NG9-1-1 Call Processing Metrics Standard

Abstract: The intent of this document is to define normalized NG9-1-1 call processing metrics for computing useful statistics so that independent implementations can derive the same comparable measurements.

NENA NG9-1-1 Call Processing Metrics Standard

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1 Executive Overview

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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.

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NENA-STA-019.1-2018	07/02/2018	Initial Document

2 Call Processing Metrics

2.1 Introduction

Call processing metrics are measurements between events in the call processing chain and are used to drive reporting, analysis, and real-time monitoring. This document concentrates on operations and management metrics specific to NG9-1-1, but some are equivalent to SIP session metrics defined in RFC 6076 [2]. Instances where the metrics defined herein overlap with those in RFC 6076 [2] are identified. In addition to the SIP messages used in RFC 6076 [2] to derive metrics, this document identifies related LogEvents [3] to achieve the same. RFC 6076 [2] includes computed metrics such as computed ratios and percentages. Computations involving metrics are out of scope for this document. Accordingly, all computed metrics from RFC 6076 [2] have been explicitly ignored. Any calculation that looks at metrics applied to multiple calls to compute things like mean/average/worst case are beyond the scope of this document but any such computations/reports MUST be based on metrics defined in this document.

2.2 Call Related Definitions

Please note that the following definitions only apply to emergency calls.

2.2.1 Call

2.2.1.1 Definition

A generic term referring to any request for emergency assistance, regardless of the media used to make that request. This term may appear in conjunction with specific media, such as "voice Call", "video Call", "text Call", or "data-only Call" when the specific media is of importance. The term "non-human-initiated Call" refers to an emergency call that is initiated automatically, carries data, does not establish a two-way interactive media session, and typically does not involve a human at the "initiating" end.

2.2.1.2 Determination Using LogEvents

A Call can be identified by the logging of a StartCall LogEvent from the view of the Functional Element (FE) logging the event.

2.2.1.3 Determination Using SIP Messages

The first INVITE the FE receives for a particular NENA Call Tracking Identifier

2.2.2 Answered Call

2.2.2.1 Definition

A Call (excluding non-human-initiated Calls) that has been answered by an Agent and two-way communication has been established, irrespective of whether the call was auto-answered for the Agent or if an auto-greeting message was played. For a non-human-initiated Call, that Call may be accepted by an automaton.

2.2.2.2 Determination Using LogEvents

The logging of a CallStateChange LogEvent containing callAnswered and AgencyAgentId.

2.2.2.3 Determination Using SIP Messages

The reception or transmission of the ACK message of the 200 OK message to the initial call's INVITE.

2.2.3 Attempted Call

2.2.3.1 Definition

A call presented to a FE (such as Call Handling FE) regardless of whether successful completion status was achieved.

2.2.3.2 Determination Using LogEvents

The logging of the StartCall LogEvent.

2.2.3.3 Determination Using SIP Messages

The reception of an INVITE message.

2.2.4 Prematurely Disconnected Call

2.2.4.1 Definition

An Answered Call that terminated before the parties have finished their conversation[1].

2.2.4.2 Determination Using LogEvents

Impossible to determine at this time.

2.2.4.3 Determination Using SIP Messages

Impossible to determine.

[1] Currently there is no LogEvent or SIP header that carry this information. It is feasible that it can be added in the future.

2.2.5 Diverted Call

2.2.5.1 Definition

A call that was rerouted due to the nominal destination's unavailability or inability to accept.

2.2.5.2 Determination Using LogEvents

- For the nominal PSAP, diversion notifications are currently not logged.
- For the diverted-to PSAP, the logging of a CallSignalingMessage LogEvent containing the SIP INVITE message where the History-Info header specifies the call has been redirected.

2.2.5.3 Determination Using SIP Messages

- For the nominal PSAP, the reception of either MESSAGE or NOTIFY message which specifies that call has been redirected.
- For the diverted-to PSAP, the reception of a SIP INVITE message where History-Info header specifies call has been redirected.

2.2.6 Abandoned Call

2.2.6.1 Definition

A call placed to 9-1-1 in which the caller disconnects before the call can be answered by the Public Safety Answering Point (PSAP).

2.2.6.2 Determination Using LogEvents

Logging of a CallSignalingMessage LogEvent containing the SIP CANCEL message and/or a CallStateChange LogEvent containing callCancel.

2.2.6.3 Determination Using SIP Messages

The reception of a SIP CANCEL message and/or reception of a SIP NOTIFY message with the AbandonedCall event package.

2.2.7 Misrouted Call

2.2.7.1 Definition

A call routed to a PSAP that should not have received it due to a provisioning error (for example in the ECRF [Emergency Call Routing Function], in the PRF [Policy Routing Function], or the LIS [Location Information Server]) or other misconfigurations.

2.2.7.2 Determination Using LogEvents

The logging of a DiscrepancyReport LogEvent where <DiscrepancyReportFunctionValuesCode> contains DiscrepancyReportRequest and the Discrepancy Report specifies the call has been misrouted.

2.2.7.3 Determination Using SIP Messages

Impossible to determine.

2.3 Call-Related Metrics

For a PSAP, call-related metrics are measured when the request hits the Call Handling Element but for other services (such as the Next Generation Core Services (NGCS)), they can be measured at another FE (such as a BCF [Border Control Function] or ESRP [Emergency Service Routing Proxy]) except as otherwise noted.

2.3.1 Call Network Transit (in an ESInet)

2.3.1.1 Definition

The difference in time between a call's ingress into an ESInet and the time the call is processed at the egress from the same ESInet.

2.3.1.2 Determination Using LogEvents

The difference in time between the StartCall LogEvent by the ingress FE and the StartCall LogEvent by the egress FE.

2.3.1.3 Determination Using SIP Messages

The difference in time between the reception of the INVITE or MESSAGE for a call by the ingress FE and the transmission of the INVITE or MESSAGE transaction for the same call by the egress FE.

2.3.2 Inter-Network Transit

2.3.2.1 Definition

The difference in time between a call's ingress into the ESInet and the time the call is processed at the ingress of the next downstream network.

2.3.2.2 Determination Using LogEvents

The difference in time between the StartCall LogEvent by the ingress FE of one network and the StartCall LogEvent by the ingress FE of the next downstream network.

2.3.2.3 Determination Using SIP Messages

The difference in time between the reception of the INVITE or MESSAGE request by the ingress FE and the reception of the INVITE or MESSAGE transaction for the same call by the ingress FE of the next downstream network.

2.3.3 Session Duration

2.3.3.1 Definition

The difference in time between the start of a session (INVITE) and the end of the same session (BYE or final response error code) for a unique SIP Call ID. For a PSAP, this is measured at the Call Handling FE and, for an NGCS, this would be measured at the ingress BCF.

2.3.3.2 Determination Using LogEvents

The difference in time between StartSession and EndSession LogEvents for a particular session with the same SIP CallId. For a PSAP, this is measured at the Call Handling FE and, for an NGCS, this would be measured at the ingress BCF.

2.3.3.3 Determination Using SIP Messages

The difference in time between INVITE message and the final session message (BYE or error code) for a particular session with the same SIP Call ID. For a PSAP, this is measured at the Call Handling FE and, for an NGCS, this would be measured at the ingress BCF.

2.3.4 Successful Session Request Delay (SSRD)

2.3.4.1 Definition

The difference in time from the session establishment request to the notification that the session is proceeding per RFC 6076 [2]. For example, the difference in time between the INVITE message (request) and the 180 RINGING message (response) associated with the same call.

2.3.4.2 Determination Using LogEvents

The difference in time between the StartSession LogEvent and the CallSignalingMessage LogEvent that contains the non-100 provisional response.

2.3.4.3 Determination Using SIP Messages

The difference in time between the INVITE and a non-100 provisional response message associated with the same session.

2.3.5 Session Disconnect Delay (SDD)

2.3.5.1 Definition

The difference in time between a request to terminate a session and its response received per RFC 6076 [2].

2.3.5.2 Determination Using LogEvents

The difference in time between the EndSession LogEvent and the CallSignalingMessage LogEvent that contains the response.

2.3.5.3 Determination Using SIP Messages

The difference in time between the BYE message and the final response to that BYE.

2.3.6 Call Answered Delay

2.3.6.1 Definition

The difference in time from a Call establishment request to the Call being established. This would include early media if any early media is exchanged.

2.3.6.2 Determination Using LogEvents

The difference in time between StartCall LogEvent and the CallStateChange LogEvent containing callAnswered.

2.3.6.3 Determination Using SIP Messages

The difference in time between the INVITE of the initial session signaling the Call and the 200 OK response of the session answered by an Agent**.**

2.3.7 Session Answered Delay

2.3.7.1 Definition

The difference in time from a session establishment request to the session being established for a unique SIP Call ID. This would include early media if any early media is exchanged.

2.3.7.2 Determination Using LogEvents

The difference in time between StartSession LogEvent and the SessionStateChange LogEvent containing callAnswered for the same SIP Call ID.

2.3.7.3 Determination Using SIP Messages

The difference in time between the INVITE and its 200 OK response for the same SIP Call ID**.**

2.3.8 Call Failed Delay

2.3.8.1 Definition

The difference in time from the Call establishment request to the issuance of an error message.

2.3.8.2 Determination Using LogEvents

The difference in time between StartCall LogEvent and the CallSignalingMessage LogEvent that contains the error.

2.3.8.3 Determination Using SIP Messages

The difference in time between the INVITE or MESSAGE request and the error response sent, or timeout for the request. Please note that an abandoned call due to CANCEL falls within this definition as it will fail with a 587 Request Terminated response.

2.3.9 Session Failed Delay

2.3.9.1 Definition

The difference in time from the session establishment request to the issuance of an error message for a unique SIP Call ID.

2.3.9.2 Determination Using LogEvents

The difference in time between StartSession LogEvent and the CallSignalingMessage LogEvent that contains the error for the same SIP Call ID.

2.3.9.3 Determination Using SIP Messages

The difference in time between the INVITE or MESSAGE request and the error response sent, or timeout for the request for the same SIP Call ID. Please note that an abandoned call due to CANCEL falls within this definition as it will fail with a 587 Request Terminated response.

2.3.10 Call Alerting Delay

2.3.10.1 Definition

The delay between when the Call enters the alerting state (such as ringing or other notification) on an end-point device and the Call being answered.

2.3.10.2 Determination Using LogEvents

The difference in time between a CallStateChange LogEvent containing callAlerting and a CallStateChange LogEvent containing callAnswered.

2.3.10.3 Determination Using SIP Messages

Because an implementation can answer a session in order to play an announcement, it is therefore impossible to determine when a Call is answered by an Agent using SIP messages.

2.3.11 Session Alerting Delay

2.3.11.1 Definition

The delay between when the Session enters the alerting state (such as ringing or other notification) on an end-point device and the Session being answered for a unique SIP Call ID.

2.3.11.2 Determination Using LogEvents

The difference in time between a SessionStateChange LogEvent containing callAlerting and a SessionStateChange LogEvent containing callAnswered for the same SIP Call ID.

2.3.11.3 Determination Using SIP Messages

The difference in time between a 180 Ringing, 182 Queued or 183 SessionProgress response and a 200 OK for a particular session.

2.3.12 Time to Invite Third-Party Delay

2.3.12.1 Definition

The difference in time between the time a Call is being answered and the time the same Call is offered to another party. This metric is only applicable to FEs which implement the Bridging Function.

2.3.12.2 Determination Using LogEvents

The difference in time between the CallStateChange LogEvent containing callAnswered and the StartCall LogEvent for the call to the third party.

2.3.12.3 Determination Using SIP Messages

The difference in time between the 200 OK response sent to the calling party and the INVITE message sent to the third party to join the session.

2.3.13 Location Dereference Query Response Delay

2.3.13.1 Definition

The difference in time between when a location dereference query is generated and the response is received.

2.3.13.2 Determination Using LogEvents

The difference in time between the LocationQuery and LocationResponse LogEvents.

2.3.13.3 Determination Using SIP Messages

The difference in time between a SIP SUBSCRIBE request and its first NOTIFY response.

2.3.13.4 Determination using i3 HELD Messages

The difference in time between a HELD (HTTP [hyper-text transfer protocol] Enabled Location Delivery) query request and its response.

2.3.14 Location Inter-Notification Delay

2.3.14.1 Definition

The time between two consecutive location update notifications for a specific subscription.

2.3.14.2 Determination Using LogEvents

The difference in time between one LocationResponse LogEvent and the next LocationResponse LogEvent for the same subscription.

2.3.14.3 Determination Using SIP Messages

The difference in time between one SIP NOTIFY and the next SIP NOTIFY message for the same subscription.

2.3.15 LoST Dereference Query/Response Delay

2.3.15.1 Definition

Time between when a LoST (Location to Service Translation) query is generated and the response is received.

2.3.15.2 Determination Using LogEvents

The difference in time between the LoSTQuery LogEvent and its applicable LoSTResponse LogEvent

2.3.15.3 Determination Using LoST Messages

The difference in time between the LoST query message and its applicable LoST response message.

2.3.16 Hold Time

2.3.16.1 Definition

The time between when a Call is placed on hold and when that Call changes state.

2.3.16.2 Determination Using LogEvents

The difference in time between the holdCall CallStateChange LogEvent and the subsequent CallStateChange LogEvent.

2.3.16.3 Determination Using SIP Messages

Due to the different possibilities as to how the hold functionality can be implemented (e.g., transfer to a Music-on-Hold media server, one-way mute at the position, etc.), determining Hold Time using SIP messages is left undefined.

2.3.17 Park Time

2.3.17.1 Definition

The time between when a Call is placed in a parked state and when that Call changes state.

2.3.17.2 Determination Using LogEvents

The difference in time between the parkCall CallStateChange LogEvent and the subsequent CallStateChange LogEvent.

2.3.17.3 Determination Using SIP Messages

Due to the different possibilities as to how the park functionality can be implemented, determining Park Delay using SIP messages is left undefined.

2.3.18 Call Queued Delay

2.3.18.1 **Definition**

The time between when a Call is placed in a queue waiting to be offered to an agent and when that Call changes state.

2.3.18.2 Determination Using LogEvents

The difference in time between the CallQueued CallStateChange LogEvent and the subsequent CallStateChange LogEvent.

2.3.18.3 Determination Using SIP Messages

Due to the different possibilities as to how the queue functionality can be implemented, determining Call Queued Delay using SIP messages is left undefined.

2.3.19 Announcement Duration

2.3.19.1 Definition

The time between the beginning and the end of an announcement.

2.3.19.2 Determination Using LogEvents

The difference in time between the StartAnnouncement LogEvent and the EndAnnouncement LogEvent.

2.3.19.3 Determination Using SIP Messages

Due to the different possibilities in announcements that can be implemented, determining Announcement Duration using SIP messages is left undefined.

2.3.20 Total Call Duration

2.3.20.1 Definition

The time between the beginning and the end of a Call for a particular NENA Call ID (urn:nena:uid:callid:).

2.3.20.2 Determination Using LogEvents

The difference in time between the StartCall LogEvent and the associated EndCall LogEvent for a particular NENA Call ID.

2.3.20.3 Determination Using SIP Messages

The difference in time between the INVITE message and the final disposition message (BYE or final response error code) for a particular NENA Call ID.

2.3.21 Call Media Quality Metrics

Reports on several quality metrics of the media for a Call.

2.3.21.1 Definition

Contains the media quality statistics reported in the EndMedia LogEvent. It includes, among other items, the jitter, delay, and packet loss statistics for the Call.

2.3.21.2 Determination Using LogEvents

Statistics reported in the MediaQualityStats element of the EndMedia LogEvent.

2.3.21.3 Determination Using SIP Messages

Statistics in sender and receiver reports that come with a Real Time Control Protocol (RTCP) BYE message (as defined in RFC 3550[4], Section 6) at the end of a media exchange.

2.3.22 Route Determination Time

2.3.22.1 Definition

The time between when the Call entered the ESRP and when the route is determined for that Call.

2.3.22.2 Determination Using LogEvents

The difference in time between the StartCall or CallProcess LogEvent and the Route LogEvent.

2.3.22.3 Determination Using SIP Messages

The difference in time between when the INVITE is received by the ESRP and when the INVITE is transmitted to the next hop downstream.

2.3.23 Message Session Relay Protocol (MSRP) Automated Response Message Delay

2.3.23.1 Definition

The time between the reception of a session initiation message from the caller and the reception of an automated response message from the PSAP.

2.3.23.2 Determination Using LogEvents

Not applicable. MSRP messages are not logged explicitly (they are captured as media by the Logging Service).

2.3.23.3 Determination Using SIP/MSRP Messages

The difference in time between the INVITE message of a MSRP session requested by the caller and the first automated MSRP SEND from the PSAP.

2.3.24 MSRP Response Message Delay

2.3.24.1 Definition

The time between the reception of a MSRP message from the caller and the response message from the agent.

2.3.24.2 Determination Using LogEvents

Not applicable. MSRP messages are not logged explicitly (they are captured as media by the Logging Service).

2.3.24.3 Determination Using SIP/MSRP Messages

The difference in time between the first MSRP SEND message from the caller (either after a session has been established or after a MSRP SEND message from the agent) and the first subsequent MSRP SEND message from the agent. For example, in the following SIP/MSRP call, MSRP Response Message Delay is the difference in time between messages (4) and (6), (8) and (12) and (16) and (18).

```
Caller                  Agent
  |                       |
  |                       |
  |(1)  (SIP) INVITE      |
  |---------------------->|
  |(2)  (SIP) 200 OK      |
  |<----------------------|
  |(3)  (SIP) ACK         |
  |---------------------->|
  |(4)  (MSRP) SEND       |
  |---------------------->|
  |(5)  (MSRP) 200 OK     |
  |<----------------------|
  |(6)  (MSRP) SEND       |
  |<----------------------|
  |(7)  (MSRP) 200 OK     |
  |---------------------->|
  |(8)  (MSRP) SEND       |
  |---------------------->|
  |(9)  (MSRP) 200 OK     |
  |<----------------------|
  |(10) (MSRP) SEND       |
  |---------------------->|
  |(11) (MSRP) 200 OK     |
  |<----------------------|
  |(12) (MSRP) SEND       |
  |<----------------------|
  |(13) (MSRP) 200 OK     |
  |---------------------->|
```

```
|(14) (MSRP) SEND         |
|<------------------------|
|(15) (MSRP) 200 OK       |
|------------------------>|
|(16) (MSRP) SEND         |
|------------------------>|
|(17) (MSRP) 200 OK       |
|<------------------------|
|(18) (MSRP) SEND         |
|<------------------------|
|(19) (MSRP) 200 OK       |
|------------------------>|
|(20) (MSRP) SEND         |
|------------------------>|
|(21) (MSRP) 200 OK       |
|<------------------------|
|(22) (SIP) BYE           |
|<------------------------|
|(23) (SIP) 200 OK        |
|------------------------>|
|                         |
|                         |
```

2.4 Agent Related Metrics

In this section determinations only pertain to difference in time between AgentStateChange LogEvents.

2.4.1 Agent Availability Metric

2.4.1.1 Definition

Measured as the time an agent enters a primary agent state (Available or Not Available) until the time the agent transitions to another primary agent state.

2.4.1.2 Determination Using LogEvents

Difference in elapsed time between entering a PrimaryAgentStateValuesCode and the time of transition to the next PrimaryAgentStateValuesCode value.

2.4.2 Agent Secondary State Metric

2.4.2.1 Definition

Measured as the time an agent enters a secondary agent state (e.g., LoggedOut, Break, Waiting, Active, Hold, Reserved) until the time the agent transitions to another secondary agent state.

2.4.2.2 Determination Using LogEvents

Difference in elapsed time between entering a SecondaryAgentState and the time of transition to the next SecondaryAgentState value.

3 New LogEvents Values

This document creates five new LogEvents entries in the LogEvent Registry.

StartAnnouncement and EndAnnouncement: used by an element to log the beginning and the end of the playing of an (multimedia) announcement to the caller, such as an automatic answer greeting or an interactive media response announcement. The type of announcement is included in a <AnnouncementType> tag. The CallIdURN, IncidentIDURN, and sipCallId in the header are those of the emergency call over which the announcement is played. An optional, locally defined <AnnouncementTag> identifies the specific announcement played, for example, the name of the VoiceXML announcement script. This document creates a registry for Announcement Types in Section 4.2.

StartSession/EndSession: Each element that is call stateful logs the beginning and end of its processing of a SIP Session with Start Session and End Session events. This allows differentiation between the start and end of a Call versus the start and end of a session that establishes a Call. For StartSession and EndSession, the Timestamp MUST be the time of the INVITE, BYE, or the final error code received or sent by the element logging the event. A <CallDirectionValuesCode> tag has one of two values, "incoming" and "outgoing", where "incoming" means a session was received and "outgoing" means a session placed by the element.

SessionStateChange: Used by an element to log a state change, such as logging an "answered" event by a device. The new state is included in a <SessionStateText> tag, values from this field MUST be from the CallStates Registry. The CallIdURN, IncidentIDURN, and sipCallId in the header are from the session whose state has changed. A <DirectionValuesCode> tag has one of two values: "incoming", meaning the element logging the state change received a message or other notice that changed the state; and "outgoing", meaning this element caused the state change. An optional <SessionStateChangeReason> tag contains the reason why the state changed. The content of this tag is not standardized at this time.

4 NENA Registry System (NRS) Considerations

Whenever a standard has a list of items, especially where the list is used in an XML data structure, and the list is expected to change over time, the list should be maintained in a "Registry". A registry is, at heart, just a table of data, with rows and columns. The Registry is established by a standard, which defines the columns and what they are used for. Each entry in the registry is a row, and has values for the columns specified. The standard that creates the registry usually defines the initial values (row and column content). It also specifies how a new value is added: we call that a "Management Policy".

Registries can be hierarchical (Registry contains sub-registries, nested as needed) if you have a group of registries that are related.

Registries are maintained by the NENA Registry System (NRS), which operates according to NENA-STA-008.2 (formerly 70-001). The existing registries, with all of the content of the registry, are available in stable locations in the NENA website. Registries are stored as XML objects, although through custom style sheets, the registry content is human-readable. The intent of storing the registries at stable URLs, in XML form, is that implementers of standards that use registries can automatically include current values in their implementations. NRS will only modify registries according to the management policy specified for that registry.

4.1 New Values for LogEvent

Add **StartAnnouncement** and **EndAnnouncement** to the **LogEvent** registry**,** source as <this document>**:**

Value	Purpose	Reference	Date
StartAnnouncement	Used by an element to log the beginning of the playing of a (multimedia) announcement to the caller, such as an automatic answer greeting or an interactive media response announcement.	<This document>	MM/DD/YYYY
EndAnnouncement	Used by an element to log the end of the playing of a (multimedia) announcement to the caller, such as an automatic answer greeting or an interactive media response announcement.	<This document>	MM/DD/YYYY

4.2 LogEvent AnnouncementTypes

4.2.1 LogEvent Request

NRS is requested to create a new registry, LogEvent AnnouncementTypes. Announcement types used within the StartAnnouncement and EndAnnouncement LogEvents in the <AnnouncementType> field are listed in the "LogEvent AnnouncementTypes" Registry.

4.2.2 Registry Title/Name

The name of this registry is the "*LogEventAnnouncementTypes".*

4.2.3 Parent Registry

None.

4.2.4 Information Required to Create a New Value

A new entry to "LogEventAnnouncementTypes" requires a name and a definition of the announcement type, and must be suitably explicit to differentiate the type from existing types.

4.2.5 Management Policy

Addition of a new entry requires "Expert Review". The expert shall consider how the new type is differentiated from existing types. Too many types result in differences among implementers as to which type is to be used. Too few result in ambiguity about the actual type. The expert shall attempt to balance these forces with a bias towards simplicity.

4.2.6 Content

Each entry in this registry contains:

- The UTF-8 "name" of the entry
- A short description of the entry

4.2.7 Initial Values

Name	Description
AutoAnswerGreeting	Indicates an announcement played automatically after a call is answered by an agent. Typically recorded with the agent's voice, this type of recorded greeting is used to standardize the answering of calls.
NoAgentsAvailableAnnouncement	Indicates an announcement indicating no agents are currently available to take the call and the call will be answered by the next available agent.
StandardAnnouncement	Indicates an announcement played to all calls regardless of the availability of agents to take the call.

5 Documentation Required for the Development of a NENA XML Schema

5.1 Schema Request

Add two new entries in the < EventValuesCodeSimpleType>:

- StartAnnouncement

- EndAnnouncement

5.2 Schema Name

The name of this Schema is **StartAnnouncement**.

5.2.1 Schema Purpose

Used by an element to log the beginning of the playing of an (multimedia) announcement to the caller, such as an automatic answer greeting or an interactive media response announcement. When LogEventType is StartAnnouncement, then this element must be provided.

5.2.2 Parent Element

LogEvent

5.2.3 Child Elements

ELEMENT DESCRIPTION	OCCURS	DATA TYPE	DATA DESCRIPTION
AnnouncementType	**1**	**AN**	Must be one of the entries found in the LogEvent AnnouncementTypes registry
AnnouncementTag	**0 or 1**	**AN**	Optional locally defined description of announcement

5.2.4 WSDL Needed

No

5.2.5 XML Example(s)


```xml
<?xml version="1.0" encoding="UTF-8"?>
<!--Sample XML file generated by XMLSpy v2014 rel. 2 sp1 (http://www.altova.com)-->
<nena-lex:LogEventMessageRequest xmlns="urn:ietf:params:xml:ns:lost1" xmlns:nena-cd="urn:nena:xml:ns:CodeList:2.1"  xmlns:nena-lex="urn:nena:xml:ns:LoggingExchange:2.0" xmlns:nena-sdt="urn:nena:xml:ns:SharedDataTypes:2.0" xmlns:xml="http://www.w3.org/XML/1998/namespace" xmlns:nena-lgt="urn:nena:xml:ns:LoggingDataTypes:2.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:n1="http://www.altova.com/samplexml/other-namespace" xsi:schemaLocation="urn:nena:xml:ns:LoggingExchange:2.1 ..\exchange\2.0\LoggingExchange.xsd">
	<nena-lgt:LogEventTimestamp>2001-12-17T09:30:47Z</nena-lgt:LogEventTimestamp>
	<nena-lgt:AgencyId>psap.com</nena-lgt:AgencyId>
	<nena-lgt:ElementId>CallHandlingFe.psap.com</nena-lgt:ElementId>
	<nena-lgt:AgencyAgentId>Jane.Doe@psap.com</nena-lgt:AgencyAgentId>
	<nena-lgt:AgencyPositionId>String</nena-lgt:AgencyPositionId>
	<nena-lgt:CallIdURN>http://www.altova.com/</nena-lgt:CallIdURN>
	<nena-lgt:IncidentIdURN>http://www.altova.com/</nena-lgt:IncidentIdURN>
```

```
        <nena-lgt:SIPCallId>String</nena-lgt:SIPCallId>
        <nena-cd:EventValuesCode>StartAnnouncement</nena-cd:EventValuesCode>
        <nena-lgt:StartAnnouncement>
                <nena-lgt:AnnouncementType> AutoAnswerGreeting </nena-lgt: AnnouncementType >
                <nena-lgt:AnnouncementTag>JaneDoeAutoAnswerGreeting.wav</nena-lgt: AnnouncementTag >
        </nena-lgt:StartAnnouncement >
</nena-lex:LogEventMessageRequest>
```

5.2.6 Additional Notes

- None

5.3 Schema Name

The name of this Schema is **EndAnnouncement**.

5.3.1 Schema Purpose

Used by an element to log the end of the playing of a (multimedia) announcement to the caller, such as an automatic answer greeting or an interactive media response announcement. When LogEventType is EndAnnouncement, then this element must be provided.

5.3.2 Parent Element

LogEvent

5.3.3 Child Elements

ELEMENT DESCRIPTION	OCCURS	DATA TYPE	DATA DESCRIPTION
AnnouncementType	**1**	**AN**	Must be one of the entries found in the LogEvent AnnouncementTypes registry
AnnouncementTag	**0 or 1**	**AN**	Optional locally defined description of announcement

5.3.4 WSDL Needed

No

5.3.5 XML Example(s)

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Sample XML file generated by XMLSpy v2014 rel. 2 sp1 (http://www.altova.com)-->
<nena-lex:LogEventMessageRequest xmlns="urn:ietf:params:xml:ns:lost1" xmlns:nena-cd="urn:nena:xml:ns:CodeList:2.1"  xmlns:nena-lex="urn:nena:xml:ns:LoggingExchange:2.0" xmlns:nena-sdt="urn:nena:xml:ns:SharedDataTypes:2.0"
```

```
xmlns:xml="http://www.w3.org/XML/1998/namespace" xmlns:nena-lgt="urn:nena:xml:ns:LoggingDataTypes:2.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:n1="http://www.altova.com/samplexml/other-namespace"
xsi:schemaLocation="urn:nena:xml:ns:LoggingExchange:2.1 ..\exchange\2.0\LoggingExchange.xsd">
        <nena-lgt:LogEventTimestamp>2001-12-17T09:30:47Z</nena-lgt:LogEventTimestamp>
        <nena-lgt:AgencyId>psap.com</nena-lgt:AgencyId>
        <nena-lgt:ElementId>CallHandlingFe.psap.com</nena-lgt:ElementId>
        <nena-lgt:AgencyAgentId>Jane.Doe@psap.com</nena-lgt:AgencyAgentId>
        <nena-lgt:AgencyPositionId>String</nena-lgt:AgencyPositionId>
        <nena-lgt:CallIdURN>http://www.altova.com/</nena-lgt:CallIdURN>
        <nena-lgt:IncidentIdURN>http://www.altova.com/</nena-lgt:IncidentIdURN>
        <nena-lgt:SIPCallId>String</nena-lgt:SIPCallId>
        <nena-cd:EventValuesCode>EndAnnouncement</nena-cd:EventValuesCode>
        <nena-lgt:EndAnnouncement>
                <nena-lgt:AnnouncementType> AutoAnswerGreeting </nena-lgt: AnnouncementType >
                <nena-lgt:AnnouncementTag>JaneDoeAutoAnswerGreeting.wav</nena-lgt: AnnouncementTag >
        </nena-lgt:StartAnnouncement >
</nena-lex:LogEventMessageRequest>
```


5.3.6 Additional Notes

- None

6 Impacts, Considerations, Abbreviations, Terms, and Definitions

6.1 Operations Impacts Summary

Agencies may use this standard as a reference in preparation of procurement documents for a NG9-1-1 system and in reviewing agencies' current systems or current policies to see if they conform. This standard may change how statistics are collected and reported. Reporting systems for NG9-1-1 may require operations personnel to identify differences between their current measurement systems and the metrics contained in this standard.

6.2 Technical Impacts Summary

System designs and/or measurements may change based on the adoption of the metrics defined in this standard. The metrics defined in this document are based on NG9-1-1 events and are therefore applicable to NG9-1-1 deployments only.

6.3 Security Impacts Summary

There are no known security impacts from implementing this standard.

6.4 Recommendation for Additional Development Work

Metrics for incident processing and agent state transitions will need to be developed.

6.5 Anticipated Timeline

This document provides specifications for systems that need to generate statistics. This document is not implementable on its own but is expected to be used immediately upon publication and on an ongoing basis for NG9-1-1.

6.6 Cost Factors

Some costs to the vendors for implementing the metrics in this document are expected. While implementations typically carry a cost, specific costs cannot be determined.

6.7 Cost Recovery Considerations

Not applicable.

6.8 Additional Impacts (non-cost related)

Having standardized statistics will improve the ability to make comparisons between systems and agencies in the processing of 9-1-1 calls. Definition of standardized call processing metrics will influence 9-1-1 Management Information Systems (MIS) to fully utilize all available call processing metrics. This document does not specify performance metrics and is not intended to replace documents that do specify performance metrics such as NFPA 1221 [5] or NENA STA-010 [1].

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
Abandoned Call	An emergency Call in which the caller disconnects before the Call can be answered by the Public Safety Answering Point (PSAP).
Answered Call	A Call (excluding non-human-initiated Calls) that has been answered by an Agent and two-way communication has been established, irrespective of whether the Call was auto-answered for the Agent or if an auto-greeting message was played. For a non-human-initiated Call, that Call may be accepted by an automaton.

Term or Abbreviation (Expansion)	Definition / Description
Attempted Call	A Call presented to a FE (such as a Call Handling FE) regardless of whether successful completion status was achieved.
BCF (Border Control Function)	Provides a secure entry into the ESInet for emergency calls presented to the network. The BCF incorporates firewall, admission control, and may include anchoring of session and media as well as other security mechanisms to prevent deliberate or malicious attacks on PSAPs or other entities connected to the ESInet.
Call	A generic term referring to any request for emergency assistance, regardless of the media used to make that request. This term may appear in conjunction with specific media, such as "voice Call", "video Call", "text Call", or "data-only Call" when the specific media is of importance. The term "non-human-initiated Call" refers to an emergency Call that is initiated automatically, carries data, does not establish a two-way interactive media session, and typically does not involve a human at the "initiating" end.
Diverted Call	A Call that was rerouted due to the nominal destination's unavailability or inability to accept. Calls may be diverted for conditions that are scheduled (e.g., maintenance, hours the PSAP is not staffed, etc.), or for events that cannot be scheduled (e.g., equipment or network failure, disasters, etc.)

Term or Abbreviation (Expansion)	Definition / Description
ECRF (Emergency Call Routing Function)	A functional element in an NGCS which is a LoST protocol server where location information (either civic address or geo-coordinates) and a Service URN serve as input to a mapping function that returns a URI used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency. - External ECRF: An ECRF instance that resides outside of an NGCS instance. - Internal ECRF: An ECRF instance that resides within and is only accessible from an NGCS instance.
ESInet (Emergency Services IP Network)	An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national, and international levels to form an IP-based internetwork (network of networks). The term ESInet designates the network, not the services that ride on the network. See NG9-1-1 Core Services.
ESRP (Emergency Service Routing Proxy)	An i3 functional element which is a SIP proxy server that selects the next-hop routing within the ESInet, based on location and policy. There is an ESRP on the edge of the ESInet. There is usually an ESRP at the entrance to an NG9-1-1 PSAP. There may be one or more intermediate ESRPs between them.

Term or Abbreviation (Expansion)	Definition / Description
FE (Functional Element)	An abstract building block that consists of a set of interfaces and operations on those interfaces to accomplish a task. Mapping between functional elements and physical implementations may be one-to-one, one-to-many, or many-to-one.
HELD (HTTP Enabled Location Delivery)	A protocol that can be used to acquire Location Information (LI) from a LIS within an access network as defined in IETF RFC 5985.
IETF (Internet Engineering Task Force)	Lead standard-setting authority for Internet protocols.
Location-to-Service Translation (LoST) Protocol	A protocol that takes location information and a Service URN and returns a URI. Used generally for location-based call routing. In NG9-1-1, used as the protocol for the ECRF and LVF.
LIS (Location Information Server)	A Location Information Server (LIS) is a functional element in an IP-capable originating network that provides locations of endpoints (i.e., calling device). A LIS can provide Locationby-Reference, or Location-by-Value, and, if the latter, in geo or civic forms. A LIS can be queried by an endpoint for its own location, or by another entity for the location of an endpoint. In either case, the LIS receives a unique identifier that represents the endpoint, for example an IP address, circuit-ID or Media Access Control (MAC) address, and returns the location (value or reference) associated with that identifier. The LIS is also the entity that provides the dereferencing service, exchanging a location reference for a location value.
LogEvent	An XML document structure defined in NENA STA-010 that is used to convey Call processing and Incident processing event information to the Logging Service.
Misrouted Call	A Call routed to a PSAP that should not have received it due to a provisioning error (for example in the ECRF, in the PRF, or the LIS) or other misconfigurations.

Term or Abbreviation (Expansion)	Definition / Description
NG9-1-1 Call Processing	The sequence of steps performed by operations personnel and NG9-1-1 systems in the handling of a NG9-1-1 Call.
*NGCS (*Next Generation 9-1-1 (NG9-1-1*) Core Services)*	The base set of services needed to process a 9-1-1 call on an ESInet. Includes the ESRP, ECRF, LVF, BCF, Bridge, Policy Store, Logging Services, and typical IP services, such as DNS and DHCP. The term NG9-1-1 Core Services includes the services and not the network on which they operate. See Emergency Services IP Network.
Prematurely Disconnected Call	An Answered Call that terminated before the parties have finished their conversation.
Public Safety Answering Point (PSAP)	An entity responsible for receiving 9-1-1 calls and processing those calls according to a specific operational policy.
Session Initiation Protocol (SIP)	An IETF-defined protocol (RFC 3261) that defines a method for establishing multimedia sessions over the Internet. Used as the call signaling protocol in VoIP, i2 and, i3.
WSDL (Web Service Description Language)	The Web Services Description Language (WSDL) is an XML-based language used to describe the services a business offers and to provide a way for individuals and other businesses to access those services electronically. WSDL is the cornerstone of the Universal Description, Discovery, and Integration (UDDI) initiative spearheaded by Microsoft, IBM, and ARIBA. UDDI is an XML-based registry for businesses worldwide, which enables businesses to list themselves and their services on the Internet. WSDL is the language used to do this. WSDL is derived from Microsoft's Simple Object Access Protocol (SOAP) and IBM's Network Accessible Service Specification Language (NASSL). WSDL replaces both NASSL and SOAP as the means of expressing business services in the UDDI registry. An XML-based interface definition language that is used for describing the functionality offered by a web service.

7 Recommended Reading and References

1. NENA Detailed Functional and Interface Standards for the NENA i3 Solution, National Emergency Number Association, NENA-STA-010 (originally 08-003).
2. Basic Telephony SIP End-to-End Performance Metrics, Internet Engineering Task Force, RFC 6076.
3. NENA Detailed Functional and Interface Standards for the NENA i3 Solution, National Emergency Number Association, NENA-STA-010 (originally 08-003), Section 5.13.3.2, LogEvent Event Types.
4. RTP: A Transport Protocol for Real-Time Applications, Internet Engineering Task Force, RFC 3550.
5. NFPA 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, NFPA 1221.
6. NENA Master Glossary of 9 1 1 Terminology, NENA-ADM-000

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