1 System
- 911AUTH - 9-1-1 Authority

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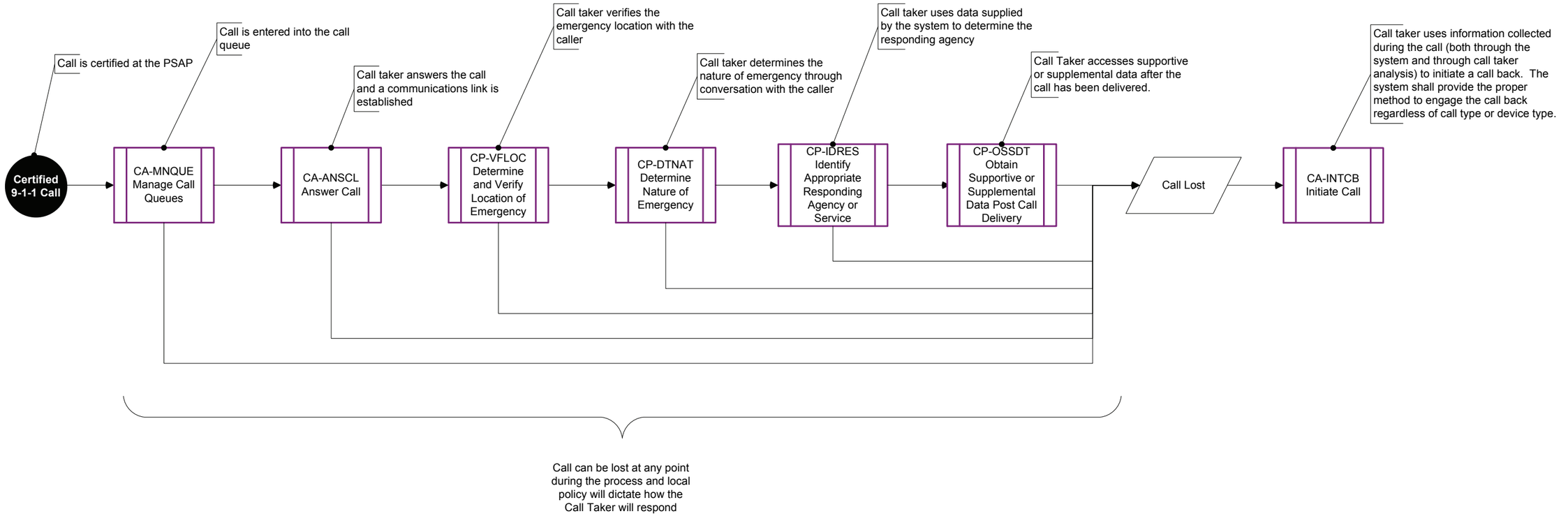
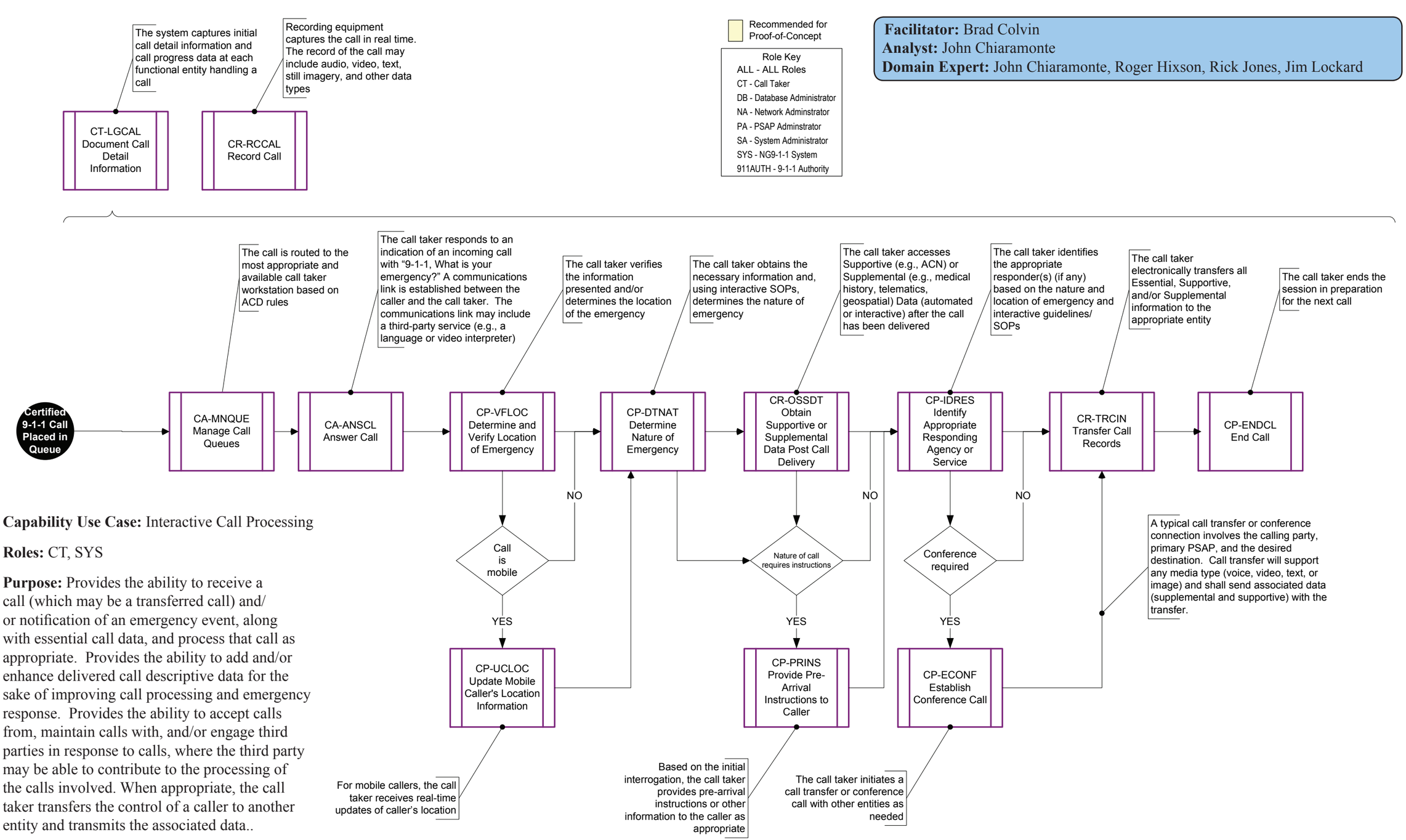


Figure 3–3: Call Back Ability Capability Use Case



Capability Use Case: Interactive Call Processing

Roles: CT, SYS

Purpose: Provides the ability to receive a call (which may be a transferred call) and/ or notification of an emergency event, along with essential call data, and process that call as appropriate. Provides the ability to add and/or enhance delivered call descriptive data for the sake of improving call processing and emergency response. Provides the ability to accept calls from, maintain calls with, and/or engage third parties in response to calls, where the third party may be able to contribute to the processing of the calls involved. When appropriate, the call taker transfers the control of a caller to another entity and transmits the associated data..

Figure 3–4: Interactive Call Processing Capability Use Case

Capability Use Case: Data Interaction with Public Safety Entities

Roles: CT, DBA, SYS

Purpose: Provides the ability for call records to be transmitted to an appropriate public safety entity. Provides the ability for a PSAP to receive a call and any associated data to or from any other public safety entity. One example of this information exchange is the transfer of a call from the initial PSAP to an Alternate PSAP. This capability use case also describes the ability for call records to be transmitted from the PSAP to public safety dispatch and / or responder agency systems.

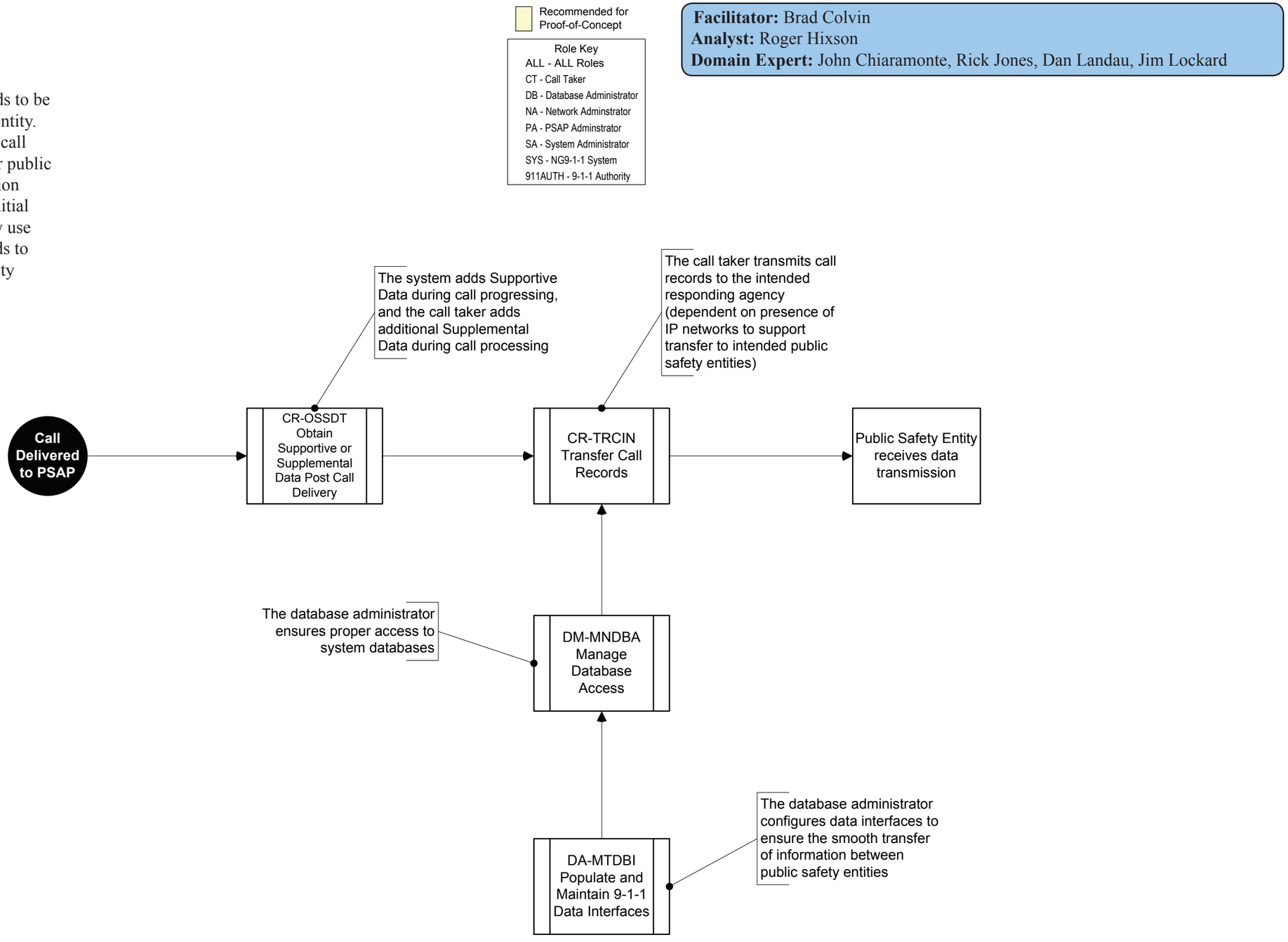


Figure 3–5: Data Interaction with Emergency Entities Capability Use Case

Capability Use Case: Publish and Maintain Validated Physical Location

Roles: DBA, DM, 9-1-1AUTH, SYS

Purpose: Provides the ability for the 9-1-1 authority to publish validated location information that can be used by communication application service providers and/or access service providers to ensure proper call routing and emergency response is provided for their subscribers. Service providers are able to download authoritative location addresses and submit error correction requests.

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
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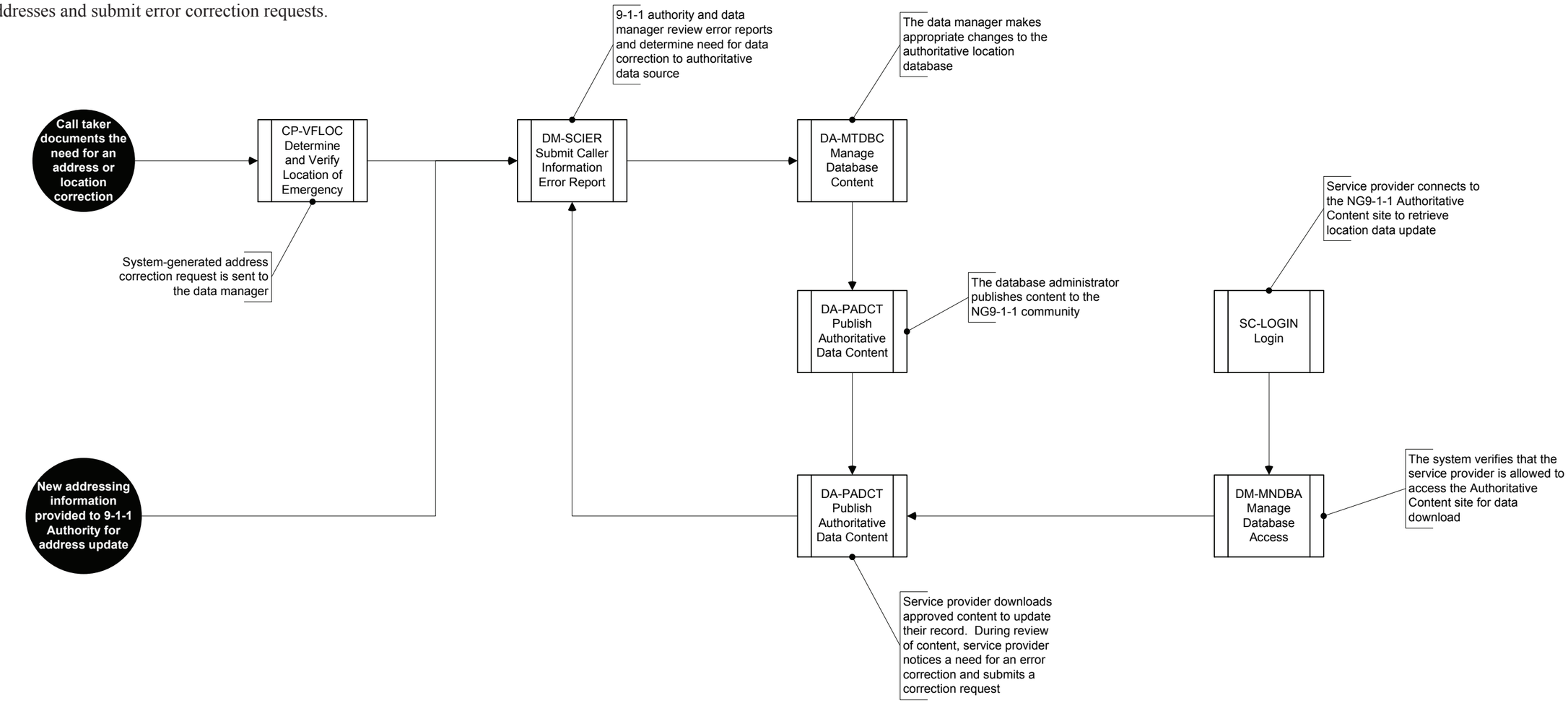

Figure 3–6: Publish and Maintain Validated Physical Location Capability Use Case

Capability Use Case: Add New PSAP to NG9-1-1 System

Roles: 911AUTH, DB, PA, SA

Purpose: Provides the ability for a PSAP to be added to the NG9-1-1 System, including both physical and logical connectivity. Security, authentication, identify management, and network access must be established. Geographical coverage areas for primary PSAP service must be defined. Routing and failover rules and methodologies must be documented.

Recommended for Proof-of-Concept

Role Key
- ALL - ALL Roles
- CT - Call Taker
- DB - Database Administrator
- NA - Network Adminstrator
- PA - PSAP Adminstrator
- SA - System Administrator
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Facilitator: Brad Colvin
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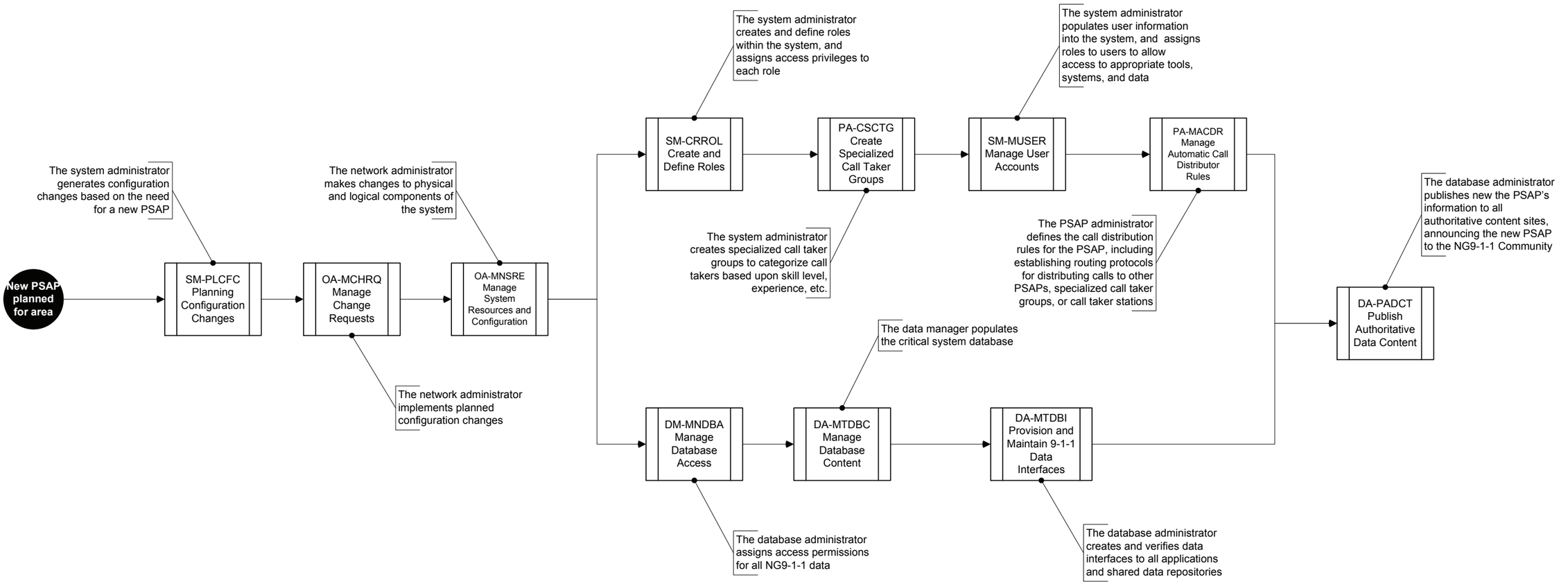


Figure 3–7: Add New PSAP to NG9-1-1 System Capability Use Case

3.1 End-to-End Call Flow

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: John Chiaramonte, Roger Hixson, Rick Jones, Jim Lockard

The call flow found in Figure 3-8 below, is a compilation of several capability use cases and is used to describe the use of NG9-1-1 from a caller activating the system through a Call Taker ending the call process. This end-to-end flow includes activities that occur outside of the NG9-1-1 system, but are important to recognize, as they provide data in the call stream that is used by various activities within the NG9-1-1 system. Once the call has been authenticated and accepted by the NG9-1-1 system, activities occur to determine routing of the call to an appropriate PSAP. Upon arrival at the PSAP and routing to an available Call Taker, the call is answered and additional details about the call are determined. Once the details of the call have been collected and the information has been transferred to the appropriate entity, the call is ended. There are global activities that record and document the call throughout the process. Each of the activities and the individual use cases are described in further detail in other parts of this document. It should be noted that not every activity will be performed for every call and that the end-to-end call flow assumes that the call is not lost. For call lost processing, see Figure 3-3, Call Back Ability Capability Use Case.

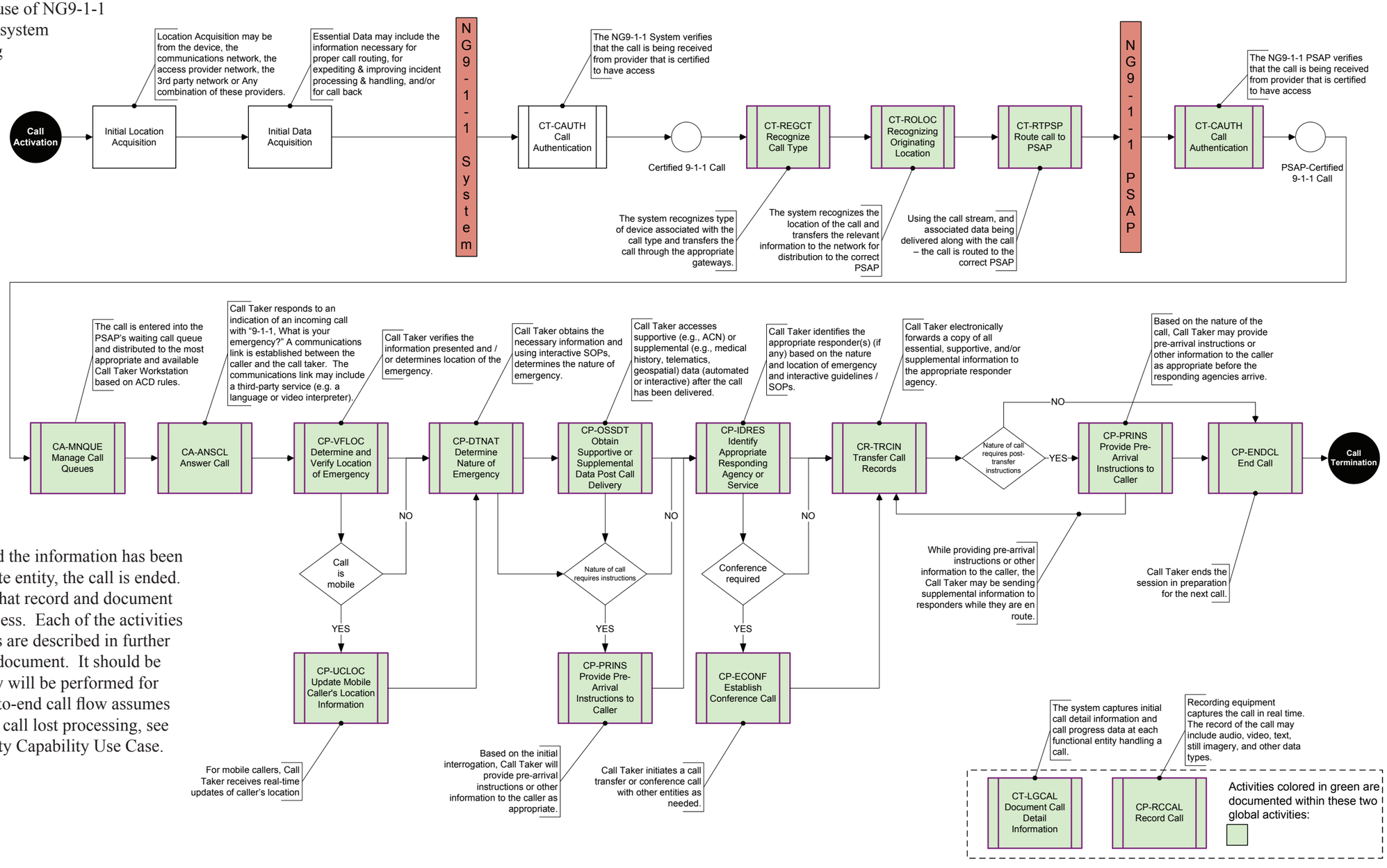


Figure 3–8: End-to-End Call Flow

Section 4: Functional Activity and Requirements Overview

The NG9-1-1 system requirements are presented within Enterprise Segments, as discussed and illustrated in Section 2. The ESAR (Figure 2-9, Figure 2-10, and Figure 2-11) presents the Service Areas and Activities for each Enterprise Segment. Each Enterprise Segment contains multiple Service Areas. Each Service Area contains multiple Activities. These functional activities are then further decomposed to identify the system requirements necessary to provide the activity.

On the following page, Figure 4-1 illustrates this requirements organization.

The NG9-1-1 system requirements are presented as a series of one-page Activity descriptions in an easy-to-read format, organized by Service Area and Enterprise Segment. An example Activity description and Requirements page follows, including an explanation of each element of the format.

Many types of requirements are needed to express the full capabilities of the NG9-1-1 System. To ensure that a comprehensive picture of the NG9-1-1 System has been developed the following requirement types are categorized in Table 4-1.

Table 4–1: Requirements Type

Abbreviation	Requirement Type	Description
FR	Functional Requirement	Functional requirements are the conditions or capabilities needed by a user to enable a task or action to achieve a desired outcome.
SR	System Requirement	System requirements describe the conditions or capabilities possessed by the system that support, enable, or satisfy the goal and functional requirements of the activity.
DR	Data Requirement	Data requirements describe the data used by the system in greater detail. Data requirements are used in conjunction with a data dictionary.
BR	Business Rule	Business rules are typically used to describe conditions within the system. For example, depending on the status of a report or process, certain fields or actions may not be available.
EL	Elaboration Point	Elaboration points provide greater written detail for objects depicted in a Multidimensional Requirements View (MRV). These are not contractual requirement statements but provide additional information to help define the context for system and application developers.

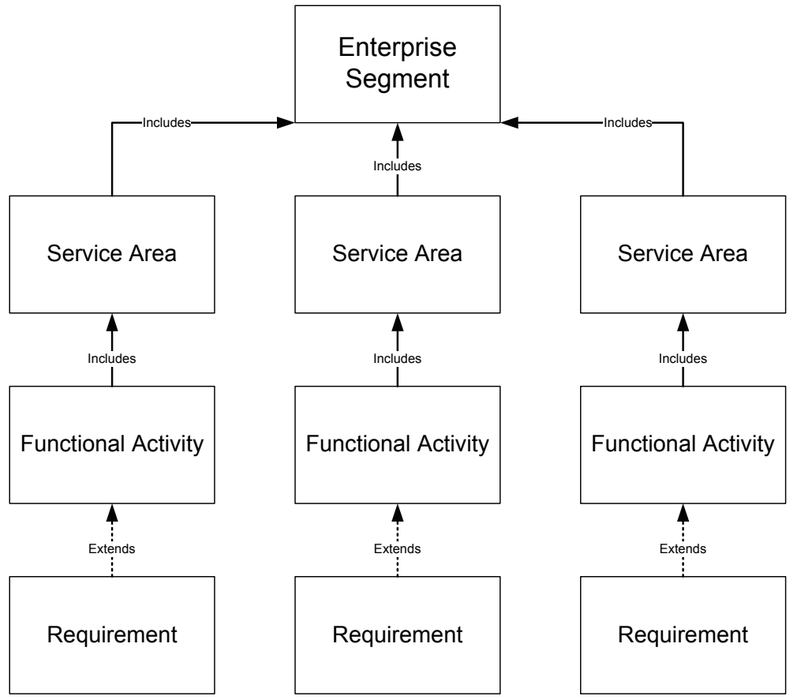


Figure 4–1: NG9-1-1 System Requirements Organization

Sample Enterprise Segment [SAMP] – Enterprise Segment from the Community Model

Sample Service Area [EX] – Service Area from the ESAR

EX-SAMPL – Unique Code for the Activity

Sample Activity – Activity Name

Role(s): Indicates the job role of the person or system who performs the Activity

Proof-Of-Concept: Yes/No. A recommendation of whether the Activity should be demonstrated in the Proof of Concept

References: Abbreviations of the documents used as references when defining this activity

Goal:

A brief description of the objective end result of the Activity

Description:

The details of the workflow, actions, and the results of performing the Activity

Assumptions:

For each activity, assumptions may be indicated. Assumptions include but are not limited to: issues or requirements that exist outside the scope of this requirements definition effort or the NG9-1-1 system, operational issues to be addressed by the 9-1-1 or PSAP Authority and external events or actions that could affect the NG9-1-1 system.

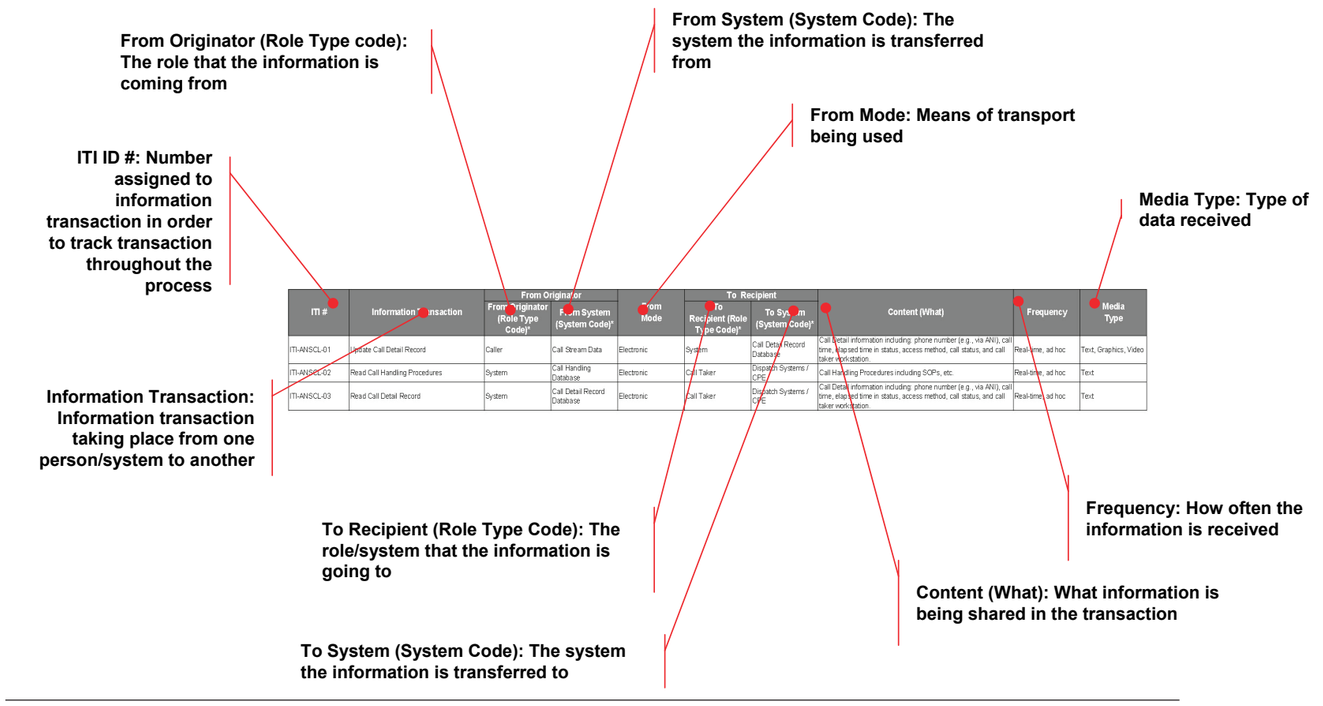
High-Level Requirements:

Listing of high-level requirements describing the operations the system must perform to enable the Activity; the Requirement Code notation for each requirement includes the Activity name and calls out Functional, System, and Data Requirements

Requirement Code	Requirement Text
FR-SAMPL-01	The system shall provide the capability to support the functional requirements.
SR-SAMPL-02	The system shall support the system requirements.
DR-SAMPL-03	The system shall provide the capability to support the data requirements.

Figure 4–2: NG9-1-1 System Requirements Organization

The functional activity Information Transaction Inventory (ITI) identifies the information exchanges that have been identified with this activity. This index will be used by the engineers and architects to understand what data and information interfaces currently exist, and what 'to be' interfaces need to be created within the new NG9-1-1 system. The contents of this inventory can be used to develop the architecture Interface Control Documentation (ICD), Service Level Agreements (SLA), Memorandum of Understanding (MOU) and Agreements (MOA).



ITI #	Information Transaction	From Originator (Role Type Code)*	From System (System Code)*	From Mode	To Recipient (Role Type Code)*	To System (System Code)*	Content (What)	Frequency	Media Type
ITI-ANSCL-01	Update Call Detail Record	Caller	Call Stream Data	Electronic	System	Call Detail Record Database	Call detail information including: phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text, Graphics, Video
ITI-ANSCL-02	Read Call Handling Procedures	System	Call Handling Database	Electronic	Call Taker	Dispatch Systems / CPE	Call Handling Procedures including SOPs, etc.	Real-time, ad hoc	Text
ITI-ANSCL-03	Read Call Detail Record	System	Call Detail Record Database	Electronic	Call Taker	Dispatch Systems / CPE	Call Detail information including: phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text

Figure 4–3: Example Information Transaction Inventory (ITI)v

Each functional activity is accompanied by a Multidimensional Requirements View (MRV) that provides a detailed analysis of each prioritized activity by analyzing interactions or behaviors across all three layers of the architecture. The MRV is used to conceptually describe the activity from the users perspective while simultaneously determining the requirements to be implemented by developers. A MRV identifies entry points, shows any pre- or post-activity links, charts the operational workflow, provides conceptual business or systems logic and displays the requirements of an activity.

Requirements are derived, captured, and mapped to the functions within the MRVs. New and existing functional requirements are mapped to each MRV. The MRV illustrates the 'intent' of the activity, thus the intent of the requirement. As this document is refined over time requirements for the NG9-1-1 system may be added, deleted or modified. Those requirements that have been deleted will not appear on an MRV, this may result in non-sequential numbering of the requirements on a MRV page.

A MRV consists of five primary layers that detail the functions performed within a specific activity.

These layers are:

- Title – Identifies Activity, Service Area, Actors
- Operations – Charts the operational workflow of an Actor
- Application – Maps application behavior to operational data
- Data – Documents data used by the functions
- Requirements/Description – Maps requirements to operations, application, and data

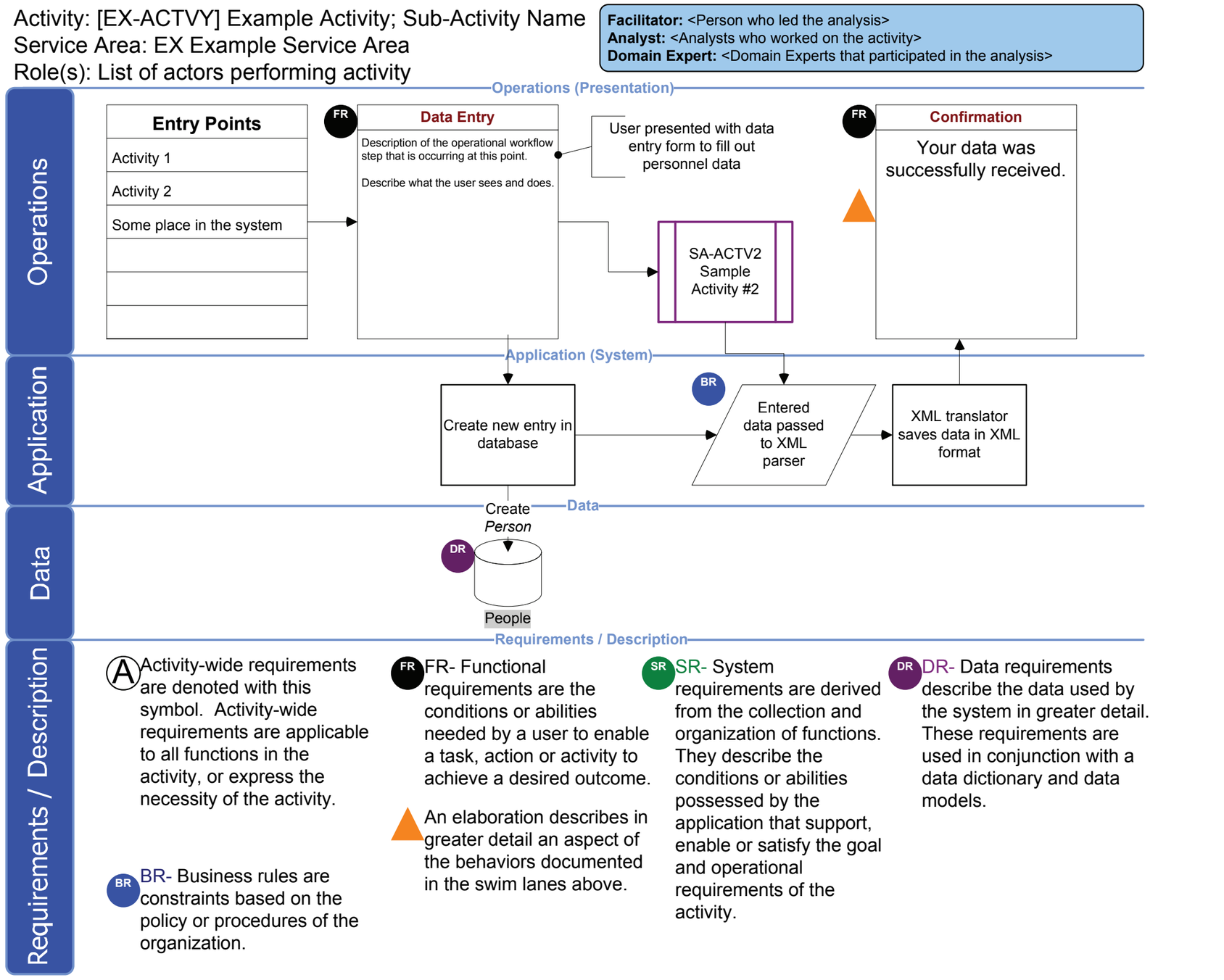
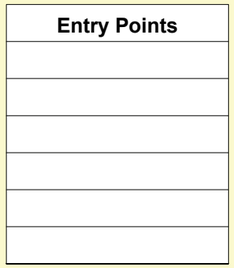


Figure 4–4: Example Multidimensional Requirements View (MRV)



Entry Points

Used to list names of pages, activities, or other locations from which actors gain entry to the activity.

Conceptual Operational Screen

Used to represent a set of operations a user sees and interacts with. Conceptual details such as buttons, menus, or even screenshots may be depicted, but they are not intended to dictate design.

Side brace

Used to add comments.

Thought Bubble

Used to enter text conveying ideas and items to remember in the future.

Notification

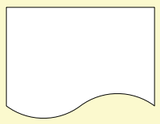
Used in the Operations layer to illustrate a delivery mechanism, which includes but is not limited to e-mail or a system generated message.

Activity

Used to show a connection to another Activity. The corresponding activity code and name should appear in the box

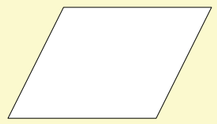
Clock

Used to denote a "time triggered" system response.



File (or Document)

Used in the Application layer to show HTML, JSP, XML, or other types of documents/ files. Also used to show application interaction and requests.

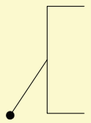


Data

Used in the Application layer to show data that is processed or passed by the application. Also used in the data layer to show non-database related data.

Data Repository

Used to show logical or conceptual storage of data. Specific database names (e.g., ABLV1) listed if known.

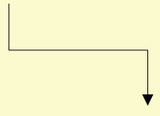


Action Description

Used to describe what a user sees and actions the user or system performs.

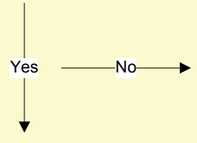
System Function

Used in the Application layer to describe application functions such as queries and processes.



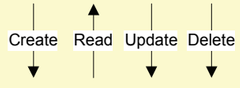
Dynamic Connector

Used to connect two shapes together to denote workflow. Text on the line indicates information or data passed between objects.



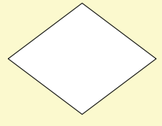
Yes and No Connectors

Used to connect shapes to decision boxes to show logic results.



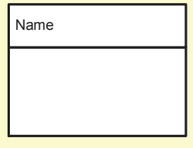
Database Connectors

Used to show data paths between the Application and Data layers. Used with Data, Process, Database, and Database Entity shapes.



Decision

Used primarily in the System layer to show logic. The text entered in this box is in the form of a question. Only used in conjunction with Yes and No result shapes. Can also be used to illustrate user choice.



Database Entity

Used when more specific data is known. Enter data category in the top box and the data to be stored or retrieved in the lower box. Also can be used when referring to specific data tables in the schema.

Last updated: 8/7/06

Description Text

Used to enter text describing functions and system requirements. Color coded by type.

Description Indicators

Used in the layers to relate Business Rules, System Requirements, Functional Requirements, and Data Requirements to their corresponding descriptive text.

Functional requirements are the conditions or abilities needed by a user to enable a task, action, or activity to achieve a desired outcome. — FR

System requirements are shall statements derived from the collection and organization of functions. They describe the conditions or abilities possessed by the system that support, enable, and/or satisfy the goal and functional requirements of the activity. — SR

Data requirements describe the data used by the system in greater detail. These requirements are used in conjunction with a data dictionary and data models. — DR

Business rules are contraints based on the policy or procedures of the organization. If applicable, a notation is made in the appropriate layer to reference the business rule. — BR

Activity Wide Requirements are requirements that apply to all functions within the activity or justify the need for the activity. — A

Elaborations provide greater written detail for objects depicted in the layers. These are not requirement statements, but they do provide additional information to help define the context.

Recycle Requirements are requirements that are re-used throughout a workflow. Since objects maybe be used multiple times in a workflow, but requirements must be unique, the recycle symbol and corresponding requirement number directs the reader to the originating requirement statement instead of re-stating the requirement.

Conceptual Functional Illustrators

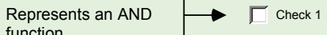
This group of conceptual functional elements are used to help developers, users, and stakeholders understand the desired function. It does not reflect that the particular element be used specifically. For example, a dropdown may be in a functional MRV, but the developer may choose to implement a javascript function or radio button instead.

Edit Box

Represents a space for the user to type in text.

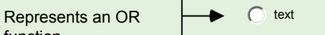
Checkbox

Represents an AND function.



Radio Button

Represents an OR function.



Button

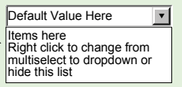
Represents a submission of a form or a navigational function.

Complex Multiselect

Represents a Complex Multiselect Normalized AND Function

Dropdown Box

Represents a Normalized OR selection. Note the single down arrow which differentiates from a multiselect box.



Multiselect box

Represents a Multiselect, Normalized AND selection. Note the double arrows which differentiates from a dropdown box.

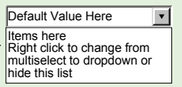


Figure 4–5: Multidimensional Requirements View (MRV) Key

Notes

Section 5: 9-1-1 PSAP Operations Segment

The 9-1-1 PSAP Operations Segment (refer to Figure 2-9) is primarily used by PSAP call takers to receive 9-1-1 calls, verify the nature and location of the emergency, and verify the location of the call. This segment also captures the activities for forwarding pertinent data to the appropriate public safety dispatch center for response.[5]

5 *In many instances, the call taker and the dispatcher are the same person. Dispatching, while an essential function in the emergency response continuum, is outside the scope of this project, except as it relates to the functional handoff between the 9-1-1 system and dispatch operations. In this document, these real-world emergency response functions are presented in the Community Model (Figure 2-1) as the "Dispatch Operations" layer.*

Notes

9-1-1 PSAP Operations Segment Service Area

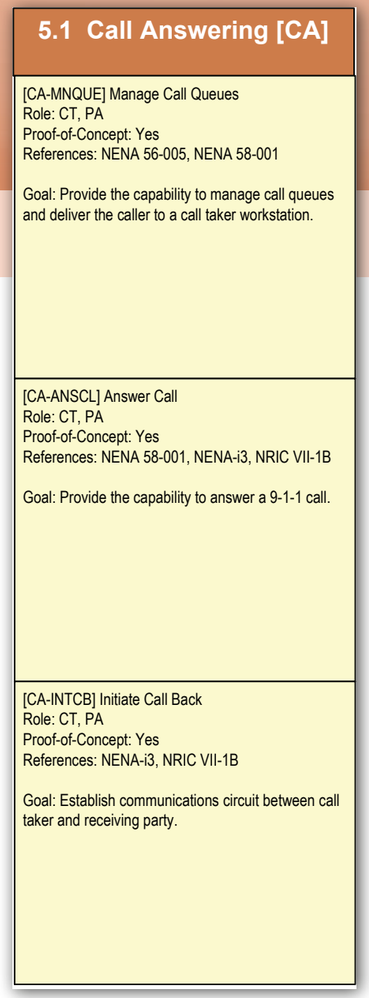


Figure 5–1: Call Answering Service Area

5.1 Call Answering

The Call Answering Service Area (Figure 5-1) describes the activities needed by a call taker to receive and answer a call from the Originating Subscriber Services layer of the Community Model (Figure 2-1). This service area includes answering a call and initiating a call back as needed. The call taker is the primary role involved in the execution of these activities.

9-1-1 PSAP Operations [PSAP]

Call Answering [CA]

Manage Call Queues [CA-MNQUE]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA 56-005, NENA 58-001

Goal:

Provide the capability to manage call queues and deliver the caller to a call taker workstation.

Description:

This activity allows a PSAP to manage their active calls that exist in a call queue. Call queues may be geographically displayed on a map to assist in identifying, selecting, and answering a call that appears geographically unrelated to a cluster of calls that appear to be associated with a common event. In the NG9-1-1 world, call takers could select a call outside of a cluster of possibly related events to prioritize handling of a call relating to a potentially different emergency. The queue of calls will be integrated to present a call taker with an overall representation of incoming incidents.

The system will determine the appropriate / available Call Taker, based on business rules and will distribute the caller to the Call Taker workstation. The Call Taker is alerted to the incoming call and the queue status is updated. The call taker is presented with the Call Detail Record data, including: Call Type, Caller Location, default call handling procedure for the call type, previous call history.

Upon distribution of the call from a call queue, the call taker is presented with Essential data from the Call Stream, which may include: Call Type, Caller Location, and Call Back information. Other essential, supportive, and supplemental data may also be available and presented to the call taker at this time.

Assumptions:

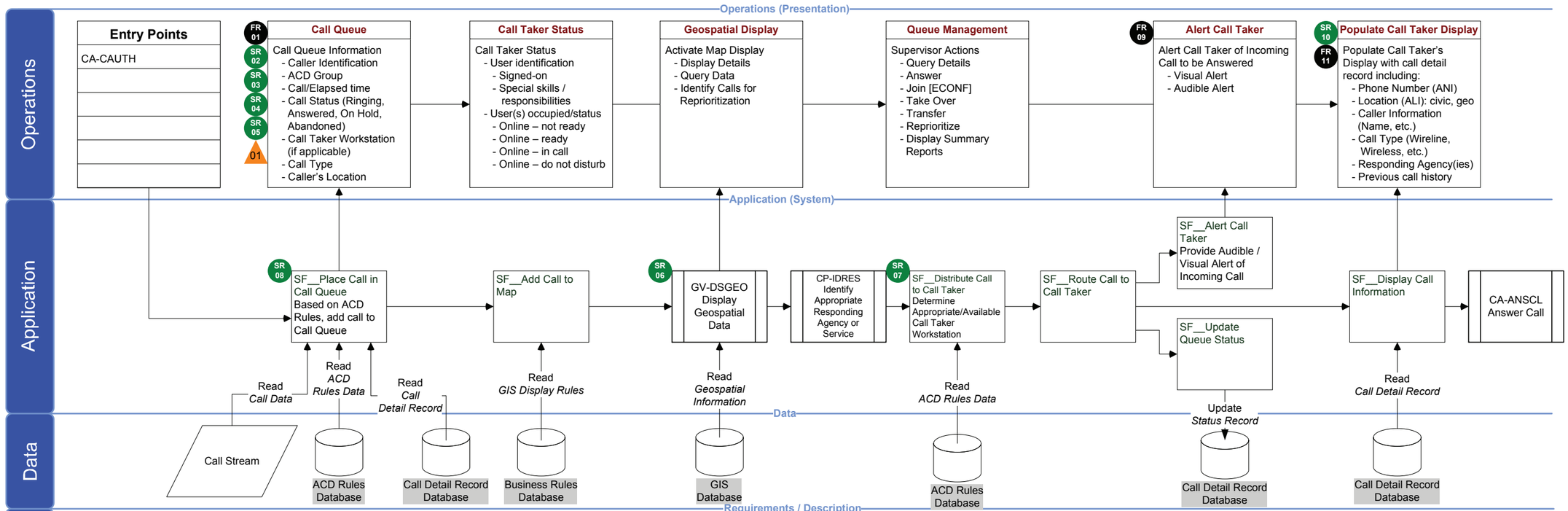
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-MNQUE-01	Read Call Stream	Caller	Call Stream Data	Electronic	System	Call Detail Record Database	Call Detail information including: phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text, Graphics, Video
ITI-MNQUE-02	Read ACD Rules	System	ACD Rules	Electronic	System	CPE	ACD Rules that specify how a call should be handled within the call queue.	Real-time	Text
ITI-MNQUE-03	Read Call Detail Record	System	Call Detail Record Database	Electronic	Call Taker	Dispatch Systems / CPE	Call Detail information including: location in the call queue, phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text
ITI-MNQUE-04	Read GIS Display Rules	System	Business Rules Database	Electronic	System	Map Display	Display rules to determine layout and format of the map display and related data.	Real-time	Text
ITI-MNQUE-05	Read Geospatial Information	System	GIS Database	Electronic	Call Taker	Map Display	Raster and vector data, as well as call-related and supplemental data that will be displayed on the map.	Real-time, ad hoc	Text, Graphics
ITI-MNQUE-06	Update Status Record	System	ACD	Electronic	System	Call Detail Record Database	Change in call status in the Call Detail Record Database.	Real-time	Text

Activity: [CA-MNQUE] Manage Call Queues; Display Call Queue
Service Area: Call Answering [CA]
Role(s): CT

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: Roger Hixson, Rick Jones, Dan Landau, Jim Lockard

Modified on 10/05/07 @09:48



Requirements / Description

SR-MNQUE-02-01: Call queues shall be displayed only to authorized system users.

SR-MNQUE-02-02: The call queue information shall be based on the information included in the call stream.

SR-MNQUE-02-03: The system shall provide the capability to configure the call queue content, based on local business rules.

SR-MNQUE-02-04: The system shall provide the capability to configure the call queue layout, based on local business rules.

FR 01 FR-MNQUE-01: The system shall provide the capability to monitor call queues.

FR 02 FR-MNQUE-02: The system shall display call queues.

SR 08 SR-MNQUE-08: The system shall provide real-time updates to the call queue.

SR-MNQUE-08-01: The system shall be capable of providing a dynamically updated, incident specific voice announcement to callers in queue

SR 05 SR-MNQUE-05: The system shall display the time elapsed for a call in the queue.

SR 03 SR-MNQUE-03: The system shall display call queues by automatic call distributor (ACD) group.

SR 04 SR-MNQUE-04: The system shall display the time a call was placed in queue.

SR-MNQUE-04-01: The system shall provide a visual warning that a call remains unanswered after TBD seconds.

SR-MNQUE-04-02: The system shall provide an audible warning that a remains unanswered after TBD seconds.

SR-MNQUE-02-05: The system shall capture caller location from the call stream and allow the ACD to dynamically change call processing based on ACD rules and caller's location.

SR-MNQUE-02-06: The system shall support assignment of call takers to geographic zones that correspond to incoming geographical areas of callers.

SR-MNQUE-02-07: The system shall analyze callers' geographic information and alert users when calls outside of a particular geographic area are received.

SR 06 SR-MNQUE-06: The system shall display caller location information on a map.

SR-MNQUE-06-01: The map display shall include both raster and vector data.

SR-MNQUE-06-02: The map display shall include status and selected essential and supplemental data about the call, as defined in business rules.

01 EL-01 The call taker display could include additional information about the call origination (another PSAP, 3rd party call center, etc).

SR 07 SR-MNQUE-07: The system shall route calls to the appropriate / available call taker workstation as defined by ACD rules.

SR-MNQUE-07-01: The system shall be capable of reprioritizing call routing based on ACD rules (i.e., call taker skills or language, call volume).

SR 10 SR-MNQUE-10: The system shall populate Call Taker's display with call detail information.

FR 09 FR-MNQUE-09: The system shall provide the capability to notified a call taker that a call has arrived.

FR-MNQUE-09-01: The system shall provide the call taker with both an audible and visual alert when a call has arrived.

FR 11 FR-MNQUE-11: The system shall make previous call history available to the call taker based on the telecommunications device number.

Activity: [CA-MNQUE] Manage Call Queues

9-1-1 PSAP Operations [PSAP]

Call Answering [CA]

Answer Call [CA-ANSCL]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA 58-001, NENA-i3, NRIC VII-1B

Goal:

Provide the capability to answer a 9-1-1 call.

Description:

This activity allows a call taker to answer an incoming call in response to an audible and/ or visual indicator and a communications link is established. In the event of a human-initiated call, the call taker greets the caller, usually with a standard query, e.g., "9-1-1, what is your emergency?" or "9-1-1, where is your emergency?"

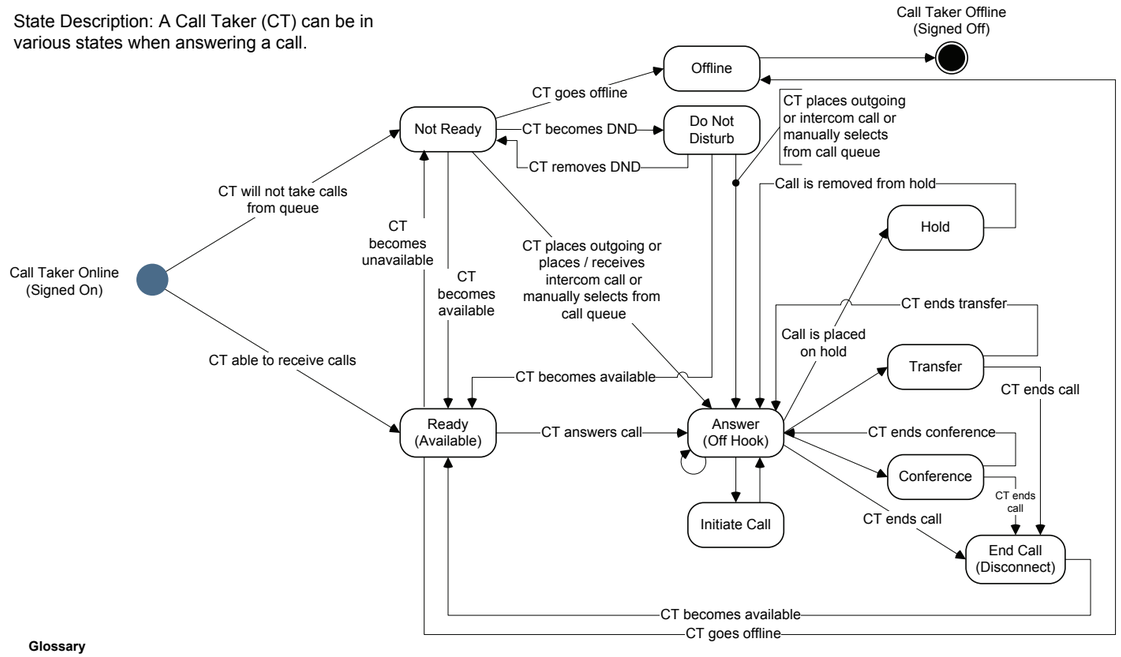
Calls may be automatically distributed to Call Takers, based on ACD rules, or based on local policy, be selected from the call queue to manually reprioritize the call handling. The system can be configured to automatically answer the call for the Call Taker.

A caller can be put on hold and the system will alert users whenever a call has been on hold longer than a predetermined threshold. Any authorized Call Taker may retrieve a call from hold.

Assumptions:

State Diagram:

State Description: A Call Taker (CT) can be in various states when answering a call.



Glossary

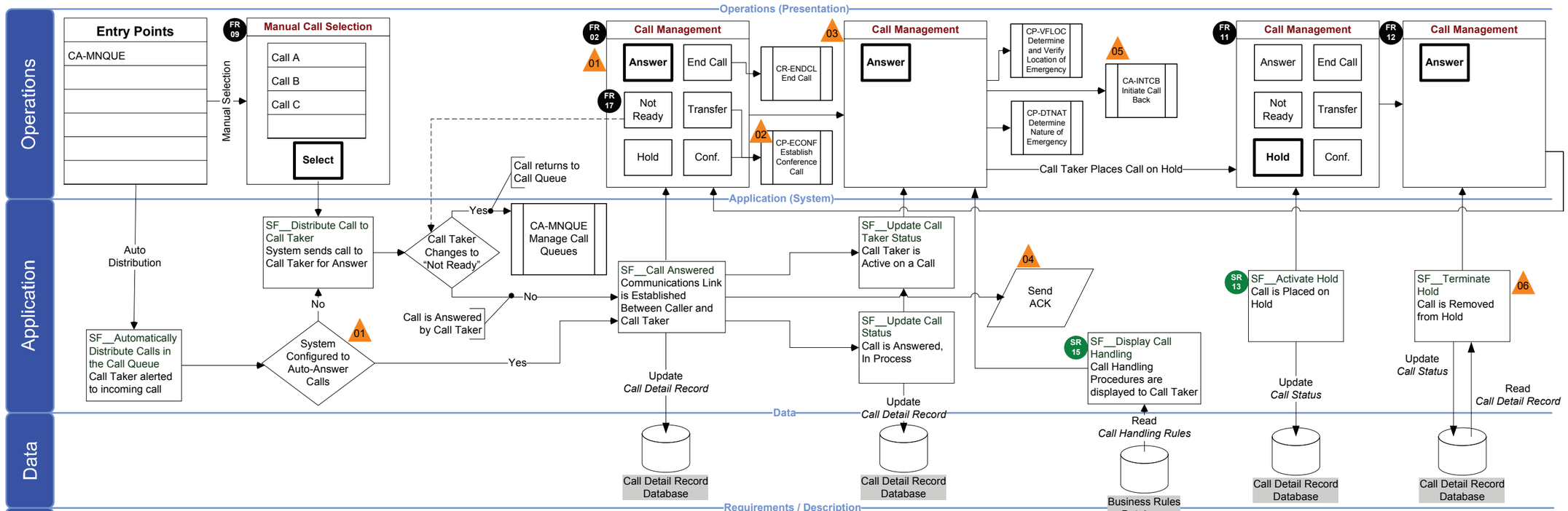
Busy (off hook):	Call Taker has an open communications link with the caller and the phone is in use.
Conference:	One or more parties has been brought into the telephone conversation.
Disconnect:	Call Taker has ended the call.
Do Not Disturb:	Call Taker has indicated that no inbound call will be received, however outgoing or intercom calls can be placed.
Hold:	Call Taker has not terminated the connection but no verbal communication is possible until the call is removed from hold.
Not Ready:	Call Taker is not available to answer calls from the queue, but is available to place outgoing or place / receive intercom calls or manually select from the call queue.
Ready:	Call Taker is ready to answer incoming calls from the queue or intercom.
Transfer:	Call Taker has brought a third-party into the conversation with the intention of turning over control of the caller to that third-party.
Initiate Call:	Call Taker initiates a call to the caller (call back) or third-party (conference or transfer).

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-ANSCL-01	Update Call Detail Record	Caller	Call Stream Data	Electronic	System	Call Detail Record Database	Call Detail information including: phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text, Graphics, Video
ITI-ANSCL-02	Read Call Handling Procedures	System	Call Handling Database	Electronic	Call Taker	Dispatch Systems / CPE	Call Handling Procedures including SOPs, etc.	Real-time, ad hoc	Text
ITI-ANSCL-03	Read Call Detail Record	System	Call Detail Record Database	Electronic	Call Taker	Dispatch Systems / CPE	Call Detail information including: phone number (e.g., via ANI), call time, elapsed time in status, access method, call status, and call taker workstation.	Real-time, ad hoc	Text

Activity: [CA-ANSCL] Answer Call; Call Taker Interaction
Service Area: Call Answering [CA]
Role(s): CT

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: Roger Hixson, Rick Jones, Dan Landau, Jim Lockard
Modified on 10/05/07 @09:48



Requirements / Description

FR 09 FR-ANSCL-09: The system shall provide the capability for a call taker to select a call from a call queue.

FR-ANSCL-09-01: The system shall permit an authorized call taker to select any pending call from the queue.

FR-ANSCL-09-02: The system shall record when a call taker has selected a call and overridden ACD rules.

01 EL-01 Call may be automatically answered at the Call Taker position, depending on local policy.

FR 17 FR-ANSCL-17: The system shall permit the Call Taker to indicate a status of "Not Ready" for the situation where the user is signed-on (but not available to answer queue calls).

FR 02 FR-ANSCL-02: The system shall provide the capability to answer an incoming call.

FR-ANSCL-02-01: The system shall be configurable to automatically answer the call for the call taker.

02 EL-02 The call may be automatically presented to the call taker with multiple parties or a conference call may be automatically initiated (based upon call type) at the moment of call answer.

03 EL-03 For voice calls, the Call Taker typically responds with "9-1-1, what is your emergency?" or "9-1-1, where is your emergency?"

04 EL-04 An acknowledgement may be verbal, automated or other data.

SR 15 SR-ANSCL-15: The system shall display the default call handling procedure based upon Call Type upon call answer.

05 EL-05 A call may be lost at various points during the Answer Call activity.

FR 11 FR-ANSCL-11: The system shall provide the capability to place a call on hold.

SR 13 SR-ANSCL-13: The system shall display a time on hold alert after TBD-01 seconds.

SR-ANSCL-13-01: The system shall be configurable to specify the elapsed time before the "time on hold" alert will be generated.

SR-ANSCL-13-02: The system shall be configurable to deliver an audible and/or visual alert when the "time on hold" alert has been generated.

FR 12 FR-ANSCL-12: The system shall provide the capability to take a call off hold.

FR-ANSCL-11-01: The system shall record the time a call is placed on hold.

FR-ANSCL-12-01: The system shall record the time a call taken off hold.

FR-ANSCL-12-02: The system shall re-read and redisplay the call detail record each and every time a call is taken off hold.

06 EL-06 Any authorized Call Taker can remove a call from hold.

Activity: [CA-ANSCL] Answer Call

9-1-1 PSAP Operations [PSAP]

Call Answering [CA]

Initiate Call Back [CA-INTCB]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B

Goal:

Establish communications circuit between call taker and receiving party.

Description:

The call taker may initiate a call back for an abandoned, hang-up, or disconnected call. The system determines the connection method based on the caller identification information received as part of the call stream. A communications link is established, and the call taker proceeds to process the call in accordance with established standards and operational best practices. If the link cannot be reestablished, the call taker uses established standards and operational best practices to follow through. Contact can be established initially in the case of an abandoned call or reestablished with a hung-up or disconnected call. While the ability to call back is device-dependent, the call back is not always to the device itself and some call backs may be to a service provider or third-party call center.

Assumptions:

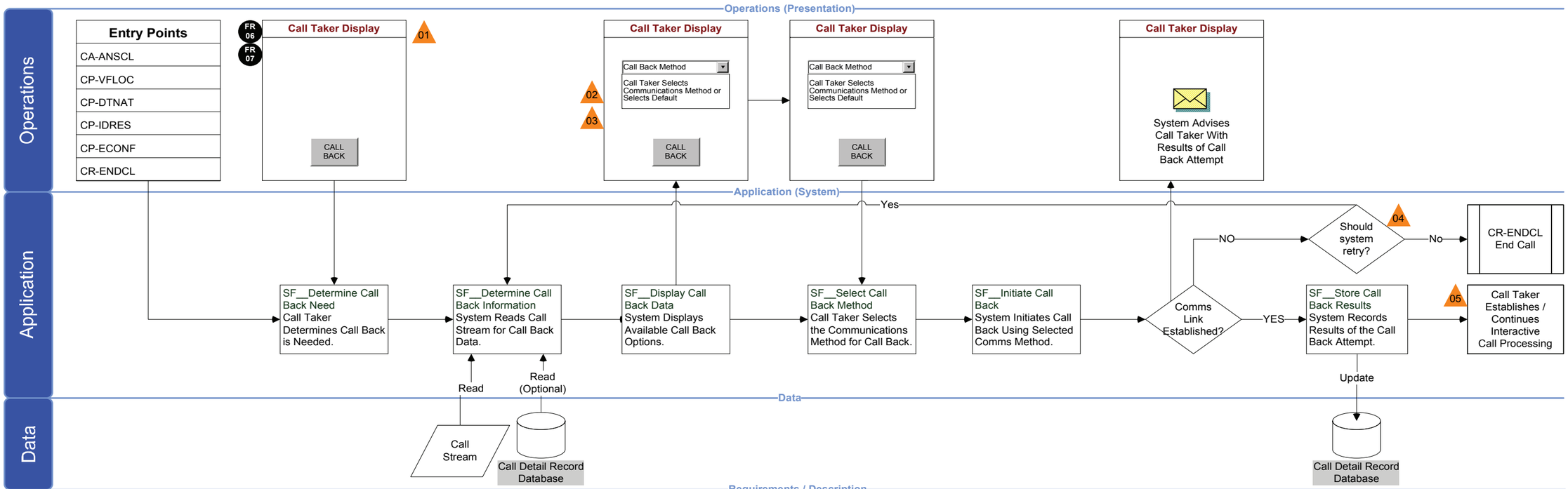
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-INTCB-01	Read Call Stream	Caller	Call Stream Data	Electronic	System	CPE	Caller identification, including callback details.	Real-time, ad hoc	Text
ITI-INTCB-02	Read Call Detail Record	System	Call Detail Record Database	Electronic	System	CPE	Additional caller identification and/ or call back information, including supplemental or supportive data.	Real-time, ad hoc	Text
ITI-INTCB-03	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	Method of call back and success or failure to establish communications when initiating a call back.	Real-time, ad hoc	Text

Activity: [CA-INTCB] Initiate Call Back; Call Back
Service Area: Call Answering [CA]
Role(s): CT

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: Roger Hixson, Rick Jones

Modified on 10/05/07 @09:48



FR 06 FR-INTCB-06: The system shall provide the capability to reestablish a call path to a telecommunications device.

FR 07 FR-INTCB-07: The system shall provide the capability to establish a call path between a call taker and a telecommunications device if a call is abandoned before a call taker can answer the call.

FR-INTCB-06-01: The system shall read the Call Stream to determine the supported call back communications method(s).

FR-INTCB-06-02: The system shall provide the option to read from the call detail record database to display any supportive or supplemental data that exists that provides additional call back methods.

FR-INTCB-06-03: The system shall display the supported call back communications methods to the call taker, when a call back has been requested.

FR-INTCB-06-04: The system shall permit the call taker to select from the supported communications methods when initiating a call back.

FR-INTCB-06-05: The system shall store the results of the call back attempt in the call detail record.

01 EL-01 A caller may hang up or abandon the call to 9-1-1 at any point and the Call Taker can initiate a Call Back to establish or reestablish a communications link at any point during the process.

02 EL-02 More than one call back method can be displayed to the Call Taker. The system will default to the connection method used by the caller when initiating the original call.

03 EL-03 The call back capability is device- and situation-specific and some calls may not be able to be called back.

04 EL-04 Local policy will dictate how the Call Taker will handle failed attempts to establish a communications link with a caller who has hung up or abandoned a 9-1-1 call.

05 EL-05 Because a call can be lost at any point during the process, typically a call taker will return to the same point in interactive call processing when communications have been reestablished.

Activity: [CA-INTCB] Initiate Call

Notes

9-1-1 PSAP Operations Segment Service Area

5.2 Call Processing [CP]	
[CP-DTNAT] Determine Nature of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine the nature of the emergency and provide an initial assessment of the situation.	[CP-IDRES] Identify Appropriate Responding Agency or Service Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Select appropriate responders based on the nature and location of emergency, incident management procedures, and standard operating procedures (SOP).
[CP-VFLOC] Determine and Verify Location of Emergency Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Determine whether an emergency is located at the caller's location or elsewhere. Ensure responders are directed to the correct location.	[CP-PRINS] Provide Pre-Arrival Instructions to Caller Role: CT Proof-of-Concept: No References: NENA-i3, NRIC VII-1B Goal: Provide appropriate pre-arrival instructions to call taker. A call taker may distribute pre-arrival instructions to a caller as necessary.
[CP-UCLOC] Update Mobile Caller's Location Information Role: CT, PA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Receive location information for mobile callers.	[CP-ECONF] Establish Conference Call Role: CT, PA Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Establish communication among the call taker, caller, third-party (e.g., telematics) service provider, and appropriate public safety entities.

Figure 5–2: Call Processing Service Area

5.2 Call Processing

The Call Processing Service Area (Figure 5-2) collects the activities performed by a call taker to determine how to handle a call. That determination is made on the basis of protocol, training and experience, and intelligence acquired from incoming data and interrogation of the caller. Call takers are trained to elicit information using interrogation techniques that determine what is commonly referred to as the "Five Ws" or the "Five Ws Plus WH"—where, what, when, who, why, weapons, and hazards. Clearly, some information can only be obtained by direct interrogation, for example, "Why?" or "Are weapons involved?" Other information may be obtained automatically via the incoming data associated with the call, for example, "Who?" or "Where?" The need to obtain the answers to these essential questions does not change in NG9-1-1.

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Determine Nature of Emergency [CP-DTNAT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B

Goal:

Determine the nature of the emergency and provide an initial assessment of the situation.

Description:

This activity involves obtaining the necessary information - "the Five Ws" - to route the caller to the proper person or agency, or to dispatch the proper emergency response. This activity also screens out those calls that are not considered emergencies. In NG9-1-1, calls or alerts received are documented in the system and assigned to appropriate categories based on accepted standards and best practices (e.g., fire emergency, law enforcement emergency, non-emergency, prank). In NG9-1-1, wherever possible, descriptive information is added to the call stream before the call is answered by a call taker, e.g., crash information. In addition, software applications that rank the emergency to aid responders are integral to the system.

Assumptions:

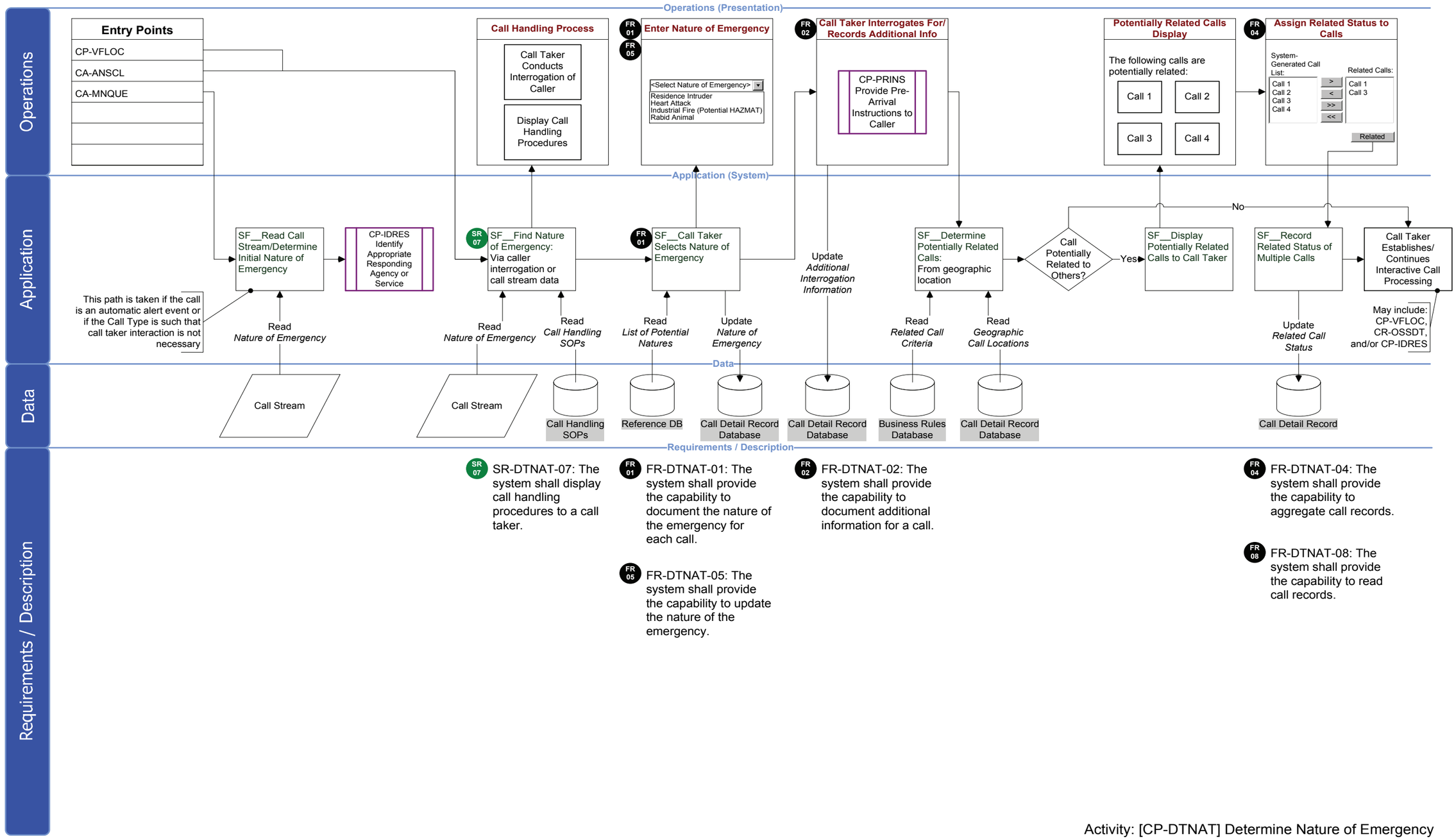
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-DTNAT-01	Read Nature of Emergency	Caller	Call Stream Data	Electronic	System	CPE	Call Type.	Real-time, ad hoc	Text
ITI-DTNAT-02	Read Nature of Emergency	Caller	Call Stream Data	Electronic	System	CPE	Call Type.	Real-time, ad hoc	Text
ITI-DTNAT-03	Read Call Handling SOPs	System	Call Handling SOPs Database	Electronic	System	CPE	Caller interrogation call handling SOPs based on Call Type.	Real-time, ad hoc	Text
ITI-DTNAT-04	Read List of Potential Natures	System	Reference Database	Electronic	System	CPE	Potential natures of emergency, potentially based on Call Type.	Real-time, ad hoc	Text, Graphics
ITI-DTNAT-05	Update Nature of Emergency	Call taker	User input	Electronic	System	Call Detail Record Database	Nature of emergency as selected by call taker.	Real-time, ad hoc	Text
ITI-DTNAT-06	Update Additional Interrogation Information	Call taker	User input	Electronic	System	Call Detail Record Database	Miscellaneous information gathered by the call taker from the caller during interrogation.	Real-time, ad hoc	Text, Graphics, Video
ITI-DTNAT-07	Read Related Call Criteria	System	Business Rules Database	Electronic	System	CPE	The criteria by which the system determines which calls are potentially related (e.g., concerning the same incident).	Real-time, ad hoc	Text
ITI-DTNAT-08	Read Geographic Call Locations	System	Call Detail Record Database	Electronic	System	CPE	Emergency locations and caller locations of the call in question and calls from a similar geographic region.	Real-time, ad hoc	Text
ITI-DTNAT-09	Update Related Call Status	Call taker	User input	Electronic	System	Call Detail Record Database	Data indicating that related calls are associated with the same (or related) incident.	Real-time, ad hoc	Text

Activity: [CP-DTNAT] Determine Nature of Emergency; Interrogate Caller
Service Area: Call Processing [CP]
Role(s): CT, PA

Facilitator: John Chiaramonte
Analyst: Dan Landau
Domain Expert: Roger Hixson, Rick Jones

Modified on 10/05/07 @09:44



Activity: [CP-DTNAT] Determine Nature of Emergency

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Determine and Verify Location of Emergency [CP-VFLOC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B

Goal:

Determine whether an emergency is located at the caller's location or elsewhere. Ensure responders are directed to the correct location.

Description:

When a call taker is presented with an incoming call, data are displayed on a screen. The call taker uses established standards and operational best practices to verify the information presented and/or determine the location of the emergency. The location of the emergency and the location of the call may be different. A call taker identifies incorrect automatic location identification (ALI) information for an update or change request. Presentation of the caller location will be, minimally, text-based.

Assumptions:

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-VFLOC-01	Read Caller Location	Caller	Call Stream Data	Electronic	System	CPE	Caller Location.	Ad hoc	Text
ITI-VFLOC-02	Read Caller Location Display Rules	System	Business Rules Database	Electronic	System	CPE	Display Rules (e.g., civic, geodetic, map).	Ad hoc	Text
ITI-VFLOC-03	Read GIS	System	GIS Database	Electronic	System	CPE	Geodetic locations and coordinates.	Ad hoc	Text
ITI-VFLOC-04	Write Emergency Location	System	CPE	Electronic	System	Call Stream Data	Emergency location.	Ad hoc	Text
ITI-VFLOC-05	Write Emergency Location Decision Details	System	CPE	Electronic	System	Call Detail Record Database	Emergency location and call taker decision details.	Ad hoc	Text
ITI-VFLOC-06	Read Verifying Location Display Rules	System	Business Rules Database	Electronic	System	CPE	Display Rules (e.g., jurisdiction, handling procedures).	Ad hoc	Text

Activity: [CP-VFLOC] Determine and Verify Location of Emergency; Find Emergency Location
Service Area: Call Processing [CP]
Role(s): CT, PA

Facilitator: Brad Colvin
Analyst: Wesley Chen
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard. John Chiaramonte

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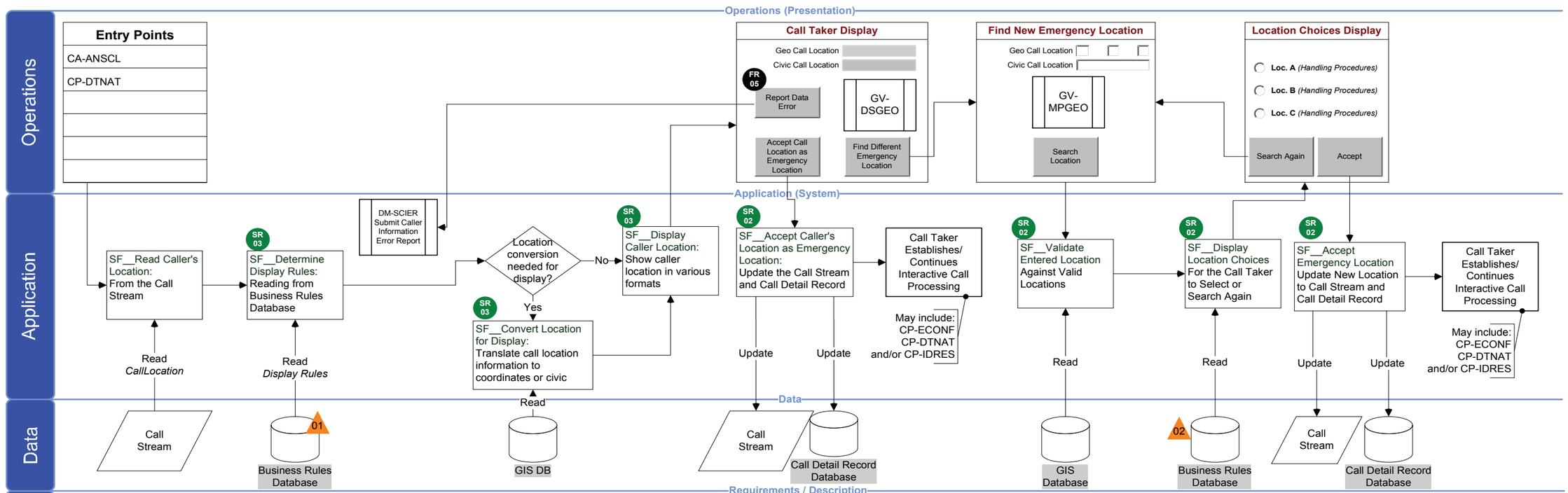


SR 03 SR-VFLOC-03: The system shall display caller location information to the call taker.

SR-VFLOC-03-01: The system shall provide the capability to customize the display rules for caller location.

SR-VFLOC-03-02: The system shall display caller location based upon display rules.

SR-VFLOC-03-03: The system shall convert caller location from geo-coordinates to civic address.

SR-VFLOC-03-04: The system shall convert caller location from civic address to geo-coordinates.

01 EL-VFLOC-01: Contains display rules for displaying caller location

SR 02 SR-VFLOC-02-03: The system shall validate all locations entered by the call taker against a GIS database.

FR 05 FR-VFLOC-05: The system shall provide the capability to document incorrect location information for correction.

SR 02 SR-VFLOC-02: The system shall provide the call taker with a capability to document the location of the emergency.

SR-VFLOC-02-01: The system shall write the caller location to the call stream and call detail record as the emergency location when the call taker accepts caller location as the emergency location.

SR-VFLOC-02-02: The system shall provide the capability for the call taker to search for the emergency location using: a) geo-coordinates, b) civic address location, c) by clicking a location on an interactive map.

02 EL-VFLOC-02: Contains display rules used for verifying location

SR-VFLOC-02-04: The system shall display location search results to the call taker.

SR-VFLOC-02-05: The system shall provide the capability for the call taker to select the emergency location from the location search results.

SR-VFLOC-02-06: The system shall write the emergency location to the call stream and call detail record when the call taker accepts an alternate location as the emergency location.

Activity: [CP-VFLOC] Determine and Verify Location of Emergency

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Update Mobile Caller's Location Information [CP-UCLOC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B

Goal:

Receive location information for mobile callers.

All representations of location supported by this activity include the capability to identify altitude and structural floor designation.

Description:

The call taker requests more accurate or updated location information for a mobile caller. The call taker is able to monitor the change in a mobile caller's location through successive update requests. The system automatically stores update requests and the location information received.

Assumptions:

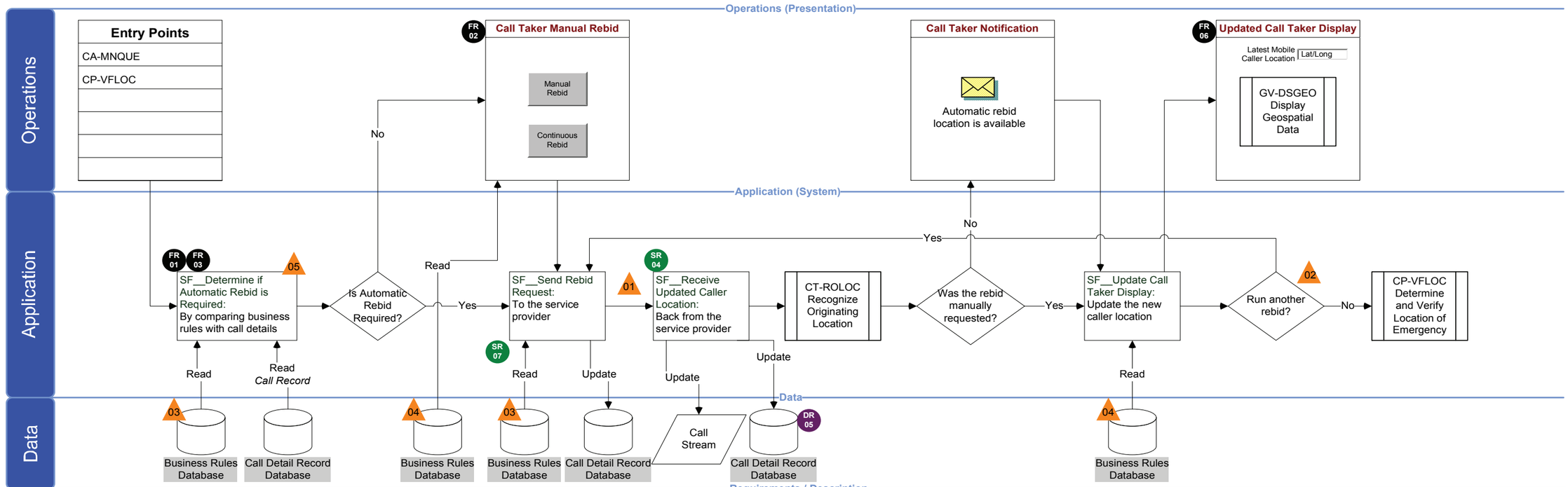
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-UCLOC-01	Read Rebidding Rules	System	Business Rules Database	Electronic	System	CPE	Provider mobile location rebidding rules (e.g., first availability, interval between rebids).	Ad hoc	Text
ITI-UCLOC-02	Read Call Record	System	Call Detail Record Database	Electronic	System	CPE	Call details such as Call Type, as dynamically specified by Business Rules Database.	Ad hoc	Text
ITI-UCLOC-03	Read Display Rules	System	Business Rules Database	Electronic	System	CPE	Display rules (e.g., manual, continuous).	Ad hoc	Text
ITI-UCLOC-04	Write Rebid Request Attempt	System	CPE	Electronic	System	Call Detail Record Database	Attempted provider and attempt time.	Ad hoc	Text
ITI-UCLOC-05	Write Caller Location	System	CPE	Electronic	System	Call Stream Data	Caller location.	Ad hoc	Text
ITI-UCLOC-06	Write Caller Location Details	System	CPE	Electronic	System	Call Detail Record Database	Caller location and location updated time.	Ad hoc	Text

Activity: [CP-UCLOC] Update Mobile Caller's Location Information; Rebid Requests
Service Area: Call Processing [CP]
Role(s): CT, PA

Facilitator: Brad Colvin
Analyst: Wesley Chen
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard, John Chiaramonte

Modified on 10/05/07 @09:45



Activity: [CP-UCLOC] Update Mobile Caller's Location Information

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Identify Appropriate Responding Agency or Service [CP-IDRES]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Select appropriate responders based on the nature and location of emergency, incident management procedures, and standard operating procedures (SOP).

Description:

This activity identifies the appropriate responding agencies for the emergency location (or, if unavailable, caller location) of the call. This activity also identifies which of these responding agencies are recommended for conference and potential response to the call based on the nature of emergency (or, if unavailable, Call Type) of the call. Responders for the emergency location, the recommended set of responders, and a set call handling procedures are presented to the call taker. A call taker selects the appropriate responders from the list presented and transmits the information to the dispatchers for the responding agencies selected. Responders include, but are not limited to, law enforcement, fire, and emergency medical services (EMS) agencies.

In 9-1-1, response may be provided to the caller's location unless interrogation of the caller reveals that the caller is not at the emergency location.

Assumptions:

Subscriber's Service provider uses the MSAG established by the 9-1-1 authority.

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-IDRES-01	Read Emergency Location	Caller	Call Stream Data	Electronic	System	CPE	Emergency location and/or caller location.	Real-time, ad hoc	Text
ITI-IDRES-02	Read Responding Agencies	System	Responding Agency Repository	Electronic	System	CPE	Responding agency location, responding agency unique ID, responding agency name.	Real-time, ad hoc	Text
ITI-IDRES-03	Read Business Rules	System	Business Rules Database	Electronic	System	CPE	Business rules for determining how to select recommended responders.	Real-time, ad hoc	Text
ITI-IDRES-04	Read Business Rules	System	Business Rules Database	Electronic	System	CPE	Business rules for determining how to display recommended responders.	Real-time, ad hoc	Text
ITI-IDRES-05	Read Call Type	Caller	Call Stream Data	Electronic	System	CPE	Call Type, emergency location, and caller location.	Real-time, ad hoc	Text
ITI-IDRES-06	Read Nature of Emergency	System	Call Detail Record Database	Electronic	System	CPE	Nature of emergency.	Real-time, ad hoc	Text
ITI-IDRES-07	Read Call Handling Procedures	System	Call Handling Database	Electronic	System	CPE	Call handling SOPs for the Call Type or nature of emergency of the call.	Real-time, ad hoc	Text, Graphics, Video
ITI-IDRES-08	Update Displayed Agencies	Call taker	User input	Electronic	System	Call Record Database	Displayed emergency responder agencies, displayed recommended emergency responder agencies, and displayed call handling SOPs.	Real-time, ad hoc	Text, Graphics, Video
ITI-IDRES-09	Update Selected Agencies	Call taker	User input	Electronic	System	Call Record Database	Emergency responder agencies selected by the call taker for response (e.g., conference, dispatch).	Real-time, ad hoc	Text

Activity: [CP-IDRES] Identify Appropriate Responding Agency or Service; Determine Responder
Service Area: Call Processing [CP]
Role(s): CT, PA

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard

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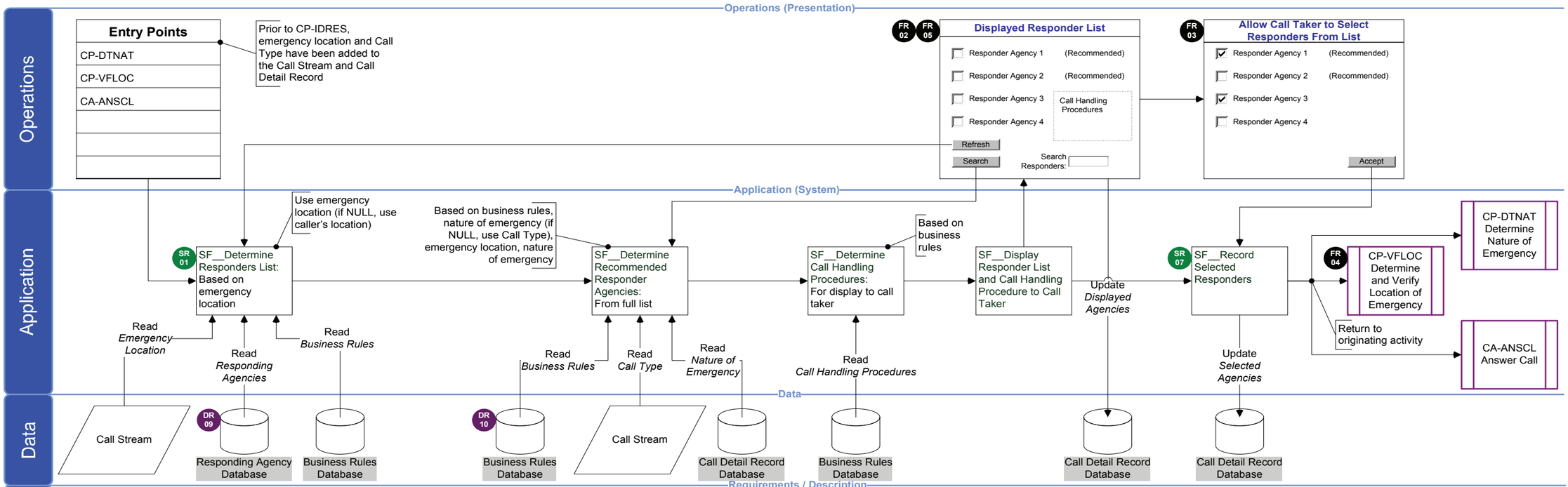


Requirements / Description

SR 01

SR-IDRES-01: The system shall display the emergency responder agencies associated with the emergency location.

SR-IDRES-01-01: The system shall display the emergency responder agencies associated with the caller location if the emergency location is not available.

SR-IDRES-01-02: The system shall display the emergency responder agencies associated with the nature of emergency (that is, recommended responders).

SR-IDRES-01-03: The system shall display the emergency responder agencies associated with the Call Type if nature of emergency is not available.

SR-IDRES-01-04: The system shall log the displayed responder agencies for each call.

SR-IDRES-01-05: The system shall display call handling procedures based on business rules to the call taker.

SR-IDRES-01-06: The system shall display the mode of communication capabilities of the displayed responder agencies.

DR 09

DR-IDRES-09: The system shall contain a Responding Agency Database.

DR-IDRES-09-01: The Responding Agency Database shall contain the following information for all responding agencies in the PSAP's jurisdiction: a) name, b) business area, c) URL, d) telephone number, e) available communications media.

DR-IDRES-09-02: All emergency responder agencies shall be uniquely identifiable nationwide.

DR-IDRES-09-03: The Responding Agency Database shall have the capability to contain individual agents within a responding agency.

DR 10

DR-IDRES-10: The Business Rules Database shall contain SOPs for the display of emergency responder agency information.

DR-IDRES-10-01: The Business Rules Database shall contain rules for automatically determining whether call taker is needed for a given Call Type.

FR 02

FR-IDRES-02: The system shall provide the capability to refresh the list of responders.

FR 05

FR-IDRES-05: The system shall provide the capability to search the responder list.

FR-IDRES-05-01: The system shall provide the capability to search the responder list using Boolean search terms.

FR 03

FR-IDRES-03: The system shall provide the capability to select responders from the list.

FR-IDRES-03-01: The system shall provide the capability to select individual agents within a responding agency.

SR 07

SR-IDRES-07: The system shall log the selected responder agencies for each call.

FR 04

FR-IDRES-04: The system shall provide the capability to transmit a call record to the selected responder agencies' dispatchers.

Activity: [CP-IDRES] Identify Appropriate Responding Agency or Service

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Provide Pre-Arrival Instructions to Caller [CP-PRINS]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT
Proof-of-Concept: False
References: NENA-i3, NRIC VII-1B

Goal:

Provide appropriate pre-arrival instructions to call taker. A call taker may distribute pre-arrival instructions to a caller as necessary.

Description:

This activity automates the display or pre-arrival instructions to the call taker. The call taker delivers pre-arrival instructions to the caller based on established standards and operational best practices. Essential, supportive, and supplemental data associated with the call are used to prioritize the list of pre-arrival instructions presented to the call taker. The call taker selects from the list of presented instructions or searches for additional instructions to provide. The system responds with the search results. Pre-arrival instructions may be presented to the caller without voice contact. The call taker may distribute pre-arrival instructions as appropriate.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-PRINS-01	The system shall provide the capability for a call taker to select pre-arrival instruction based on the nature of the emergency.
SR-PRINS-02	The system shall display pre-arrival instructions to the call taker.
SR-PRINS-03	The system shall prioritize pre-arrival instructions based on a) essential or supportive data delivered with the call, b) supplemental information obtained subsequently, or c) information typed into the Call Record by the call taker.
FR-PRINS-04	The system shall provide the capability to search the pre-arrival instruction database.
FR-PRINS-05	The system shall provide the capability to distribute appropriate pre-arrival instructions in accordance with accepted standards and operational best practices.

Notes

9-1-1 PSAP Operations [PSAP]

Call Processing [CP]

Establish Conference Call [CP-ECONF]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Establish communication among the call taker, caller, third-party (e.g., telematics) service provider, and appropriate public safety entities.

Description:

Call taker initiates a call transfer or conference session. The conference session may be voice, text or video. Text and video conferencing capability are important to people who are deaf and hard-of-hearing; video conferencing may be of vital importance to pre-literate deaf children. Regardless of the media, the call taker stays on the line to ensure caller and dispatcher, third-party service provider, or responding entity establish communications. The call taker informs the dispatcher of the need to mobilize responders. PSAP call taker stays on the line with the caller and dispatcher to assist the caller and provide updated information to the dispatcher. This activity enables the call taker to establish conference sessions with other entities as required.

Assumptions:

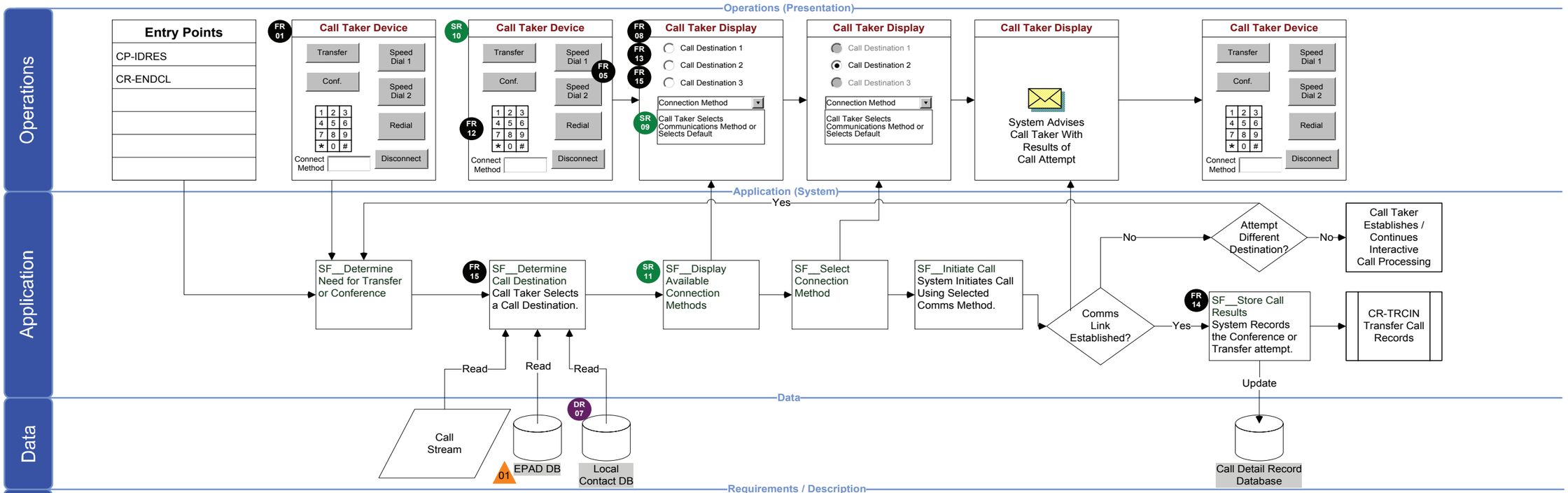
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-ECONF-01	Read Call Stream	Caller	Call Stream Data	Electronic	System	CPE	Caller identification, including call back details and caller location.	Real-time, ad hoc	Text
ITI-ECONF-02	Read External Database	System	CPE	Electronic	External System	EPAD Database	Emergency provider contact information and communication methods.	Real-time, ad hoc	Text
ITI-ECONF-03	Read Local Database	System	Local Contact Database	Electronic	System	CPE	Contact information and communication methods.	Real-time, ad hoc	Text
ITI-ECONF-04	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	Method of conference or transfer and success or failure to establish communications when initiating the conference or transfer.	Real-time, ad hoc	Text

Activity: [CP-ECONF] Establish Conference Call; Initiate Call
Service Area: Call Processing [CP]
Role(s): CT

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: Roger Hixson, Rick Jones

Modified on 10/07/07 @22:04



FR 01 FR-ECONF-01: The system shall provide the capability to establish a call path to one or more telecommunication devices.

SR 10 SR-ECONF-10: The system shall provide teleconferencing features including mute based on NENA 58.001.

FR 12 FR-ECONF-12: The system shall provide the capability to dial a telecommunications device number.

SR 09 SR-ECONF-09: The system shall provide media options to the Call Taker when establishing the call path.

SR 11 SR-ECONF-11: The system shall select an outgoing line.

FR 13 FR-ECONF-13: The system shall provide the capability to select a telecommunications device number from a list.

FR 08 FR-ECONF-08: The system shall provide the capability to establish a call path to a third-party call center associated with the call.

SR-ECONF-09-01: The system shall provide the capability to establish voice conferencing.

SR-ECONF-09-02: The system shall provide the capability to establish video conferencing.

SR-ECONF-09-03: The system shall provide the capability to establish interactive text conferencing.

FR-ECONF-08-01: The system shall provide the ability to query the EPAD database for emergency provider contact method and access data.

01 EL-01 EPAD, the Emergency Provider Access Directory, is a GIS-enabled database registry of local, state, and federal emergency authorities and public service providers to enable interoperable communication and accurate notification of emergency events and related situations.

FR 14 FR-ECONF-14: The system shall store the results of the conference or transfer attempt in the call detail record.

FR 05 FR-ECONF-05: The system shall provide the capability to store frequently used conference call participant numbers.

DR 07 DR-ECONF-07: The system shall provide the capability to store frequently used telecommunications device numbers.

Activity: [CP-ECONF] Establish Conference Call

Notes

9-1-1 PSAP Operations Segment Service Area

5.3 Call Records Management

The Call Records Management Service Area (Figure 5-3) describes the capabilities and activities needed for creating, logging, archiving, retrieving, and transmitting Call Records. The Call Taker and PSAP Administrator roles perform activities within this service area.

5.3 Call Records Management [CR]

[CR-RCCAL] Record Call
Role: CT, SYS
Proof-of-Concept: Yes
References: NENA 08-501, NENA 58-001

Goal: Preserve a detailed record of the interactive communications occurring during a call.

[CR-OSSDT] Obtain Supportive or Supplemental Data Post Call Delivery
Role: CT, PA
Proof-of-Concept: Yes
References: NENA 02-011, NENA 58-001

Goal: Obtain supportive or supplemental data after call delivery to facilitate call processing.

[CR-ENDCL] End Call
Role: CT, PA
Proof-of-Concept: Yes
References: NENA 08-501, NRIC VII-1B

Goal: Terminate existing call and return to ready to accept next call.

[CR-TRCIN] Transfer Call Records
Role: CT, PA
Proof-of-Concept: Yes
References:

Goal: Transfer all Essential, Supportive, Supplemental, and/or manually-entered data concerning the call to the appropriate responding agency dispatch or other authorized entity.

Figure 5–3: Call Records Management Service Area

9-1-1 PSAP Operations [PSAP]

Call Records Management [CR]

Record Call [CR-RCCAL]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, SYS
Proof-of-Concept: Yes
References: NENA 08-501, NENA 58-001

Goal:

Preserve a detailed record of the interactive communications occurring during a call.

Description:

Recording equipment captures the call in real time. The record of the call may include audio, video, text, still imagery, and other data types. Recording is automatically initiated when a call is placed in the call queue. This activity allows for the retrieval of recordings of the most recent calls from a short-term call recording buffer. The system retrieves information associated with a specific call taker. Calls may be retrieved by searching essential, supportive ,or supplemental data such for date, time, call back information, caller location, caller identification, and call taker identification, or any combination of specific data fields. Call recordings may be retrieved during a call session to facilitate the classification of the nature of a call, the retrieval of additional call detail information by the call taker, and the response.

Call Recordings are stored in short term buffers, a.k.a. instant recall recorders, and in long term master logging recorders. Instant recall recorders have a limited buffer and archive recordings from a finite number of the most recent calls. Long term master logging recorders have greater capacity. Essential, supportive, and supplemental data are preserved and identified as part of the Call Record. The Call Record is distinct from the Call Recording. Any information manually entered into the record by the call taker is also preserved and identified as part of the Call Record. The length of time a Call Recording and Call Record is archived is a matter of state or local laws or regulations. The system must meet those requirements. Call Recordings and the associated Call Records must be linked together in the archive so they can be retrieved together

Assumptions:

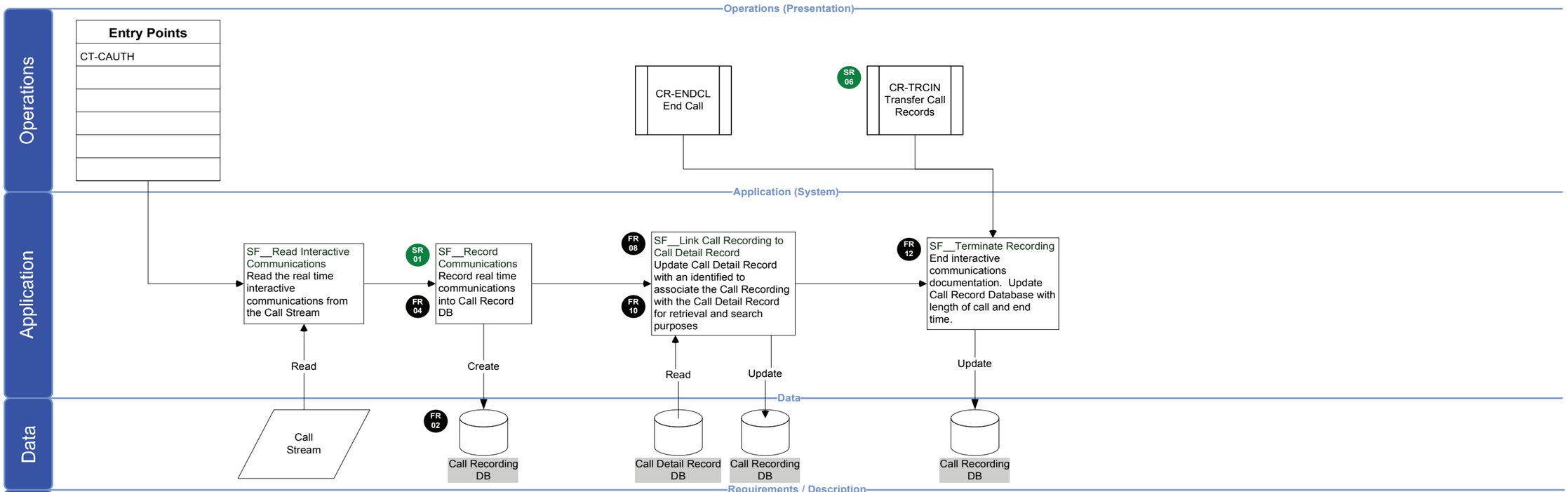
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-RCCAL-01	Real Time Interactive Communications	Caller	Call Stream Data	Electronic	System	Call Recording Database	Interactive recording of real time communications. Includes but is not limited to: voice, video, still imagery transmitted, and interactive text.	Real-time, ad hoc	Text, Graphics, Video
ITI-RCCAL-02	Record Interactive Communitcation	Caller	Call Stream Data	Electronic	System	Dispatch Systems / CPE	Call Handling Procedures including SOPs, etc.	Real-time, ad hoc	Text, Graphics, Video
ITI-RCCAL-03	Retrieve Call Recording	Call Taker	Call Recording Database	Electronic	Call Taker	Dispatch Systems / CPE / Display Systems	Display manipulatable Call Recording, including all standard audio, video, and interactive text methods of manipulation.	Real-time, ad hoc	Text, Graphics, Video
ITI-RCCAL-04	Read Call Detail Record Database	SYS	Call Detail Record Database	Electronic	System	Call Recording Database	Indentification code that links Call Detail Record and Call Recording of the call to create a single Call Record.	Real-time, ad hoc	Text, Graphics, Video

Activity: [CR-RCCAL] Record Call; Record Communications
Service Area: Call Records Management [CR]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert:

Modified on 10/05/07 @09:45



FR 02 FR-RCCAL-02: The system shall provide the capability to archive a Call Recording at a remote location.

FR 04 SR-RCCAL-04: The system shall record all calls.

SR 01 SR-RCCAL-01: The system shall archive a detailed recording of each call locally.

SR 01 SR-RCCAL-01-01: The system shall record incoming a)voice, b) video, c) interactive text, d) still imagery, e) interactive data as part of the Call Recording.

SR 08 SR-RCCAL-08: The system shall link a Call Recording with its call record.

FR 10 FR-RCCAL-10: The system shall be able to correllate recordings of different media types to construct a single recording set.

FR 06 FR-RCCAL-06: The system shall provide the capability to transfer a Call Recording with its Call Record to a third party.

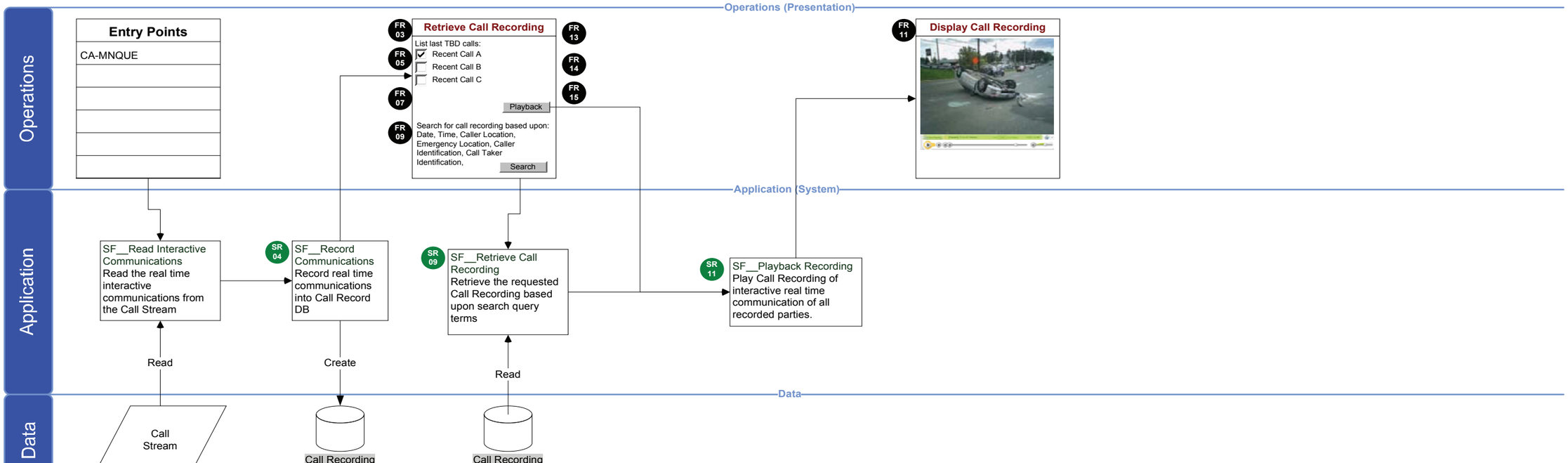
FR 12 FR-RCCAL-12: The sytem shall cease the Call Recording upon termination of the call.

Activity: [CR-RCCAL] Record Call

Activity: [CR-RCCAL] Record Call; Retrieve Recording
Service Area: Call Records Management [CR]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert:

Modified on 10/05/07 @09:45



Requirements / Description

FR 03 FR-RCCAL-03: The system shall provide the capability to access a Call Recording from a remote location.

SR 04 SR-RCCAL-04-01: The system shall record calls while the call is a) in a call queue b) assigned c) in process. Please refer to the state diagram included with the CT-LGAL activity to identify these states.

FR 05 FR-RCCAL-05: The system shall provide the capability to access a Call Recording.

FR 07 FR-RCCAL-07: The system shall provide the capability to locally access a Call Recording.

FR 07 FR-RCCAL-07-01: The system shall provide the capability to display TBR previous Call Recording for instant playback

FR 09 FR-RCCAL-09: The system shall provide the capability to retrieve a Call Recording with its Call Record.

FR 09 FR-RCCAL-09-01: The system shall provide the capabiilty to search the Call Recording database

FR 09 FR-RCCAL-09-02: The system shall provide the cabapility to retrieve call recording based upon search criteria.

FR 13 FR-RCCAL-13: The system shall provide the capability to retrieve a call recording after a call.

FR 14 FR-RCCAL-14: The system shall provide the capability to retrieve a call recording during a call.

FR 15 FR-RCCAL-15: The system shall provide the capability to monitor a call recording during a call.

FR 11 FR-RCCAL-11: The system shall provide the capability to display Call Recording

FR 11 FR-RCCAL-11-01: The sytem shall provide the capability to play the call recording

FR 11 FR-RCCAL-11-02: The system shall provide the capability to pause the Call Recording.

FR 11 FR-RCCAL-11-03: The system shall provide the capability to rewind the Call Recording

FR 11 FR-RCCAL-11-04: The system shall provide the capability to fast forward the Call Recording

Activity: [CR-RCCAL] Record Call

Notes

9-1-1 PSAP Operations [PSAP]

Call Records Management [CR]

Obtain Supportive or Supplemental Data Post Call Delivery [CR-OSSDT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA 02-011, NENA 58-001

Goal:

Obtain supportive or supplemental data after call delivery to facilitate call processing.

Description:

This activity supports the capability for a call taker to access Supportive (e.g., ACN) or Supplemental data (e.g., medical history, telematics, geospatial) after the call has been delivered to the PSAP. Data queries can be performed both automatically by the system and by the Call Taker. The data sources may be external to the 9-1-1 system; external to the PSAP, but still within the 9-1-1 system; or internal to the PSAP (e.g., computer aided dispatch [CAD]). The functional capability is the same regardless of the location of the data source. Such information may be automatically accessible to the call taker based on identifiers within the Supportive Call Data, or identifiers within the Essential Call Data. This information may also be acquired through the use of searches based upon information collected from the caller. The call taker can search Supportive or Supplemental databases. Data may be displayed on a map, as a three-dimensional rendering, or as photographic imagery. The query parameters and the results of all queries are stored in the Call Detail Record Database.

* - CAD is a dispatch system, not a 9-1-1 system. It is included here in recognition of the many PSAPs that are combined facilities that handle both the 9-1-1 call taking and dispatching functions.

Assumptions:

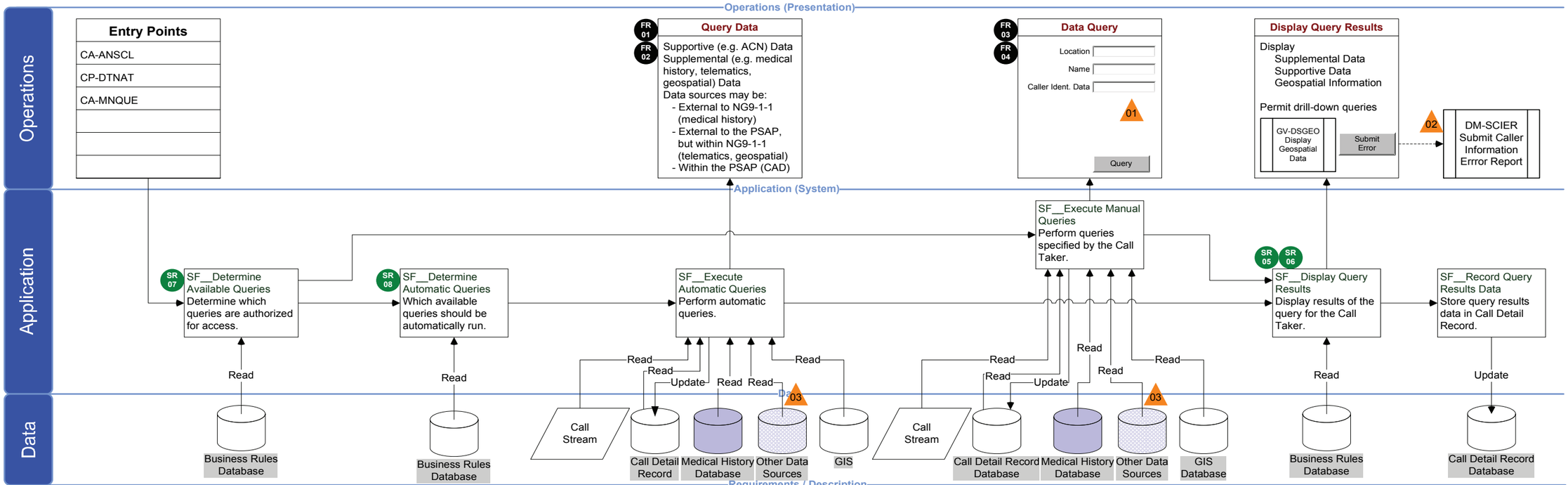
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-OSSDT-01	Read Query Rules	System	Business Rules Database	Electronic	Call Taker	Query Results	Business rules to determine which queries are authorized/automatic.	Real-time, ad hoc	Text
ITI-OSSDT-02	Read Supportive / Supplemental Data	System	Call Stream Data	Electronic	Call Taker	Query Results	Call stream data.	Real-time, ad hoc	Text
ITI-OSSDT-03	Read Supportive / Supplemental Data	System	Call Detail Record Database	Electronic	Call Taker	Query Results	Call Detail information.	Real-time, ad hoc	Text
ITI-OSSDT-04	Read Call Detail Record	System	Call Detail Record Database	Electronic	Call Taker	Query Results	Call Detail Record information about calls that may be related to a call.	Real-time, ad hoc	Text
ITI-OSSDT-05	Read Medical History Data	External System	Medical History Database	Electronic	Call Taker	Query Results	Medical information about the caller or victim.	Real-time, ad hoc	Text
ITI-OSSDT-06	Read Other Data	External System	Other Database	Electronic	Call Taker	Query Results	Other data sources for information about the caller or victim.	Real-time, ad hoc	Text, Graphics, Video
ITI-OSSDT-07	Read GIS	System	GIS Database	Electronic	Call Taker	Map Display	GIS data to display information on a map.	Real-time, ad hoc	Text, Graphics
ITI-OSSDT-08	Update Call Detail Record	Caller	Call Stream Data	Electronic	System	Call Detail Record Database	Query results.	Real-time, ad hoc	Text, Graphics, Video

Activity: [CR-OSSDT] Obtain Supportive or Supplemental Data Post Call Delivery; Query Data
Service Area: Call Records Management [CR]
Role(s): CT, PA

Facilitator: Brad Colvin
Analyst: John Chiaramonte
Domain Expert: Roger Hixson, Rick Jones

Modified on 10/05/07 @09:45



SR 07 SR-OSSDT-07: The system shall determine which queries are authorized for access based on established business rules.

SR-OSSDT-07-01: The system shall record the query parameters for all queries performed in the call detail record database.

SR-OSSDT-07-02: The system shall record the query results for all queries performed in the call detail record database.

SR 08 SR-OSSDT-08: The system shall determine which queries are automatically executed based on established business rules.

FR 01 FR-OSSDT-01: The system shall provide the capability for a call taker to access Supplemental Data.

FR 02 FR-OSSDT-02: The system shall provide the capability for a call taker to access Supportive Data.

FR 03 FR-OSSDT-03: The system shall provide the capability to search Supportive Data.

FR 04 FR-OSSDT-04: The system shall provide the capability to search Supplemental Data.

03 EL-03 Other sources of data include: telematics, computer aided dispatch (CAD), call history, location-specific data (i.e. pre-plan, owner / occupant information), emergency contact, hazardous materials, etc.

SR 05 SR-OSSDT-05: The system shall display Supportive Data search results to the call taker, based on business rules.

SR-OSSDT-05-01: The system shall support queries of supportive data from internal systems, including: call stream data, call detail record data, and GIS.

SR-OSSDT-05-02: The system shall support queries of supportive data from external systems, including: medical records data and other data sources.

SR-OSSDT-05-03: The system shall support drill-down queries of supportive data to obtain additional detail

SR 06 SR-OSSDT-06: The system shall display Supplemental Data search results to the call taker, based on business rules.

SR-OSSDT-06-01: The system shall support queries of supplemental data from internal systems, including: call stream data, call detail record data, and GIS.

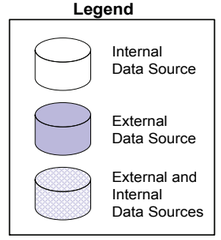
SR-OSSDT-06-02: The system shall support queries of supplemental data from external systems, including: medical records data and other data sources.

SR-OSSDT-06-03: The system shall support drill-down queries of supplemental data to obtain additional detail for matched records.

01 EL-01 Call Taker will be permitted to query various data sources for information related to location, name and/or caller identification information (i.e. callback number or other identification).

02 EL-02 If errors in the source data are identified by the Call Taker, the system will invoke the DM-SCIER activity.

Legend



Activity: [CR-OSSDT] Obtain Supportive or Supplemental Data Post Call Delivery

9-1-1 PSAP Operations [PSAP]

Call Records Management [CR]

End Call [CR-ENDCL]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: NENA 08-501, NRIC VII-1B

Goal:

Terminate existing call and return to ready to accept next call.

Description:

The call taker ends a call. This is done only when it is safe to do so, and is preceded by a verbal announcement in accordance with established standards and operational best practices.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-ENDCL-01	The system shall provide the capability to terminate a call.
SR-ENDCL-02	The system shall terminate all communication links associated with the call.

Notes

9-1-1 PSAP Operations [PSAP]

Call Records Management [CR]

Transfer Call Records [CR-TRCIN]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: Yes
References: N/A

Goal:

Transfer all Essential, Supportive, Supplemental, and/or manually-entered data concerning the call to the appropriate responding agency dispatch or other authorized entity.

Description:

This activity supports the capability for a call taker to electronically transfer or forward call records to other call takers, dispatchers, responders, or other authorized entities with or without a simultaneous conference call.

Assumptions:

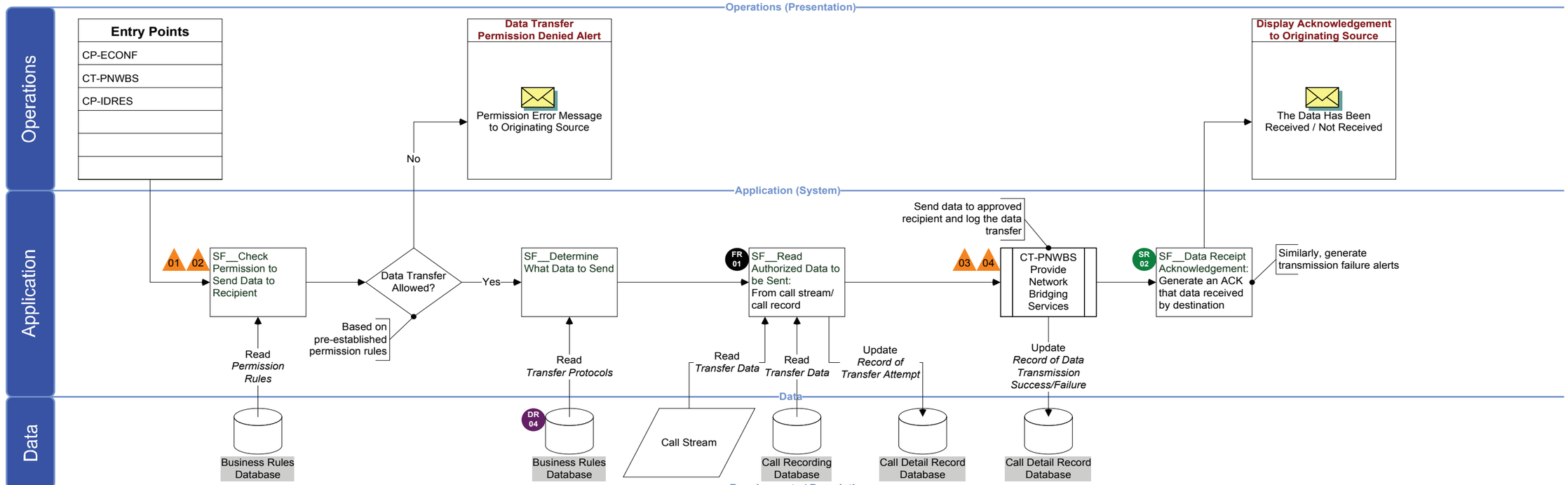
Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-TRCIN-01	Read Permission Rules	System	Business Rules Database	Electronic	System	CPE	Transmission permissions for sending data to the selected intended recipient.	Real-time, ad hoc	Text
ITI-TRCIN-02	Read Transfer Protocols	System	Business Rules Database	Electronic	System	CPE	Protocols for system transfer of selected data to intended recipient.	Real-time, ad hoc	Text
ITI-TRCIN-03	Read Transfer Data	Caller	Call Stream Data	Electronic	System	CPE	Data for transmission to recipient.	Real-time, ad hoc	Text
ITI-TRCIN-04	Read Transfer Data	System	Call Detail Record Database	Electronic	System	CPE	Data for transmission to recipient.	Real-time, ad hoc	Text
ITI-TRCIN-05	Update Record of Transfer Attempt	System	CPE	Electronic	System	Call Detail Record Database	The following information about the transfer attempt: a) time initiated, b) date of transfer, c) summary of data for transfer, d) intended recipient, e) agency of intended recipient, f) IP address of intended recipient, g) call taker initiating transfer, h) associated call ID, i) method of transfer, j) reason for/circumstances of transfer.	Real-time, ad hoc	Text, Graphics, Video
ITI-TRCIN-06	Update Record of Transmission Success/Failure	System	CPE	Electronic	System	Call Detail Record Database	Acknowledgement of successful or unsuccessful call record transmission.	Real-time, ad hoc	Text

Activity: [CR-TRCIN] Transfer Call Records; Data Transfer
Service Area: Call Records Management [CR]
Role(s): CT, PA

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard

Modified on 10/05/07 @09:46



01 EL-01 Those within the PSAP system have physical access to the data repositories, so no "transfer" is necessary.

02 EL-02 CR-TRCIN must receive a destination (EPAD may be used as an external source).

DR 04 DR-TRCIN-04: The Business Rules database shall contain permission rules for data transfers.

FR 01 FR-TRCIN-01: The system shall provide the capability to transfer a call record.

FR-TRCIN-01-01: The system shall provide the capability transfer call records only to those permitted.

03 EL-03 A snapshot of the recording is transferred at the moment of Conference acceptance and the recording continues locally.

04 EL-04 Receiving center will have its own recording through CR-RCCAL.

SR 02 SR-TRCIN-02: The system shall log the transfer of call records.

SR-TRCIN-02-01: The system shall log data transfer attempts, including: a) transfer request date/time, b) notification of transfer success/failure date/ time, c) transfer requestor, d) intended recipient, e) transferred data.

SR-TRCIN-02-02: The system shall display a message that data was not received to the originating requestor upon failed call record transfer.

SR-TRCIN-02-03: The system shall display an acknowledgement message of data receipt to the originating requestor upon successful call record transfer.

Activity: [CR-TRCIN] Transfer Call Records

Notes

9-1-1 PSAP Operations Segment — Service Area

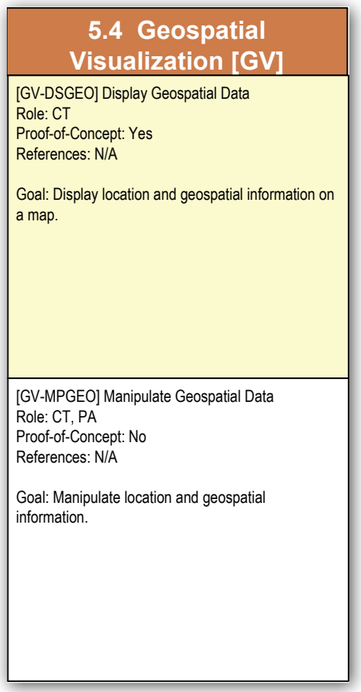


Figure 5–4: Geospatial Visualization Service Area

5.4 Geospatial Visualization

The Geospatial Visualization Service Area (Figure 5-4) provides the call taker with the capabilities for visualizing and analyzing call information on a map.

9-1-1 PSAP Operations [PSAP]

Geospatial Visualization [GV]

Display Geospatial Data [GV-DSGEO]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT
Proof-of-Concept: Yes
References: N/A

Goal:

Display location and geospatial information on a map.

Description:

This activity provides basic geographic information system functions and includes a graphical interface that displays data geospatially on a map. This interface may be used for the graphical specification of geospatial objects. This activity will allow the call taker to save data displayed within the graphical interface to the Call Record as a shape file for use at a later time.

Basic GIS functions such as zoom and pan are supported. This activity will display all geospatially-stored data for the system to include geospatial reference baseline object footprints, image footprints, and map feature data as a set of objects rendered on the display. Additional data may be displayed via symbols placed at the geospatial coordinate linked to the geospatial object.

Visual filtering will be available in a data driven fashion against any displayed GIS layer type. GIS Layer types include, but are not limited to, image footprints, geographic features, and buildings, roads, and borders. Visual filtering is applied against the selected visible layers in the display. Layers may be turned off and on as the user requires.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-DSGEO-01	The system shall provide the capability to display a map for context.
FR-DSGEO-02	The system shall provide capability to display a Caller Location on a map
FR-DSGEO-03	The system shall provide the capability to display a Emergency Location on a map.
FR-DSGEO-04	The system shall provide the capability to zoom on the display.
FR-DSGEO-05	The system shall provide the capability to pan on the display
FR-DSGEO-06	The system shall provide the capability to display three-dimensional renderings.
DR-DSGEO-07	The system shall provide the capability to store shape files.
FR-DSGEO-08	The system shall provide the capability to select a GIS layer type for display.
FR-DSGEO-09	The system shall provide the capability to display the emergency responders associated with a Caller Location on the map.
FR-DSGEO-10	The system shall provide the capability to display the emergency responders associated with an Emergency Location on the map.

Requirement Code	Requirement Text
SR-DSGEO-11	The system shall display the emergency responders associated with a Caller Location on the map.
SR-DSGEO-12	The system shall display the emergency responders associated with an Emergency Location on the map.

Manipulate Geospatial Data [GV-MPGEO]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, PA
Proof-of-Concept: False
References: N/A

Goal:

Manipulate location and geospatial information.

Description:

This activity provides the capability to manipulate geospatial data. The call taker is able to graphically specify query parameters to include polygon, rectangle, circle, ellipse, and point. Allows the call taker to define bounding box(es) on a map as the initial criteria for a search. Search results will be presented as plots on the map. This activity allow the call-taker to save data manipulated within the graphical interface to the Call Record as a shape file for use at a later time. All the basic geographic information system functions from the GV-DGEO functional activity are supported.

This activity supports the gathering of information to enable the distribution of emergency notification services.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MPGEO-01	The system shall provide the capability to manipulate the map.
FR-MPGEO-02	The system shall provide the capability to draw geometric shapes on the map.
FR-MPGEO-03	The system shall provide the capability to draw geometric shapes on the three dimensional rendering.
FR-MPGEO-04	The system shall provide the capability to search the NG9-1-1 data repositories by the selected geometric shape.
FR-MPGEO-05	The system shall provide the capability to display query results geospatially.
FR-MPGEO-06	The system shall provide the capability to display the emergency responders for a given polygon.
SR-MPGEO-07	The system shall display the emergency responders for a given polygon.

Notes

9-1-1 PSAP Operations Segment Service Area

5.5 PSAP Administration

The PSAP Administration Service Area (Figure 5-5) describes the capabilities and rules needed for establishing call handling procedures, managing ACD, and scheduling appropriate staff levels. The PSAP Administrator role performs activities within this service area.

5.5 PSAP Administration [PA]

[PA-DECHP] Define and Establish Call Handling Protocols
Role: PA, SA
Proof-of-Concept: Yes
References: NENA 08-501, NRIC VII-1B

Goal: Ensure proper and efficient call handling and compliance with PSAP processes and best practices through the creation and automation of protocols and procedures.

[PA-SCHST] Schedule Staff
Role: PA
Proof-of-Concept: No
References: NENA 08-501, NRIC VII-1B

Goal: Ensure the staffing level is set to handle the call volume.

[PA-CSCTG] Create Specialized Call Taker Groups
Role: PA
Proof-of-Concept: No
References: NENA 08-501, NENA 58-001, NRIC VII-1B

Goal: Create specialized call taker groups to be used in conjunction with call distribution rules.

[PA-MACDR] Manage Automatic Call Distributor Rules
Role: PA, SA
Proof-of-Concept: No
References: NENA 08-501, NENA 58-001, NRIC VII-1B

Goal: Create, manage, and distribute rules and policies governing the distribution of incoming 9-1-1 calls and automatic event alerts, along with the associated data to call takers.

Figure 5–5: PSAP Administration Service Area

9-1-1 PSAP Operations [PSAP]

PSAP Administration [PA]

Define and Establish Call Handling Protocols [PA-DECHP]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): PA, SA
Proof-of-Concept: Yes
References: NENA 08-501, NRIC VII-1B

Goal:

Ensure proper and efficient call handling and compliance with PSAP processes and best practices through the creation and automation of protocols and procedures.

Description:

The PSAP Administrator promulgates call handling procedures based on 9-1-1 PSAP CPE, incident type, and data sources accessed by the call taker. PSAP Administrators are able to define, update, and delete call handling procedures as needed. Call handling procedures are entered during this activity to facilitate the presentation of the procedure to call takers during call processing, based on Call Type and the call taker's training and knowledge. This activity captures and supports the customization of call handling procedures based on jurisdiction-specific policies, procedures, and best practices.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-DECHP-01	The system shall provide the capability for PSAP administrator to input call handling procedures.
SR-DECHP-02	The system shall provide a unique identifier for each call handling procedure.
SR-DECHP-03	The system shall display a call handling procedure to a call taker.
FR-DECHP-04	The system shall provide the capability for a PSAP administrator to edit call handling procedures.
FR-DECHP-05	The system shall provide the capability for a PSAP administrator to suspend call handling procedures.
FR-DECHP-06	The system shall provide the capability for a PSAP administrator to delete call handling procedures.
FR-DECHP-07	The system shall provide the capability to measure a call taker's compliance with a call handling procedure.
FR-DECHP-08	The system shall provide the capability to generate statistical or call specific reports of a call taker's compliance with call handling procedures.
FR-DECHP-09	The system shall provide the capability for a call taker to select the appropriate call handling procedure based on the Call Type.
DR-DECHP-10	The system shall store the data that measures the compliance of each call taker.
FR-DECHP-11	The system shall provide the capability to read the data that measures the compliance of each call taker.
FR-DECHP-12	The system shall provide the capability to sort the data that measures the compliance of each call taker.

Schedule Staff [PA-SCHST]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): PA
Proof-of-Concept: False
References: NENA 08-501, NRIC VII-1B

Goal:

Ensure the staffing level is set to handle the call volume.

Description:

The PSAP Administrator plans, establishes, and publishes staffing levels based on busy hour(s), busy day(s), busy season(s), and special events held in the PSAP's jurisdiction. The system facilitates the generation of staffing levels using optimization rules and long-term scheduling supported by call volume and distribution data. Schedule and staffing information is shared with appropriate agencies to reflect and balance joint needs. Staffing absences may include, but are not limited to, professional training, vacation, and/or sick leave.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-SCHST-01	The system shall support the allocation of resources supporting multiple staffing levels.
FR-SCHST-02	The system staffing levels shall be based on a) busy hour(s), b) busy day(s), c) busy season(s), and d) special event data (for example, call taker training).
FR-SCHST-03	The system shall provide the capability for an approved user, as defined by user account data, to overwrite the system staffing level.
FR-SCHST-04	The system staffing level shall account for the scheduling of staff absences.
FR-SCHST-05	The system shall provide the capability to share scheduling information
SR-SCHST-06	The system shall use Erlang or similar centum call second (CCS) measurement to determine staffing requirements versus number of calls.

9-1-1 PSAP Operations [PSAP]

PSAP Administration [PA]

Create Specialized Call Taker Groups [PA-CSCTG]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): PA
Proof-of-Concept: False
References: NENA 08-501, NENA 58-001, NRIC VII-1B

Goal:

Create specialized call taker groups to be used in conjunction with call distribution rules.

Description:

This activity enables the PSAP Administrator to define ACD groups based on call taker training level, skill set, and experience level. ACD groups can be assigned to an ACD rule to facilitate the management of call volume and the automatic distribution of calls to the call taker.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-CSCTG-01	The system shall provide the capability to create ACD groups.
SR-CSCTG-02	The system shall support multiple ACD groups.
FR-CSCTG-03	The system shall provide the capability to read ACD groups.
FR-CSCTG-04	The system shall provide the capability to assign a call taker to an ACD group by a) call taker training level, b) skill, and c) experience level.
FR-CSCTG-05	The system shall provide the capability to assign multiple call takers to an ACD group.
FR-CSCTG-06	The system shall provide the capability to update ACD groups.
FR-CSCTG-07	The system shall provide the capability to suspend ACD groups.
FR-CSCTG-08	The system shall provide the capability to delete ACD groups.
FR-CSCTG-09	The system shall provide the capability to add call takers to an ACD group from a remote location.
FR-CSCTG-10	The system shall provide the capability to add call takers to an ACD group who are not physically located in a PSAP.
FR-CSCTG-11	The system shall provide the capability to delete call takers from an ACD group from a remote location.
FR-CSCTG-12	The system shall provide the capability to restore ACD groups.
FR-CSCTG-13	The system shall provide the capability to save ACD groups.

Manage Automatic Call Distributor Rules [PA-MACDR]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): PA, SA
Proof-of-Concept: False
References: NENA 08-501, NENA 58-001, NRIC VII-1B

Goal:

Create, manage, and distribute rules and policies governing the distribution of incoming 9-1-1 calls and automatic event alerts, along with the associated data to call takers.

Description:

This activity addresses the need to distribute 9-1-1 call volume among call takers for the sake of maximizing call processing service and efficiency. Depending on the nature and operating policy of the PSAP involved, related rules may include, but are not limited to, automatic distribution that is a function of information provided by the caller, data on callers and incident locations, and other system parameters. The activity, by definition, also includes the distribution of call event data in accordance with the rules involved.

This activity supports the proper routing of calls to the first available or most appropriate call taker A PSAP Administrator defines the routing strategy to be used within a PSAP. The routing strategy is a rule-based set of instructions provided to the ACD to ensure proper handling of calls. PSAP Administrators define call distribution rules based on standards and operational best practices.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MACDR-01	The system shall provide the capability to create ACD rules.
FR-MACDR-02	The system shall provide the capability to read ACD rules.
FR-MACDR-03	The system shall provide the capability to update ACD rules.
FR-MACDR-04	The system shall provide the capability to delete an ACD rule.
FR-MACDR-05	The system shall provide the capability to suspend an ACD rule.
SR-MACDR-06	The system shall provide the capability to restore an ACD rule.
FR-MACDR-07	The system shall provide the capability to assign ACD groups to a call distribution rule.
FR-MACDR-08	The system shall provide the capability to define ACD rules based on a) call taker availability, b) call taker expertise, c) ACD group, and d) direct number identification.
FR-MACDR-09	The system shall provide the capability to distribute ACD rules.

Notes

Section 6: 9-1-1 System Administration Segment

The 9-1-1 System Administration Segment (refer to Figure 2-10) describes the capabilities needed and rules for sharing information, collaborating, assigning work tasks, maintaining security standards, training, and configuring the 9-1-1 Enterprise (Figure 2-1).

Notes

9-1-1 System Administration Segment

Service Area

6.1 System Management

The System Management Service Area (Figure 6-1) activities are focused on ensuring that, for the sake of optimal performance and service, users and organizations within the NG9-1-1 Enterprise systems have access to all their desired and required functions, applications, and data. It is understood and acknowledged that some of these functions may either occur outside the 9-1-1 enterprise, and/or be affected by related activities within the broader public safety world to ensure proper and effective coordination and service delivery across 9-1-1 call delivery, emergency response, and incident management service environments. With that in mind, this service area includes management of user accounts, access control, hardware and software resources identification and location, and license information at appropriate system and intra-system levels. Management of these system activities may be performed by authorized individuals as agreed upon by public safety authorities at all levels.

6.1 System Management [SM]

[SM-CRROL] Create and Define Roles
Role: PA, SA
Proof-of-Concept: No
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal: Create, manage, and assign roles within the system.

[SM-MUSER] Manage User Accounts
Role: SA
Proof-of-Concept: No
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal: Provide the capability to enable the creation, modification, suspension, and deletion of system accounts. Provide the capability to build user permissions/views with appropriate access to allowable systems, networks, and databases. Provide the capability for only those system administrators with proper authority to create and modify/update user accounts.

[SM-PLCFC] Planning Configuration Changes
Role: DBA, SA
Proof-of-Concept: No
References: N/A

Goal: Ensure that the system and necessary network configurations adequately support the system and network desired functions and capabilities.

Figure 6–1: System Management Service Area

9-1-1 System Administration [SYAD]

System Management [SM]

Create and Define Roles [SM-CRROL]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): PA, SA
Proof-of-Concept: False
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Create, manage, and assign roles within the system.

Description:

This activity provides the capability for system administrators to manage the higher-level user group accounts from which individual user accounts are derived and the specific user group access attributes are assigned. Access attributes, in this instance, relate to privileges assigned to high-level groups based on group functions, roles, and responsibilities. Creating and defining roles includes the provision of system capabilities to control access to system databases, directories, files, programs, and applications. This activity is based, in part, on authentication policies established between internal and external systems through which information is shared and distributed. This activity also allows the System Administrator to create tools, information sources, databases, and organizational templates to provide, adjust, and maintain access for users, based on their user groups. Specific role information is assigned according to a predefined set of role descriptions and rules, and to defined group responsibilities and functions. Examples of such high-level user groups include, but are not limited to, call taker categories (e.g., entry level call taker, senior call taker, supervising call taker), database maintenance and management staff, network maintenance and management staff, and system administrators.

Assumptions:

System security and efficiency will require structured access to system functions and applications.

High-Level Requirements:

Requirement Code	Requirement Text
FR-CRROL-01	The system shall provide the capability to create system access roles.
FR-CRROL-02	The system shall provide the capability to create group accounts based on system access roles.
FR-CRROL-03	The system shall provide the capability to create organizational templates for user roles.
FR-CRROL-04	The system shall provide the capability for a system administrator to assign system access permissions to a role.
FR-CRROL-05	The system shall provide the capability for a system administrator to assign information sources (that is, resources for data and information essential to system function, such as location and event descriptive information, telematics data, and medical hi
FR-CRROL-06	The system shall provide the capability for a system administrator to assign system tools to a role.
FR-CRROL-07	The system shall provide the capability to read system access roles.
FR-CRROL-08	The system shall provide the capability to update system access roles.
FR-CRROL-09	The system shall provide the capability to delete system access roles.
FR-CRROL-10	The system shall provide the capability to save system access roles.
FR-CRROL-11	The system shall provide the capability to read group accounts based on system access roles.
FR-CRROL-12	The system shall provide the capability to update group accounts based on system access roles.

Requirement Code	Requirement Text
FR-CRROL-13	The system shall provide the capability to delete group accounts based on system access roles.
FR-CRROL-14	The system shall provide the capability to save group accounts based on system access roles.
FR-CRROL-15	The system shall provide the capability to read organizational templates for user roles.
FR-CRROL-16	The system shall provide the capability to update organizational templates for user roles.
FR-CRROL-17	The system shall provide the capability to delete organizational templates for user roles.
FR-CRROL-18	The system shall provide the capability to save organizational templates for user roles.
FR-CRROL-19	The system shall provide the capability to create a system organization (that is, a 9-1-1 enterprise comprised of interconnected networks and PSAPs supporting a defined 9-1-1 authority responsibility and jurisdictional area).
FR-CRROL-20	The system shall provide the capability to read a system organization.
FR-CRROL-21	The system shall provide the capability to update a system organization.
FR-CRROL-22	The system shall provide the capability to delete a system organization.
FR-CRROL-23	The system shall provide the capability to save a system organization.

Manage User Accounts [SM-MUSER]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SA
Proof-of-Concept: False
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to enable the creation, modification, suspension, and deletion of system accounts. Provide the capability to build user permissions/views with appropriate access to allowable systems, networks, and databases. Provide the capability for only those system administrators with proper authority to create and modify/update user accounts.

Description:

This activity provides the capability for system administrators to create and manage user accounts.

Administrators create the authorization for a user to access system accounts, either locally or from a remote location. This activity provides the capability to build specific user permissions and views with appropriate access to allowable tools, systems, networks, and databases. User account management can be performed for all distributed system components.

Account creation requests contain the name, e-mail address, employee username, organization, and roles requested. Administrators can modify the organization and roles requested. A user may be assigned to multiple organizations or maintain multiple roles within the system. A user is assigned a role for each organization level with which he or she is associated.

Assumptions:

System security and efficiency will require structured access to system functions and applications.

High-Level Requirements:

Requirement Code	Requirement Text
FR-MUSER-01	The system shall provide the capability to create user operational environments.
FR-MUSER-02	The system shall provide the capability to assign a role to a user account.
FR-MUSER-03	The system shall provide the capability to create user accounts.
FR-MUSER-04	The system shall provide the capability to update user accounts.
FR-MUSER-05	The system shall provide the capability to delete user accounts.
FR-MUSER-06	The system shall provide the capability to suspend user accounts.
FR-MUSER-07	The system shall provide the capability to read user operational environments.
FR-MUSER-08	The system shall provide the capability to update user operational environments.
FR-MUSER-09	The system shall provide the capability to delete user operational environments.
FR-MUSER-10	The system shall provide the capability to save user operational environments.
FR-MUSER-11	The system shall provide the capability to read user accounts.
FR-MUSER-12	The system shall provide the capability to save user accounts.
FR-MUSER-13	The system shall provide the capability for a system administrator to view user account requests.

9-1-1 System Administration [SYAD]

System Management [SM]

Planning Configuration Changes [SM-PLCFC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA, SA
Proof-of-Concept: False
References: N/A

Goal:

Ensure that the system and necessary network configurations adequately support the system and network desired functions and capabilities.

Description:

This activity specifically supports system and network(s) functions and capabilities, and ensures that system and network configurations are optimally designed to maximize performance. Generally this activity addresses the overall design of system and network configurations, building on architectural decisions performed at the system level. Additionally, it emphasizes the activity involved in evaluating system performance and planning for and responding to changing service environments, growth, upgrades and enhancements, and other such change dynamics.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-PLCFC-01	The system shall provide the capability to monitor system performance.
FR-PLCFC-02	The system shall provide the capability to collect system performance metrics.
FR-PLCFC-03	The system shall provide the capability to aggregate system performance metrics.
FR-PLCFC-04	The system shall provide the capability to model system configuration changes.
FR-PLCFC-05	The system shall provide the capability to deploy system configuration changes.

9-1-1 System Administration Segment Service Area

6.2 Data Management

The Data Management Service Area (Figure 6-2) provides activities needed to monitor, restore, and assign access or distribution privileges for all of the NG9-1-1 databases. Service area activities also provide database administrators with views into database performance and resource allocation. The database administrator is the primary role for these activities.

6.2 Data Management [DM]	
[DM-MNDBA] Manage Database Access Role: DBA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide, support, and manage the capability to access the enterprise database(s) and to allow the distribution of data contained within those database(s).	[DM-MNDBT] Manage Database Auditing Role: DBA Proof-of-Concept: No References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to audit the specified user and maintenance activities against the enterprise database.
[DM-MNDBP] Manage Database Performance Role: DBA Proof-of-Concept: No References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to monitor and report on the operational performance of the enterprise databases.	[DM-MNDBI] Manage 9-1-1 Interface and Protocol Availability and Usage Role: SA Proof-of-Concept: Yes References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Ensure the availability of necessary and beneficial data interfaces and communication protocols to support call processing and emergency response.
[DM-PDBSR] Perform Database Save & Recovery Role: DBA Proof-of-Concept: No References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Provide the capability to back up and save enterprise database(s), along with the archiving of appropriate system data. Provide the capability to recover and restore the enterprise databases based on previous backups.	[DM-SCIER] Submit Caller Information Error Report Role: CT, DBA Proof-of-Concept: No References: N/A Goal: Submit caller information error report to the originating data provider for correction.

Figure 6–2: Data Management Service Area

9-1-1 System Administration [SYAD]

Data Management [DM]

Manage Database Access [DM-MNDBA]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: False
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide, support, and manage the capability to access the enterprise database(s) and to allow the distribution of data contained within those database(s).

Description:

This activity addresses the need to provide, maintain, and oversee access to functional databases essential to, and/or beneficial to, the delivery and processing of a NG9-1-1 communications event (e.g., location and validation functions, telematics and ACN data, medical information, pictorial and graphical descriptive information). This activity also defines the access privileges required for the distribution of data to authorized and interested data users (internal and external to the 9-1-1 system). Tools (access utilities, passwords, trust policies, validation utilities, and other forms of access and data distribution control) will be implemented to ensure that access and the availability of data is limited to authorized personnel and user groups based on their functional need and responsibility. It is noted that such functions are normally components of database management system (DBMS) applications and tools that support the creation, storage, retrieval, and general management of information and data in critical system databases. The deployment of such tools may be a logical extension of this activity.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNDBA-01	The DBMS shall provide the capability to change database parameters for each data source.
FR-MNDBA-02	The DBMS shall provide the capability to change permissions for individual connections between data sources and enterprise databases.
FR-MNDBA-03	The DBMS shall provide the capability to access database tables for each data source.
FR-MNDBA-04	The DBMS shall provide the capability to authenticate user account access to data stores.
FR-MNDBA-05	The DBMS shall provide the capability to audit user account access to data stores.
FR-MNDBA-06	The DBMS shall provide database administrators the capability to grant access to data stores.
FR-MNDBA-07	The DBMS shall provide the capability for a database administrator to access data dictionaries for database metadata review.

Requirement Code	Requirement Text
FR-MNDBA-08	The DBMS shall provide the capability to change system-level database parameters.
FR-MNDBA-09	The DBMS shall provide the capability to change the system permissions for each data source.
FR-MNDBA-10	The DBMS shall provide the capability to change the object permissions for each data source.
FR-MNDBA-11	The DBMS shall provide the capability to create system databases.
FR-MNDBA-12	The DBMS shall provide the capability to read system databases.
FR-MNDBA-13	The DBMS shall provide the capability to update system databases.
FR-MNDBA-14	The DBMS shall provide the capability to delete system databases.
FR-MNDBA-15	The DBMS shall provide the capability to save system databases.
FR-MNDBA-16	The DBMS shall provide the capability to monitor connections to system databases.

Manage Database Performance [DM-MNDBP]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: False
References: ECRIT, NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to monitor and report on the operational performance of the enterprise databases.

Assumptions:

Description:

This activity provides the capability to gauge and document the performance of operational databases, with the intent of maximizing their performance. Specifically, the activity involves the effective use of database and software tools to tune database functions for optimum use, and diagnose problems, both existing and potential.

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNDBP-01	The DBMS shall provide the capability to monitor the operational performance of the enterprise databases.
FR-MNDBP-02	The DBMS shall provide the capability to report on the operational performance of the enterprise databases.
SR-MNDBP-03	The DBMS shall collect database performance statistics.
FR-MNDBP-04	The DBMS shall provide the capability to sort database performance statistics.
SR-MNDBP-05	The DBMS shall store database performance statistics.
FR-MNDBP-06	The DBMS shall provide the capability to search database performance statistics.
FR-MNDBP-07	The DBMS shall provide the capability to create a database performance alert.
FR-MNDBP-08	The DBMS shall provide the capability to read a database performance alert.
FR-MNDBP-09	The DBMS shall provide the capability to update a database performance alert.
FR-MNDBP-10	The DBMS shall provide the capability to delete a database performance alert.

Requirement Code	Requirement Text
FR-MNDBP-11	The DBMS shall provide the capability to monitor database performance alert thresholds.
FR-MNDBP-12	The DBMS shall provide the capability to execute database performance trending.

9-1-1 System Administration [SYAD]

Data Management [DM]

Manage 9-1-1 Interface and Protocol Availability and Usage [DM-MNDBI]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SA
Proof-of-Concept: Yes
References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Ensure the availability of necessary and beneficial data interfaces and communication protocols to support call processing and emergency response.

Description:

This activity addresses necessary and beneficial interfaces and communication protocols associated with the call processing function to ensure effective emergency response. Said interfaces include, but are not limited to, call processing to achieve the first responder (i.e., CAD interface) handoffs, as well as other data streams that may support and/or enhance incident management and event outcome. Communication protocols ensure the effective and reliable provision of necessary services to support call processing and emergency response. The NG9-1-1 system must be capable of incorporating and communicating with the protocols necessary for programmatic interaction with existing and/or legacy systems in a fashion which does not require modification of said systems. Where possible, preference should be given to open, industry-proven standards in anticipation of the need to incorporate future systems and technologies into the NG9-1-1 system architecture.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNDBI-01	The DBMS shall provide the capability to create data interfaces for the enterprise database(s).
FR-MNDBI-02	The DBMS shall provide the capability to read data interfaces for the enterprise database(s).
FR-MNDBI-03	The DBMS shall provide the capability to update data interfaces for the enterprise database(s).
FR-MNDBI-04	The DBMS shall provide the capability to delete data interfaces for the enterprise database(s).
FR-MNDBI-05	The DBMS shall support the provisioning and management of effective and reliable communication protocols necessary to call processing and emergency response.

Submit Caller Information Error Report [DM-SCIER]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): CT, DBA
Proof-of-Concept: False
References: N/A

Goal:

Submit caller information error report to the originating data provider for correction.

Description:

This activity provides the ability to document incorrect caller information and automate the reporting and tracking of the information so it may be corrected in the source data. When a user identifies an error in data, the system will provide a method to record the incorrect data and note the problem or suggest the correct data.

The system will record the error report, determine the data source and transmit the report to the entity responsible for the source data for correction. The system will track the request and any response from the responsible party.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-SCIER-01	The system shall provide the capability to document incorrect caller information.
FR-SCIER-02	The system shall pre-populate the discrepancy report with the associated source data.
FR-SCIER-03	The system shall provide the capability for the user to submit a discrepancy report for correction.
FR-SCIER-04	The system shall determine the party responsible for correcting the source data.
FR-SCIER-05	The system shall transmit the discrepancy report to the entity responsible for correcting the source data.
FR-SCIER-06	The system shall pre-populate the location discrepancy report with caller identification information.
SR-SCIER-07	They system shall pre-populate the location discrepancy report with the incorrect information.

9-1-1 System Administration [SYAD]

Data Management [DM]

Perform Database Save & Recovery [DM-PDBSR]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: False
References: NENA 08-501, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to back up and save enterprise database(s), along with the archiving of appropriate system data. Provide the capability to recover and restore the enterprise databases based on previous backups.

Description:

This activity involves the periodic and scheduled backup of essential and/or beneficial databases and the critical data involved supporting the delivery and processing of a 9-1-1 communications event, and other beneficial system functions. Secure, robust storage tools and backups are used to ensure the integrity of the saved information involved. This activity also supports the recovery and restoration of critical and/or beneficial databases supporting the delivery and processing of 9-1-1 communication events, in accordance with system policy and procedure.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-PDBSR-01	The DBMS shall provide the capability to generate backup copies of enterprise databases in accordance with established policy and procedure.
FR-PDBSR-02	The DBMS shall provide the capability to restore enterprise databases in accordance with established policy and procedure.
SR-PDBSR-03	The DBMS shall store multiple backup versions of the enterprise database(s).
FR-PDBSR-04	The DBMS shall provide the capability for database administrators to select database(s) to restore.
FR-PDBSR-05	The DBMS shall provide the capability for database administrators to select database(s) to recover.
FR-PDBSR-06	The DBMS shall provide the capability for a database administrator to restore a database to a previously known state.

Requirement Code	Requirement Text
FR-PDBSR-07	The DBMS shall provide a database administrator the capability to recover the restored database(s) using transaction logs.
FR-PDBSR-08	The DBMS shall provide the capability for a database administrator to view the status of a database recovery.

Manage Database Auditing [DM-MNDBT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: False
References: NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to audit the specified user and maintenance activities against the enterprise database.

Assumptions:

Description:

This activity addresses the need to ensure that the data stored within essential and beneficial databases accurately represent functional requirements and that user maintenance activities are properly and efficiently updating the data involved. A variety of access and auditing tools are used, including periodic database/user data compares and synchronization support.

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNDBT-01	The DBMS shall provide the capability to audit user activity.
FR-MNDBT-02	The DBMS shall provide the capability to audit maintenance activities against enterprise databases.
FR-MNDBT-03	The DBMS shall provide the capability for database administrator to search for specific actions within the audit log for reporting purposes.
SR-MNDBT-04	The DBMS shall prevent changes to entries within the audit log.

Notes

Section 7: 9-1-1 System Operations Segment

The 9-1-1 Systems Operations Segment (refer to Figure 2-11) consists of activities, systems, and network resources to manage, protect, administer, and operate the technology infrastructure supporting the 9-1-1 mission. This enterprise segment contains the Call Treatment, Security Administration, Database Administration, and Operations Administration service areas. This segment focuses on the management of the security, databases and the operations of system resources.

Notes

9-1-1 System Operations Segment Service Area

7.1 Call Treatment

The Call Treatment Service Area (Figure 7-1) describes the activities performed by the NG9-1-1 System to prepare a call for presentation to a call taker. Activities within this service include recognizing the originating location, determining the call delivery treatment, routing a call to the PSAP, recognizing call types, adding adjunct data to a call stream, and accessing Supplemental data after call delivery.

7.1 Call Treatment [CT]	
[CT-ROLOC] Recognize Originating Location Role: SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Receive and electronically validate location-originating caller location information (civic or geospatial).	[CT-LGCAL] Document Call Detail Information Role: SYS Proof-of-Concept: No References: NENA-i3 Goal: Preserve a record of call information in a data file.
[CT-REGCT] Identify Call Type Role: SYS Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Receive and validate call type information (e.g., telematics, silent alarm) from telecommunications devices and recalculate call type and default priority based on supporting data.	[CT-PNWBS] Provide Network Bridging Services Role: SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3 Goal: Ensure that all system and network entities are able to conference and share data as appropriate and beneficial to call treatment and processing.
[CT-RTPSP] Route Call to PSAP Role: NTA, SYS Proof-of-Concept: Yes References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D Goal: Route call from the initiator and call-originating service to the appropriate destination based on identified call treatment including location information received (civic or geospatial).	[CT-CAUTH] Call Authentication Role: SYS Proof-of-Concept: Yes References: IETF RFC-3647, IETF RFC-4474, NENA 02-502, NENA 04-503, NENA 08-001, NENA 58-001 Goal: The call authentication process ensures that only appropriate entities are granted permission through to the system.

Figure 7–1: Call Treatment Service Area

9-1-1 System Operations [SNSP]

Call Treatment [CT]

Recognize Originating Location [CT-ROLOC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SYS
Proof-of-Concept: Yes
References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Receive and electronically validate location-originating caller location information (civic or geospatial).

Description:

This activity supports a system function to accept, acknowledge, and, potentially validate the location of the caller (which may or may not be the location of the emergency event). Validation may occur prior to this step as a function of the access network, the telecommunications device, or internal data stores. This activity supports representations of location that include the capability to identify altitude and/or structural floor designation. Also, this activity supports the use and identification of "fall-back" location information when measurement-based location determination is not available. "Fall-back" location information is more generalized location information generated by system call processing that can be used to identify the general locality or region of the incident or calling party. An example is the cell site used to relay a wireless cellular 9-1-1 call.

Assumptions:

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-ROLOC-01	Read Caller Location	Caller	Call Stream Data	Electronic	System	CPE	Caller location.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-02	Read GIS Format	Caller	GIS Database	Electronic	System	CPE	GIS error conditions.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-03	Read Fall Back Location	System	Call Stream Data	Electronic	System	CPE	Fall back location data.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-04	Update Caller Location	System	CPE	Electronic	Call Stream	Call Stream Data	Caller location.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-05	Update Caller Location	System	CPE	Electronic	System	Call Detail Record Database	Caller location.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-06	Read Fall Back Location Data	Caller	Call Stream Data	Electronic	System	CPE	Fall back location data (e.g., Wireless Tower Location, Wireless Tower/Sector ID, County ID).	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-07	Read Authoritative Default Location	System	Authoritative Default Location Database	Electronic	System	CPE	Authoritative Default Location.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-08	Update Caller Location	System	CPE	Electronic	Call Stream	Call Stream Data	Default location, and caller location.	Real-time, ad hoc	Text, Graphics
ITI-ROLOC-09	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	Default location, and caller location.	Real-time, ad hoc	Text, Graphics

Activity: [CT-ROLOC] Recognize Originating Location; Check Location
Service Area: Call Treatment [CT]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: John Chiaramonte, Roger Hixson, Rick Jones, Jim Lockard

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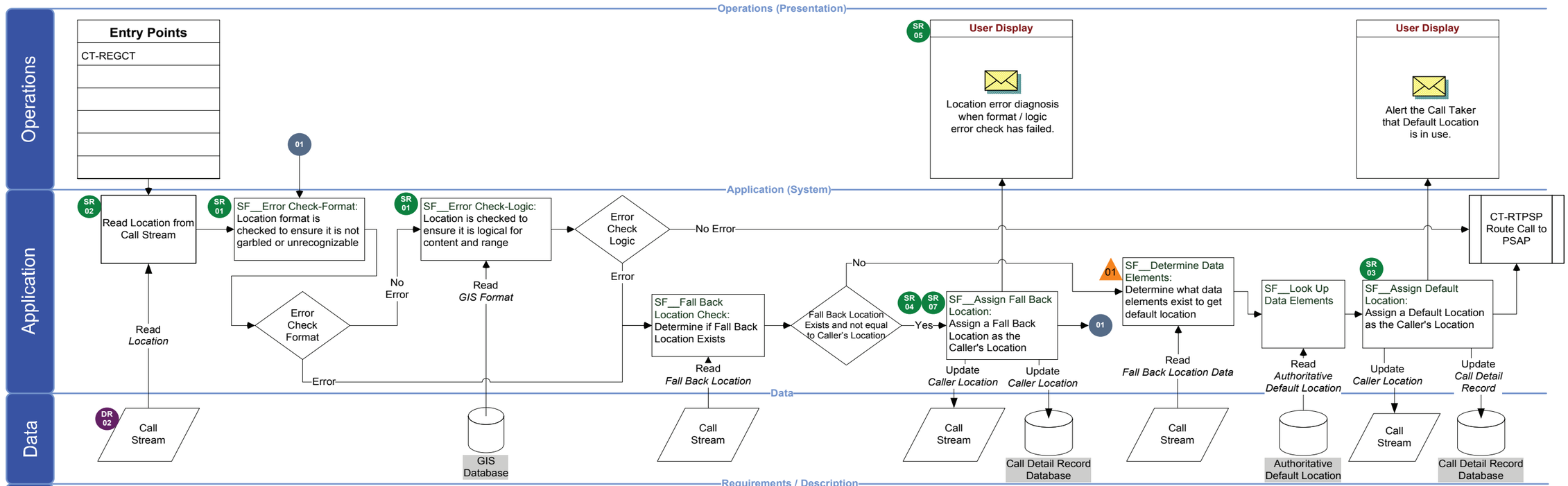

SR 02 — SR-ROLOC-02: The system shall recognize Caller Location Information formatted to NENA Standard Formats & Protocols for ALI Data Exchange, ALI Response & GIS Mapping (NENA-02-010).

DR 02 — DR-ROLOC-02-01: Caller Location shall contain a) House Number, b) House Number Suffix, c) Prefix Directional, d) Street Name, e) Street Suffix, f) Post Directional, g) MSAG Community Name, h) Postal Community Name, i) State/ Province, j) Additional Free Formatted Location Information, k) Landmark or Vanity Address, l) Also Rings At Address, m) Exchange, n) P-ANI, o) County ID, p) Postal/Zip Code, q) Longitude, r) Latitude, s) Elevation, t) Cell Site ID, u) Sector ID, v) Location Determination Technology (LDT) Confidence, w) LDT Confidence Percentage, x) LDT Technology, y) Speed, z) Heading (in degrees), aa) Location Valid Flag.

SR 01 — SR-ROLOC-01: The system shall validate Caller Location Information.

SR-ROLOC-01-01: The system shall check Caller Location for unrecognizable data type.

SR-ROLOC-01-02: The system shall check Caller Location for garbled data.

SR-ROLOC-01-03: The system shall check Caller Location fields for logical data ranges.

SR-ROLOC-01-04: The system shall check Caller Location fields for logical content.

SR 05 — SR-ROLOC-05: The system shall supply the user with an error diagnosis in the event of a failed location determination attempt.

SR 04 — SR-ROLOC-04: The system shall make use of Fall-Back Location Information in the event of a failed location determination attempt.

SR-ROLOC-04-01: The system shall check Fall Back Location for unrecognizable data type.

SR-ROLOC-04-02: The system shall check Fall Back Location for garbled data.

SR-ROLOC-04-03: The system shall check Fall Back Location fields for logical data ranges.

SR-ROLOC-04-04: The system shall check Fall Back Location fields for logical content.

SR 07 — SR-ROLOC-07: The system shall support the use of Fall-Back Location Information when measurement-based location determination is not available.

01 — EL-01 Examples of Fall Back Location include: Wireless Tower Location, Wireless Tower/Sector ID, or County ID.

SR 03 — SR-ROLOC-03: The system shall provide alternate location information in the absence of primary location information.

SR-ROLOC-03-01: The system shall assign a default location upon Caller location and Fall Back Location failure.

SR-ROLOC-03-02: The system shall update the Call Stream with the assigned Default Location.

SR-ROLOC-03-03: The system shall store the Caller Location as part of the Call Detail Record.

SR 08 — SR-ROLOC-08: The system shall support representations of location that include the capability to identify structural floor designation.

SR 06 — SR-ROLOC-06: The system shall support representations of location that include the capability to identify altitude.

Activity: [CT-ROLOC] Recognize Originating Location

Identify Call Type [CT-REGCT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SYS
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Receive and validate call type information (e.g., telematics, silent alarm) from telecommunications devices and recalculate call type and default priority based on supporting data.

Description:

This activity addresses system and network capability to automatically identify types or classifications of calls (like telematics, ACN, silent alarms, and similar automated calls) and assign a default priority. Call type and priority then contributes to or helps guide call treatment, routing, and processing, depending on the characteristics of the call type involved. The intent is to facilitate that process and maximize performance and minimize response time.

Undefined call types are those call type codes received by the system which are not represented in system's authoritative call type list. Unrecognizable call types are those call type codes that have an intended match in system tables but the received code is garbled or otherwise unidentifiable.

This activity also supports the system capability to add additional data to the 9-1-1 call setup itself (e.g., additional location and call type information, or links to outside data sources) for the sake of facilitating call processing. This activity is distinguished from the capability of a call taker (or a responder downstream of the call) to access additional beneficial data once the call arrives. Call setup data is limited to that which enhances call delivery and initial handling, and/or aids in the tracking and tracing of calls. (This is termed "supporting data.") The control of which data is added to the call setup is expected to be accomplished through data Rights Management mechanisms, with preset definitions of what data should be added, where available, possibly by call type. If any of the supporting data affects call routing, the initial call type and default priority will be recalculated to reflect those changes.

Assumptions:

Information Transaction Inventory (ITI):

To view ITI go to page 7-9.

Activity: [CT-REGCT] Identify Call Type; Record Initial Call Type
Service Area: Call Treatment [CT]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: Wesley Chen, Dan Landau
Domain Expert: Jim Lockard, Roger Hixson, Rick Jones, John Chiaramonte
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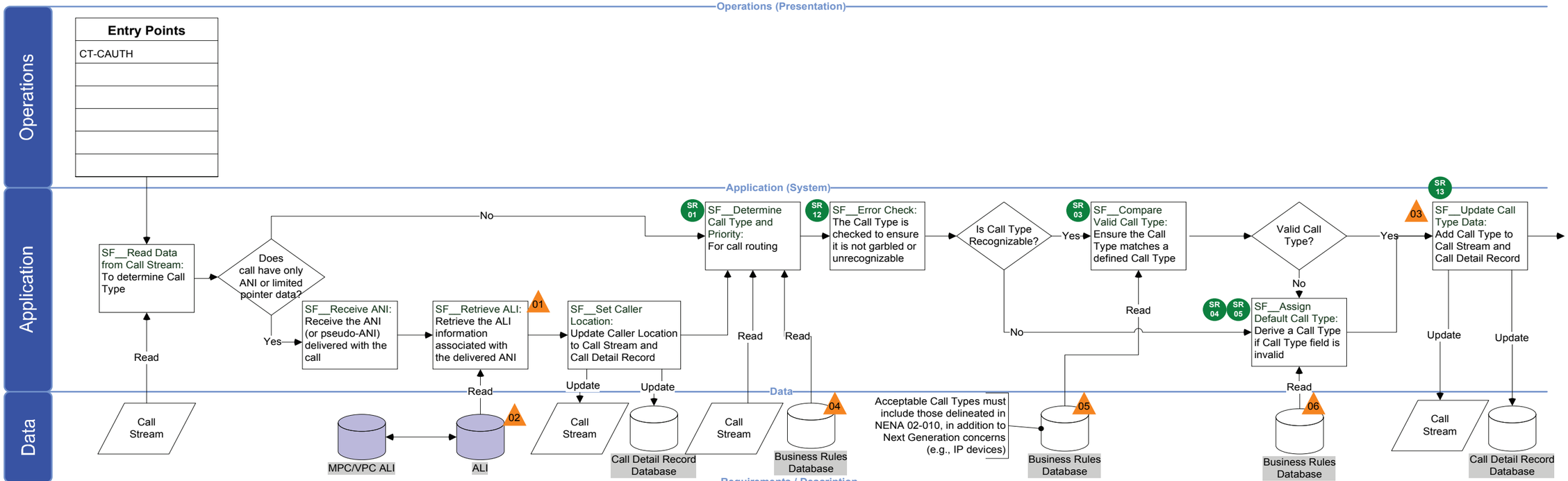

SR 01 SR-REGCT-01: The system shall use call type data as defined in NENA Standard Formats & Protocols for ALI Data Exchange, ALI Response & GIS Mapping (NENA-02-010) to perform call treatment.

SR-REGCT-01-01: The system shall use the following data to determine Call Type:
A) Emergency Location
B) Class of Service
C) Type of Service

SR 12 SR-REGCT-12: The system shall be able to detect any unrecognizable formats or garbled data in the Call Type.

SR 03 SR-REGCT-03: The system shall validate incoming Call Type.

SR-REGCT-03-01: The system shall ensure that the incoming call includes the fields delineated in NENA 02-010

SR-REGCT-03-03: The system shall provide the capability to allow a system administrator to create new Call Type definitions.

SR-REGCT-03-05: The system shall provide the capability to allow a system administrator to update Call Type definition.

SR-REGCT-03-02: The system shall ensure that the incoming call matches a predefined Call Type

SR-REGCT-03-04: The system shall provide the capability to allow a system administrator to read an expected Call Type definition.

SR-REGCT-03-06: The system shall provide the capability to allow a system administrator to delete Call Type definition.

SR-REGCT-03-07: The system shall provide the capability to allow a system administrator to save Call Type definition.

SR 04 SR-REGCT-04: The system shall assign a default Call Type for calls received with an undefined Call Type.

SR-REGCT-04-01: The system shall determine an appropriate Call Type for calls received with an undefined Call Type.

SR 05 SR-REGCT-05: The system shall assign a default Call Type for calls received with an unrecognizable Call Type.

SR 13 SR-REGCT-13: The system shall record the original Call Type when a received call type is a) unrecognizable, b) undefined

SR-REGCT-04-02: The system shall indicate to the call taker whether the Call Type of a call was changed by the system as the result of a received undefined Call Type.

SR-REGCT-05-01: The system shall indicate to the call taker whether the Call Type of a call was changed by the system as the result of a received unrecognizable Call Type.

01 EL-01 If the 9-1-1 call was placed using a non-NG device, the Call Type is read from the ALI data associated with the call

02 EL-04 ALI contains the traditional Call Type information

03 EL-03 The usable Call Type will be delivered with the call to the call taker via the Call Stream and Call Detail Record

04 EL-04 Contains call treatment rules that determine call Call Type and the default Priority

05 EL-05 Contains the Authoritative Call Type List with all Acceptable Call Types

06 EL-06 Contains default Call Types

Internal
External

Activity: [CT-REGCT] Identify Call Type

Activity: [CT-REGCT] Identify Call Type; Add Supporting Data
Service Area: Call Treatment [CT]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: Wesley Chen, Dan Landau
Domain Expert: Jim Lockard, Roger Hixson, Rick Jones, John Chiaramonte
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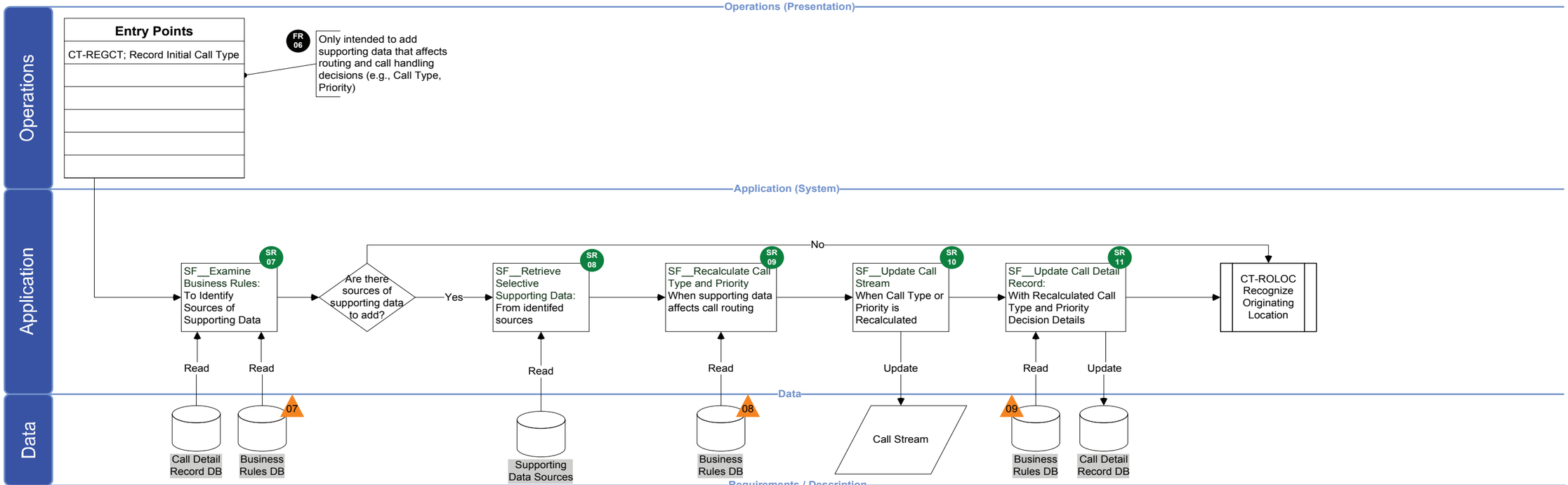


FR 06 FR-REGCT-06: The system shall provide the capability to add identified data items according to NENA Technical Information Document on the Interface between the E9-1-1 Service Provider Network and the Internet Protocol (IP) PSAP (NENA-08-501) to data associated with Call Stream.

FR-REGCT-06-01: The system will check the supporting data to determine if the Call Type or Priority needs to be updated.

SR 07 SR-REGCT-07: The system shall determine additional supportive data for the call based on the Essential Call Data.

SR-REGCT-07-01: The system shall identify how to access the supporting data (e.g., IP address of server).

SR-REGCT-07-02: The system shall maintain the credentials to allow access to the supporting data.

SR 08 SR-REGCT-08: The system shall be able to automatically retrieve or query data from supporting data sources.

SR 09 SR-REGCT-09: The system shall be able to automatically process the retrieved data and make a decision on whether or not to change the Call Type or Priority, based on business rules.

SR-REGCT-09-01: The system shall not make any changes to the Call Type or Priority if nothing in the supplemental information retrieved affects call call routing rules.

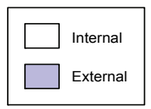
SR 10 SR-REGCT-10: The system shall have the ability to update the call stream (i.e., Call Type, Priority) to affect call routing.

SR 11 SR-REGCT-11: The system shall be able to update the call detail record with selective data, based on business rules, from supporting data sources and a pointer to the full data set, in order to document the functions performed in this activity.

07 EL-07 Contains supporting data sources for various Call Types

08 EL-08 Contains call treatment rules that determine call Call Type and Priority

09 EL-09 Contains rules on what details to write to the Call Detail Record DB



Activity: [CT-REGCT] Identify Call Type

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-REGCT-01	Read Call Stream Data	Caller	Call Stream Data	Electronic	System	CPE	ANI, pointer data, emergency location, class of service, and type of service.	Ad hoc	Text
ITI-REGCT-02	Read ALI Information for Traditional Calls	External	ANI/ESQK/ ALI Database	Electronic	System	CPE	Caller location.	Ad hoc	Text
ITI-REGCT-03	Write Traditional Caller Location	System	CPE	Electronic	System	Call Stream Data	Caller location.	Ad hoc	Text
ITI-REGCT-04	Write Traditional Caller Location Details	System	CPE	Electronic	System	Call Detail Record Database	Caller location details.	Ad hoc	Text
ITI-REGCT-05	Read NG Call Type	Caller	Call Stream Data	Electronic	System	CPE	Call Type data, including a) emergency location, b) class of service, and c) type of service.	Ad hoc	Text
ITI-REGCT-06	Read Call Treatment Rules	System	Business Rules Database	Electronic	System	CPE	Call treatment rules, and default priority.	Ad hoc	Text
ITI-REGCT-07	Read Acceptable Call Types	System	Business Rules Database	Electronic	System	CPE	Acceptable Call Types.	Ad hoc	Text
ITI-REGCT-08	Read Default Call Type	System	Authoritative Call Type List	Electronic	System	CPE	Default Call Type information.	Ad hoc	Text
ITI-REGCT-09	Write Call Type and Priority	System	CPE	Electronic	System	Call Stream Data	Call Type and priority data of current call.	Ad hoc	Text
ITI-REGCT-10	Write Call Type and Priority Record	System	CPE	Electronic	System	Call Detail Record Database	Call Type and priority data of current call.	Ad hoc	Text
ITI-REGCT-11	Read Supporting Data Source Rules	System	Business Rules Database	Electronic	System	CPE	Supporting Data retrieval rules.	Ad hoc	Text
ITI-REGCT-12	Read Supporting Data Sources	System	Supporting Data Sources	Electronic	System	CPE	Supporting Data for current call.	Ad hoc	Text
ITI-REGCT-13	Read Call Treatment Rules	System	Business Rules Database	Electronic	System	CPE	Call Treatment rules, and default priority.	Ad hoc	Text
ITI-REGCT-14	Write Call Type and Priority	System	CPE	Electronic	System	Call Stream Data	Call Type and priority data of current call.	Ad hoc	Text
ITI-REGCT-15	Read Call Detail Record Documentation Rules	System	Business Rules Database	Electronic	System	CPE	Documentation rules for writing to the Call Detail Record.	Ad hoc	Text
ITI-REGCT-16	Write Call Type and Priority Record	System	CPE	Electronic	System	Call Detail Record Database	Call Type and priority data of current call.	Ad hoc	Text

9-1-1 System Operations [SNSP]

Call Treatment [CT]

Route Call to PSAP [CT-RTPSP]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SYS
Proof-of-Concept: Yes
References: NENA 58-001, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Route call from the initiator and call-originating service to the appropriate destination based on identified call treatment including location information received (civic or geospatial).

Description:

This activity is the actual routing of a 9-1-1 call event to one or more appropriate destinations based on caller location, routing policy, media choices, language preferences, and other business rules. Multiple destinations may be involved in a coordinated relationship depending on the nature of the event (e.g., a large-scale disaster event), and its location (e.g., if the determined location accuracy is not sufficient to specifically identify a single destination).

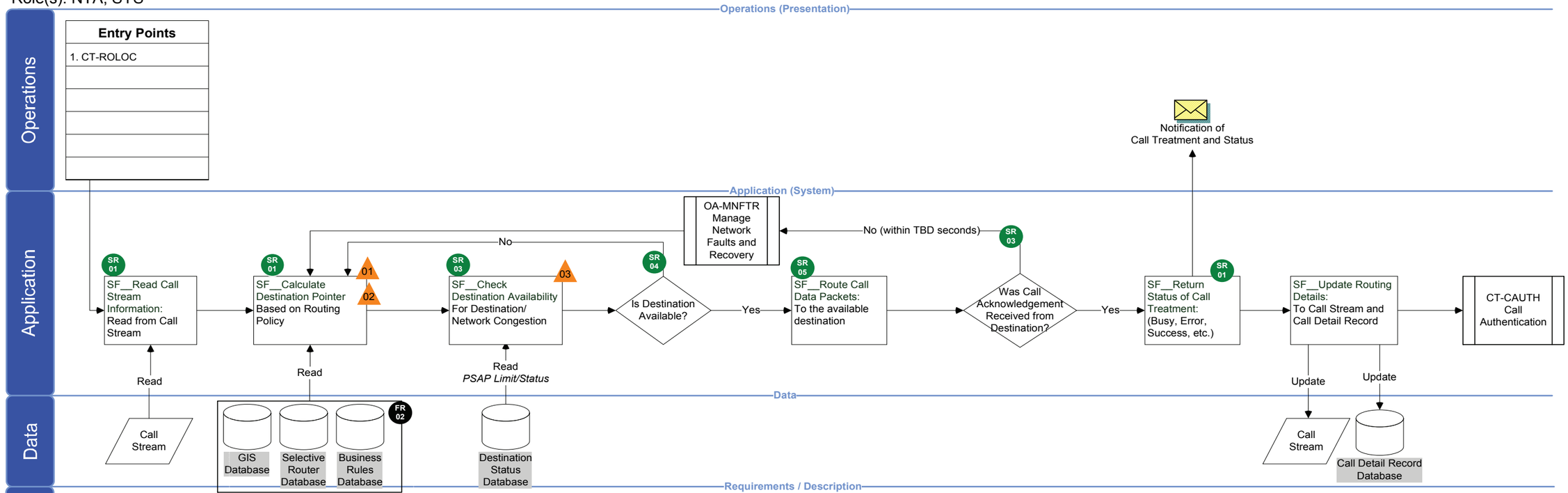
Assumptions:

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-RTPSP-01	Read Call Type, Caller Location	Caller	Call Stream Data	Electronic	System	CPE	Call Type and caller location.	Ad hoc	Text
ITI-RTPSP-02	Read GIS	System	GIS Database	Electronic	System	CPE	Geospatial data and query results.	Ad hoc	Text
ITI-RTPSP-03	Read Service Routing Rules	System	Service Routing Database	Electronic	System	CPE	Service routing rules.	Ad hoc	Text
ITI-RTPSP-04	Read Destination Business Rules	System	Business Rules Database	Electronic	System	CPE	Destination business rules.	Ad hoc	Text
ITI-RTPSP-05	Read Destiontion Limit/Status	System	Destination Status Database	Electronic	System	CPE	Destination capacity and status.	Ad hoc	Text
ITI-RTPSP-06	Write Routing Decision	System	CPE	Electronic	System	Call Stream Data	Call routing pointer.	Ad hoc	Text
ITI-RTPSP-07	Write Routing Decision Details	System	CPE	Electronic	System	Call Detail Record Database	Call routing pointer and routing decision details.	Ad hoc	Text

Activity: [CT-RTPSP] Determine Treatment and Route to PSAP; Call Routing
Service Area: Call Treatment [CT]
Role(s): NTA, SYS

Facilitator: Brad Colvin — Modified on 10/05/07 @09:47
Analyst: Wesley Chen
Domain Expert: John Chiaramonte, Roger Hixson, Rick Jones, Jim Lockard



SR 01 SR-RTPSP-01: The system shall route calls based on the associated call treatment process.

SR-RTPSP-01-01: The system shall be able to read fields from the call stream as input to determine how to route the call.

SR-RTPSP-01-02: The system shall be able to handle calls that involve error cases (garbled ANI, ANI failure, no location data), based on service routing rules.

SR-RTPSP-01-03: The system shall determine the call treatment for each call based on call type, location, and service routing rules.

SR-RTPSP-01-04: The system shall determine the proper treatment for fragmented Call Type records.

SR-RTPSP-01-05: The system shall determine the proper treatment for incomplete Call Type records.

SR-RTPSP-01-06: The system shall send a status message to the telecommunications device based on identified call treatment.

SR-RTPSP-01-07: The system shall be able to provide an alternate call treatment when a call cannot be immediately answered because of call volume

FR 02 FR-RTPSP-02: The system shall provide the capability for the network administrator to dynamically make changes to the routing policy.

SR 03 SR-RTPSP-03: The system shall support the ability to establish a pre-determined limit on the total number of simultaneous 9-1-1 calls presented to the PSAP, regardless of what technology was used to deliver each individual call; and, at the option of the PSAP, when the pre-determined limit has been reached, provide alternate call treatments. (i.e., flexible queuing, network busy signal or message, interactive voice response, rollover to an alternate PSAP, etc.)

SR-RTPSP-03-01: The system shall be designed with sufficient bandwidth to support the predetermined limit of simultaneous calls using the type of call technology supported that has the highest bandwidth requirement.

SR-RTPSP-03-02: The system shall be capable of negotiating for the highest quality of service supported by the 9-1-1 caller's equipment and the PSAP's 911 system in order to get the best audio /video available

SR 04 SR-RTPSP-04: The system shall be able to overflow 9-1-1 calls directly to another designated backup IP PSAP, or multiple PSAPs, using agreed upon, predetermined criteria at both the sending and receiving PSAPs, including the receiving PSAP's total call load.

SR-RTPSP-04-01: The system shall determine the next available destination pointer if the current is not available or accessible for any reason.

SR-RTPSP-04-02: The system shall track when Fall-Back Location Information is presented to the call taker as location data.

SR-RTPSP-04-03: The system shall provide a visual indication at the original PSAP that calls are overflowing.

01 EL-01 This process uses Call Type, Caller Location, and Service Routing Rules to generate a destination pointer. Service routing rules may also take media choices, language preferences, and other business rules into consideration. In some cases, this could be multiple pointers.

SR-RTPSP-04-05: The system shall provide a visual indication at the designated overflow PSAP that they are now receiving overflow calls from the original PSAP with identification of the original PSAP.

SR-RTPSP-04-06: The system shall be able to overflow IP 9-1-1 calls to a traditional 9-1-1 PSAP, with the associated location data, to the extent the traditional 9-1-1 network supports connectivity (i.e. shares access to the same selective router, can transfer calls and data between selective routers, etc.).

02 EL-02 If all destination points fail, a default or final destination pointer may be used.

SR 05 SR-RTPSP-05: The system shall be able to physically route the call to the determined destination.

03 EL-03 This step may not necessarily read from a database when implemented.

9-1-1 System Operations [SNSP]

Call Treatment [CT]

Document Call Detail Information [CT-LGCAL]

Role(s): SYS
Proof-of-Concept: False
References: NENA-i3

Goal:

Preserve a record of call information in a data file.

Description:

The system captures initial call information and call progress data at each functional entity handling a call or message (essentially all service/ information provisioning, routing, and signaling entities), and as a record of the call/message arrival within the PSAP. System applications store call progress timing, originator, identity of networks and routers used in the call, ANI information, assigned call taker, call transfers, and length of call. Supportive data automatically added to the call is included. Call Records are accessible by authorized administrators for reporting and analysis. The call log must contain date, time, and duration at a minimum.

The call detail record reads information from the Call Stream to document the path of the call through the NG9-1-1 system. The Call Stream information captured as part of the Call Detail Record include: date, Time of day, packetized voice, packetized text, packetized video, packetized supplemental data (e.g. telematics, ACN), service originator code, location, Call Type, network processing data (e.g. last hop, routing information reference tags), and caller classification. The Call Detail Record information provides one piece of the formal Call Record.

The system also captures information the call taker manually enters to document details about a call, a telephone number, or a location. This information may include supplemental data from a call taker search or may be information supplied by the caller. Call Detail Record and Call Recording comprise a Call Record.

The length of time Call Records are archived is a matter of state or local laws or regulations. The system must meet those requirements. The two components of a Call Record must be linked so they can be retrieved together. Calls may be retrieved by searching for a variety of data elements collected during a call (e.g., date, time, ANI, ALI, call taker identification, call type)

Assumptions:

Information Transaction Inventory (ITI):

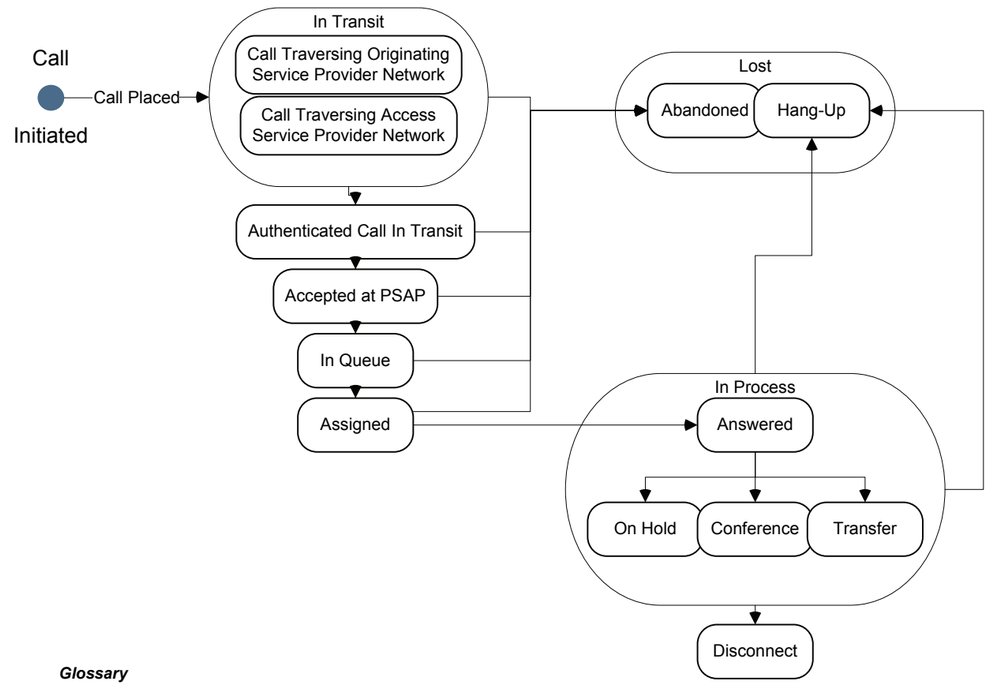
To view ITI go to page 7-14.

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

State Diagram:

State Description: The states of a call within the NG9-1-1 System

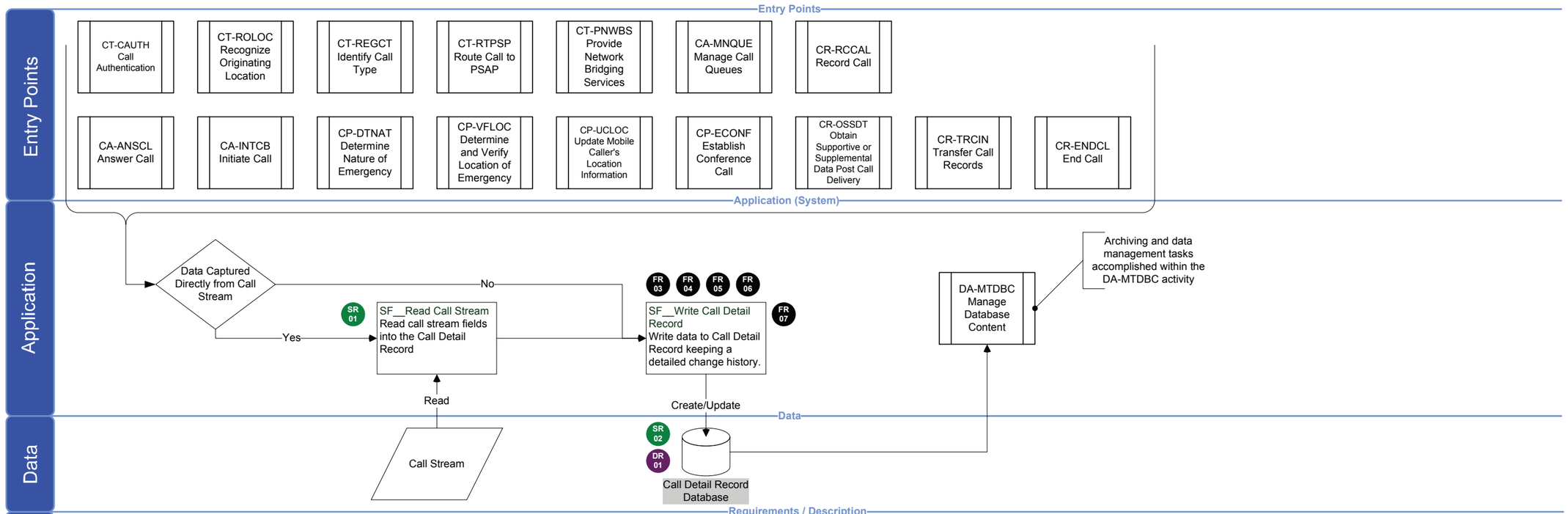


Glossary

Abandoned	*Call has been initiated to 9-1-1 and accepted for answer. The communications link is severed prior to the 9-1-1 call being answered by a 9-1-1 operator. Detailed call information is still delivered to the 9-1-1 PSAP.*
Accepted:	*Authenticated Call has arrived at the appropriate PSAP over the Emergency Services Internetwork.*
Answered:	*Call Taker has an open communications link with the caller and the communications device is in use.*
Assigned:	*Call has been allocated to a specific Call Taker or resolution queue based upon call distribution rules.*
Authenticated:	*Call has been established as a genuine 9-1-1 call from an approved service provider network.*
Conference:	*Call Taker has brought one or more parties into the communications conversation.*
Disconnect:	*Call Taker has ended the call. Communications link is severed.*
Hang Up	*The call has passed through the Emergency Services Internetwork and has been answered by a 9-1-1 operator. The initiating caller has ended the communication link after the 9-1-1 operator has answered the call.*
Hold:	*Call Taker has not terminated the connection but no communication with the caller is possible until the call is removed from hold.*
In Process:	*Call has been answered by a Call Taker and a communications link is active between the Caller and the Call Taker.*
In Queue:	*Call is being processed by call distribution tools to be assigned to the appropriate Call Taker or queue.*
In Transit	*Call is being distributed within the Emergency Services Internetworks and to the appropriate PSAP or agency.*
Transfer:	*Call Taker has brought a third-party into the conversation with the intention of turning control of the caller to that third-party.*

Activity: [CT-LGCAL] Document Call Detail Information; Log Call
Service Area: Call Treatment [CT]
Role(s): CT, SYS

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard, John Chiaramonte
Modified on 10/05/07 @09:46



SR 02 SR-LGCAL-02: The system shall provide the capability to store local call logs at an designated alternate location.

SR 01 SR-LGCAL-01: The system shall automatically log the Call Detail Record.

SR 01 SR-LGCAL-01-02: The system shall read the Call Stream to populate the Call Detail Record.

DR 01 DR-LGCAL-01-01: The Call Detail Record shall contain: a) Date, b) Time, c) packetized supplemental data, d) service originator code, e) Caller Location, f) Call Type, g) network processing data, h) caller classification

FR 03 FR-LGCAL-03: The system shall provide the capability to create a Call Detail Record.

FR 04 FR-LGCAL-04: The system shall provide the capability to read a Call Detail Record.

FR 05 FR-LGCAL-05: The system shall provide the capability to update a Call Detail Record.

FR 06 FR-LGCAL-06: The system shall provide the capability to delete a Call Detail Record.

FR 07 FR-LGCAL-07: The system shall provide the capability to save a Call Detail Record.

Activity: [CT-LGCAL] Document Call Detail Information

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
CT-LGCAL-01	Add Call Authentication Verification	Call Stream	CT-CAUTH	Electronic	Call Detail Record	Call Detail Record Database	Service provider and final authentication status.	Real-time	Text
CT-LGCAL-02	Caller Location	Call Stream	CT-ROLOC	Electronic	Call Detail Record	Call Detail Record Database	Call location received from the communications device, and Authoritative Default Location.	Real-time	Text
CT-LGCAL-03	Add Call Type Information to Call Detail Record	Call Stream	CT-REGCT	Electronic	Call Detail Record	Call Detail Record Database	Call Type.	Real-time	Text
CT-LGCAL-04	Last Hop of Call Route	Call Stream	CT-RTPSP	Electronic	Call Detail Record	Call Detail Record Database	Last hop routing information.	Real-time	Text
CT-LGCAL-05	Network Bridge linkage information	System	CT-PNWBS	Electronic	Call Detail Record	Call Detail Record Database	Network Bridge troubleshooting information including: date, time, duration of communications connection, and connection type.	Real-time	Text
CT-LGCAL-06	Call Queue Tracking information	System	CA-MNQUE	Electronic	Call Detail Record	Call Detail Record Database	Queue call is placed in, time in queue, and destination call taker workstation.	Real-time	Text
CT-LGCAL-07	Store Call Detail Record	Call Stream	CT-ANSCL	Electronic	Call Detail Record	Call Detail Record Database	Call Detail information including: phone # (ANI), call time, elapsed time in status, access method, call status, call taker workstation.	Real-time, ad hoc	Text, Graphics
CT-LGCAL-08	Read Call Detail Record	System	CA-INTCB	Electronic	Call Taker	Call Detail Record Database	Call Back Number.	Real-time, ad hoc	Text
CT-LGCAL-09	Nature of Emergency	Call Taker	CP-DTNAT	Electronic	Call Detail Record	Call Detail Record Database	Documentation of nature of emergency.	Real-time	Text
CT-LGCAL-10	Location of Emergency	Call Taker	CP-VFLOC	Electronic	Call Detail Record	Call Detail Record Database	Actual location of emergency, as verified by the call taker.	Real-Time	Text, Graphics
CT-LGCAL-11	Caller Location	Call Stream	CP-UCLOC	Electronic	Call Detail Record	Call Detail Record Database	Caller location, updated upon request or captured as part of real time tracking.	Real-time, ad hoc	Text, Graphics
CT-LGCAL-12	Conference Call Request	Call Taker	CP-ECONG	Electronic	Call Detail Record	Call Detail Record Database	Conference participants.	Real-time	Text
CT-LGCAL-13	Call Recording association	System	CR-RCAL	Electronic	Call Detail Record	Call Detail Record Database	Unique identifier to associate Call Recording with the corresponding Call Detail Record.	Upon Creation	Text
CT-LGCAL-14	Suppportive or Supplemental Data	System	CR-OSSDT	Electronic	Call Detail Record	Call Detail Record Database	Supplemental or Supportive Data collected during call processing.	Real-time, ad hoc	Text, Graphics
CT-LGCAL-15	Data Transferred	Call Stream	CR-TRCIN	Electronic	Call Detail Record	Call Detail Record Database	Data recipient, time of transfer, and contents of data transfer.	Upon Transfer	Text, Graphics
CT-LGCAL-16	End Call	Call Stream	CR-ENDCL	Electronic	Call Detail Record	Call Detail Record Database	Final update to all date and time stamps.	Real-time	Text

Notes

9-1-1 System Operations [SNSP]

Call Treatment [CT]

Provide Network Bridging Services [CT-PNWBS]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SYS
Proof-of-Concept: Yes
References: NENA 58-001, NENA-i3

Goal:

Ensure that all system and network entities are able to conference and share data as appropriate and beneficial to call treatment and processing.

Description:

This activity addresses network and system service functions necessary for system call taking and response entities to conference and share data as appropriate and beneficial to call treatment, processing, and incident management. The service functions involved should allow any PSAP to conference and share data with any other PSAP (available through all interconnections, both domestic and international), and to manage that conferencing and sharing.

Network bridging services are implemented by the system when a call taker establishes a conference call [CP-ECONF] connecting multiple parties.

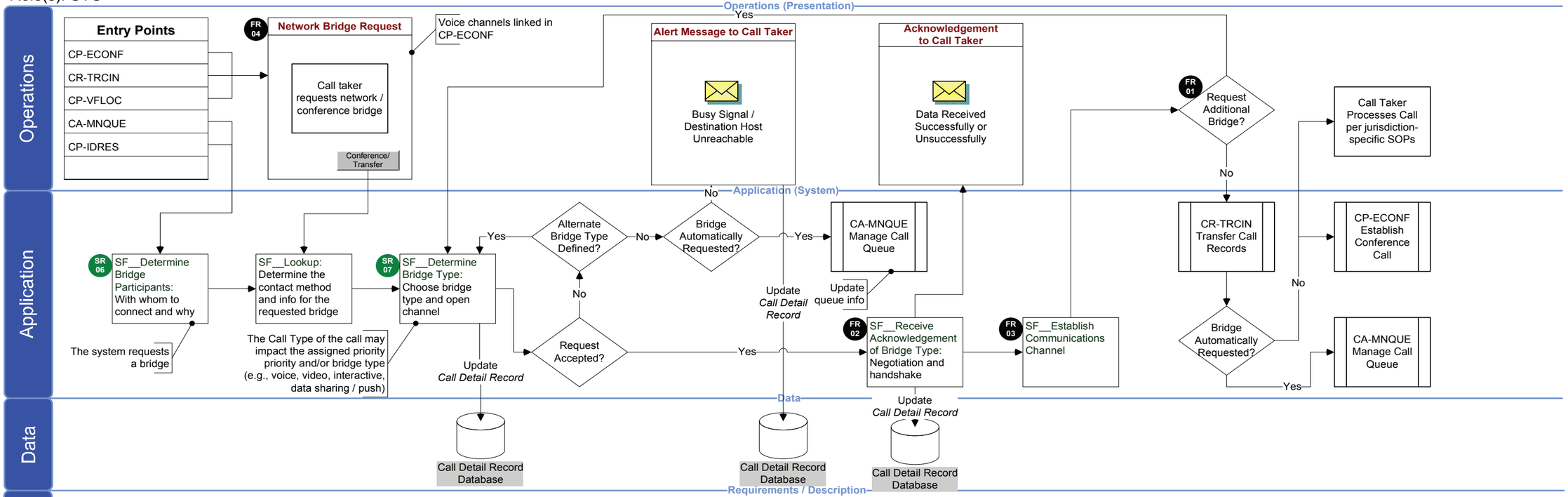
Assumptions:

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-PNWBS-01	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	The following information about the network bridge attempt: a) initiating party, b) intended participants, c) network bridge type, d) time of network bridge attempt initiation, and e) date of network bridge attempt initiation.	Real-time, ad hoc	Text, Graphics, Video
ITI-PNWBS-02	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	Rejection of network bridge request.	Real-time, ad hoc	Text
ITI-PNWBS-03	Update Call Detail Record	System	CPE	Electronic	System	Call Detail Record Database	Success or failure of network bridge request.	Real-time, ad hoc	Text

Activity: [CT-PNWBS] Provide Network Bridging Services; Establish Network Bridge
Service Area: Call Treatment [CT]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: Dan Landau
Domain Expert: Roger Hixson, Rick Jones, Jim Lockard
Modified on 10/05/07 @09:46



FR 04 FR-PNWBS-04: The system shall provide the capability to accept bridge requests.

SR 06 SR-PNWBS-06: The system shall have the capability to automatically initiate a bridge request.

SR-PNWBS-06-01: The system shall determine the appropriate entities with which to initiate an automatic bridge request.

SR 07 SR-PNWBS-07: The system shall determine the contact method for the parties with whom a bridge is requested.

SR-PNWBS-07-01: The system shall determine the contact information for the parties with whom a bridge is requested.

SR-PNWBS-07-02: The system shall choose a bridge type based on Call Type of the call.

SR-PNWBS-07-03: The system shall be capable of establishing bridges of the following types: a) voice, b) video, c) interactive data sharing.

SR-PNWBS-07-04: The system shall log conference bridge requests, including: a) time/date, b) all bridge participants, c) bridge type, d) bridge status.

SR-PNWBS-07-05: The system shall alert the call taker in the event of an successful bridge setup.

SR-PNWBS-07-06: The system shall alert the call taker in the event of an unsuccessful bridge setup.

FR 02 FR-PNWBS-02: The system shall provide the capability to identify all bridged parties.

FR-PNWBS-02-01: The system shall provide the capability to allow all bridged parties access to the unique call identifier.

FR-PNWBS-02-02: The system shall provide the capability to allow all bridged parties to identify all bridged parties.

FR 03 FR-PNWBS-03: The system shall provide the capability to bridge requested parties into a conference call.

FR-PNWBS-03-01: The system shall provide the capability for the call taker to control the communication and data received by the caller.

FR 01 FR-PNWBS-01: The system shall provide the capability to automatically connect multiple parties based on Call Detail Record.

Activity: [CT-PNWBS] Provide Network Bridging Services

9-1-1 System Operations [SNSP]

Call Treatment [CT]

Call Authentication [CT-CAUTH]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SYS
Proof-of-Concept: Yes
References: IETF RFC-3647, IETF RFC-4474, NENA 02-502, NENA 04-503, NENA 08-001, NENA 58-001

Goal:

The call authentication process ensures that the appropriate entity, such as the originating provider or other responsible party, has been granted permission to access the system.

Description:

The call authentication process will include checking for the appropriate credential information in the incoming call stream against a list of approved provider credentials and other authorization lists. If the provider credential is verified successfully, the call will be allowed to enter the NG9-1-1 system and is directed to the appropriate PSAP normally. If the credential is not successfully verified because it is not on the approved provider list, is explicitly blocked by the PSAP, or various other reasons, an error message will be generated and the call will be distributed based upon authentication policy. Unverified calls may be directed to a particular PSAP or other entity for handling and call analysis. The call is authenticated both at the point of entry of the NG9-1-1 system as well as at a PSAP and the authentication rules may be different for each entry point. The rules can explicitly permit or deny access to the NG9-1-1 System or PSAP. For example, a PSAP may need to deny access to a specific caller, based on local policy / statute (e.g. a device making repeated and malicious false calls)

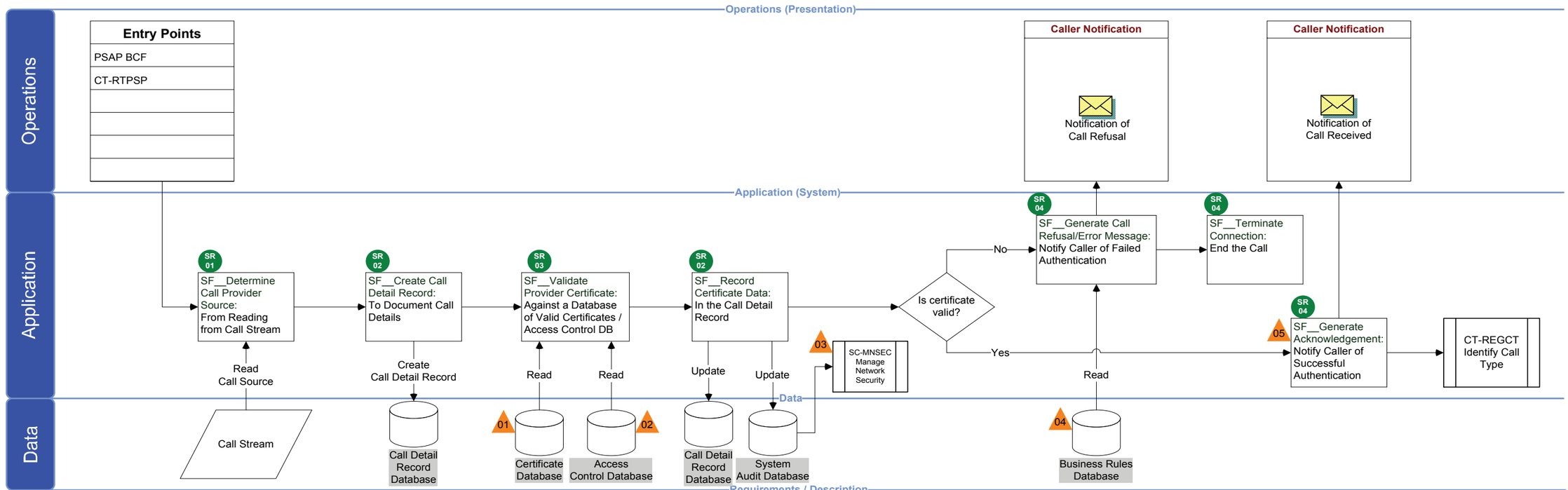
Assumptions:

Information Transaction Inventory (ITI):

ITI #	Information Transaction	From Originator		From Mode	To Recipient		Content (What)	Frequency	Media Type
		From Originator (Role Type Code)*	From System (System Code)*		To Recipient (Role Type Code)*	To System (System Code)*			
ITI-CAUTH-01	Read Call Source	Caller	Call Stream	Electronic	System	CPE	Call source/service provider.	Ad hoc	Text
ITI-CAUTH-02	Read Call Valid Certificates	System	Certificate Database	Electronic	System	CPE	Valid source/service provider certificates.	Ad hoc	Text
ITI-CAUTH-03	Read Access Control Details	System	Access Control Database	Electronic	System	CPE	Entities that are explicitly permitted or denied access.	Ad hoc	Text
ITI-CAUTH-04	Write Call Stream Information	System	CPE	Electronic	System	Call Detail Record Database	Call source/service provider.	Ad hoc	Text
ITI-CAUTH-05	Write Certificate Details	System	CPE	Electronic	System	Call Detail Record Database	Valid certificate.	Ad hoc	Text
ITI-CAUTH-06	Write Audit Log Details	System	CPE	Electronic	System	Audit Log	Call validation failures.	Ad hoc	Text
ITI-CAUTH-07	Read Error Message Rules	System	Business Rules Database	Electronic	System	CPE	Error message rules (e.g., refusal messages, error types).	Ad hoc	Text

Activity: [CT-CAUTH] Call Authentication; Allowing Only Authorized Calls
Service Area: Call Treatment [CT]
Role(s): SYS

Facilitator: Brad Colvin
Analyst: Wesley Chen
Domain Expert: John Chiaramonte, Roger Hixson, Rick Jones
Modified on 10/05/07 @09:46



SR 01 SR-CAUTH-01: The system shall be able to read call source information from the call stream.

SR 02 SR-CAUTH-02: The system shall be able to create a call detail record to start storing detailed call information.

SR-CAUTH-02-01: The system shall write the certificate authentication details (successful and failed) to the call detail record.

SR 03 SR-CAUTH-03: The system shall certify/ authenticate that the originating provider or other responsible party has been granted permission to deliver calls.

SR-CAUTH-03-01: The system of authenticating provider certificates shall be deployed with strong authentication (RSA-1024 or better, as documented in RFC2313 [14]) using X.509 certificates and Certificate Revocation Lists as profiled in RFC 3280 [15] and best current practice. (08-001)

SR 04 SR-CAUTH-04: The system shall not accept un-certified or un-authenticated calls (beyond this initial step).

SR-CAUTH-04-01: The system shall generate a call refusal or error message for the user (e.g., voice recording) if the call is not successfully authenticated.

SR-CAUTH-04-02: The system shall generate a notice when the call is successfully authenticated.

01 EL-01 The provider or other responsible party will be required to apply for certification/authentication key with system administrator. The application process may include establishing the appropriate call type(s) which will be utilized by accessing devices, agreeing to follow standardized rules established for call stream data and other details. Certificates are expected to be available prior to entry to the NG9-1-1 system. Certificates can be generated by device or service/ access/third party provider.

02 EL-02 During Call Authentication, the NG9-1-1 System or PSAP may employ an Access Control DB to explicitly permit or deny access.

03 EL-03 The Audit DB is used by the Manage Network Security activity to analyze call authentication failures, identify network routing problems, and to prevent security intrusions.

04 EL-04 This business rule database contains rules that govern the error message generated in various scenarios.

05 EL-05 Generating an acknowledgement to the caller at this stage may be optional since a notification is also generated once the call is successfully routed to the appropriate PSAP.

Activity: [CT-CAUTH] Call Authentication

Notes

9-1-1 System Operations Segment Service Area

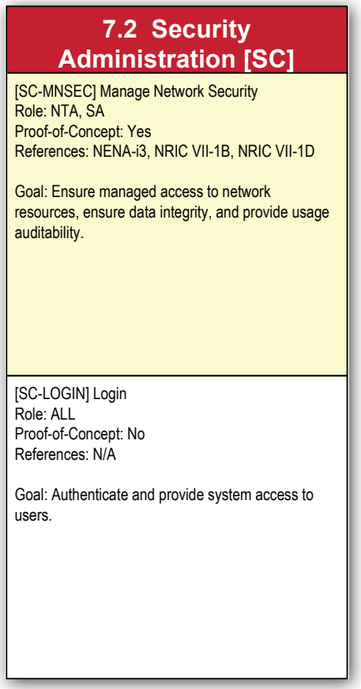


Figure 7–2: Security Administration Service Area

7.2 Security Administration

The Security Administration Service Area activities are dedicated to setting up, managing, authenticating, and maintaining a secure environment across all NG9-1-1 enterprise systems.

9-1-1 System Operations [SNSP]

Security Administration [SC]

Manage Network Security [SC-MNSEC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Ensure managed access to network resources, ensure data integrity, and provide usage auditability.

Assumptions:

Description:

This activity provides the capability and tools to monitor network security across the enterprise; collect and manage enterprise security audit information; and detect, analyze, identify, and resolve potential security threats.

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNSEC-01	The system shall provide the capability to monitor network security.
FR-MNSEC-02	The system shall provide the capability to manage security audit data.
FR-MNSEC-03	The system shall provide the capability to detect network security threats.
FR-MNSEC-04	The system shall provide the capability to analyze potential security threats.
FR-MNSEC-05	The system shall provide the capability to log identified security threats.

9-1-1 System Operations [SNSP]

Security Administration [SC]

Login [SC-LOGIN]

Role(s): ALL
Proof-of-Concept: False
References: N/A

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Goal:

Authenticate and provide system access to users.

Assumptions:

Description:

This activity provides the capability for all user roles to access the NG9-1-1 environment. Users are authenticated based on user ID and password. Successful authentication grants access to the NG9-1-1 systems based on user role and user account access permissions. User identification methods include, but are not limited to: user ID and password, retinal scan, and biometric information scan.

High-Level Requirements:

Requirement Code	Requirement Text
SR-LOGIN-01	The system shall provide a unique identifier for each user.
SR-LOGIN-02	The system shall generate an error message for each unsuccessful system access.
SR-LOGIN-03	The system shall track user-associated auditable actions by the user unique identifier.
SR-LOGIN-04	The system shall perform user log-on authentication, ensuring that the user can log onto the system only at access levels for which the user is authorized.
FR-LOGIN-05	The system shall provide the capability to log into the system based on valid user identification method.
FR-LOGIN-06	The system shall provide the capability to query user access audit trails by: a) date, b) time, c) user access, action event type, d) user identifier, e) browser type, and f) IP address.
SR-LOGIN-07	The system shall enable user access audit trails to be maintained and protected.

Requirement Code	Requirement Text
SR-LOGIN-08	For each user-login action the system shall capture: a) event type, b) date, c) time, d) user identifier, and e) IP address.
FR-LOGIN-09	The system shall provide the capability to monitor and log the following user access actions: a) failed attempts, b) successful logins, c) password changes.
SR-LOGIN-10	The system shall prohibit a user from logging on the system after lock out.
SR-LOGIN-11	The system shall authenticate system access attempts.
SR-LOGIN-12	The system shall log all system access attempts.
FR-LOGIN-13	The system shall provide the capability to ensure passwords conform to TBD-XX security standards.
SR-LOGIN-14	The system shall lock out a user from the system after TBD-XX failed login attempts.
FR-LOGIN-15	The system shall provide the capability for a system administrator to reset the system lock out counter.

Notes

9-1-1 System Operations Segment Service Area

7.3 Database Administration

The Database Administration Service Area provides activities needed to create, update, and maintain all of the NG9-1-1 databases. Service area activities also provide database administrators with views into database performance, resource allocation, structure, and content. The data architect and the database administrator are the primary actors for these activities.

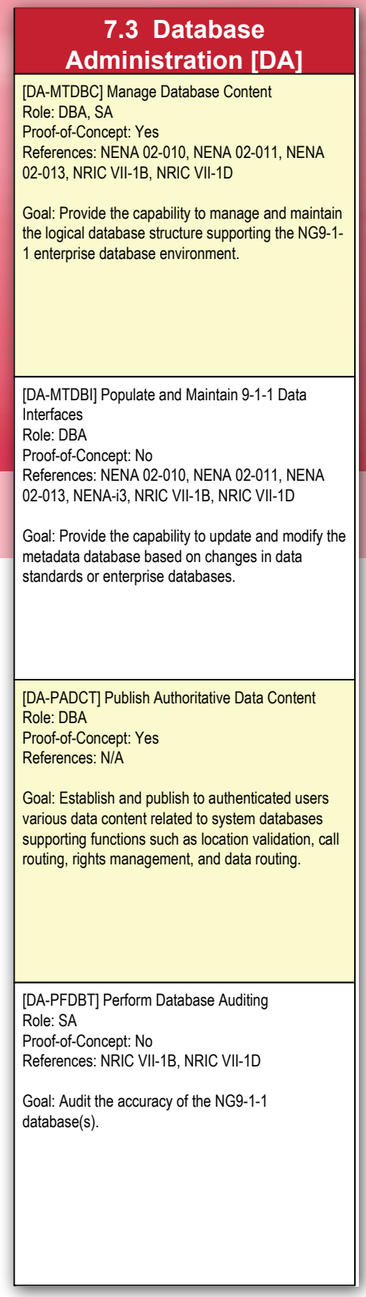


Figure 7–3: Data Administration Service Area

9-1-1 System Operations [SNSP]

Database Administration [DA]

Manage Database Content [DA-MTDBC]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA, SA
Proof-of-Concept: Yes
References: NENA 02-010, NENA 02-011, NENA 02-013, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to manage and maintain the logical database structure supporting the NG9-1-1 enterprise database environment.

Description:

This activity provides the tools, policies, and processes to create and manage the logical structures for the NG9-1-1 enterprise environment, including all logical schema structures. These structures include error correction management, location validation, and other databases. This activity supports maintenance of valid address information for the service area, accessible by call originators and vendors. This activity fully supports problem resolution along with normal database upgrades. Users performing this activity will work to resolve identified error conditions in order to provide highly accurate system functions.

This activity provides the capability to perform a complete cataloging, reporting, and maintenance function to document and manage the NG9-1-1 database inventory according to all established retention, recovery, and security policies. Current NG9-1-1 conceptual data repositories include: Call Record Database, Call Detail Record Database, Call Recording Database, Civic Address Information Database, GIS Layer Database, Identity Management Database, Service Routing Database, ANI/ALI Database, and Responding Agency Database.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MTDBC-01	The DBMS shall provide the capability to alter the logical database structure(s).
FR-MTDBC-02	The DBMS shall provide the capability to add tables.
FR-MTDBC-03	The DBMS shall provide the capability to drop tables.
FR-MTDBC-04	The DBMS shall provide the capability to select the logical database structure(s) for modification.
FR-MTDBC-05	The DBMS shall provide the capability to identify error conditions in content of databases.
FR-MTDBC-06	The DBMS shall provide the capability to add table columns.
FR-MTDBC-07	The DBMS shall provide the capability to drop table columns.
FR-MTDBC-08	The DBMS shall provide the capability to modify table columns.
FR-MTDBC-09	The DBMS shall provide the capability to apply a new logical structure to a system database.
FR-MTDBC-10	The system shall provide mechanisms to support error correction.
FR-MTDBC-11	The DBMS shall provide the capability to create a data record.
FR-MTDBC-12	The DBMS shall provide the capability to read a data record.

Requirement Code	Requirement Text
FR-MTDBC-13	The DBMS shall provide the capability to update a data record.
FR-MTDBC-14	The DBMS shall provide the capability to delete a data record.
FR-MTDBC-15	The DBMS shall provide the capability to define data archive rules.
SR-MTDBC-16	The system shall provide data storage capacity to maintain TBD-08 years of data in an offline archive.
FR-MTDBC-17	The DBMS shall provide the capability to archive data automatically to near-line data storage using data archive rules.
FR-MTDBC-18	The DBMS shall provide the capability to archive data automatically to off-line data storage using data archive rules.
FR-MTDBC-19	The DBMS shall provide the capability for a database administrator to manually initiate an archive of specified data.
FR-MTDBC-20	The DBMS shall provide the capability to generate a summary report of the data that is archived.
SR-MTDBC-21	The DBMS shall log the history of all changes to a database record.

Populate and Maintain 9-1-1 Data Interfaces [DA-MTDBI]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: False
References: NENA 02-010, NENA 02-011, NENA 02-013, NENA-i3, NRIC VII-1B, NRIC VII-1D

Goal:

Provide the capability to update and modify the metadata database based on changes in data standards or enterprise databases.

Assumptions:

Description:

This activity maintains information, contextual and characteristic data about databases, and supporting databases essential and/or beneficial to the delivery and processing of a 9-1-1 communications event. Such data are essential to standards and best practice compliance, and describe the activities, people and organizations involved, locations of data and processes, access methods, limitations, timing, and events.

High-Level Requirements:

Requirement Code	Requirement Text
SR-MTDBI-01	The DBMS shall provide the capability to create metadata catalogs.
FR-MTDBI-02	The DBMS shall provide the capability to read metadata catalogs.
FR-MTDBI-03	The DBMS shall provide the capability to update metadata catalogs.
FR-MTDBI-04	The DBMS shall provide the capability to delete metadata catalogs.
FR-MTDBI-05	The DBMS shall provide the capability to create metadata entries.
FR-MTDBI-06	The DBMS shall provide the capability to read metadata entries.
FR-MTDBI-07	The DBMS shall provide the capability to update metadata entries.
FR-MTDBI-08	The DBMS shall provide the capability to delete metadata entries.
FR-MTDBI-09	The DBMS shall provide the capability to restrict user access to designated metadata records.
FR-MTDBI-10	The DBMS shall provide the capability to review proposed changes to metadata catalogs.

Requirement Code	Requirement Text
FR-MTDBI-11	The DBMS shall provide the capability to verify metadata prior to entry into a metadata catalog.
FR-MTDBI-12	The DBMS shall provide the capability to validate metadata prior to entry into a metadata catalog.
FR-MTDBI-13	The DBMS shall provide the capability to verify metadata in a metadata catalog.
FR-MTDBI-14	The DBMS shall provide the capability to validate metadata in a metadata catalog.
FR-MTDBI-15	The DBMS shall provide the capability to accept proposed changes to metadata catalogs.
FR-MTDBI-16	The DBMS shall provide the capability to reject proposed changes to metadata catalogs.
FR-MTDBI-17	The DBMS shall provide the capability to synchronize the system databases holding directory level metadata.
SR-MTDBI-18	The DBMS shall maintain configuratin control of metadata catalogs.

9-1-1 System Operations [SNSP]

Database Administration [DA]

Publish Authoritative Data Content [DA-PADCT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): DBA
Proof-of-Concept: Yes
References: N/A

Goal:

Establish and publish to authenticated users various data content related to system databases supporting functions such as location validation, call routing, rights management, and data routing.

Description:

This activity provides the capability for the 9-1-1 Authority to publish authoritative content. Database Administrators manage (add, edit, delete) the published information as appropriate to enable efficient browsing, search and download by the NG9-1-1 community. Database Administrators assign metadata to content entries and link similar authoritative content. Content availability is based upon NG9-1-1 system access permissions.

This activity supports a the publication of a set of databases, such as legitimate civic addresses or ranges, which service providers or their vendors can use to validate customer addresses or other forms of location for accuracy of use in the NG9-1-1 System. These authoritative databases support accurate call routing and display to the call taker, dispatcher, and other downstream users. Other examples are data rights management databases and PSAP boundary information.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-PADCT-01	The system shall provide the capability to publish NG9-1-1 database content.
FR-PADCT-02	The system shall provide the capability to approve content for publication.
FR-PADCT-03	The system shall provide the capability to browse published content.
FR-PADCT-04	The system shall provide the capability to search published content.
FR-PADCT-05	The system shall provide the capability to download published content.
FR-PADCT-06	The system shall provide the capability to submit an approved content error correction request.
FR-PADCT-07	The system shall provide the capability to delete approved content.

Perform Database Auditing [DA-PFDBT]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): SA
Proof-of-Concept: False
References: NRIC VII-1B, NRIC VII-1D

Goal:

Audit the accuracy of the NG9-1-1 database(s).

Assumptions:

Description:

This activity uses tools, policies, and processes to track database accuracy and performance. Administrators are able to schedule audits of the NG9-1-1 baseline against the source information or perform unscheduled audits in an ad hoc manner. This activity includes the ability to record, preserve, protect, and examine all audit activities according to all stated level-of-detail and retention security policies. Audit data are the results of scheduled or ad hoc auditing. Audit errors may be corrected manually or using automated system tools.

High-Level Requirements:

Requirement Code	Requirement Text
SR-PFDBT-01	The system shall create a baseline of system databases. This is a set of data representing a fixed copy of system databases as of a specific date and time for use in auditing.
FR-PFDBT-02	The DBMS shall provide the capability to schedule an audit.
SR-PFDBT-03	The DBMS shall perform version control on the system databases.
FR-PFDBT-04	The DBMS shall provide the capability to compare baseline database with the associated source file(s).
FR-PFDBT-05	The DBMS shall provide the capability to perform an ad hoc audit.
SR-PFDBT-06	The DBMS shall log anomalies detected during audit.
FR-PFDBT-07	The DBMS shall provide the capability to read the anomaly log file.
FR-PFDBT-08	The system shall provide the capability to perform scheduled audits.
FR-PFDBT-09	The DBMS shall provide the capability to compare the current baseline database to a historical baseline database.

Notes

7.4 Operations Administration [OA]	
[OA-MOSRE] Monitor System Resources Role: NTA, SA Proof-of-Concept: No References: NENA-i3, NRIC VII-1B Goal: Provide the ability to monitor and manage system and subsystem usage and reliability.	[OA-MNCLR] Manage Call Records Role: ALL Proof-of-Concept: Yes References: N/A Goal: Create and maintain call records
[OA-MNFTR] Manage Network Faults and Recovery Role: NTA, SA Proof-of-Concept: Yes References: NRIC VII-1B, NRIC VII-1D Goal: Provide network capability to identify, isolate, and correct network faults.	[OA-MCHRQ] Manage Change Requests Role: NTA, SA Proof-of-Concept: No References: N/A Goal: Provide the administrative and analytical resources to support management decisions affecting system configuration and operation.
[OA-MANSP] Manage System Performance Role: NTA, SA Proof-of-Concept: Yes References: NENA-i3, NRIC VII-1B Goal: Ensure network and system operation and reliability to meet acceptable and adopted standards. Provide the capability to monitor, record, and analyze system performance data against predefined metrics (i.e., establish system norms and flag exceptions).	[OA-MNSRE] Manage System Resources and Configuration Role: NTA, SA Proof-of-Concept: Yes References: NRIC VII-1B Goal: Provide management and control of network system resources and configurations.

Figure 7–4: Operations Administration Service Area

9-1-1 System Administration Segment Service Area

7.4 Operations Administration

The Operations Administration Service Area Activities include monitoring, troubleshooting, maintaining, and improving the performance of NG9-1-1 systems and networks. Most activities within this service area rely on the monitoring and collection of key system and network performance data, analysis and modeling of that data, and providing recommendations for improvements to functional performance. This service area also includes reporting on performance metrics to show overall system health. Systems Administrator, Database Administrator, and Network Administrator roles perform activities within this service area.

Note: Because it is assumed that NG9-1-1 will operate on IP networks shared among governmental uses and operations, and will likely use shared software applications as well, administration of NG9-1-1 specific components and functions will likely require coordination among multiple administrators who are using shared network and application capacities.

9-1-1 System Operations [SNSP]

Operations Administration [OA]

Monitor System Resources [OA-MOSRE]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: False
References: NENA-i3, NRIC VII-1B

Goal:

Provide the ability to monitor and manage system and subsystem usage and reliability.

Assumptions:

Description:

This activity provides tools for the System Administrator to monitor systems from fault, configuration, account, performance, and security perspectives. This activity includes the capability to establish monitoring cycles, set limits on resources consumption, and set alerts on configuration. This activity allows traces and isolation to permit root cause analysis of system performance.

High-Level Requirements:

Requirement Code	Requirement Text
FR-MOSRE-01	The system shall provide the capability to monitor system resources for: a) Fault tolerance, b) Configuration, c) Performance, and d) Security.
FR-MOSRE-02	The system shall provide the capability to configure system resource tools for use.

Manage Network Faults and Recovery [OA-MNFTR]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: Yes
References: NRIC VII-1B, NRIC VII-1D

Goal:

Provide network capability to identify, isolate, and correct network faults.

Assumptions:

Description:

This activity addresses system needs for the identification, isolation, and correction of network faults and failures. Included in this activity is the testing and acceptance of corrective action, and the creation and maintenance of fault history documentation of system components.

High-Level Requirements:

Requirement Code	Requirement Text
SR-MNFTR-01	The system shall identify network faults.
SR-MNFTR-02	The system shall isolate network faults.
FR-MNFTR-03	The system shall provide the capability to correct network faults.
FR-MNFTR-04	The system shall provide the capability to document network fault history.

9-1-1 System Operations [SNSP]

Operations Administration [OA]

Manage System Performance [OA-MANSP]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: Yes
References: NENA-i3, NRIC VII-1B

Goal:

Ensure network and system operation and reliability to meet acceptable and adopted standards. Provide the capability to monitor, record, and analyze system performance data against predefined metrics (i.e., establish system norms and flag exceptions).

Description:

This activity supports the monitoring, recording, maintenance, and improvement of system performance data in accordance with adopted standards and best practices. The activity includes, but is not limited to, network component monitoring, coupled with the development and maintenance of operational resource utilization databases and documentation in aid of minimizing congestion and maximizing performance. Performance trend analysis enables system administrators to determine whether system components are adequate or decreasing in service capability.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MANSP-01	The system shall provide the capability to monitor system performance data in accordance with known standards and best practices.
FR-MANSP-02	The system shall provide the capability to analyze system performance data in accordance with known standards and best practices.
FR-MANSP-03	The system shall provide the capability to test system performance without interrupting real time operations.
FR-MANSP-04	The system shall provide the capability to collect system performance results.
FR-MANSP-05	The system shall provide the capability to execute performance trend analysis.
FR-MANSP-06	The system shall provide the capability to establish alarm thresholds for critical services.
SR-MANSP-07	The system shall generate critical service alarms.
FR-MANSP-08	The system shall provide the capability to record system performance data in accordance with known standards and best practices.

Manage System Resources and Configuration [OA-MNSRE]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: Yes
References: NRIC VII-1B

Goal:

Provide management and control of network system resources and configurations.

Assumptions:

Description:

This activity provides the procedures, software, equipment, and techniques necessary to identify and manage system resources and system/network configurations. This activity includes, but is not limited to, identifying, monitoring, adding, deleting, and/or changing physical and logical elements of system and network components (connections, addresses, topologies, etc.).

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNSRE-01	The system shall provide the capability to install system software from a remote location.
FR-MNSRE-02	The system shall provide the capability to display network devices in logical groupings.
FR-MNSRE-03	The system shall provide the capability to add new network devices to the network without interrupting ongoing operations.
FR-MNSRE-04	The system shall provide the capability to configure system network components.
SR-MNSRE-05	The system shall log all detected network fault conditions.
FR-MNSRE-06	The system shall provide the capability to detect state changes that occur at local sites.
FR-MNSRE-07	The system shall provide the capability to detect fault conditions that occur at local sites.

Requirement Code	Requirement Text
FR-MNSRE-08	The system shall provide the capability to detect state changes that occur at remote sites.
FR-MNSRE-09	The system shall provide the capability to detect fault conditions that occur at remote sites.
FR-MNSRE-10	The system shall provide the capability to automatically restore mission critical functions based on pre-defined failure recovery rules.
FR-MNSRE-11	The system shall provide the capability to automatically implement fail over strategies to redundant hardware based on pre defined failure recovery rules.

9-1-1 System Operations [SNSP]

Operations Administration [OA]

Manage Call Records [OA-MNCLR]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): ALL
Proof-of-Concept: Yes
References: N/A

Goal:

Create and maintain call records

Description:

Capture and aggregate all information related to a call. A Call Record is comprised of 1) Call Detail Record - system generated initial call information and the call progress data 2) Call Recording - the electronic documentation of all interactive communication between a call taker, caller, and any conferenced parties and 3) Call Narrative - the manually entered information to document details of a call. Call Records link these three components so they can be searched, retrieved, and distributed together. A call taker may search for a Call Record based on any attribute of components. Search results return the entire call record. Proper database management includes the transfer of records to archives according to the appropriate archiving policies and procedure of the local jurisdiction, including the deletion of records as necessary and required by law.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
FR-MNCLR-01	The system shall provide the capability to create a Call Record.
FR-MNCLR-02	The system shall provide the capability to read a Call Record.
FR-MNCLR-03	The system shall provide the capability to update a Call Record.
FR-MNCLR-04	The system shall provide the capability to delete a Call Record.
SR-MNCLR-05	The system shall assign a unique identifier to a Call Record.
FR-MNCLR-07	The system shall provide the capability to search Call Records.
DR-MNCLR-08	The system shall store Call Records.
SR-MNCLR-09	The system shall maintain the association between a Call Record and the a) Call Detail Record, b) Call Recording, c) Call Narrative

Manage Change Requests [OA-MCHRQ]

Recommended for Proof-of-Concept

Role Key
ALL - ALL Roles
CT - Call Taker
DB - Database Administrator
NA - Network Adminstrator
PA - PSAP Adminstrator
SA - System Administrator
SYS - NG9-1-1 System
911AUTH - 9-1-1 Authority

Role(s): NTA, SA
Proof-of-Concept: False
References: N/A

Goal:

Provide the administrative and analytical resources to support management decisions affecting system configuration and operation.

Description:

This activity provides the administrative and analytical infrastructure for processing change requests, conducting traffic and usage analysis, and deploying system hardware, circuits, and software.

Assumptions:

High-Level Requirements:

Requirement Code	Requirement Text
SR-MCHRQ-01	The system shall support decisions regarding system configuration and operation.
FR-MCHRQ-02	The system shall provide mechanisms to deploy hardware and software changes or additions within the system.

Notes

Section 8: System Requirements

System requirements were established to help ensure that a NG9-1-1 system is fully supported and capable of processing the workload required. It must provide transaction processing integrity and general operating reliability; use standard procedures for installation, configuration, and operations; provide seamless integrated workflow processing; have the capability to query, access, and format information; and be well documented. It must not conflict with other administrative or program systems or with other agency-established information technology standards.

NG9-1-1 systems must meet the technical requirements specified in this section.

8.1 Technical Performance Requirements

8.1.1 Maintainability

Maintainability provides seamless service delivery while supporting both scheduled and unscheduled maintenance activities. These activities will include, but are not limited to, software updates and validation of data integrity. Implementation of specific process, procedures, and vendor agreements will be necessary to ensure quality and consistency of operations through maintenance activities.

Requirement Code	Requirement Text
SR-SYSTM-01	Individual critical system components shall be capable of being brought into or out of service without affecting services that are not dependent on them.
SR-SYSTM-02	Hardware elements of high-availability services shall be capable of being brought into or out of service without affecting overall service availability.
SR-SYSTM-03	Critical system components shall be capable of having their supporting software upgraded without affecting the availability of those devices or the services they provide.
SR-SYSTM-04	A notification mechanism shall be defined to alert management and/or users of impending service activities.
SR-SYSTM-05	Data made available to users shall be capable of being verified for integrity and authenticity by the viewing party.
SR-SYSTM-06	The system shall use commercially available software and hardware and/or open standards where applicable.
SR-SYSTM-07	The system shall support remote configuration download from individual deployed hardware and software assets in support of system-wide configuration management.

8.1.2 Availability

The availability requirements identify specific metrics for uptime and availability. Explicit architectural design, system capabilities, and procedure must be implemented in order to achieve the desired level of availability. The scope of requirements impacting system availability spans such key areas as system uptime, system throughput and performance, and system resilience and event resolution,

Requirement Code	Requirement Text
SR-SYSTA-01	The system shall support 24x7x365 operations.
SR-SYSTA-02	The system shall support a call/transaction volume of TBD-03.
SR-SYSTA-03	The system response time shall be lower than TBD-04 for any individual transaction within the system.
SR-SYSTA-04	The system shall implement redundant infrastructure to support intelligent routing of calls/data in the event of outage conditions.
SR-SYSTA-05	The system shall incorporate proactive monitoring of individual system components, including network elements, hardware devices, and software applications.
SR-SYSTA-06	Where applicable, the system shall use policy-based management to facilitate automated system event/incident resolution.
SR-SYSTA-07	The system shall allow historical tracking of events and event resolution to serve as a knowledge-base and trending tool for support staff.
SR-SYSTA-08	The system shall allow the maintainer to exercise system restore procedures to support transparent restoration of archived data in the event of data loss or system failure.
SR-SYSTA-09	The system shall be capable of remote booting.
SR-SYSTA-10	The system shall support TBD-09 simultaneous users
SR-SYSTA-11	The system shall support TBD-10 simultaneous transactions
SR-SYSTA-12	The system shall support TBD-11 transactions over a TBD period of time
SR-SYSTA-13	The system shall require no more than TBD-12 seconds to process a single transaction
SR-SYSTA-14	The system shall support a data volume of TBD-13 GB per day
SR-SYSTA-15	The system shall scale vertically
SR-SYSTA-16	The system shall scale horizontally

8.1.3 Reliability

The focus of reliability is to ensure operation for specific, extended periods of time without critical failure. The requirements within this activity area describe the metrics for expected system reliability and the procedures necessary to guarantee that level of availability.

Requirement Code	Requirement Text
SR-SYSTR-01	The system shall have a Mean Time Between Critical Failure (MTBCF) of at least TBD-05 execution hours under normal environmental/operational conditions.
SR-SYSTR-02	The system shall provide for error handling.
SR-SYSTR-03	The system shall provide for failure recovery.
SR-SYSTR-04	The system shall be capable of retrying or retransmitting operations based on either administrative control or predefined policy.
SR-SYSTR-05	The system shall have no single point of failure.
SR-SYSTR-06	The system shall ensure that failures within individual components of the system do not propagate to other system components or cause failure of downstream components or services.
SR-SYSTR-07	The system shall intelligently route communications and service requests such that individual system component failures do not affect overall system reliability.

8.2 Technical System Requirements

8.2.1 Security

Security support provides adequate data and service protection to mitigate unauthorized access, service exploitation, and leakage of confidential or sensitive information. The system must also provide audit capability for activity traceability and accountability.

Requirement Code	Requirement Text
SR-SYSTS-01	The system shall provide system-wide intrusion detection system (IDS) a) processing, and b) monitoring.
SR-SYSTS-02	The system shall protect all sensitive communications in accordance with industry standards and best practices.
SR-SYSTS-03	The system shall provide organizational identity management infrastructure to support user and cross-system authentication (single-sign-on [SSO] authentication).
SR-SYSTS-04	The mechanisms chosen for security requirements shall use multi-agency standards wherever possible.
SR-SYSTS-05	The system shall facilitate the audit of system activities by an individual or for a particular case or incident.
SR-SYSTS-06	The system shall support and provide for periodic security assessments and vulnerability scanning.
SR-SYSTS-07	The system shall conform to pertinent Health Insurance Portability and Accountability Act (HIPAA) requirements for all communications containing medical information.
SR-SYSTS-08	The system shall provide system-wide intrusion information assurance (IA) a) processing and b) monitoring.

8.2.2 Continuity of Operations

Continuity of operations (COOP) accounts for and provides continuous operations during system outage events. The following requirements outline the capabilities and processes that must be defined to support operations during such a scenario. Proper COOP practices include the transfer of records to offsite archives according to the appropriate archiving policies and procedures of the local jurisdiction as necessary and required by law.

Requirement Code	Requirement Text
SR-SYSTC-01	The system shall incorporate processes and procedures for mass off-site archive storage.
SR-SYSTC-02	The system shall incorporate processes and procedures for data retrieval from mass off-site archive storage.
SR-SYSTC-03	The system shall provide the capability to implement defined system restore processes.
SR-SYSTC-04	The system shall periodically exercise system restore processes and procedure.
SR-SYSTC-05	The system shall incorporate process and procedure for periodic off-line testing of system archives to ensure availability and reliability of backup data.
SR-SYSTC-06	Individual system components shall possess the capability to operate autonomously in the event that one or more subsystems become unavailable.
SR-SYSTC-08	The system shall notify stakeholders of system outage events.
FR-SYSTC-09	The system shall notify stakeholders of system service restoration.

8.3 Design Constraints

The NG9-1-1 System must maintain the 9-1-1 system's capability to respond to new communication technologies and take advantage of additional new technology that may benefit system operations. Design constraints are included to address both the impact that new communication technology potentially has on 9-1-1 system operations and the opportunity that same technology has to benefit those operations through new features and functionalities. This includes monitoring new technology development, the theoretical application of relevant new technologies to NG9-1-1 system operations, and, as appropriate and beneficial, the proof-of-concept demonstration of their use.

The NG9-1-1 System will facilitate the reception and handling of requests for emergency service including the routing of requests to appropriate responders. As a result of the breadth of participating organizations and agencies, the NG9-1-1 System must coordinate the extraction, correlation, aggregation, and transfer of relevant case data from external systems which are both already developed and currently deployed, as well as those which are currently under development or may be developed in the future. The NG9-1-1 System must therefore be designed with a standards-based, modular architecture that will allow interoperation with external systems using agreed upon standards for communication and data transfer and storage.

The NG9-1-1 system must also maintain flexibility with respect to the software, protocols, and underlying technologies required to interact with existing external systems in order to be effectively integrated into any operational environment which will be comprised of a variety of heterogeneous systems and infrastructure. This flexibility must also persist over the life of the deployed NG9-1-1 system to allow for the incorporation of new technology as a result of either a response to an external system change or the need to adopt beneficial new technologies which improve the system in some capacity. To this end, the system shall use software and interfaces compliant with open, industry-proven standards to facilitate integration with not only existing and/or legacy technologies, but also any future technologies the system may need to incorporate or from which it may benefit. Furthermore, the system shall be designed in such fashion as to incorporate external system integration without the requirement of significant change to either the NG9-1-1 System or the external system.

The NG9-1-1 System must incorporate a relational database management system (DBMS) to facilitate the accurate conveyance of call data to all involved personnel and the appropriate archival of supporting data. The data architecture implemented within the supporting DBMS shall allow storage of data of varying structure to include but not be limited to simple textual constructs as well as complex binary or other structured forms of data. Such a system must be robust enough to handle the expected volume of transactions, volume of data, and the requisite service level agreements (SLA) to properly address 9-1-1 operations. Additionally, appropriate continuity of operations measures must be put in place to ensure the reliability of the NG9-1-1 System and the integrity of the data contained within the DBMS.

Section 9: Source References

Primary sources of information used in this document were published and working draft documents from the USDOT, the Federal Communications Commission (FCC), NENA, the IETF, and the Alliance for Telecommunications Industry Solutions—Emergency Services Interconnection Forum (ATIS-ESIF).

- *Next Generation 9-1-1 (NG9-1-1) System Initiative: Concept of Operations.* USDOT ITS JPO. April 2007. http://www.its.dot.gov/ng911/pdf/NG911ConOps_ April07.pdf—This is a formal document that provides a user-oriented vision of NG9-1-1 in the context of an emergency services internetwork that can be understood by stakeholders with a broad range of operational and technical expertise. It is intended to communicate the vision of this system to stakeholders so that they can be actively engaged in its development and deployment.

- *Network Architecture Properties in 2010, Extending E9-1-1 to Satellites, and Generic Architectures to Support Video and Advanced Service*. Network Reliability and Interoperability Council (NRIC) VII Focus Group 1B, FCC. June 2005. *Long Term Issues for Emergency/E9-1-1 Services* (Draft)—These documents are designed to provide a set of specific recommendations regarding future emergency communications network properties and their capabilities by 2010 to support the exchange of voice, data, text, photographs, and live video through the emergency services internetwork to the PSAP and beyond.

- *Communication Issues for Emergency Communications Beyond E911: Final Report—Properties and network architectures for communications between PSAPs and emergency services organizations and personnel.* NRIC VII Focus Group 1D, FCC. December 2005. http://www.nric.org/meetings/docs/meeting_20051216/FG1D_Dec%2005_Final%20Report.pdf—The purpose of these documents is to describe the properties that network architectures for communications between PSAPs and emergency services personnel must meet.

- *NENA i3 Technical Requirements Document* [NENA i3]. NENA VoIP/Packet Technical Committee Long-Term Definition Working Group. September 2006. http://www.nena.org/media/files/08-751_20060928.pdf—This document provides requirements for a NENA-recommended standard for the i3 architecture for end-to-end emergency calling over IP networks.
- *Requirements for Emergency Context Resolution with Internet Technologies* [ECRIT]. Internet Engineering Task Force (IETF). August 2006. http://www.ietf.org/internet-drafts/draft-ietf-ecrit-requirements-12.txt—This document enumerates requirements for emergency calls placed by the public using VoIP and general Internet multimedia systems, where Internet protocols are used end-to-end.
- The ATIS-ESIF Next Generation Emergency Services (NGES) Subcommittee will define a new messaging and interaction protocol between PSAPs and Emergency Services Networks to significantly expand the paradigms that exist to provide those services today. Various summaries and briefing materials are available at the NGES Subcommittee website at http://www.atis.org/esif/nges.asp. The NGES messaging and interaction protocol will be specified as an American National Standard (ANS). Messaging interfaces have been adopted for trial use.
- *NENA Technical Information Document (TID) on the Network Interface to IP Capable PSAP* [NENA 08-501]. NENA Migration Working Group of the Network Technical Committee. June 2004. http://nena.org/9%1e1%1e1TechStandards/ TechInfoDocs/NENATIDIPPSAPIF.pdf—This TID provides information to guide manufacturers of network equipment and PSAP customer premises equipment (CPE) in the development of IP-based interfaces between the network and PSAP CPE and to assist E9-1-1 network service providers and PSAPs in implementing such interfaces.
- *IP PSAP 9-1-1 System Features and Capabilities Operational Information Document (OID)* [NENA 58-001]. NENA VoIP PSAP Operations Features/Capabilities Work Group. June 2004. http://www.nena.org/9%1e1%1e1OperPractices/ OpsInfoDocs/NENAopsOIDipPSAP060404final.pdf—This OID contains a list of capabilities or features that are expected to be supported in a PSAP using IP-based 9-1-1 equipment and software developed in an open architecture environment that will allow interoperability at all levels of the 9-1-1 network, regardless of vendors.
- *NENA Standard Formats & Protocols for ALI Data Exchange, ALI Response & GIS Mapping* [NENA 02-010]. NENA Technical Committee Chairs. February 2006. http://www.nena.org/media/files/02-010_20060225.pdf—This document sets forth ALI data exchange formats and a standard GIS data model. Although there are many methods for the transfer of such data, this NENA document represents an industry-accepted standard.
- *NENA Data Standards for Local Exchange Carriers, ALI Service Providers, & 9-1-1 Jurisdictions* [NENA 02-011]. NENA Technical Committee Chairs. November 2006. http://www.nena.org/media/files/02-011_20061121.pdf—This document establishes technical standards for all service providers involved in providing telephone services.
- *NENA Data Standards for the Provisioning and Maintenance of MSAG Files to VDBs and ERDBs* [NENA 02-013]. NENA Data Technical Committee, VDB/MSAG Working Group. January 2007. http://www.nena.org/media/files/02-013_20070109.pdf—This document contains system and process requirements for the Validation Database (VDB), ESZ Routing Database (ERDB), and system administrator to maintain the Master Street Address Guide (MSAG) and Alternate Location Information required in i2 system architecture.

Appendix A: Acronyms

ACD	Automatic Call Distribution
ACN	Automatic Collision Notification
ALEC	Alternate Local Exchange Carrier
ALI	Automatic Location Identification
ANI	Automatic Number Identification
ANS	American National Standard
APCO	Association of Public-Safety Communications Officials—International
ATIS-ESIF	Alliance for Telecommunications Industry Solutions— Emergency Services Interconnection Forum
CAD	Computer Aided Dispatch
CAMA	Centralized Automatic Message Accounting
CAP	Competitive Access Provider
CCS	Centum Call Second
CLEC	Competitive Local Exchange Carrier
COOP	Continuity of Operations
CPE	Customer Premises Equipment
DBMS	Database Management System
E9-1-1	Enhanced 9-1-1
ECRIT	Emergency Context Resolution with Internet Technologies
EMS	Emergency Medical Services
ERDB	Emergency Service Zone Routing Database
ESAR	Enterprise Segment Activity Roadmap
ESN	Emergency Service Number
ESZ	Emergency Service Zone
FCC	Federal Communications Commission
GIS	Geographic Information Systems
GPS	Global Positioning System
HIPAA	Health Insurance Portability and Accountability Act
IA	Information Assurance
IDS	Intrusion Detection System
IETF	Internet Engineering Task Force
ILEC	Incumbent Local Exchange Carrier
IP	Internet Protocol
ISP	Internet Service Provider
ITI	Information Transaction Inventory
ITU	International Telecommunication Union
LEC	Local Exchange Carrier
MRV	Multidimensional Requirements View
MSAG	Master Street Address Guide
MTBCF	Mean Time Between Critical Failures
NENA	National Emergency Number Association
NG9-1-1	Next Generation 9-1-1
NGES	Next Generation Emergency Services
NRIC	Network Reliability and Interoperability Council
OID	Operational Information Document
OSI	Operating System Interface
PDA	Personal Digital Assistant
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
QA	Quality Assurance
QC	Quality Control
SLA	Service Level Agreement
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SOP	Standard Operating Procedure
SR	Selective Routing
SSO	Single Sign-On
TBD	To Be Determined
TBR	To Be Resolved
TCP	Transmission Control Protocol
TIA	Telecommunication Industry Association
TID	Technical Information Document
TTY/TDD	Teletypewriter / Telecommunications Device for the Deaf
UDP	User Datagram Protocol
USDOT	United States Department of Transportation
VDB	Validation Database
VoIP	Voice over Internet Protocol

Appendix B: Glossary

9-1-1	A three-digit telephone number to facilitate the reporting of an emergency requiring response by a public safety agency.
9-1-1 Enterprise Operations	The set of functions performed to fulfill the mission of the 9-1-1 community. The 9-1-1 Enterprise Operations layer is an element of the NG9-1-1 Community Model that illustrates the collection of the enterprise segments identified for NG9-1-1.
9-1-1 PSAP Operations Segment	The element of the NG9-1-1 Community Model that represents the set of activities used by Public Service Answering Point (PSAP) call takers to receive, process, and relay emergency calls and data.
9-1-1 System	The set of network, database, and customer premises equipment (CPE) components required to provide 9-1-1 service.
9-1-1 System Administration Segment	The element of the NG9-1-1 Community Model that represents the set of activities needed to accommodate functions such as collaboration, task assignment, training, and configuration of the 9-1-1 Enterprise.
9-1-1 System Operations Segment	The element of the NG9-1-1 Community Model that represents the set of activities and systems to manage, support, and protect the 9-1-1 technology infrastructure.
Activity	See "Functional Activity."
Alternate Routing	The capability of directing 9-1-1 calls to a designated alternate location(s) if all 9-1-1 trunks are busy or out of service. May be activated upon request or automatically, if detectable, when 9-1-1 equipment fails or the PSAP itself is disabled.
American Sign Language	System of hand and body movements used to communicate concepts rather than spoken complete sentences. The grammatical structure is different from standard English.
Analog	Continuous and variable electrical waves that represent an infinite number of values; as opposed digital.
Association for Public-Safety Communications—International (APCO)	A not-for-profit organization established in 1935 and that the world's largest organization dedicated to public safety communications. Members rely on APCO for their professional needs—from examining standards and issues to providing education, products and services, and frequency coordination services.
Audit Log	A data structure that contains all the completed formal evaluations of user and maintenance activities and any resulting corrective actions required.
Authentication	Determination or verification of a user's identity and/or the user's eligibility to access to a system, network, or data; measures to prevent unauthorized access to information and resources.
Automatic Call Distributor (ACD)	Equipment or application that automatically distributes incoming calls to available PSAP attendants in the order the calls are received, or queues calls until an attendant becomes available.
Automatic Collision Notification (ACN)	The process of identifying that a motor vehicle has been involved in a collision, collecting data from sensors in the vehicle, and communicating that data to a PSAP.
Automatic Event Alert	9-1-1 calls placed by sensors or similar initiating devise. Includes alarms, telematics, and sensor data, and may also include real-time communications.
Automatic Location Identification (ALI)	The automatic display at the PSAP of the caller's telephone number, the address or location of the telephone, and supplementary emergency services information.
Automatic Location Identification (ALI) Database	The set of ALI records residing on a computer system.
Automatic Number Identification (ANI)	Telephone number associated with the access line from which a call originates.
Availability	The operational ability of necessary and beneficial data interfaces to support call processing and emergency response; or, the amount or percentage of time that the system provides service.
Backup Public Safety Access Point (Backup PSAP)	Typically, a disaster recovery answering point that serves as a backup to the primary PSAP and is not collocated with the primary PSAP.
Business Rules	Business rules describe the operational definitions and constraints that can be applied to the system that dynamically specify how the system should react under different circumstances. Business rules are used throughout the NG9-1-1 system enabling jurisdictions and 9-1-1 Authorities to configure the system based upon the needs of the locality or region and can be modified or updated as needed.
Busy Tone	An audible signal indicating a call cannot be completed because the called access line is busy. The tone is applied 60 times per minute.
Call	For the purposes of this NG9-1-1 System Description & Requirements Document, any real-time communication—voice, text, or video—between a person needing assistance and a PSAP call taker. This term also includes non-human-initiated automatic event alerts, such as alarms, telematics, or sensor data, which may also include real-time communications.
Callback	The ability to re-contact the calling party.
Callback Number	A telephone number used by the PSAP to re-contact the location from which the 9-1-1 call was placed. The number may or may not be the number of the station used to originate the 9-1-1 call.
Call Delivery	The capability to route a 9-1-1 call to the designated selective router for ultimate delivery to the designated PSAP for the caller's ANI/KEY.
Call Detail Record	All system (including network) data accessible with the delivery of the call, and all data automatically added as part of call processing. This includes Essential Data (including reference key to network component and call progress records) and Supportive Data. Part of the Call Record.
Caller Location Information	Data pertaining to the geospatial location of the caller, regardless of whether the caller is a person or an automatic event alert system.
Call Narrative	Supplemental Data (or caller-generated data) manually gathered and entered by the call taker for the purposes of documenting the call. Part of the Call Record.
Call Record	The collection of all information related to a call (including Essential, Supportive, and Supplemental data); comprised of: Call Detail Record, Call Recording, and Call Narrative.

Call Recording	The electronic documentation of the interactive communication (e.g., audio, video, text, image) between the caller, call taker, and any conferenced parties. Part of the Call Record.
Call Routing	The capability to selectively direct the 9-1-1 call to the appropriate PSAP.
Call Setup	The call processing events that occur, or data that are collected, during the time a call is being established, but not yet connected.
Call Taker	As used in 9-1-1, a person (sometimes referred to as a telecommunicator) who receives emergency and non-emergency calls by telephone and other sources, determines situations, elicits necessary information, and relays essential information to dispatches, staff, and other agencies, as needed, using telephony and computer equipment.
Call Transfer	The capability to redirect a call to another party.
Call Treatment	Refers to the actions taken by the NG9-1-1 System to prepare a call for presentation to a call taker, including: caller location recognition, call type identification, call delivery treatment determination, addition of supporting data to call stream, call routing determination, and network bridge establishment.
Call Type	Classification of a 9-1-1 call that indicates the call access method, which can affect call treatment, routing, and processing. Call types may include voice caller, short message service (SMS) text, Simple Mail Transfer Protocol (SMTP) text, multimedia, telematics data, ANI, silent alarms, etc.
Capability Use Case	Connected activities extracted from the ESAR to create an overarching system goal and identify a required capability for the NG9-1-1 System. Capability use cases illustrate use of the NG9-1-1 System from a user's perspective and provide context for the various ways NG9-1-1 functional activities enable users to complete complex tasks.
Circuit-Switch	The establishment, by dialing, of a temporary physical path between points. The path is terminated when either end of the connection sends a disconnect signal by hanging up.
Civic Address Information	Street address data, inclusive of suite/office number, where appropriate.
Community Model	A graphic tool used to build technical, operational, and policy understanding of the high-level system interfaces and information flows between system stakeholders. The Community Model aids in the capture and analysis of stakeholder needs.
Computer Aided Dispatch (CAD)	A computer-based system that aids PSAP call takers by automating selected dispatching and record-keeping activities.
Continuity of Operations (COOP)	A system's ability to prevent critical system failures (e.g., via component redundancy) and to seamlessly conduct updates and repairs.
Cross-System Authentication	Authentication across a number of systems or networks via a single authentication process, sometimes referred to as Single Sign-On (SSO), and potentially achieved via proxy authentication.
Customer Premises Equipment (CPE)	Communications or terminal equipment located in the customer's facilities; terminal equipment at a PSAP
Database	An organized collection of information, typically stored in computer systems, composed of fields, records (data), and indexes. In NG9-1-1, such databases include: Call Record Database, Call Detail Record Database, Call Recording Database, Civic Address Information Database, GIS Layer Database, Identity Management Database, Service Routing Database, ANI/ALI Database, and Responding Agency Database.
Data Integrity	The property of not having been altered or destroyed in an unauthorized manner.
Digital	Relating to calculation, storage, or transmission by numerical methods or discrete units, as opposed to the continuously variable analog. Computerized.
Disaster	Any event that can cause a significant disruption to normal emergency calling capability.
Dispatcher	As used in public safety, a person responsible for receiving and transmitting information pertaining to requests for emergency service and other related activities, tracking vehicles and equipment, and recording other important information using a telephone, radio, and other communications resources.
Dispatch Operations	The distribution of emergency information to responder organizations responsible for delivery of emergency services to the public.
Emergency Call	A telephone request for public safety agency emergency services that requires immediate action to save a life, to report a fire, or to stop a crime. May include other situations as determined locally.
Emergency Location Information	Data pertaining to the location of the emergency, which may be different from the caller location.
Emergency Medical Service (EMS)	A system providing pre-hospital emergency care and transportation to victims of sudden illness or injury.
Emergency Notification Service	Any service used to notify persons of an emergency. May include changeable message signs, sirens, recorded telephone messages, text and media delivered to mobile devices within a set geographic region, etc.
Emergency Response	An effort by public safety personnel and citizens to mitigate the impact of an incident on human life and property.
Emergency Services Internetworks Layer	The element of the NG9-1-1 Community Model that illustrates the 9-1-1 systems, applications, and information repositories that seamlessly share emergency data to improve response.
Enhanced 9-1-1 (E9-1-1)	An emergency telephone system that includes network switching, database, and CPE elements capable of providing selective routing, selective transfer, fixed transfer, caller routing and location information, and ALI.
Enterprise	The highest level of system functionality.
Enterprise Operations	See "9-1-1 Enterprise Operations."
Enterprise Segment	High-level grouping of related system services that address major and distinct portions of the system or enterprise.
Essential Call Data	Data that support call delivery and adequate response capability. These data, or a reference to them, is automatically provided as a part of call or message initiation. Examples include location, callback data, and call type.

Fall-Back Location Information	Caller location information used when the primary caller location information is faulty or unavailable. Generalized caller location information generated by system call processing that can be used to identify the general locality or region of the incident or calling party.
Fixed Transfer	The capability of a PSAP call taker to direct a 9-1-1 call to a predetermined location by depressing a single button.
Firewall	The primary method for keeping a computer secure from intruders. It allows or blocks traffic into and out of a private network or the user's computer.
Functional Activity	Bounded piece of work to be performed that describes the people, processes, and technology used.
Gateway	The point at which a circuit-switched call is encoded and repackaged into IP packets; equipment that provides interconnection between two networks with different communications protocols; two examples are packet assembler/disassemblers and protocol converters.
Geographic Information System (GIS)	A computer software system that enables one to visualize geographic aspects of a body of data. It contains the ability to translate implicit geographic data (such as a street address) into an explicit map location. It has the ability to query and analyze data in order to receive the results in the form of a map. It also can be used to graphically display coordinates on a map (i.e., latitude/longitude) from a wireless 9-1-1 call.
Geographic Layer	The element of the NG9-1-1 Community Model that illustrates the geographic scope of a system or enterprise. In the NG9-1-1 Community Model, the Geographic layer is depicted as a map of the United States, emphasizing the decentralized nature of the system of systems.
Global Positioning System (GPS)	A satellite-based location determination technology.
Information Transaction Inventory (ITI)	A catalog of the information exchanges that will occur within the NG9-1-1 system. The purpose of the ITI is to clarify information transactions, demonstrate what data interfaces are needed, and identify which systems integrate the information transactions.
Integrity	See "Data Integrity."
International Telecommunications Union (ITU)	The telecommunications agency of the United Nations established to provide worldwide standard communications practices and procedures. Formerly CCITT.
Internet Engineering Task Force (IETF)	The lead standards-setting authority for Internet protocols.
Internet Protocol (IP)	The set of rules by which data are sent from one computer to another on the Internet or other networks.
Internetwork	To go between one network and another; a large network made up of a number of smaller networks.
Interoperability	The capability for disparate systems to work together.
Landline	Colloquial term for the Public Switched Telephone Network access via an actual copper or fiber optic transmission line that located underground or on telephone poles. Used to differentiate the "wireless" connectivity of a cellular or personal communications services system. Also referred to as "wireline."
Local Exchange Carrier (LEC)	A telecommunications carrier under the state/local Public Utilities Act that provides local exchange telecommunications services. Also known as Incumbent Local Exchange Carrier (ILEC), Alternate Local Exchange Carrier (ALEC), Competitive Local Exchange Carrier (CLEC), Competitive Access Provider (CAP), Certified Local Exchange Carrier (CLEC), and Local Service Provider (LSP).
Location	See "Caller Location Information" and "Emergency Location Information."
Mean Time Between Critical Failures (MTBCF)	The average time between unscheduled corrective maintenance actions that meet the criterion of a critical failure. A critical failure is any failure that causes the network to lose a predetermined level of capability.
Multidimensional Requirements View (MRV)	The Multidimensional Requirements View (MRV) is a layered graphical representation of each functional activity used to describe the activity to system users and developers. The MRV visually represents the details of the processes and functions required to perform the functional activity including associated operational, system, and data behavior that, when linked together, allows the user to complete the activity.
National Emergency Number Association (NENA)	A not-for-profit corporation established in 1982 to further the goal of "One Nation–One Number." NENA is a networking source and promotes research, planning, and training. It strives to educate, set standards, and provide certification programs, legislative representation, and technical assistance for implementing and managing 9-1-1 systems.
Nature of Emergency	Reason for a citizen's request for response from emergency services (e.g., heart attack, vehicle collision, burglary)
Network	An arrangement of devices that can communicate with each other.
Originating Subscriber Operations	The processes by which the public accesses NG9-1-1 through commercial networks, via various communications devices.
Overflow	The telecommunications term for the condition when there are more calls than the primary network path is designated to handle. This condition invokes the need to perform some form of call treatment, such as busy signals or alternate routing.
Packet	Logical grouping of information that includes a header containing control information and (usually) user data. Packets are most often used to refer to network layer units of data. The terms datagram, frame, message, and segment are also used to describe logical information groupings at various layers of the Operating System Interface (OSI) reference model and in various technology circles.

Packet-Switch	A network technology that breaks up a message into small packets for transmission. Each packet contains a destination address. Thus, not all packets in a single message must travel the same path. As traffic conditions change, they can be dynamically routed via different paths in the network, and they can even arrive out of order. The destination computer reassembles the packets into their proper sequence.
Personal Digital Assistant (PDA)	Small, handheld device used to store address book information, telephone numbers, personal contacts, and other personal information.
Pre-Arrival Instructions	Scripted instructions given to a caller in situations whenever possible and appropriate, where correct advice is essential to provide necessary assistance and control of the situation prior to arrival of responder personnel.
Protocol	A set of rules or conventions that govern the format and relative timing of data in a communications network. There are three basic types of protocols: character-oriented, byte-oriented, and bit-oriented. The protocols for data communications cover such activities as framing, error handling, transparency, and line control.
Public Safety Answering Point (PSAP)	A facility equipped and staffed to receive 9-1-1 calls; a generic name for a municipal or county emergency communications center dispatch agency that directs 9-1-1 or other emergency calls to appropriate police, fire, and emergency medical services agencies and personnel.
Public Switched Telephone Network (PSTN)	The network of equipment, lines, and controls assembled to establish communication paths between calling and called parties in North America.
Quality Assurance (QA)	The activity of providing evidence needed to establish confidence among all concerned that quality-related activities are being performed effectively.
Quality Control (QC)	The activity of ensuring that products or services are designed and produced to meet or exceed customer requirements.
Redundancy	Duplication of components, running in parallel, to increase reliability; a backup system (either a device or a connection) that serves in the event of primary system failure.
Reliability	The ability of a system or component to perform its required functions under stated conditions for a specified period of time.
Remote Access	Communication with the NG9-1-1 system and services from a remote location through a data link. Authorization and access permission to system resources will be based on pre-defined user roles.
Requirement	A statement of a characteristic that the system must possess in order to be acceptable; the desired system is defined as one that fulfills all of the requirements.
Router	An interface device between two networks that selects the best path to complete the call even if there are several networks between the originating network and the destination.
Security	The ability to provide adequate data and service protection to mitigate unauthorized access, service exploitation, and leakage of confidential or sensitive information.
Selective Routing (SR)	Direction of a 9-1-1 call to the proper PSAP based on the location of the caller.
Selective Transfer	The capability to convey a 9-1-1 call to a response agency by operation of one of several buttons typically designated as police, fire, and emergency medical.
Service Area	A contextual grouping of like functional activities enabled by the system.
Service Provider	An entity providing one or more of the following 9-1-1 elements: network, CPE, or database service.
Short Message Service (SMS)	A text message service that enables messages generally no more than 140–160 characters in length to be sent and transmitted from a cellular telephone. Short messages are stored and forwarded at SMS centers, allowing their retrieval later if the user is not immediately available to receive them.
Spatial	Concept of describing a space or area of space.
Stakeholder	An individual or group with an interest in the successful delivery of intended results by a project.
Supplemental Call Data	Information that may complement, but is not necessary for, call handling and dispatch. This data typically would be automatically or manually queried after the call is delivered to the call taker. Examples include contact information for someone who should be notified of a medical emergency, building blueprints, other addresses in the immediate vicinity, etc.
Supportive Call Data	Information beyond essential data that may support call handling and dispatch. The addition of this data to the call stream is triggered by one or more of the data or reference items in essential data for a given call type. An example is ACN data such as "vehicle rollover."
System of Systems	Interconnected and decentralized system of interoperable networks.
Telecommunications Device for the Deaf (TDD)	Also known as TTY (see "Teletypewriter [TTY]").
Telecommunications Industry Association (TIA)	A lobbying and trade association, which is the result of the merger of the USTA (United States Telephone Association) and the EIA (Electronic Industries Association).
TCP (Transmission Control Protocol)	The set of rules within the TCP/IP protocol suite that ensures that all data arrives accurately and 100-percent intact at the destination.
Telematics	The system of components that supports two-way communications with a motor vehicle for the collection or transmission of information and commands.
Telephony	The electronic transmission of the human voice.
Teletypewriter (TTY)	Also known as TDD. A device capable of information interchange between compatible units using a dial-up or private-line telephone network connections as the transmission medium.
Transfer	A feature that allows PSAP call takers to redirect a 9-1-1 call to another location.

Transmission Control Protocol/Internet Protocol (TCP/IP)	A layered set of protocols (sets of rules) used to connect dissimilar computers together. TCP provides the transport service required by the application layer. The TCP layers in the two host computers that are sending data will communicate with each other to ensure reliable data packet transport. IP provides the service user to deliver the datagram to its destination, providing the routing through the network and the error messages if the datagram is undeliverable.
User Authentication	See "Authentication."
Voice over Internet Protocol (VoIP)	A set of rules that provides distinct packetized voice information in digital format using the Internet Protocol. The IP address assigned to the user's telephone number may be static or dynamic.
Wireless	In the telecommunications industry, typically refers to mobile telephony and communications through handheld devices that make a connection using radio frequency (in particular frequency bands often reserved for mobile communications) for personal telecommunications over long distances.
Wireline	Standard telephone and data communications systems that use in-ground and telephone pole cables. Also known as landline or land-based.

Appendix C: Requirements Style Guide

The USDOT NG9-1-1 Requirements Style Guide is intended to describe the style conventions followed in creating requirements for the NG9-1-1 effort.

Requirement Types

As stated in Section 4, many types of requirements are needed to express the full capabilities needed by the NG9-1-1 System. To ensure that a comprehensive picture of the NG9-1-1 Enterprise has been developed the following requirement types are categorized according to Table 4-1.

Requirements Numbering Schema

To ensure traceability, a numbering schema has been developed consistent with the hierarchical breakdown of the Enterprise Segment Activity Roadmap (ESAR) to clearly associate the requirements with the ESAR activity. Examples follow—

1. SC-LOGIN refers to the activity "Login." The preceding SC indicates that this activity is part of the Security Administration service area.
2. FR-LOGIN-05 represents the fifth requirement within this activity. The FR further describes this requirement as a functional requirement.
3. SR-LOGIN-06 represents the sixth requirement within this activity. The SR further describes this requirement as a system requirement.
4. DR-LOGIN-35 represents the thirty-fifth requirement within this activity. The DR describes this requirement as a data requirement.
5. BR-LOGIN-07 represents the seventh requirement within this activity. The BR describes this statement as a business rule within this activity.
6. SR-LOGIN-02-01 represents the first detailed requirement associated to the second high-level requirement within this activity. The SR describes this requirement as a system requirement.

Level of Detail

7. Each system function has at least one requirement.
8. Activities may share the same requirement.
9. A requirement cannot be decomposed to just one sub-requirement.
10. A requirement may contain a list of items as long as those items are not requirements themselves. If they are requirements, they are presented as sub-requirements.
11. If item enumeration is necessary, each item is identified distinctly and separately by a lowercase letter to support tracing and testability. To promote traceability, bullets are not used.

Word Choice

Operations Layer Requirements:

Operations layer requirements are typically functional in nature and are denoted with FR. Functional requirements are the conditions or capabilities needed by a user to enable a task, or actions to achieve a desired outcome. Performance is not dependent on the "role's" behavior, but reflects the system's response to the role.

For the operational layer:

12. "The system shall provide the user the capability to…"
13. "The system shall provide the operator the capability to…"
14. "The system shall provide the maintainer the capability to…"

System Layer Requirements:

System requirements describe the conditions or capabilities possessed by the system that support, enable, or satisfy the goal and functional requirements of the activity.

For the system layer, "The system shall…"

Data Layer Requirements:

Data requirements describe the data used by the system in greater detail and are used in conjunction with a data dictionary

For the data layer, "The system shall…"

Performance Requirements:

Performance requirements quantitatively describe how a specific function of the system is to perform, e.g., how fast, how big, how heavy. The basis for the performance requirement (e.g., engineering judgment, current legacy system performance, commercial industry standard, etc.) is noted where applicable. Performance requirements exhibit the following characteristics for completeness: 1) Value and Units; 2) Probability of Occurrence; 3) Start and End Events/Conditions; and 4) Loading Conditions. For example—

"The system shall be capable of processing 100,000 critical search result sets during a peak hour with .95P."

Any Layer:

1. "The user" is used as infrequently as possible. Specific names are used, such as "operator," "maintainer," etc.
2. The use of unverifiable adjectives and adverbs (e.g., significant, very, many, more, few, always, never, optimal) is avoided.
3. Use of negative "shall" statements is avoided. Specifying what a system will not do may not be testable.
4. A requirement's content is never addressed by another requirement.
5. Requirements must be concise—non-essential language is avoided.
6. Use of synonyms to describe an action or noun in order to reduce interpretation, is avoided. Consistency across all Activities is important.
7. Acronyms should be spelled out at the first time use.
8. Definitions are provided for terms that may be unfamiliar to the audience.
9. Use of "i.e." or "e.g." or "etc." in requirements statements is avoided.
10. Each instance of TBD (To Be Determined) or TBR (To Be Resolved) is enumerated and explained in a trace table, along with criteria necessary to close the TBD/TBR. (For example: "Performance value is unknown; performance analysis on x scenario should provide the value needed by x date.")

IEEE Standard on word usage:
http://standards.ieee.org/guides/style/section5.html#905

Sentence Structure

1. Use of "or" and "and" is avoided in a requirement because, in such cases, there may be two different requirements. However, if a true option exists, choose one and document why one was chosen over another.
2. Each requirement contains only one "shall" statement.
3. Each "shall" statement contains only one concept.
4. Each "shall" statement has a single verb.
5. Each "shall" statement has a single subject, which is not a pronoun.
6. Requirement statements are concise, complete sentences, e.g., a requirement has a subject, a function verb ("shall"), and the expected, observable result.

Appendix D: Specifications To Be Determined

TBD/TBR	Tracking #	TBD/TBR Description
TBD	01	SR-ANSCL-13 The system shall display a time on hold alert after TBD-01 seconds.
TBD	02	SR-UCLOC-07 The system shall request updated caller location from a mobile call service provider at least every TBD-02 seconds.
TBD	03	SR-SYSTA-02 The system shall support a call/transaction volume of TBD-03.
TBD	04	SR-SYSTA-03 The system response time shall be lower than TBD-04 for any individual transaction within the system.
TBD	05	SR-SYSTR-01 The system shall have a Mean Time Between Critical Failure (MTBCF) of at least TBD-05 execution hours under normal environmental/operational conditions.
TBD	06	FR-LOGIN-13 The system shall provide the capability to ensure passwords conform to TBD-06 security standards.
TBD	07	SR-LOGIN-14 The system shall lock out a user from the system after TBD-07 failed login attempts.
TBD	08	SR-MTDBC-16 The system shall provide data storage capacity to maintain TBD-08 years of data in an offline archive.
TBD	09	The system shall support TBD-09 simultaneous users.
TBD	10	The system shall support TBD-10 simultaneous transactions.
TBD	11	The system shall support TBD-11 transactions over a TBD-11 period of time.
TBD	12	The system shall require no more than TBD-12 seconds to process a single transaction.
TBD	13	The system shall support a data volume of TBD-13 GB per day.

Appendix E: NG9-1-1 Conceptual Databases

This list of conceptual databases includes the identified information to be managed and stored within NG9-1-1. Items provided in this Appendix are not intended as a data dictionary nor do they imply an implementation requiring multiple independent databases but identify the major categories of information within the NG9-1-1 System.

Conceptual Database	Description
Call Record Database	This repository contains all relevant call information, including references to other repositories, associated with a call.
Call Detail Record Database	This repository contains all the system (including network) data accessible with the delivery of the call, and all data automatically added as part of call processing. This includes Essential , Supplemental, and Supportive Data (including a reference key to network component and call progress records) and Supportive Data. The Call Detail Record Database is a conceptual element within the Call Record Database.
Call Recording Database	This repository contains the electronic documentation (e.g., recording, copy of exchanged text or email) of the interactive communication (e.g., audio, video, text, image) between the caller, call taker, and any conferenced parties. The Call Recording Database is a conceptual element within the Call Record Database.
Civic Address Information Database	This repository contains the authoritative street address guide for the jurisdiction or geographic region.
GIS Layer Database	This repository contains the authoritative geospatial rendering information for NG9-1-1 including layers representing terrain, roads, geographic features, and jurisdictional borders.
Identity Management Database	This repository contains all the user access and identity management information required to ensure authorized access to the appropriate systems, data repositories, and tools.
Service Routing Database (SRDB)	This repository contains the routing information for the Emergency Services Inter-Network ensuring the distribution of calls to the appropriate jurisdiction.
ANI/ALI Database	This existing repository contains detailed caller data to include the caller's telephone number (i.e., ANI), the address/location of the telephone (i.e., ALI) and supplementary emergency services information.
Responding Agency Database	This repository contains the authoritative record of responding agency jurisdictional areas and is used to identify the appropriate responding agencies based on the location of the emergency.
Business Rules Database	This repository contains the Business Rules associated with the system function being described by the activity: Business rules describe the operational definitions and constraints that can be applied to the system that dynamically specify how the system should react under different circumstances. Business rules are used throughout the NG9-1-1 system enabling jurisdictions and 9-1-1 Authorities to configure the system based upon the needs of the locality or region and can be modified or updated as needed.