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Various standards have been issued.

NG9-1-1 System and PSAP Operational Features and Capabilities Requirements

NENA NG9-1-1 System and PSAP Operational Features and Capabilities Requirements
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OPERATIONS REQUIREMENTS DOCUMENT

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Acknowledgments:

The National Emergency Number Association (NENA) Operations Committee NG Requirements Work Group developed this document.

NENA recognizes the following industry experts and their companies for their contributions in development of this document.

Version 1, Approval Date, 06/14/2011

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This committee would also thank Pete Eggimann, ENP, Wendi Lively, ENP and Rick Jones, ENP for their support and assistance.

TABLE OF CONTENTS

1 Executive Overview

Significant work is currently underway to enable the 9-1-1 system to transition from telephone-based voice only systems to a fully interoperable Internet Protocol (IP) based, multimedia Next Generation 9-1-1 (NG9-1-1) system capable of supporting a variety of different communications devices and protocols. This document contains a list of operational capabilities or features that are expected to be supported in a standards-based NG9-1-1 system. The capabilities described within this document represent minimum levels of required functionality. These capabilities should be developed around common, standard IP-based messaging and telecommunications interfaces to allow interoperability between the NG9-1-1 system and public telecommunications systems, regardless of vendor or service provider. Nothing in this document should be interpreted as limiting the development of additional capabilities or features by 9-1-1 equipment and software developers.

This document is intended to be a guide for the NENA Technical and Operations Committees, as well as other national and international standards organizations, to use in developing and finalizing standards in preparation for implementation of standards-based NG9-1-1 systems. The IP network, 9-1-1 equipment, software vendors, as well as service providers should use this requirements document as a guide during their product research and development. PSAP administrators may also find this document useful for planning purposes, as they prepare to transition from their current 9-1-1 system to NG9-1-1 systems, and to update internal policy and procedures to leverage the new features, requirements, and capabilities in the NG environment.

The current 9-1-1 network uses technology that, without conversion, is not compatible with many digital forms of telecommunications technology that are now being widely deployed. The rules and assumptions under which the current 9-1-1 systems were built are no longer valid (such as Service Providers who no longer are physically based in the locality where service is provided and aren't even licensed telephony providers, nomadic customers, mobile customers, and dramatic changes associated with numbering resources to name a few). This has led to degradation in the enhanced 9-1-1 service now provided to the general public. The NG9-1-1 systems will support the communications protocols and devices now in common use by the general public.

NG9-1-1 systems implemented at the regional, state, or multi-state level, will offer more opportunities to share infrastructure, resources, work load, and call-related data throughout the 9-1-1 call / public safety response continuum. PSAP operations will no longer need to be tied to a specific geographic location / building, but can be distributed over a wide area as long as there is connectivity to the system. This will allow all PSAPs, regardless of size, to have access to any and all applications on the NG9-1-1 system and permit ubiquitous deployment of NG systems to happen more rapidly than has been possible by anything requiring an individual PSAP by PSAP deployment.

NG9-1-1 systems will give PSAPs the ability to work together cooperatively in ways that the current systems do not allow, including interoperability between other PSAPs, response agencies, and applications; as well as improved disaster recovery options. NG9-1-1 systems will allow

PSAPs to receive call-related data from multiple data sources such as telematics service providers, wireless carriers, or Internet based telecommunications service providers. NG9-1-1 systems will support voice, text, images, and video, giving more emergency communications alternatives for the hearing impaired or disabled community (i.e. text messaging, video relay services, etc.) as well as the general public.

2 Introduction

2.1 Operations Impacts Summary

As new implementations of NG9-1-1 systems become more widely available, this document will be updated to provide additional guidance in developing operational guidance.

2.2 Technical Impacts Summary

9-1-1 Authorities will become more involved in implementing and managing NG9-1-1 systems which will allow PSAP managers to concentrate on actual call handling and response. Proper call routing in NG9-1-1 systems will be geo-based, and will require 9-1-1 Authorities to provide accurate GIS information related to PSAP and responder service areas, preferably on a regional or statewide scale. IP-based 9-1-1 equipment and software at the PSAP will rely on network and data technical standards in order to take full advantage of the IP environment and ensure true interoperability throughout the entire 9-1-1 system at a regional, state, national, and international level. Commonly used Internet-based telecommunications, messaging, image, and video protocols and standards will need to be supported in order to maintain interoperability with Internet applications. NG9-1-1 system minimum quality of service (QoS), redundancy, and diversity standards will need to be established to ensure system reliability.

2.3 Security Impacts Summary

Acknowledgement of Security Standards, Guidelines and best practices is of vital importance when planning and implementing new Operations and Features. Use of the NENA Security for Next Generation 9-1-1 Standard (NG-SEC) NENA 75-001, Version 1, February 6, 2010, is required.

2.4 Document Terminology

The terms "shall", "must" and "required" are used throughout this document to indicate required parameters and to differentiate from those parameters that are recommendations. Recommendations are identified by the words "desirable" or "preferably".

2.5 Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Version	Approval Date	Reason For Changes
NENA 58-001	02/01/2005	Initial Document (Standard)
NENA 57-750	06/14/2011	Update to 58-001 to clarify Operations NG9-1-1 Requirements
NENA 57-750.1	05/30/2015	Update web page links
NENA 57-750.1	02/25/2020	ARCHIVED

2.6 Recommendation for Additional Development Work

As new implementations of NG9-1-1 systems become more widely available, this document will be updated to assist in developing additional operational guidance.

2.7 Date Compliance

All systems that are associated with the 9-1-1 process shall be designed and engineered to ensure that no detrimental, or other noticeable impact of any kind, will occur as a result of a date/time change up to 30 years subsequent to the manufacture of the system. This shall include embedded application, computer based or any other type application.

To ensure true compliance, the manufacturer shall upon request, provide verifiable test results to an industry acceptable test plan such as Telcordia GR-2945 or equivalent.

2.8 Anticipated Timeline

Not applicable

2.9 Cost Factors

9-1-1 Authorities that work together to implement NG9-1-1 systems at the regional, state, or multi-state level will need to work out funding agreements that may be significantly different from how current 9-1-1 systems are funded. Who has responsibility for a particular NG9-1-1 system function, system operations/management, system security, participant call volume, and how any surcharges or other taxes are collected will all be factors in funding the NG9-1-1 system.

2.10 Future Path Plan Criteria for Technical Evolution

In present and future applications of all technologies used for 9-1-1 call and data delivery, it is a requirement to maintain the same level or improve on the reliability and service characteristics inherent in present 9-1-1 system design.

New methods or solutions for current and future service needs and options should meet the criteria below. This inherently requires knowledge of current 9-1-1 system design factors and concepts, in order to evaluate new proposed methods or solutions against the Path Plan criteria.

Criteria to meet the Definition/Requirement:

1. Reliability/dependability as governed by NENA's technical standards and other generally accepted base characteristics of E9-1-1 service
2. Service parity for all potential 9-1-1 callers
3. Least complicated system design that results in fewest components to achieve needs (simplicity, maintainable)
4. Maximum probabilities for call and data delivery with least cost approach
5. Documented procedures, practices, and processes to ensure adequate implementation and ongoing maintenance for 9-1-1 systems

This basic technical policy is a guideline to focus technical development work on maintaining fundamental characteristics of E9-1-1 service by anyone providing equipment, software, or services.

2.11 Cost Recovery Considerations

While specific cost recovery options are beyond the scope of this document, the use of IP technology may allow 9-1-1 to be another application on a shared public safety IP infrastructure. This could allow cost recovery to be considered on a wider scale than a 9-1-1 specific cost recovery model. NG9-1-1 system routing functions could also be used to support other N-1-1 entities that need accurate call routing, which could broaden the funding base and add additional funding sources.

2.12 Additional Impacts (non cost related)

The requirements contained in this NENA document are expected to have impacts regarding 9-1-1 management. Documents building on these requirements should provide additional details and guidance.

2.13 Intellectual Property Rights Policy

NENA takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights.

NENA invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard.

Please address the information to:

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2.14 Acronyms/Abbreviations

Some acronyms/abbreviations used in this document have not yet been included in the master glossary. After initial approval of this document, they will be included. See NENA Master Glossary of 9-1-1 Terminology located on the NENA web site for a complete listing of terms used in NENA documents.

The following Acronyms are used in this document:		
Acronym	***Description***	***** N)ew (U)pdate***
ACD	Automatic Call Distribution, Automatic Call Distributor	
GIS	Geographic Information System	
IP	Internet Protocol	
IP PSAP	Internet Protocol Public Safety Answering Point	N
NG9-1-1	Next Generation 9-1-1	
ORD	Operations Requirement Document	N
PSAP	Public Safety Answering Point or Primary Public Safety Answering Point	
PSTN	Public Switched Telephone Network	
QoS	Quality of Service	
SOP	Standard Operating Procedures	
VoIP	Voice over Internet Protocol	

The following Terms and Definitions are used in this document:		
Term	***Definition***	***** N)ew (U)pdate***
Call	A session established by signaling with two way real-time media and involves a human making a request for help. We sometimes use "voice call", "video call" or "text call" when specific media is of primary importance. The term "non human initiated call" refers to a one-time notification or series of data exchanges established by signaling with at most one way media, and typically does not involve a human at the "calling" end. The term "call" can also be used to refer to either a "Voice Call", "Video Call", "Text Call" or "Data–only call", since they are handled the same way through most of NG9-1-1.	N
Incident	A real world occurrence such as a heart attack, car crash or a building fire for which one or more calls may be received.	
Next Generation 9-1-1 (NG9-1-1)	https://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ng9-1-1_project/whatisng911.pdf The above link will take you to the web page showing NENA's current description/definition of NG9-1-1.	
System	A system is the hardware, software and databases necessary for NG9-1-1.	N

3 Call Delivery

3.1 Call Queue Management

(Provide the capability to manage call queues and deliver the call to the call taker queue.)

A. Call queues shall be displayed only to authorized system users.

B. The call queue information shall be based on the information delivered with the call.

C. The system shall provide the capability to configure the call queue content, based on local policy rules.

D. The system shall provide the capability to intelligently monitor call queues and automatically take action based on local policy rules.

E. The system shall provide real-time updates to the call queue.

F. The system shall be capable of providing a dynamically updated, incident specific voice announcement to callers in queue based on policy rules.

G. The system shall display the time elapsed for each call in the queue.

H. The system shall display call queues by an automatic call distributor type of function group.

I. The system shall display the time a call was placed in queue.

J. The system shall be capable of providing a visual warning when a call remains unanswered after a predefined number of seconds, as defined in local policy rules.

K. The system shall be capable of providing an audible warning when a call remains unanswered after a predefined number of seconds, as defined in local policy rules.

L. The system shall utilize location information delivered with the call and allow an automatic call distribution type of functionality to dynamically change call processing based on local policy rules.

M. The system shall support assignment of calltakers to geographic zones that correspond to incoming location information of the call.

N. The system shall analyze geographic information and alert calltakers when calls outside of a particular geographic area are presented.

O. The system shall support assignment of calls by calltaker skill sets based on an automatic call distribution type of function, based on the available calltaker skill set.

3.2 Call Distribution Rules

(Create specialized calltaker groups to be used in conjunction with call distribution rules)

Note: The term automatic call distribution refers to the ability for Policy Based Routing of incoming requests. This function should not be confused with the legacy product called ACD.

A. An automatic call distribution type of function group is a queue of calls/events defined by local policy rules such as call types, call data, call location and input from caller, providing skill-based call routing to a defined group of calltakers.

B. The system shall provide the capability to create groups with an automatic call distribution type of function.

C. The system shall support multiple groups with an automatic call distribution type of function.

D. The system shall provide the capability to read groups with an automatic call distribution type of function.

E. The system shall provide the capability to update groups with an automatic call distribution type of function.

F. The system shall provide the capability to suspend groups with an automatic call distribution type of function.

G. The system shall provide the capability to delete groups with an automatic call distribution type of function.

H. The system shall provide the capability to assign a calltaker to a group or groups with an automatic call distribution type of function by calltaker training level, skill, and experience level.

I. The system shall provide the capability to assign multiple calltakers to a group with an automatic call distribution type of function.

J. The system shall provide the capability to add calltakers to a group with an automatic call distribution type of function from a remote location.

K. The system shall provide the capability to add calltakers to a group with an automatic call distribution type of function who are not physically located in a PSAP.

L. The system shall provide the capability to delete calltakers from a group with an automatic call distribution type of function from a remote location.

M. The system shall provide the capability to restore groups with an automatic call distribution type of function.

N. The system shall provide the capability to save groups with an automatic call distribution type of function.

O. The system shall provide the capability to dynamically support all of the automatic call distribution type of function listed.

P. The system shall provide the capability to create automatic call distribution type of functions.

Q. The system shall provide the capability to read automatic call distribution type of functions rules.

R. The system shall provide the capability to update automatic call distribution type of functions rules.

S. The system shall provide the capability to delete an automatic call distribution type of functions rule.

T. The system shall provide the capability to suspend an automatic call distribution type of functions rule.

U. The system shall provide the capability to restore an automatic call distribution type of functions rule.

V. The system shall provide the capability to assign automatic call distribution type of function groups to a call distribution rule.

W. The system shall provide the capability to define automatic call distribution type of function rules based on resource availability, resource ability, group, event type, and direct number identification.

X. The system shall provide the capability to distribute automatic call distribution type of function rules.

Y. The system shall provide the capability to dynamically support all of the automatic call distribution type of function rules listed.

3.3 Use of Call Type Information

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

A. The system shall use call data to perform call treatment.

B. The system shall use the following data to determine Call Type: Emergency Location and Additional Data associated with the call.

C. The system shall be able to detect any unrecognizable formats or garbled data in the Call Type.

D. The system shall validate incoming Call Type.

E. The system shall provide the capability to allow a system administrator to create new Call Type definitions.

F. The system shall provide the capability to allow a system administrator to update Call Type definition.

G. The system shall ensure that the incoming call matches a predefined Call Type.

H. The system shall provide the capability to allow a system administrator to read an expected Call Type definition.

I. The system shall provide the capability to allow a system administrator to delete Call Type definition.

J. The system shall provide the capability to allow a system administrator to save Call Type definition.

K. The system shall assign a default Call Type for calls received with an undefined Call Type.

L. The system shall determine an appropriate Call Type for calls received with an undefined Call Type.

M. The system shall assign a default Call Type for calls received with an unrecognizable Call Type.

N. The system shall record the original Call Type when a received call type is a) unrecognizable, b) undefined.

O. The system shall indicate to the calltaker whether the Call Type of a call was changed by the system as the result of a received undefined Call Type.

P. The system shall indicate to the calltaker whether the Call Type of a call was changed by the system as the result of a received unrecognizable Call Type.

Q. The system will check Additional Data associated with the call to determine if the Call Type or Priority needs to be updated.

R. The system shall determine if Additional Data is associated with the call.

S. The system shall identify how to access the Additional Data.

T. The system will be able to retrieve any Additional Data.

U. The system shall maintain the credentials to allow access to the Additional Data associated with the call.

V. The system shall be able to automatically retrieve or query data from Additional Data sources to obtain the Additional Data associated with the call.

W. 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 policy rules.

X. The system will be able to update the call detail record with all data that affects the call treatment, and shall include the pointer(s) (e.g., reference – URL) to the datasets that provided the additional information.

3.4 Call Treatment Rules

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

A. The system shall route calls based on the associated call treatment process in the policy rules.

B. The system shall be able to handle calls that involve error cases (e.g. garbled callback or no location data), based on policy rules.

C. The system shall determine the call treatment for each call based on call type, location, and policy rules.

D. The system shall determine the proper treatment for fragmented or incomplete call records.

E. The system shall send a status/acknowledgement message to the communications device based on identified call treatment (e.g. text message returned saying "we got your text")

F. The system shall be able to provide an alternate call treatment when a call cannot be immediately answered because of call volume

G. The system shall provide the capability for the network administrator to dynamically make changes to the policy rules (which determine next-hop routing).

H. 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.)

I. The system shall be designed with sufficient bandwidth to support the predetermined limit of simultaneous calls using the type of transport technology supported that has the highest bandwidth requirement (e.g. calls may be voice, video, and / or text, with additional multimedia attached).

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

K. The system shall be capable of providing alternate call treatment for potentially redundant calls within a dynamically defined geographic area. Potentially redundant calls are those calls that may be reporting the same high visibility incident at a location, (e.g. highway crash).

L. The system shall provide alternate call treatment capability including distribution to an alternate location, a pre-recorded message that includes the ability to transfer to another location, a fast-busy signal, and other predefined call treatment or combination of treatments.

M. The system shall provide alternate call treatment capabilities for all media types or combination of media types including incoming voice, video, text, and emergency event notification (sensors / alarms) calls.

N. The system shall provide a visual indication, at the original PSAP, that calls are overflowing.

O. The system shall provide a visual indication at the designated overflow PSAPs or the alternate locations that they are now receiving overflow calls from the original PSAP with identification of the originating PSAP.

P. It shall be possible for PSAPs to accept additional media (e.g. images) from callers.

Q. The system shall be capable of multiple, pre-set failover scenarios.

R. The system shall allow PSAPs to receive event notifications from authorized systems.

S. The system shall support the generation of event notifications through standard interfaces of event notification systems operated by authorized entities within the NG9-1-1 system.

T. The system shall support the use of a backup PSAP that may or may not be on the same Emergency Services IP Network as the failed PSAP.

U. The system shall support emergency call routing from any entity capable of initiating an emergency call.

V. The system shall permit a call, and all of the associated call data, to be "quarantined" if a computer virus or some other malicious code is detected by the system's security systems.

W. The calltaker must be permitted to communicate with a quarantined caller to determine if an actual emergency exists.

3.5 Call Authentication

(The call authentication process ensures that the appropriate entity, such as the originating provider or other responsible party, has been granted permission to proceed (call treatment/processing) after call has accessed/entered the system.)

A. The system shall create a call detail record as the call enters the system.

B. The system shall write the certificate authentication details (successful and failed) to the call detail record.

C. The system shall certify / authenticate that the originating provider or other responsible party has been granted permission to deliver calls.

D. 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)

E. The system shall not accept calls from un-certified or unauthenticated providers (beyond this initial Step), the originating provider or other responsible party shall generate a call refusal or error message for the user (e.g., voice recording) if the call is not successfully authenticated.

F. The system shall generate a notice when the call is successfully authenticated.

4 Call Processing

4.1 Call Answering

(Provide the capability to answer a 9-1-1 call)

A. The system shall provide the capability for a calltaker to select a call from a call queue.

B. The system shall permit an authorized calltaker, as defined in local policy rules, to select any call from the queue.

C. The system shall record the time when a calltaker has selected a call.

D. The system shall record and identify the calltaker who selected the call.

E. The system shall record when a calltaker has selected a call out of queue order.

F. The system shall permit the calltaker to indicate a status of "Not Ready" for the situation where the user is signed-on (but not available to answer queue calls). – Based on local options include the ability to show not ready status to supervisor and other calltakers.

G. The system shall provide the capability to answer an incoming call.

H. The system shall be configurable to automatically answer the call for the calltaker.

I. The system shall display the default call handling procedure based on the data available with the call.

J. The system shall provide the capability to place a call on hold (two-way mute – audio specific).

K. The system shall provide the capability for calltaker to activate one-way mute for call. The system shall display a time on hold alert after predetermined number of seconds. This should display to the calltaker placing it on hold and/or the appropriate supervisor, based on local policy rules.

L. The system shall be capable of displaying call detail record of an active call and displaying multiple active call detail records of calls being worked, based on local policy rules.

M. The system shall be configurable to specify the elapsed time before the "time on hold" alert will be generated.

N. The system shall be configurable to deliver an audible and/or visual alert when the "time on hold" alert has been generated.

O. The system shall provide the capability to take a call off hold.

P. The system shall record and log the time a call is placed on hold.

Q. The system shall record and log the time a call taken off hold.

R. The system shall re-read and redisplay the call detail record each and every time a call is taken off hold.

S. PSAPs shall have facilities to detect and react to silent calls

T. The system shall be capable of terminating all communication links associated with the call.

U. The system shall have the capability to park a call.

V. The system shall have the capability to notify the caller that their call has been parked.

4.2 Communications Path

(Establish communications path between call)

A. The system shall provide the capability to reestablish a call path to a communications device.

B. The system shall provide the capability to establish a call path between a calltaker and a communications device if a call is abandoned before a calltaker can answer the call.

C. The system shall provide the calltaker with the supported call back communications method(s) for each call.

D. The system shall provide the option to read from the call detail record data to display any Additional Data that exists that provides additional call back methods.

E. The system shall display the supported call back communications methods to the calltaker, when a call back has been requested.

F. The system shall permit the calltaker to select from the supported communications methods when initiating a call back.

G. The system shall store the results of the call back attempt.

H. It shall be possible for PSAPs to supply ring back media to callers.

I. Voice activity Detection shall be disabled for emergency calls.

J. The system shall support the option of maintaining connectivity with the caller's device in situations of premature disconnect by the caller, when the originating network supports that feature.

4.3 Call Assessment

(Determine the nature of the emergency and provide an initial assessment of the situation)

A. The system shall display call handling procedures to a calltaker.

B. The system shall provide the capability to document the nature of the emergency for each call.

C. The system shall provide the capability to update the nature of the emergency.

D. The system shall provide the capability to document additional information for a call.

E. The system shall allow the call taker to edit information they are manually entering during the event creation process. Once the event is created all of the information must be preserved and any subsequent changes or editing must be logged.

4.4 Emergency Response Location

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

A. The system shall display call location information to the calltaker.

B. The system shall provide the capability to customize the display rules for call locations.

C. The system shall display call locations based upon display rules.

D. The system shall be capable of identifying known locations, or landmarks, within a user defined radius of geo-coordinates.

E. The system shall be capable of converting call location from civic address to geographic coordinates.

F. The system shall validate all locations entered by the calltaker.

G. The system shall provide the capability to document incorrect location information for correction, in the standard formats.

H. The system shall provide the calltaker with a capability to document the actual location of the emergency.

I. The system shall provide the capability to append the caller location information to the call detail record as the emergency location.

J. The system shall provide the capability for the calltaker to search for the emergency location using: geographic coordinates, civic address location, by clicking a location on an interactive map display, landmarks / common place names.

K. The system shall display location search results to the calltaker.

L. The system shall provide the capability for the calltaker to select the emergency location from the location search results.

M. The system shall write the emergency location to the call detail record when the calltaker accepts an alternate location as the emergency location.

N. The location source shall be identified and should be verified.

O. The system shall be capable of supporting three-dimensional location information (longitude, latitude, altitude).

4.5 Mobile Caller Location

(Receive location information for mobile callers; Wireless, mobile VoIP, and related technologies)

A. The system shall provide the capability to automatically update the caller location, as specified in policy rules.

B. The system shall provide the capability to activate the automatic location update function on a call-by-call basis.

C. The system shall also provide capability of requesting updated caller location from a mobile call service provider at a predetermined and configurable number of seconds.

D. The system shall be capable of providing alerts to calltaker when caller location has changed, subject to local policy rules.

E. The system shall provide the capability for a calltaker to manually initiate a location update.

F. The system shall provide the capability for the calltaker to manually initiate continuous location updates, at provider-defined update intervals.

G. The system shall archive automatic location updates as part of the Call.

H. The system shall archive manual singular location updates as part of the Call.

I. The system shall archive manual continuous location updates as a part of the Call so the entire location history can be reconstructed.

J. The system shall support the displaying of any location information present in the PIDF-Lo.

K. The system shall provide the capability to display update request results on the map display.

L. The system shall notify the calltaker before displaying automatic rebid requests.

M. The system shall support the capability of requesting different location types (last known, current, new, etc.)

N. The system shall support the capability of varying location parameters (maximum location age, minimum confidence factor, etc.) in the request for location updates.

O. The system shall support, if supplied, additional location related parameters such as velocity and direction, and be able to present those to the call taker.

P. The system shall determine, based on call and additional information received, if location updates are supported for the call.

Q. The system shall provide an indication to the call taker whether or not location updates are supported for the call.

4.6 Emergency Responder Determination

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

A. The system shall display the recommended emergency responder agencies associated with the emergency location.

B. The system shall display the recommended emergency responder agencies associated with the caller location until the emergency location is available.

C. The system shall display the recommended emergency responder agencies associated with the nature of emergency.

D. The system shall display the recommended emergency responder agencies associated with the call data if nature of emergency is not available.

E. The system shall log the displayed responder agencies for each call.

F. The system shall display call handling procedures based on policy rules to the calltaker.

G. The system shall display the mode of communication capabilities of the displayed responder agencies.

H. The system shall contain Responding Agency Data.

I. The Responding Agency Data shall include the following information for all responding agencies in the PSAPs jurisdiction: agency name, type of agency, response area, URL, telephone number, available communications media.

J. The system shall be capable of displaying the recommended responder agencies associated with the nature of event as determined by local policy rules.

K. All emergency responder agencies shall be uniquely identifiable nationwide.

L. The system shall have the capability to access individual agent data within the responding agency data.

M. The system shall contain SOPs for the display of emergency responder agency information.

N. The system shall contain rules for automatically determining whether a calltaker is needed for a given call based on data with the call or the type of device (i.e. data only sensor) placing the call.

O. The system shall provide the capability to refresh the list of response agencies.

P. The system shall provide the capability to search the responder list.

Q. The system shall provide the capability to search the responder list using Boolean search terms.

R. The system shall provide the capability to select responders from the list.

S. The system shall provide the capability to select individual agents within a responding agency.

T. The system shall log the selected responder agencies for each call.

U. The system shall provide the capability to provide a call record and associated notes to the selected responder agencies' dispatchers (all available data, the call itself – text voice video – and any calltakers notes associated with the call).

V. The system shall be capable of receiving the location of the caller from the access network or from a 3rd party.

4.7 Multiple Communication Device Support

(Establish communication between multiple communications devices; call taker, caller, third-party (e.g., vehicle telematics) service provider, and appropriate public safety entities)

A. The system shall provide the capability to establish a call path to a communications device.

B. The system shall provide the capability to establish a call path between multiple communication devices.

C. The system shall identify the media type of an incoming call (voice, video and/or text) to the calltaker when accepting or placing a call.

D. The system shall provide the capability to establish multi-media conferencing.

E. The system shall provide the ability to query a national database for emergency provider contact methods and access data, such as third party call centers, transportation dispatch centers.

F. The system shall log the results of the conference or transfer attempt.

G. The system shall provide the capability to store frequently used conference call participant paths.

H. The system shall provide the capability to store frequently used communications device paths.

I. The system shall choose the most appropriate conference type based on media and/or data of the call.

J. The system shall be capable of establishing conferences with any type of multimedia from any device capable of calling 9-1-1.

K. The system shall log conference requests, including: time/date, all conference participants, conference type, and conference status.

L. The system shall alert the calltaker in the event of a successful conference setup.

M. The system shall alert the calltaker in the event of an unsuccessful conference setup.

N. The system shall provide the capability to identify all conference parties.

O. The system shall provide the capability to allow all conference parties to identify all conference parties.

P. The system shall provide the capability to conference requested parties into a conference call.

Q. The system shall provide the capability to automatically connect multiple parties based on call data, access rights, and local policy rules.

R. Information maintained or collected by any party shall be accessible to all other authorized parties on the call. All authorized parties shall receive notification of available data.

S. The system shall be capable of utilizing a secondary network.

T. The system shall be capable of dynamically switching between primary and secondary networks to ensure call quality.

U. The system shall provide the capability of muting parties, including partial mute of individuals, being conferenced/transferred.

V. The system shall provide the capability of each calltaker to mute, un-mute other conference parties.

W. The system shall provide the capability to perform intra-PSAP call transfers

X. The system shall provide the capability to transfer calls to legacy PSAPs and legacy emergency responder agencies.

Y. The system shall notify the call taker of the incapacity/limitations of a targeted destination PSAP or emergency responder agency in supporting a call or data transfer (e.g., transferring an RTT call to a legacy emergency responder agency)

4.8 Additional Data

(Obtain Additional Data after call delivery to facilitate call processing.)

A. The system shall determine which queries are authorized for access based on established policy rules.

B. The system shall record the query parameters for all queries performed in the call detail record database.

C. The system shall record the query results for all queries performed in the call detail record database.

D. The system shall determine which queries are automatically executed based on established policy rules.

E. The system will provide an indicator that Additional Data is available. Additional Data should be accessible via a standard process involving no more than three steps, such as mouse clicks.

F. The system shall be capable of acquiring all Additional Data associated with the call and making it accessible to the calltaker, subject to security access and local policy rules.

G. The system shall provide the capability for authorized personnel to access Additional Data associated with the call.

H. The system shall provide the capability to search Additional Data associated with the call.

I. The system shall display Additional Data associated with the call based on policy rules.

J. The system shall support queries of Additional Data associated with the call from other internal and external systems (SIP messages, SIP header, call detail record data, floor plans, medical records data, and other data sources).

K. The system shall support drill-down queries of Additional Data associated with the call to obtain additional detail.

L. The system shall be capable of allowing a PSAP to download Additional Data from an external source for fast retrieval under specifically agreed to conditions.

M. The system shall require that all Additional Data elements provide data elements associated with the location, caller or call.

N. The system shall be capable of acquiring Additional information from other databases and sources based on the location of the call or the location of the emergency location.

O. The system shall be capable of distinguishing between data associated with a building or campus and a tenant of such a building or tenant. Each source may have different Additional Data.

P. The system shall be capable of providing Additional Data associated with the Address of Record of the caller.

4.9 Data Transfer

(Transfer all Additional Data associated with the call and any manually-entered data (e.g. call taker notes) concerning the call to the appropriate responding agency dispatch or other authorized entity.)

A. The system shall provide the capability to transfer a call, additional call related data received or a query key for the retrieval of the additional data, call related data created during call processing (e.g. call taker notes), and the call detail record.

B. The system shall provide the capability to transfer the call and the associated data only to authorized recipients.

C. The system shall log the transfer of all calls and associated data.

D. The system shall log data transfer attempts, including transfer request date/time, notification of transfer success/failure date/ time, transfer requestor, intended recipient, transferred data.

E. The system shall display a message that data was not received to the originating requestor upon failed call data transfer.

F. The system shall display an acknowledgement message of data receipt to the originating requestor upon successful call data transfer.

G. The system shall provide the capability to convert the NG9-1-1 location information to meet the capability of the destination PSAP.

4.10Location Map Display

(Display location and geospatial information on a GIS based map display)

A. The system shall provide the capability to display GIS based data.

B. The system shall provide capability to display a Caller Location on a GIS map display.

C. The system shall provide the capability to display an Emergency Location on a GIS map display.

D. The system shall be capable of displaying multiple locations associated with a single call by using different icons to represent the locations.

E. The system shall provide the capability to zoom on the GIS based map display.

F. The system shall provide the capability to pan on GIS based map display.

G. The system shall provide the capability to store geographic information system databases in GML formats.

H. The system shall provide the capability to turn on and off specific theme based layers of information, and be able to select on specific layers on a GIS map display (e.g. water, hydrants, city boundaries, aerial photography).

I. The system shall provide the capability to display the emergency responder agencies associated with a Caller Location on the GIS based map display.

J. The system shall provide the capability to display the emergency responder agencies associated with an Emergency Location on the GIS based map display.

K. The system shall display the emergency responder agencies associated with a Caller Location on the GIS based map display.

L. The system shall display the emergency responder agencies associated with an Emergency Location on the GIS based map display.

M. The system shall display caller location information on the GIS based map display.

N. The map display shall have the ability to include both raster and vector data.

O. The GIS based display shall include status and selected call data and any associated data through indicators as part of the call or emergency location status icons.

4.11 Working with GIS Data

(Manipulate location and geospatial information)

A. The system shall provide the capability to manipulate the GIS based map display.

B. The system shall provide the capability to draw geometric shapes on the GIS based map display.

C. The system shall provide the capability to select data from the drawn geometric shapes on the GIS based map display.

D. The system shall provide the capability to search the NG9- 1-1 data by any selected geometric shape drawn on the GIS based map display.

E. The system shall provide the capability to search the NG9- 1-1 data repositories by any user generated geometric shape.

F. The system shall provide the capability to display query results on the GIS based map display.

G. The system shall display the emergency responder agency for a given location.

H. The system shall have the capability of displaying any information in the databases associated with any locations on the GIS based map display, where such information in not restricted by security or policy.

4.12 Call Handling Protocols and Procedures

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

A. The system shall display call handling procedures to a calltaker.

B. The system shall provide the capability for authorized personnel to edit call handling procedures.

C. The system shall provide the capability for authorized personnel to suspend call handling procedures.

D. The system shall provide the capability for authorized personnel to input and edit call handling procedures.

E. The system shall log all changes made to call handling procedures including unique user id, time, and audit trail of changes made.

F. The system shall provide the capability for authorized personnel to delete call handling procedures.

G. The system shall provide the capability for authorized personnel to amend and notate any compliance reports and the system will log any changes.

H. The system shall provide the capability to measure a calltakers consistency with a call handling procedure.

I. The system shall provide the capability to generate statistical or call specific reports of a calltaker's consistency with call handling procedures.

J. The system will be able to generate statistical or call specific reports based on authorized personnel defined reports.

K. The system shall provide the capability for a calltaker to select the appropriate call handling procedure based on the data associated with the call.

L. The system shall store the data that measures the compliance of each calltaker.

M. The system shall provide the capability to read the data that measures the compliance of each calltaker to authorized individuals.

N. The system shall provide the capability to sort the data that measures the compliance of each calltaker.

If the system has call handling protocol software, the following requirements apply:

1. The system shall provide the capability for a calltaker to select pre-arrival instruction based on the nature of the emergency.
2. The system shall display pre-arrival instructions to the calltaker.
3. The system shall prioritize pre-arrival instructions based on data delivered with the call, additional information obtained, or information associated with the call, by the calltaker.
4. The system shall provide the capability to search the pre-arrival instruction database.

5. The system shall provide the capability to deliver appropriate pre-arrival instructions in accordance with accepted standards and operational best practices.

5 Call Management

5.1 Call Detail Records

(Dynamically create, maintain and preserve Call Detail Records)

A. The Call Detail Record shall at minimum contain: date(s), times, packetized Additional Data, service originator code, Caller Location, Call Type, network processing data, caller classification, and all other data added by the system during the call processing from originator to call conclusion.

B. The system shall provide the capability to create a Call Detail Record.

C. The system shall provide the capability to read a Call Detail Record.

D. The system shall provide the capability to update a Call Detail Record with any updates being logged, including transitions, which will include time stamp and user ID.

E. The system shall provide the capability to delete a Call Detail Record for the purpose of archiving.

F. It shall be possible to uniquely identify a call throughout its life cycle in the call detail record.

5.2 Incident Records

(Dynamically create, maintain and preserve Incident Records)

A. The system shall provide the capability to create an Incident Record.

B. The system shall provide the capability to read an Incident Record.

C. The system shall provide the capability to update an Incident Record.

D. The system shall provide the capability to delete an Incident Record.

E. The system shall assign a unique identifier to an Incident Record.

F. The system shall provide the capability of merging 2 or more Call Detail Records to an existing Incident record.

G. This merging may be done after the call(s) have been completed, such as by records management staff assigned with this responsibility.

H. The system shall permit the appropriate entity/person(s) to be assigned the capability of determining which existing Call Detail Record will be the master one.

I. The system shall provide the capability to search Incident Records.

J. The system shall store Incident Records.

K. The system shall maintain the association between an Incident Record, the Call Detail Record, and Call Recording, including notes added by the call taker.

6 Logging

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

6.1 Call Logging

A. The system shall log all calls.

B. The system shall provide the capability to log calls at redundant, diverse locations.

C. The system shall log all incoming multimedia, data, and designated non-emergency communications.

D. The system shall link logged data with the unique identifier of each call.

E. The system shall be able to link logged data regardless of media type to construct a single logged record of all data associated with a call or incident.

F. The system shall provide the capability to transfer a logged data to an external source.

G. The system shall provide the capability to transfer selected components of the logged data set based on the third party's level of authorization.

H. The system shall be capable of indicating call termination

I. The system shall be capable of logging which party terminated the call.

J. The system shall provide the capability to access logged data from a remote location.

K. The system shall log calls while the call is in a call queue, assigned, in process, and on hold.

L. The system shall provide the capability to access logged data.

M. The system shall provide the capability to display previous logged data for Instant Playback based on established local policy.

N. The system shall provide the capability to retrieve a logged data with its Call detail Record.

O. The system shall provide the capability to search the logging system database.

P. The system shall provide the capability to retrieve logged data based upon search criteria.

Q. The system shall provide the capability to retrieve logged data after a call.

R. The system shall provide the capability to retrieve logged data during a call.

S. The system shall provide the capability to monitor logged data during a call.

T. The system shall provide the capability to display non-audio logged data

U. The system shall provide the capability to replay logged data regardless of media type.

V. The system shall provide the capability to pause logged data.

W. The system shall provide the capability to rewind logged data.

X. The system shall provide the capability to fast forward logged data

Y. The system shall provide the capability tolocate an incident and all its related callswithin the logging function.

Z. The system shall support validation and credentialing of authorized IP connections for logging and associated functions.

AA. The Logging function shall support Audio mixing (combining of multiple audio streams into a single stream for playback, i.e. bridging).

BB. The Logging function shall support playback of multiple video streams simultaneously.

CC. The Logging function shall support Simultaneous display and/or playback of Logged Data such that the original timing of the Logged Data is reproduced in the original sequence.

DD. The Logging function shall support Retrieval of Logged Data for purposes of conducting evaluations and assessments of PSAP personnel performance, i.e. quality assurance and quality monitoring activities.

EE. The Logging function shall support Retrieval of Logged Data for purposes of producing external copies. Examples would be copies produced in response to a subpoena, request from a Prosecutor, or media request.

FF. The Logging function shall support acquisition of Display data (screen capture) via the user interface.

GG. The Logging function shall support “virtual logger” architecture, i.e. where a Logging function can be shared by multiple agencies, but each agency has access to only its own data and configuration.

HH. The Logging function shall support fault tolerant data storage such that failure of a single storage medium will not result in loss of data.

II. The Logging function shall provide and support a fault-tolerant architecture that allows failover to another Logging function in the event the primary Logging Service becomes unavailable.

JJ. The Logging function shall keep an “audit trail” of all configuration changes and all attempts to access Logged Data (successful and unsuccessful). This audit trail shall contain the type of access or change the parameter or data accessed the username, and the

date/time of the access or change. The audit trail data constitutes a "chain of custody" record for the referenced data or configuration parameters.

KK. The Logging function shall support retention policies for Logged Data that deletes expired data as required by local policy rules. These retention policies must be capable of operating in the "virtual logger" architecture described above.

LL. The Logging function shall support "functionality that allows the user to mark certain Logged Data to NOT be deleted when its retention period has expired.

MM. The Logging function shall support time synchronization.

7 Location and Routing Database Management

7.1 Call Data Error Correction

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

A. The system shall provide the capability to document incorrect call information and any associated data received as part of call treatment.

B. The system shall pre-populate the discrepancy report with the associated source data,

C. The system shall provide the capability for the user to submit a discrepancy report for correction.

D. The system shall determine the entity(s) responsible for correcting the source data.

E. The system shall transmit the discrepancy report to the entity(s) responsible for correcting the source data.

F. The system shall pre-populate the location discrepancy report with call identification information.

G. The system shall pre-populate the location discrepancy report with the incorrect information.

H. The system shall provide the capability for free form text in discrepancy and status reports.

I. The system shall provide the capability for the entity(s) responsible for correcting the information to return an incident identifier for the discrepancy to the initiating agency.

J. The system shall provide the capability for the entity(s) responsible for correcting the information to provide a completion status report to the initiating agency.

K. The system shall provide an automated process for the requestor to determine the status of an outstanding request.

7.2 Location Validation

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

A. The system shall recognize Call Location Information formatted to NENA Approved Standard Formats & Protocols (e.g. PIDF-LO).

B. The system shall check Call Location for unrecognizable data type.

C. The system shall perform location validation on civic addresses.

D. The system shall check Call Location for garbled data.

E. The system shall check Call Location fields for logical data ranges.

F. The system shall check Call Location fields for logical content.

G. The system shall make use of Default routing in the event of a failed location determination attempt.

H. System shall support the ability to provide and filter updates to the location information.

I. The solution shall specify when multiple locations are permitted, what the interpretation of multiple locations shall be, and what the functional elements must do with the locations.

J. The system shall permit location and address validation by any entity capable of routing an emergency call.

8 Recommended Reading and References

The following documents were used in the preparation of this standard:

- US Department of Transportation Next Generation 9-1-1 (NG9-1-1) System Initiative System Description and Requirements Document https://rosap.ntl.bts.gov/view/dot/4013

9 Exhibits

None

10 Previous Acknowledgments

None