NENA Standard for NG9-1-1 Additional Data

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

Doc #	Approval Date	Reason For Changes
NENA 71-001	09/17/2009	Initial Document - portions to be merged with i3, Stage 3, document. Some information will also be used to develop guidelines for 9-1-1 Authorities
NENA-STA-012.2-2017	12/21/2017	• Updated Acknowledgements • Clarifications to Executive Overview • Additions to Operational Impacts Summary • Updated description of mechanisms used to source Additional Data, updated per NENA-STA-010 [10]. • Extensive changes to Additional Data for the Call, to reflect the release of the related RFC 7852 [1]. • Removal of the section defining the EIDD, which is defined via a separate standard through a joint APCO/NENA Workgroup. • Clarification of relationship between Roles, Functional Elements, and available Conveyance Mechanisms and expected data "blocks". • Further documentation on the use of xCard across various forms of Additional Data • Definition of new Additional Data "blocks" to carry Caller and Location specific additional data. • Modifications to document format to reflect the most current template for NENA Standards • Addition of sections 4 and 5 to accommodate schema work.

Table of Contents

1 EXECUTIVE OVERVIEW 7

2 ADDITIONAL DATA FOR THE CALL / LOCATION / CALLER 8

2.1 xCard and Additional Data 10
2.2 Roles 10
2.3 Additional Data for the Call 12
2.3.1 Additional Data for the Call – Overview 12
2.3.2 Additional Data for the Call – Example Workflow 13
2.3.3 Additional Data for the Call – Data 14
2.4 Additional Data for the Location 15
2.4.1 Additional Data for the Location – Overview 15
2.4.2 Additional Data for the Location – Example Workflow 16
2.4.3 Additional Data for the Location– Data 17
2.5 Additional Data for the Caller 18
2.5.1 Additional Data for the Caller – Overview 18
2.5.2 Additional Data for the Caller – Example Workflow 19
2.5.3 Additional Data for the Caller – Field Summary 21
2.6 xCard Profile for Additional Data 23
2.6.1 xCard Profile by Additional Data Block 24
2.6.2 xCard Fields ignored by North American NG9-1-1 Implementations 30

3 NENA REGISTRY SYSTEM (NRS) CONSIDERATIONS 32

4 MIME REGISTRATIONS 32

4.1 MIME Content-Type Registration for 'application/EmergencyCallData.NENA-LocationInfo+xml' 32
4.2 MIME Content-Type Registration for 'application/EmergencyCallData.NENA-CallerInfo+xml'33

5 DOCUMENTATION REQUIRED FOR THE DEVELOPMENT OF A NENA XML SCHEMA 33

5.1 LocationInfo Schema 33
5.1.1 Schema Purpose 33
5.1.2 Parent Element 34
5.1.3 Child Elements 34
5.1.4 WSDL Needed 34
5.2 CallerInfo Schema 35
5.2.1 Schema Purpose 35
5.2.2 Parent Element 35
5.2.3 Child Elements 35
5.2.4 WSDL Needed 36
5.3 XML Example(s) 36
5.4 Additional Notes 36

6 IMPACTS, CONSIDERATIONS, ABBREVIATIONS, TERMS, AND DEFINITIONS 36

6.1 Operations Impacts Summary 36
6.2 Technical Impacts Summary 37
6.3 Security Impacts Summary 37
6.4 Recommendation for Additional Development Work 37
6.5 Anticipated Timeline 38

6.6 COST FACTORS 38
6.7 COST RECOVERY CONSIDERATIONS 38
6.8 ADDITIONAL IMPACTS (NON-COST RELATED) 38
6.9 ABBREVIATIONS, TERMS, AND DEFINITIONS 39

7 RECOMMENDED READING AND REFERENCES 40

ACKNOWLEDGEMENTS 42

1 Executive Overview

With the implementation of NG9-1-1 there will be many forms of Additional Data available to telecommunicators and emergency responders beyond the primary call data from SIP INVITE [2 PIDF-LO] & MESSAGE [11], and the primary street address and/or geodetic location data available from [12]. This document defines how to populate the Additional Data structures to describe three entities commonly associated with an emergency call: the *Caller* placing the emergency call, the *Location* the emergency call is placed from, and the *Call* itself (information about the means of communication). The combination of this primary data with Additional Data can assist in determining appropriate call routing and handling, as well as providing telecommunicators and first responders with information to better address the referenced incident. Additional Data collected by the PSAP while handling the call is captured in an Emergency Incident Data Document (EIDD) and passed to other agencies that are involved with the incident. The EIDD is developed jointly by NENA and APCO, and is described in a separate Standard [7].
The purpose of this document is to describe how to populate Additional Data structures (content, formats, and schemas) to carry information about the Call, Location, and Caller for an emergency call. Where necessary, this document directs the reader to documentation produced by NENA or other organizations for further information. Detailed descriptions of how Additional Data is sourced, and the mechanisms for conveying the Additional Data documents described in this NENA Standard are defined in *NENA Detailed Functional and Interface Standards for the NENA i3 Solution* (NENA-STA-010) [10]. Information on the sourcing and conveyance of Additional Data described within this document are provided for context and clarity only, and are not intended to be normative.

Any of the Additional Data elements within this document MAY be used by 9-1-1 Authorities to establish business rules/policies for call handling and routing. Furthermore, Additional Data MAY be presented directly to telecommunicators and first responders in order to improve decision making and incident response.

This document leverages the Internet Engineering Task Force's (IETF) RFC 7852, “Additional Data related to an Emergency Call” [1], which defines XML data structures for carrying additional data beyond the primary data. This document identifies how to populate additional data for the call structures from RFC 7852, for use in North America. It also extends RFC 7852 for additional data for the location, and additional data for the caller, for use in North America. These use cases for providing Additional Data are as follows:

- **Additional Data for the Call**: providing contact information for the access provider or an intermediary, the nature of communication service used by the caller, and any subscriber identity and contact information disclosed by the provider of the Call data. This document does not extend any of RFC 7852 structures for this type, but does clarify values for some fields.
- **Additional Data for the Location**: providing descriptive information about the location associated with the origination of the call, beyond the primary street address or geodetic location. This information can include floor plans, structure details, property management contacts, fire suppression resources, and sensor data (e.g. intrusion or fire detection). Additional Data for the Location contains descriptive information about the site and/or

structure beyond what PIDF-LO can incorporate. This document defines NENA data structures for additional location data by reusing and extending upon the additional call data structures specified by the RFC 7852 [1].

- **Additional Data for the Caller**: providing information which describes the caller, including name, common address(es), biographic statistics, medical conditions, and emergency contact information. The Caller can be either a witness to or the subject of the reported emergency. This document defines NENA data structures for additional caller data by reusing and extending upon the additional call data structures specified by the RFC 7852 [1].

While the focus of this document is on the communication of Additional Data in the provided formats, the data structures defined here are also used by functional elements such as the Legacy Network Gateway (LNG) and Legacy PSAP Gateway (LPG). NENA-STA-010 [10] describes how the LPG references Additional Data to populate ALI for Legacy PSAP's and how the LNG populates these Additional Data structures from ALI and other Legacy 9-1-1 data sources.

The implementation of some aspects of this standard may be affected by regulatory, privacy and confidentiality requirements. It is the responsibility of the implementers to determine what can and cannot be implemented in a given jurisdiction.

2 Additional Data for the Call / Location / Caller

Additional Data is information which can be associated with a given emergency call, and is managed and sourced from outside the ESInet and its associated NG9-1-1 Core Services (NGCS). For the purpose of this document, an "emergency call" is a generic term meaning an interactive multimedia session or a non-human-initiated event.

The availability of Additional Data for a given call is indicated by any of the following:

- The existence of additional data Call-Info headers within the initial message of a SIP transaction. These additional data SIP Call-Info headers MAY contain Additional Data by-value, or Additional Data by-reference (dereferenced against an ADR).
- Additional *Caller* Data MAY also be retrieved by querying external IS-ADRs.
- URI's pointing to Additional *Location* Data may be discovered by the ECRF's findService request with the Additional Data URN. These URI's may then be dereferenced against ADRs to access the associated Additional *Location* Data.
- The existence of additional data blocks by value and/or by reference in the <provided-by> element of a PIDF-LO.

Three mechanisms are defined through NENA-STA-010 [10] for sourcing Additional Data:

- "by-reference" – using Call-Info header(s) included with the call's SIP INVITE or MESSAGE method that include a URI pointing to an externally-hosted source for the referenced Additional Data. When Additional Data is passed "by reference", it is retrieved via a HTTPS GET operation issued against the referenced ADR, using the URI provided within the "emergencyCallData" SIP Call-Info header. The PIDF-LO's provided-by element MAY also contain Additional Data by-reference.

- "by-value" – using Call-Info header(s) included with the call's SIP INVITE or MESSAGE method containing a Content ID (cid:) URL [3] pointing to the MIME body within the SIP INVITE or MESSAGE method that contains the Additional Data XML document. The PIDF-LO's "provided-by" element MAY also contain Additional Data by-value.
- "Queried" – where the referenced Additional Data is retrieved by querying a resource using information associated with the call, i.e.:
    - Additional Data for the Location MAY be retrieved by a two-step process:
        - First, by querying an ECRF to return one or more URI's in response to providing the additionalData service URN (urn:nena:service:additionalData) and a civic or geodetic location. The location provided is typically the location passed in the PIDF-LO, but could be the dispatch location, or another location of interest.
        - Second, by dereferencing the returned URI's against the targeted ADR resources to return the corresponding Additional Location Data.
    - Additional Data for the Caller MAY be retrieved by querying an IS-ADR via a SOAP web service passing the URI found in the P-A-I (P-Asserted-Identity) [16] or "From" header of the SIP INVITE [2] or MESSAGE [11] as the callerURI parameter of the IS-ADR request. Where data is found, the IS-ADR may provide Additional Data for the Caller "by-reference" through a URI, or it may respond "by-value" returning XML containing the Additional Data for the Caller.

  Additional Data queries MUST be responded to with an indication of "no results", a URI "pointer" to the externally hosted Additional Data, or an XML document containing the requested Additional Data itself.

As defined by NENA-STA-010 [10] not all Additional Data Entities can be retrieved via all of the mechanisms described above. The IETF and NENA standards referenced by this standard define which mechanism MAY be used to convey a given additional data entity-type. The specific mechanism supported for a given form of Additional Data is provided in Table 1.

Additional Data Entity	"by-reference" in SIP Call-Info Header	"by-value" in SIP Call-Info Header	"by-value" in PIDF-LO	"by-reference" in PIDF-LO	Data URI "Queried" from a Resource	By-Value "Queried" from a Resource
Call Data	X	X	X	X		
Location Data					X	
Caller Data	X				X	X

Table 1 – Expected Additional Data Communication Mechanisms by Additional Data Type

Consumers of additional data should recognize there is no explicit limit to the size of additional blocks, or the number of additional data blocks associated with an emergency call. Data providers are strongly encouraged to use the "by-reference" or "queried" mechanism over "by-value" in order

to limit the overhead of passing Additional Data through all Functional Elements where not required. For example it is not expected that Additional Data for the Location to be available in the SIP Call-Info Header or the PIDF-LO.

2.1 xCard and Additional Data

xCard [5] is an XML representation of vCard [6], a widely accepted standard for sharing "contact-style" information about a person or other entity. xCard has been selected to convey contact information passed as part of Additional Data. Section 2.6 provides a NENA-specific profile of xCard as it applies to this standard.

2.2 Roles

For a given emergency call, each xCard document made available as Additional Data describes an actor engaged in the 9-1-1 call. These actors are all external to the ESInet/NGCS. In support of the tables and content within this document, each actor can be mapped to one of six roles: An Emergency Caller, Service Provider, Subscriber, Emergency Contact, Emergency Participant, or Data Provider. These roles are separate and distinct from the xCard "ROLE" field which is populated by the data provider from the valid values defined for xCard ROLE. While it is possible for the same actor to play more than one role, a separate xCard MAY be generated for each actor/role combination. The Roles are as follows:

Emergency Caller: the individual who is placing the 9-1-1 call to request emergency assistance. This individual may or may not be the Emergency Participant. It can be expected that the Emergency Caller is calling on behalf of the Emergency Participant (i.e., a call placed by a 3rd party) experiencing an emergency. A Caller is one or more individuals described as the primary users of the communications device/user-agent associated with the URI in the From or P-A-I header.

Service Provider: an entity that plays a role in connecting the Caller to the PSAP. For legacy telephony services, there is typically a single Service Provider for a 9-1-1 call. In some instances there may be multiple Service Providers in the path of the call. For example, a call carried by an independent VoIP service, running over the caller's Internet Service Provider (ISP) network may be accompanied by two Service-Provider-describing sets of Additional Call Data: one for the VoIP provider, and one for the ISP.

Subscriber: The entity known to the Service Provider as the party responsible for the communication service contract. While the Subscriber is frequently the same as the Emergency Caller, this cannot be assumed. Often the Subscriber and Emergency Caller roles are filled by different actors. For example, a company (Acme Inc.) may procure a mobile phone for their sales rep (Jane Doe). In this case, the Subscriber role is assumed by "Acme Inc." while the Caller role is assumed by "Jane Doe".

Emergency Contact: An Emergency Contact is an individual or organization which is typically different than the Emergency Caller. Emergency Contact data describes how to contact this individual or organization, and what action is requested of the PSAP when this information accompanies an emergency call.

Data Provider: A Data Provider is the entity that provides Additional Data. In some cases, a 3rd party is contracted to store and source Additional Data on behalf of the Emergency Caller, Service Provider, Subscriber, or the owner/operator of a site/structure. In this case, contact information for the Data Provider is made available should the recipient of the Additional Data need to resolve a discrepancy, or request further assistance.

Emergency Participant: The Emergency Participant is the individual in need of emergency assistance. The Emergency Participant may or may not be the Emergency Caller. At this time, there are no means to reliably identify, retrieve, and convey information about the Emergency Participant. As such the interfaces defined through this standard do not distinguish between the Emergency Caller and Emergency Participant.

Not all Roles can be described by all forms of Additional Data. The following table identifies which Role(s) a given form of Additional Data is able to describe:

Role	Additional Data Entity		
	Call Data	**Caller Data**	**Location Data**
Subscriber	X		
Emergency Caller		X	
Service Provider	X		
Emergency Contact	X	X	X
Data Provider	X	X	X

Table 2 – Roles described within a given form of Additional Data

Finally, not all Additional Data Functional Elements can produce all Additional Data entity types:

Functional Element	Type of Additional Data		
	Call	**Caller**	**Location**
Device or User Agent	X	X	
ADR	X	X	X
IS-ADR		X	
LIS PIDF-LO Source	X		

Table 3 – Roles known by Additional Data Functional Elements

Further details on how each type of Additional Data is sourced, including example call flows, is provided in the following sub-sections.

2.3 Additional Data for the Call

2.3.1 Additional Data for the Call – Overview

The format and handling of Additional Data for the Call is defined through the following specifications:

- The structure of Additional Data for the Call is developed through RFC 7852 [1]. This document (NENA-STA-012.2) supplements the IETF document by describing NENA-specific implementations of the IETF-defined XML schema.
- The mechanisms for sourcing, communicating and retrieving Additional Data for the Call in a North American NG9-1-1 environment is described NENA-STA-010 [10].

Additional Call data, provided in the form of an XML document, is associated with a specific 9-1-1 call. Additional Call data MAY be added to the SIP INVITE or MESSAGE. Additional Data for the Call describes the nature of the communications service provided, and contact information for the service provider or device sourcing the Additional Call Data. Additional Data for the Call MAY be inserted by the device which places the call, or any intermediary service provider, such as a carrier, telematics provider, alarm company or video relay service. Additional Call Data also provides a means to pass information which is unique to the device placing the call, or the service carrying the call; for example Additional Data for the Call MAY carry a Device or Service Specific URI pointing to Vehicular Emergency Data Set (VEDS) [13] data or other telemetry data reported by a device.

The following informative text describes how Additional Data for the Call is conveyed within a NG9-1-1 environment. NENA-STA-010 [10] is the normative document regarding conveyance and the reader is expected to reference that standard for further detail. Where a difference exists between this document and NENA-STA-010, the information in NENA-STA-010 prevails. Additional Data for the Call is conveyed within either a SIP Call-Info header [2] having a "purpose" parameter beginning with "emergencyCallData" and containing the Data Structures defined in section 2.3.3, or within the PIDF-LO "provided-by" element. Typically, entities within the call-signaling path, such as devices or intermediary services providers, will insert Additional Data for the Call into a SIP Call-Info header, whereas entities outside of the call-signaling path, such as access providers, MAY insert Additional Data for the Call into the PIDF-LO that contains the location data they source. In cases where a single entity is both the service provider and the access provider, Additional Data for the Call SHOULD be provided via both the SIP Call-Info header and the PIDF-LO "provided-by" element, as the nature of the underlying access service is expected to differ from the nature of the communications service carrying the 9-1-1 call.

More than one SIP Call-Info header having an emergencyCallData purpose-parameter can be provided for a given call. Multiple SIP Call-Info headers are inserted to convey multiple data blocks sourced by a single provider and/or data blocks sourced by multiple providers. The device MAY insert blocks, and an intermediary MUST insert its own block(s). When there are multiple intermediaries each intermediary that can differentiate the call as an "emergency" call SHOULD insert at least one emergencyCallData SIP Call-Info header. For example, a telematics service provider could provide blocks containing telematics data, and the mobile carrier handling the call could contribute blocks to describe the nature of the mobile service used to complete the emergency

call. At a minimum, any intermediary that inserts an emergencyCallData SIP Call-Info header MUST insert a Provider Info block.

When provided through the PIDF-LO within the "provided-by" element, Additional Call Data is preferably passed "by-reference" but MAY alternatively be passed "by-value".

2.3.2 Additional Data for the Call – Example Workflow

An example of how Additional Data for the Call can be sourced follows. This example is provided to help illustrate the concepts covered in this document. *It is not intended to document all possible use cases or Additional Data for the Call sourcing options*. One or more of the following mechanisms MAY be employed for a given emergency call.

Example 1: Additional Data for the Call is communicated by the caller's service provider directly within the SIP INVITE

1. A mobile phone subscriber who is in distress places a 9-1-1 call from its mobile phone.
2. The Mobile Carrier completing the call inserts two or more SIP Call-Info headers into the emergency call's SIP INVITE. These SIP Call-Info headers have the following properties:
   a) They contain a Purpose parameters beginning with "EmergencyCallData."
   b) Each SIP Call-Info header encapsulates a URI pointing back to an ADR hosted by the Mobile Carrier, or a 3rd party operating on behalf of the Carrier.
   c) Minimally, the Provider Info block, and at least one other block described in Section 2.3.3 are passed each in their own SIP Call-Info header.
3. The Originating ESRP(s) route the INVITE to the appropriate PSAP
4. The PSAP's Terminating ESRP forwards the INVITE to the most appropriate telecommunicator.
5. The telecommunicator's User Agent accepts the SIP INVITE.
6. The telecommunicator's workstation inspects the INVITE for the presence of Additional Call Data SIP Call-Info headers.
7. Any discovered URI's are dereferenced against the target ADR (either automatically or when requested by the telecommunicator).
8. The carrier's ADR receives each of the dereference requests. For each request, the target ADR:
   a) Checks the PSAP's credentials.
   b) Returns the XML document associated with the proffered URI, or an error message.
9. The telecommunicator's application will parse the XML data and render this data in a meaningful way for the telecommunicator, trigger an automated action, or both based on the content of the XML documents and the business logic within the telecommunicator's workstation application.
10. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Call Data documents can be shared via the EIDD.

Example 2: Access-Provider sourced Additional Data for the Call is discovered through the call's PIDF-LO.

1. A VoIP subscriber who is in distress places a 9-1-1 call from a VoIP client, which is running on a device connected to the internet via a public Wi-Fi access point.

2. The VoIP client inserts a geolocation header into the SIP-INVITE. This geolocation header contains a URI pointing to a LIS operated by the Access Provider.
3. The Originating ESRP dereferences the URI against the Access Provider's LIS, retrieves the caller's location, and routes the call to the PSAP serving the caller's location.
4. The PSAP's Terminating ESRP forwards the INVITE to the most appropriate telecommunicator.
5. The telecommunicator's User Agent accepts the SIP INVITE.
6. The telecommunicator's workstation dereferences the URI in the geolocation header against the Access Provider's LIS.
7. After validating the PSAP's credentials, the LIS returns a PIDF-LO in response to the query utilizing the URI within the geolocation header.
8. The PIDF-LO document includes a provided-by element containing at least an EmergencyCallData Provider Info block, and potentially other Additional Data for the Call blocks, enclosed within EmergencyCallDataValue blocks. Each EmergencyCallData block contains an XML fragment describing an aspect of Additional Data for the Call, as reported by the Access Network Provider.
9. The telecommunicator's application will parse the Additional Call Data XML and render this data in a meaningful way for the telecommunicator, trigger an automated action, or both based on the content of the XML and the business logic within the telecommunicator's workstation application.
10. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Call Data documents can be shared via the EIDD.

2.3.3 Additional Data for the Call – Data

This section summarizes which blocks defined in the IETF RFC 7852 [1] are used to carry Additional Data for the Call within NENA-STA-010 compliant architecture. This section is provided for references purposes. The RFC is the normative document for Additional Data for the Call.

The RFC 7852 includes four blocks for Additional Data for the Call:

- EmergencyCallData.ServiceInfo (section 4.2)
- EmergencyCallData.DeviceInfo (section 4.3)
- EmergencyCallData.SubscriberInfo (section 4.4)
- EmergencyCallData.Comment (section 4.5)

When any one of the above is included, the EmergencyCallData.ProviderInfo block (section 4.1 of RFC 7852) MUST be provided. Where any of the blocks above are provided, they are linked to the "owning" ProviderInfo block via the DataProviderReference field. For example, if a ServiceInfo block is provided, it MUST reference a ProviderInfo block identifying the source of the ServiceInfo block.

To support troubleshooting, the Data Provider Information block SHOULD be supplied by every service provider in the call path and by the access network provider if those entities do not add any other blocks.

The Service Information block SHOULD be provided for all instances of Additional Data for the Call, where the information is known to the Data Provider. This information provides some of the service-describing information found in legacy ALI.

The Device Information block SHOULD be provided whenever the enclosed data is known to the Data Provider, otherwise this block is omitted. This block describes characteristics of the device placing the emergency call, and is the mechanism to carry data that can be uniquely provided by the device.

The Owner/Subscriber Information block MAY be provided whenever the enclosed data is known to the provider of the Additional Data for the Call, otherwise this block is omitted.

The Comment block provides supplemental human-readable text that the provider of the Additional Data for the Call wishes to communicate to any recipient.

2.4 Additional Data for the Location

2.4.1 Additional Data for the Location – Overview

Primary location data (street address & geodetic location) is carried within the PIDF-LO [12]. Additional Data for the Location supplies supplemental information about a specific parcel, site, building or other structure to authorized entities; this information is provided in XML data structures retrieved from a web service. Expected consumers of Additional Data for the Location include ESRP's, Primary and Secondary PSAP personnel, as well as emergency responders. There are two functional elements used to obtain Additional Data for the Location, which are:

- Emergency Call Routing Function (ECRF) – supports discovery of URI's pointing to Additional Data for the Location.
- ADR – returns Additional Data for the Location XML data structure(s) when asked to dereference the Additional Data URI returned by the ECRF.

The ECRF supports an "additionalData" query (specified as urn:nena:service:additionalData) which returns Additional Data URI(s) associated with the Site/Structure points or polygons found within the bounds of the queried location. This query can be executed using a geodetic shape or civic address as input, as per the Location-to-Service Translation (LoST) protocol [18]. The location used for this query MAY specify an area that encompasses more than one location that has Additional Data. In that event, the ECRF will return more than one mapping, each with a URI.

The Additional Data URI(s) returned by the query to the ECRF references data within an ADR. The ADR maintains the Additional Data associated with the URI's discovered via the ECRF. When the returned Additional Data URI is dereferenced against the ADR, the data associated with a location is returned in an XML data structure. This location-describing Additional Data XML is carried via one or more EmergencyCallData.NENA-LocationInfo blocks. Upon retrieval, the Additional Data URI MAY be passed within a SIP Call-Info header having a "purpose" parameter beginning with

"emergencyCallData", where it can be referenced by downstream systems or processes as described in NENA-STA-010 [10].

Additional Data for the Location leverages the data model set forth by the IETF RFC 7852 [1] to support the delivery of Additional Data for the Call. The data structures defined in 2.4.3 both reuse data blocks defined in the IETF standard, as well as define new data blocks to support the unique needs of location data.

The primary goal of Additional data for the Location is to describe readily interpreted information about the location that is of value to emergency call dispatch and first response, including:

- Building contact information
- Building tenant information
- Information which can help locate a specific building or site within a larger campus
- Building emergency contact information

Additionally, a provision is made to extend the data to describe a location, however no commonly implemented, open standards have been identified that can be referenced here. The provided extension point is anticipated to carry information such as:

- Spatial building information (e.g. asset locations, floor plans, 3D)
- Structural information about a building
- Building sensor data feeds (e.g. video, smoke, alarms)
- Hazardous materials located at a site

2.4.2 Additional Data for the Location – Example Workflow

An example of the sourcing and use of Additional Data for the Location follows. This example is provided to help illustrate the concepts covered in this document. *It is not intended to document all possible use cases or Location Data sourcing options*:

1. A telecommunicator uses an application to request Additional Data for the Location, for example the caller's location or a dispatch address. The application sends a LoST findService request, using the ECRF's AdditionalData service, to discover a source of Additional Data for the proffered location.
2. The ECRF will use the location provided in the findService request to query the Site/Structure layer(s) to find Additional Location Data URI(s) associated with the proffered location.
3. The ECRF will send a LoST findServiceResponse to the requestor, providing URI(s) which point to Additional Data for the Location, where it is known to exist.
4. The URI(s) provided by the ECRF response can be cached and passed to other applications, or the application/requestor MAY dereference the URI(s) by querying the ADR to obtain the additional location data. Caching of the URI(s) provided via the ECRF response should take into consideration the expiration indicated in the response.
5. The ADR will respond with Additional Data XML block(s), containing data describing the location.
6. The application will parse the XML data and render this data in a meaningful way for the telecommunicator.

7. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Data for the Location documents can be shared via the EIDD.

2.4.3 Additional Data for the Location– Data

When any Additional Data for the Location block is provided, EmergencyCallData.ProviderInfo (section 4.1 of RFC 7852 [1]) MUST be provided. Additional Data blocks are linked to the "owning" ProviderInfo block via the DataProviderReference field. For example, if a LocationInfo block is provided, it MUST reference a ProviderInfo block identifying the source of the LocationInfo block.

The following summarizes the blocks which MAY accompany Additional Data for the Location. The blocks marked as "IETF" are defined via the IETF RFC 7852 . Blocks marked as "NENA" are newly defined via this standard. Field Usage is per RFC 7852 unless otherwise defined.

IETF: The Data Provider Information block is defined in the IETF RFC 7852. The Data Provider Information block MUST be provided whenever Additional Data for the Location is provided. The Call Info header including this block identifies the source of the accompanying Additional Data for the Location.

NENA: The Location Information block is a NENA-specific extension to RFC 7852 that provides basic supplemental and location-contact information known to the provider of the Additional Data for the Location. The Location Information block SHOULD be provided whenever the enclosed data is known to the Data Provider, otherwise this block is omitted.

NENA will request that this block be added to the block registry described in RFC 7852 via this standard:

NENA Introduced Data Element	NENA Introduced XML Element	NENA Introduced Usage
Location Information block	EmergencyCallData.NENA-LocationInfo	CONDITIONAL: provided only where one or more of "xCard for Location's Data" or "Location-Specific Additional Data Structure" are provided, otherwise PROHIBITED
Data Provider Reference *Token linking all blocks sourced by this provider*	DataProviderReference	REQUIRED

xCard for Location's Data	LocationContacts	OPTIONAL *0 or 1* Where present, contains one or more vCard elements.
Location-Specific Additional Data Structure *An extension point to convey further XML-formatted data provided by, or about, the Location, as per the namespace identified by the data provider.*	N/A (Any element in any other namespace)	OPTIONAL *0 or many*

Table 4 - Location Information block fields for Additional Data for the Location

IETF: The Comment block provides supplemental human-readable text that the provider of the Additional Data for the Location chooses to communicate to any recipient.

2.5 Additional Data for the Caller

2.5.1 Additional Data for the Caller – Overview

Additional Data for the Caller supplies authorized entities with supplemental information about one or more individuals associated with the calling device or user agent. Additional Data for the Caller is provided in XML data structures retrieved from a web service. Expected consumers of Additional Data for the Caller include ESRP's, Primary and Secondary PSAP personnel, as well as emergency responders.

Additional Data for the Caller differs from the EmergencyCallData.SubscriberInfo block (2.3.3). The data in the .SubscriberInfo provides information about the subscriber that owns & pays for the device from which the emergency call was placed, while the data in this caller block is intended to provide data about the person who actually dialed 911 (the actual caller).

The IETF RFC 7852 [1] does not define data structures for providing data about the caller, so NENA is introducing a NENA-specific Additional Data for the Caller block that carries name, commonly visited address, and emergency contact information for individuals that have configured their device, user agent, or a provider of an ADR with this information. This NENA block also provides an extension point to pass further information (such as detailed medical information). NENA is in search of currently available, and preferably open, standards to carry such extended caller-describing

information. At the time of this writing, the HL7 Clinical Document Architecture (HL7 CDA)[8] and/or the BlueButton+[9] document is under consideration for inclusion.

The following informative text provides a brief summary of how Additional Data for the Caller is conveyed within a NG9-1-1 environment. NENA-STA-010 [10] is the normative document, and the reader is expected to reference it for further detail. Where a variance exists between NENA-STA-010and this document, the information in NENA-STA-010 prevails.

When Additional Caller Data is passed within a SIP Call-Info header "by-reference", it is accessed by dereferencing the provided Additional Data URI against an ADR to return the Additional Data XML document for the Caller.

Additional Caller Data URI's are also discovered by "querying" IS-ADRs. The ADR/IS-ADR web service may be operated by the carrier, or it may be operated by an independent service provider.

The entity operating the ADR and/or IS-ADR MUST construct the URI to maintain the privacy of the caller. The entity MAY provide the caller or service provider with a different URI, any of which would return the same data. The caller-data URI MUST be provided automatically on emergency calls, where available. There MAY be multiple URIs/URLs and each will lead to one or more instances of the XML data elements defined in section 2.5.3.

Caller URI's are intended to be used for the duration of the emergency call. Where Caller Data is required after the call, local sources of logs or EIDD's which contain the data "by-value" SHOULD be referenced. If the Additional Caller Data URL(s) are used to retrieve data subsequent to the call, the data may have changed or may no longer be available per data access policy or for other reasons.

2.5.2 Additional Data for the Caller – Example Workflow

Examples of sourcing and use of Additional Data for the Caller follow. These examples are provided to help illustrate the concepts covered in this document. *They are not intended to document all possible use cases or Caller Data sourcing options.* One or more of the following mechanisms may be employed for a given emergency call.

Example 1: Additional Data for the Caller is communicated by the caller's device or user agent. Additional Data for the Caller is passed "by-reference".

1. A mobile phone subscriber who is in distress places a 9-1-1 call from their mobile phone.
2. When constructing the SIP INVITE, the mobile device inserts two or more Call-Info headers; minimally "EmergencyCallData.ProviderInfo" and one or more Caller-describing EmergencyCallData blocks. These SIP Call-Info headers contain a URI pointing to the ADR hosting the Caller-describing XML document.
3. The Originating ESRP(s) route the INVITE to the appropriate PSAP
4. The PSAP's Terminating ESRP forwards the INVITE to the most appropriate telecommunicator.
5. The telecommunicator's User Agent accepts the SIP INVITE.
6. The telecommunicator's workstation dereferences the URI(s) passed in the SIP Call-Info header(s).
7. The ADR receiving the dereference request:
    a. Checks the PSAP's credentials, and where valid.

   b. Returns the XML document associated with the proffered URI.
8. The telecommunicator's application will parse the XML data and render this data in a meaningful way for the telecommunicator, trigger an automated action, or both based on the content of the XML and the business logic within the telecommunicator's workstation application.
9. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Data for the Caller documents can be shared via the EIDD.

Example 2: Additional Data for the Caller is retrieved from an IS-ADR, based on Caller-identifying data found within the SIP INVITE.

1. A mobile phone subscriber who is in distress places a 9-1-1 call from their mobile phone.
2. A SIP INVITE for the emergency call is presented to the NGCS.
3. The Originating ESRP(s) route the INVITE to the appropriate PSAP
4. The PSAP's Terminating ESRP forwards the INVITE to the most appropriate telecommunicator.
5. The telecommunicator's User Agent accepts the SIP INVITE.
6. The telecommunicator's workstation extracts the caller's URI from the P-A-I or From headers of the INVITE.
7. The telecommunicator's workstation refers to the registry of recognized IS-ADR(s).
8. The telecommunicator's workstation queries each IS-ADR in the registry using the caller's URI as the query key (either serially or in parallel).
11. Each targeted IS-ADR receives the query request. For each request, the IS-ADR:
    a) Checks the PSAP's credentials, and where valid.
    b) Returns the XML document(s) associated with the proffered caller's URI.
12. The telecommunicator's application will parse the XML data and render this data in a meaningful way for the telecommunicator, trigger an automated action, or both based on the content of the XML and the business logic within the telecommunicator's workstation application.
13. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Data for the Caller documents can be shared via the EIDD.

Example 3: Additional Data for the Caller is retrieved from an ADR, based a URI's provided in the SIP INVITE's Call-Info headers.

A person registers emergency-response impacting information with a service operating an ADR. URI(s) pointing to this person's Additional Data for the Caller is provided to the registrant.

1. The ADR-generated URI(s) for the registrant are provided to the registrant's communications service provider. For example, the registrant may log into their device or their service providers customer care portal and enter their Additional Data for the Caller URI's.
2. The URI(s) are stored by the person's telecommunications service provider.
3. The person places a 9-1-1 call from their VoIP user-agent client.
4. Their VoIP service provider identifies the call as an emergency call. The VoIP provider inserts Call-Info header(s) into the SIP INVITE, each Call-Info header contains the URI(s) stored in Step (2).

5. The SIP INVITE for the emergency call is presented to the NGCS.
6. The Originating ESRP(s) to route the INVITE to the appropriate PSAP
7. The PSAP's Terminating ESRP forwards the INVITE to the most appropriate telecommunicator.
8. The telecommunicator's User Agent accepts the SIP INVITE.
9. The telecommunicator's workstation dereferences the URI(s) passed in the Call-Info header(s).
10. The ADR receiving the dereference request:
    a) Checks the PSAP's credentials, and where valid.
    b) Returns the XML document associated with the proffered URI.
11. The telecommunicator's application will parse the XML data and render this data in a meaningful way for the telecommunicator, trigger an automated action, or both based on the content of the XML and the business logic within the telecommunicator's workstation application.
12. Should the call be transferred to another entity, or there is a need to make this data available to other entities after call completion, the Additional Data for the Caller documents can be shared via the EIDD.

2.5.3 Additional Data for the Caller – Field Summary

The IETF RFC 7852 [1] does not define a block to carry Additional Data for the Caller. This document seeks to extend the Emergency Call Data Structures defined RFC 7852 with new block marked as "NENA" to support the delivery of Additional Data for the Caller. Data blocks marked as IETF below refer to blocks already defined in RFC 7852. Field Usage is per RFC 7852 unless otherwise defined.

Once this document is approved, the "NENA" blocks will be submitted for creation within the NENA Registry Service as defined in Section 3 through the process described in section 11 of RFC 7852

IETF: The Data Provider Information block is defined in the IETF RFC 7852. A linked Provider Info block MUST be provided whenever any other Additional Data for the Caller block is provided. This Call Info header identifies the source of the accompanying Additional Data for the Caller.

NENA: The Caller Information block is a NENA-specific extension to the IETF RFC 7852 that provides information about the Caller, or potential Callers that have been registered with a Data Provider or the Calling Device as likely users of the communications device or service. A given Provider MAY source zero, one, or many CallerInfo blocks. It is strongly encouraged that only one Caller Information block is generated for each individual associated with the emergency call; more than one block per individual MAY be provided.

NENA will request that this block be added to the block registry described in RFC 7852 via this standard:

NENA Introduced Data Element	NENA Introduced XML Element	NENA Introduced Usage
Caller Information Block	EmergencyCallData.NENA-CallerInfo	CONDITIONAL: provided only where one or more of "xCard for Location's Data" or "Location-Specific Additional Data Structure" are provided, otherwise PROHIBITED
Data Provider Reference *Token linking all blocks sourced by this provider*	DataProviderReference	REQUIRED
xCard for Caller Data *Includes basic data for a caller associated with the device or user agent.*	CallerData	OPTIONAL *1 Recommended, 0 possible.* Where present, contains one or more vCard elements.
Caller-Specific Additional Data Structure *An extension point to convey further XML-formatted data provided by, or about, the Caller, as per the namespace identified by the data provider.*	N/A (Any element in any other namespace)	OPTIONAL 0 or Many

Table 5 - Caller Info block fields for Additional Data for the Caller

IETF: The Comment block provides supplemental human-readable text that the provider of the Additional Data for the Caller wishes to communicate to any recipient.

2.6 xCard Profile for Additional Data

xCard[5] is the XML representation of vCard [6], a widely adopted standard for representing and exchanging a variety of information about individuals and other entities. The xCard specification is not domain specific; it does not attempt to address any one specific use case for exchanging information about individuals and other entities.

Consequently, the reader is provided with the following guidance on how to populate an xCard document when used with following entities:

- Additional Data for the Call
- Additional Data for the Location
- Additional Data for the Caller
- Emergency Contact Data accompanying the above

Usage Rules, as used to document the user of xCard for Additional Data conveyance:

- (M)andatory – this information MUST be provided
- (C)onditional – this information MUST be provided where the described condition is met
- (R)ecommended – where available, this information SHOULD be provided. The entity populating the xCard is strongly encouraged to procure and source this data for Emergency Calls
- (O)ptional – this information MAY be provided

The "xCard Element Xpath Notation" column in Table 6 identifies the xml element name, and uses XPath notation to represent the hierarchical structure of the xCard document. For more information about XPath notation, please refer to [22].

2.6.1 xCard Profile by Additional Data Block

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
All XPath expressions are relative to vc:vcard, where vc = "urn:ietf:params:xml:ns:vcard-4.0"						
vc:uid	OPTIONAL	OPTIONAL	OPTIONAL	Recommended	OPTIONAL	Unique ID – used to create a globally unique identifier for the xCard 0 or 1 Populated in the associated Caller or Location xCard's RELATED field, otherwise ignored.
vc:kind	OPTIONAL 'group' RECOMMENDED	OPTIONAL 'org' or 'individual' RECOMMENDED	OPTIONAL 'individual' RECOMMENDED	OPTIONAL 'individual' or 'org' RECOMMENDED	OPTIONAL 'location' RECOMMENDED	Kind of Contact OPTIONAL Where absent, 'individual' is assumed. NENA Supported values: 'individual', 'group', 'org', 'location'
vc:fn	MANDATORY	MANDATORY	MANDATORY	MANDATORY	MANDATORY	Formatted Name While xCard allows > 1, it is recommended that only one be passed. Additional values MAY be ignored.
vc:n	OPTIONAL	RECOMMENDED	RECOMMENDED	RECOMMENDED	OPTIONAL	Name Components 1 Maximum

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:n/vc:surname	OPTIONAL	RECOMMENDED	RECOMMENDED	RECOMMENDED	OPTIONAL	Family / Last Name
vc:n/vc:given	OPTIONAL	RECOMMENDED	RECOMMENDED	RECOMMENDED	OPTIONAL	First Name
vc:n/vc:additional	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Additional/alternate name(s)
vc:n/vc:prefix	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Honorific Prefix 0 to many
vc:n/vc:suffix	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Honorific Suffix 0 to many
vc:nickname	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Nickname 0 to many
vc:title	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Job Position 0 to Many
vc:role	RECOMMENDED	OPTIONAL	OPTIONAL	OPTIONAL	RECOMMENDED	Role 0 to Many
vc:org	RECOMMENDED	OPTIONAL	OPTIONAL	OPTIONAL	RECOMMENDED	Organizational Name/Hierarchy
vc:photo	OPTIONAL	OPTIONAL	RECOMMENDED	OPTIONAL	OPTIONAL	Image of xCard contact 0 to Many URI pointing to location of the image

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:bday	OPTIONAL	OPTIONAL	RECOMMENDED	OPTIONAL	OPTIONAL	Birthday 1 max
vc:gender	OPTIONAL	OPTIONAL	RECOMMENDED	OPTIONAL	OPTIONAL	Gender 1 max Use "U" (unknown) where not known
vc:adr	RECOMMENDED Company address for Service provider	RECOMMENDED Subscriber's Address of Record as known by Service provider	RECOMMENDED List of addresses provided by Caller (expected to be "frequented" addresses: home, work, etc.)	OPTIONAL	RECOMMENDED Civic Address of described Location	Address(es) for Role as provided ahead of placing a 9-1-1 call. May be different than address in PIDF-LO 0 or many
vc:adr/vc:type	OPTIONAL	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	Address Type e.g. work, home
vc:adr/vc:label	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Display Formatted Address / Delivery Address Label
vc:adr/vc:pobox	OPTIONAL	OPTIONAL	Ignored	OPTIONAL	Ignored	Post Office Box Ignored where related to dispatch affected data

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:adr/vc:ext	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Extended Address (Apartment, Suite, etc.) 0 or 1
vc:adr/vc:street	OPTIONAL	RECOMMENDED	RECOMMENDED	OPTIONAL	RECOMMENDED	Street Address 0 or 1
vc:adr/vc:locality	OPTIONAL	RECOMMENDED	RECOMMENDED	OPTIONAL	RECOMMENDED	City 0 or 1
vc:adr/vc:region	OPTIONAL	RECOMMENDED	RECOMMENDED	OPTIONAL	RECOMMENDED	State 0 or 1
vc:adr/vc:code	OPTIONAL	RECOMMENDED	RECOMMENDED	OPTIONAL	RECOMMENDED	Zip Code 0 or 1
vc:adr/vc:country	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Country 0 or 1
vc:geo	OPTIONAL	RECOMMENDED	RECOMMENDED	OPTIONAL	RECOMMENDED	Geographic Coordinates 0 or 1
vc:pref	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	The relative preference of a given instance of an address related to other addresses passed in the same CARD
vc:tz	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Time Zone for the specified address.

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:related	CONDITIONAL	OPTIONAL	CONDITIONAL	OPTIONAL	CONDITIONAL	Relationship Identifies the relationship between a given contact and the xCard via UID field Conditional – provided where the Emergency Contact is specified 0 to Many
vc:action	Ignored	Ignored	OPTIONAL 'informational' 'bridge' 'notify'	Ignored	OPTIONAL	Action *Identifies the action the owner of the data wishes the PSAP to take using the Emergency Contact data.*
vc:note	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Note As size and content of this field is not bounded, the content of this field is referenced at the discretion of the PSAP. 0 to Many

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:tel	MANDATORY	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	Telephone 0 or Many • Format per The tel URI RFC [17] • Should be used to carry alternate means to contact the object described by the xCard • Value MAY be the same as SIP FROM-URI
vc:email	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Email Address 0 or Many • Should be used to carry alternate means to contact the object described by the xCard
vc:impp	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL	Instant Message Presence Protocol 0 or Many • Should be used to carry alternate means to contact the object described by the xCard

xCard Element XPath Notation	xCard Field Usage by Additional Data block					Recommended Usage and Notes
	Provider-Info	Subscriber-Info	Caller-Info	Any Emergency Contact	Location-Info	
vc:lang	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	OPTIONAL	Identifies the preferred language for the associated contact. Where not provided, United States English is assumed.
vc:rev	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	RECOMMENDED	Describes the date/time the xCard was last modified. 1 max

Table 6 - Usage of xCard elements by described Role

2.6.2 xCard Fields ignored by North American NG9-1-1 Implementations

For the sake of completeness, provided below are xCard elements which are valid per the xCard specification, but are not necessarily expected to appear within Additional Data. As per the xCard Specification "A vCard XML parser MUST ignore XML elements and attributes for which it doesn't recognize the expanded name."

Ignored xCard Element	Property Description
All XPath expressions are relative to vc:vcard, where vc = "urn:ietf:params:xml:ns:vcard-4.0"	
vc:anniversary	The date of marriage, or equivalent, of the object the xCard represents
vc:tz	Time Zone, as associated with xCard object. Allowed where specified as param of ADR

Ignored xCard Element	Property Description
vc:logo	Logo (e.g. corporate)
vc:member	Used only for “KIND” = ‘group’
vc:categories	A series of “tags” to categorize the object described by the xCard
vc:prodid	Identifies the product that created the xCard
vc:sound	Digital Sound Content to annotate xCard 0 to Many
vc:key	Public Key or Authentication Certificate
vc:fburl	URI describing busy-time for xCard object (calendar)
vc:caladruri	Address to submit calendar invitations for scheduling requests
vc:clientpidmap	Used to synchronize two xCards across devices.
vc:caluri	URI for Calendar associated with the object
vc:url	Uniform Resource Locator A resource associated with object described by the xCard.

Table 7 - IETF Defined xCard elements ignored for NG9-1-1

3 NENA Registry System (NRS) Considerations

N/A - None introduced by this standard.

4 MIME Registrations

Two MIME registrations are required in support of the NENA XML Schema's introduced in section 5. The information supporting the MIME Registrations

4.1 MIME Content-Type Registration for 'application/EmergencyCallData.NENA-LocationInfo+xml'

Type name: application

Subtype name: EmergencyCallData.NENA-LocationInfo+xml

Mandatory parameters: N/A

Optional parameters: charset (indicates the character encoding of the contents)

Encoding considerations: Uses XML, which can contain 8-bit characters, depending on the character encoding. See Section 3.2 of the XML Media Types RFC [21].

Security considerations: This content type is designed to carry information about the characteristics of a location, including information such as address and contact information for the location. Since this data can contain personal or sensitive information, appropriate precautions are needed to limit unauthorized access, inappropriate disclosure, and eavesdropping. Please refer to Section **Error! Reference source not found.** for more information.

Interoperability considerations: N/A

Published specification: NENA-STA-012.2

Applications that use this media type: Emergency Services

Additional information:

- Magic Number: N/A
- File Extension: .xml
- Macintosh file type code: 'TEXT'

Person and email address for further information: NENA Additional Data Working Group Chair, csds-addldata-chair@dev.nena.org.

Intended usage: LIMITED USE

Author: This specification is a work item of the NENA Additional Data Working Group, with mailing list address csds-addldata@dev.nena.org.

Change controller: The NENA Data Structures Committee datastruc-chair@dev.nena.org.

4.2 MIME Content-Type Registration for 'application/EmergencyCallData.NENA-CallerInfo+xml'

Type name: application

Subtype name: EmergencyCallData.NENA-CallerInfo+xml

Mandatory parameters: N/A

Optional parameters: charset (indicates the character encoding of the contents)

Encoding considerations: Uses XML, which can contain 8-bit characters, depending on the character encoding. See Section 3.2 of the XML Media Types RFC [21].

Security considerations: This content type is designed to carry information about the characteristics of an emergency caller, including information such as name, address, additional contact information, and emergency contacts for the caller. Since this data can contain personal or sensitive information, appropriate precautions are needed to limit unauthorized access, inappropriate disclosure, and eavesdropping. Please refer to Section **Error! Reference source not found.** for more information.

Interoperability considerations: N/A

Published specification: NENA-STA-012.2

Applications that use this media type: Emergency Services

Additional information:

- Magic Number: N/A
- File Extension: .xml
- Macintosh file type code: 'TEXT'

Person and email address for further information: NENA Additional Data Working Group Chair, csds-addldata-chair@dev.nena.org.

Intended usage: LIMITED USE

Author: This specification is a work item of the NENA Additional Data Working Group, with mailing list address csds-addldata@dev.nena.org.

Change controller: The NENA Data Structures Committee datastruc-chair@dev.nena.org.

5 Documentation Required for the Development of a NENA XML Schema

Two additional NENA XML schemas must be developed in support of this standard: NENA-LocationInfo and NENA-CallerInfo.

5.1 LocationInfo Schema

5.1.1 Schema Purpose

This schema is used to introduce a new “block” as per the model specified in the IETF RFC 7852 [1]. This new block is created to convey Additional Data for the Location. Specifically this block

will provide an xCard document to carry contact-style information for the referenced Location. This block also provides an extension point for future schemas anticipated to support location-describing data elements beyond those accommodated by xCard. The size and content of this extension point is expected to be documented by the data provider sourcing LocationInfo.

5.1.2 Parent Element

NENA-LocationInfo

5.1.3 Child Elements

ELEMENT DESCRIPTION	OCCURS	DATA TYPE	DATA DESCRIPTION
DataProviderReference	**Min 1** **Max 1**	**See Description** **→**	The value of the <DataProviderReference> element has the same syntax and properties (specifically, world-uniqueness) as the value of the "Message-ID" message body header field specified in the Internet Message Format RFC [20] except that the <DataProviderReference> element is not enclosed in brackets (the "<" and ">" symbols are omitted).
LocationContacts	**Min 0** **Max 1**	**XML**	LocationContacts includes one or more vcard elements [5] to convey multiple contacts for a given location, patterned after RFC 7852 [1] Section 8.1.
<extension as defined by source> (containing location-specific data)	**Min 0** **Max Unbounded**	**Any**	Schema extensions patterned after RFC 7852 [1] Section 8.1: <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

Table 8 – NENA-LocationInfo Child Elements

5.1.4 WSDL Needed

Not Applicable.

5.2 CallerInfo Schema

5.2.1 Schema Purpose

This schema is used to introduce a new "block" as per the model specified in IETF RFC 7852 [1]. This new block is created to convey Additional Data for the Caller. Specifically this block will provide an xCard document to carry contact-style information for the referenced Caller. This block also provides an extension point for future schemas anticipated to support caller-describing data elements beyond those accommodated by xCard. The size and content of this extension point is expected to be documented by the data provider sourcing CallerInfo.

5.2.2 Parent Element

NENA-CallerInfo

5.2.3 Child Elements

ELEMENT DESCRIPTION	OCCURS	DATA TYPE	DATA DESCRIPTION
DataProviderReference	**Min 1** **Max 1**	**See Description →**	The value of the <DataProviderReference> element has the same syntax and properties (specifically, world-uniqueness) as the value of the "Message-ID" message body header field specified in the Internet Message Format [20] except that the <DataProviderReference> element is not enclosed in brackets (the "<" and ">" symbols are omitted).
CallerData	**Min 0** **Max 1**	**XML**	Includes one or more vcard elements [5] to convey multiple contacts for a given location, patterned after RFC 7852 [1] Section 8.1.
<extension as defined by source> (containing caller-specific data)	**Min 0** **Max Unbounded**	**Any**	Schema extensions patterned after RFC 7852 [1] Section 8.1: <xs:any namespace="##other" processContents="lax" minOccurs="0"

			maxOccurs="unbounded"/>

Table 9 – NENA-CallerInfo Child Elements

5.2.4 WSDL Needed

Yes, as per the Identity Searchable Additional Data Repository (IS-ADR) section of NENA-STA-010 [10].

5.3 XML Example(s)

Schemas, documentation and XML examples for LocationInfo and CallerInfo may be found in the NENA Registry System[23]. You may also refer to the "Owner/Subscriber Information" block of RFC 7852 [1] for an example of passing xCard within an additional data "block". Please also refer to sections 2.4.3 and 2.5.32.4.3 of this document.

5.4 Additional Notes

The schemas requested here are strongly based on those defined by the IETF RFC 7852 [1]. The schemas developed for RFC 7852 are the basis for the blocks introduced by this NENA standard.

6 Impacts, Considerations, Abbreviations, Terms, and Definitions

6.1 Operations Impacts Summary

Each 9-1-1 Authority will need to determine what Additional Data is available to them and how it will be used to assist with call routing and emergency response.

9-1-1 Authorities will need to ascertain what subset of available Additional Data will be processed by their PSAP upon the implementation of NG9-1-1.

9-1-1 Authorities must develop policies and procedures for the use of Additional Data within their organization. Topics to consider when developing such policies and procedures include:

- Who should have access to a given form of Additional Data?
- Storage and retention policies.
- Determining when Additional Data is used to drive an automated or scripted action, versus requiring human analysis of the provided data before an action is taken.

Additional Data will most likely require interpretation, some considerations identified include:

- NG9-1-1 provides a means to separately identify the calling device, the network access provider, and the telecommunications service provider. The Additional Call data provided by these separate entities must be evaluated together to develop an understanding of the provided service (e.g. contact information for escalation, whether the service is most likely fixed, mobile, or nomadic).
- Procedures for manually or automatically evaluating Additional Data for the Call will need to be established (e.g. it may be most important to understand the transport first, and then the device or service provider. This could be a business rule in the PSAP CPE).

Proper training for all call takers and dispatchers is absolutely mandatory.

6.2 Technical Impacts Summary

Large pieces, or multiple small pieces of information carried in the body of a SIP message may impede the processing of an emergency call. Additional Data, if all provided by-value may cause such a condition. To minimize this risk, it is recommended that actors providing Additional Data utilize the "by-reference" method over the "by-value" method whenever both options are available.

6.3 Security Impacts Summary

All additional data MUST be handled to ensure that the privacy of the information is secured. Access to Additional Data will require appropriate access controls. Access logs SHOULD also be implemented to record when, how, and who accessed such data.

NENA documents 75-001 NENA Security for Next-Generation 9-1-1 and the associated 75-502 Next-Generation 9-1-1 Security (NG-SEC) Audit Checklist can be further referenced for Security best practices when operating in a NG9-1-1 environment.

6.4 Recommendation for Additional Development Work

This document does not include the actual schemas for the fields and structures introduced by this Standard however the tables contain the information reflected in the schemas.

Additional work is required to identify data formats and entities that better support the needs of Additional Data for the Location and Additional data for the Caller. This standard leverages xCard to carry basic "contact style" information for these forms of Additional Data.

The Location and Caller standards in sections 2.4.3 and 2.5.3 include extension points for the inclusion of schemas carrying information uniquely relevant to call taking, dispatch, and response. Future work should include the identification and selection of these schemas and the inclusion of these schemas in the relevant registries. The HL7 Clinical Document Architecture (HL7 CDA) [8] and/or the BlueButton+ [9] documents are likely candidates for use within the Additional Data for the Caller extension point, and should receive additional consideration in the next version of this document.

No automated mechanism is currently defined to identify the "Emergency Participant" (individual in need of emergency assistance) for a given 9-1-1 call. This is beyond a NG9-1-1 technology matter, as several questions of practicality have been raised: How does one identify a stranger in need of emergency assistance? How is identifying information collected/scanned and communicated at the point of the emergency? Must the individual in need consent to having this information shared? If consent is required, how is it granted? The Work Group believes field experience with currently defined Additional Data, coupled with technology advancements to automatically identify and provide Additional Data for the Emergency Participant (e.g., RFID, personal telematics/health monitoring, etc.), is required before this standard can define a means to automate the identification of the "Emergency Participant".

The IETF has released eCall RFC 8147 [14] and eCrash RFC 8148 [15]. These standards should be reviewed as future work and if relevant, this standard should reference the IETF eCall and eCrash standards if determined to fall within the scope of the NENA-STA-010 architecture.

6.5 Anticipated Timeline

Additional data is an integral piece of NG9-1-1 and must be considered during implementation planning.

6.6 Cost Factors

Additional data requires entities and systems to gather, maintain, store, and transmit this additional data which has costs associated. PSAP premise equipment may require enhancement to accept and utilize additional data as defined. Costs associated with Additional Data must be taken into consideration during NG9-1-1 implementation planning.

6.7 Cost Recovery Considerations

Normal business practices shall be assumed to be the cost recovery mechanism.

6.8 Additional Impacts (non-cost related)

The information or requirements contained in this NENA document are expected to have impacts, based on the analysis of the authoring group. The primary impacts are expected to include:

- Additional training of PSAP personnel and emergency responders to ensure they understand what Additional Data is available within their work environment.
- 9-1-1 Authorities may need to work out agreements with Additional Data providers to source this information, possible topics include, but may not be limited to:
    - Acquiring appropriate training and Standard Operating Procedures (SOPs) for its use.
    - Determining what, if any, liability may be introduced by sourcing data from a given Additional Data provider. Consider state, local, and federal law, as well as agreements the 9-1-1 Agency may enter into with Additional Data providers may address some or all of this liability.
    - Understanding that it may not be practical or possible to enter into agreements with all possible Additional Data providers, especially where Additional Data is sourced from a device user agent placing an emergency call.
- Devices, or the User Agents installed on the devices seeking to directly pass Additional Data by-reference or by-value in SIP headers (as opposed to taking advantage of Identity Searchable Additional Data Repositories (IS-ADRs) which do not require special treatment above support for standard SIP protocol) will need to:
    - Providing a means to collect and configure additional data, or otherwise configure URI's which point to Additional Data source(s) for the call or caller.
    - Placing emergency calls via SIP.

- Inserting Additional Data "by-value" or "by-reference" into SIP INVITE or MESSAGE call-info headers.

- Service providers are expected to maintain or subcontract the maintenance and operation of Additional Data Repositories (ADRs) to source Additional Data for the Call. Otherwise these providers MUST insert the minimally required data "by-value" into SIP Call-Info headers for the emergency calls they complete.
- Operators of ADR (including IS-ADR) will need to acquire the necessary credentials to communicate with PSAP and NENA-STA-010 defined Functional Elements. IS-ADR operators MUST be added to the appropriate PSAP registries if they are to be accessed by the PSAP.

6.9 Abbreviations, Terms, and Definitions

See NENA-ADM-000, NENA Master Glossary of 9-1-1 Terminology, located on the NENA web site for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

Term or Abbreviation (Expansion)	Definition / Description	New (N) / Update (U)
Additional Data	Data that further describes the nature of how the call was placed, the person(s) associated with the device placing the call, or the location the call was placed from. There are three types of Additional Data: Additional Data for the Call, Additional Data for the Caller and Additional Data for the Location.	U
ADR (Additional Data Repository)	A data storage facility for Additional Data. The ADR dereferences a URI passed in a SIP Call-Info header field or PIDF-LO <provided-by> element and returns an Additional Data object block. It replaces and deprecates the concept of CIDB previously defined in 08-003 v1.	U
IS-ADR (Identity Searchable Additional Data Repository)	An Additional Data Repository that provides a service that can search for Additional Data based on a sip/sips or tel URI: (e.g., Additional Data for the Caller).	U
Call-Info Header	A SIP header which contains a URI referring to some kind of data relevant to a call, and a "purpose" parameter describing what the URI refers to. Used to carry URIs to such entities as Additional Data for the Call and Caller, and call/Incident Tracking Identifiers.	U

7 Recommended Reading and References

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