Diagnostics and Monitoring VoLTE Function Specification

Candidate Version 1.0 – 25 Nov 2014

Open Mobile Alliance

OMA-TS-DiagMon_VoLTE_Function-V1_0-20141125-C

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1. Scope

This document defines a specific DiagMon Function for collecting performance and diagnostic information associated with Voice over LTE (VoLTE) using the framework defined in [DiagMonTS].

The existing DiagMon framework features are reused and this document provides information on the standardised MO format of the DiagMon VoLTE Function. This specification defines:

- The standardized Management Object Identifier (MOID)
- Additional information necessary to execute the DiagMon VoLTE Function
- The location and format of the data as result of DiagMon VoLTE Function execution on the device

1.1 Dependencies

The management object in thisTS has a dependency on OMA Device Management v1.2 [DM] or later compatible version, and OMA DiagMon v1.2 or later compatible version.

2. References

2.1 Normative References

[3GPP-TS_23.032] 3GPP TS 23.032: Technical Specification Group Services and System Aspects; Universal Geographical Area Description (GAD)

[3GPP-TS_23.038] 3GPP TS 23.038 "Alphabets and language-specific information", URL:http://www.3gpp.org/ftp/Specs/archive/23_series/23.038/

[3GPP-TS_24.301] 3GPP TS 24.301: Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3

[3GPP-TS_36.331] 3GPP TS 36.331: Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC)

[DiagMon1_2] "OMA DiagMon Management Object Enabler Release Definition", Version 1.2, Open Mobile Alliance, OMA-ERELD-DiagMon_V1_2, URL:http://www.openmobilealliance.org/

[DiagMonTS] "DiagMon Management Object Framework", Version 1.2, Open Mobile Alliance, OMA-TS-DiagMonMOFrame-V1_2, URL:http://www.openmobilealliance.org/

[DM] "OMA Device Management Enabler Release Package", Version 1.2, Open Mobile Alliance, OMA-ERP-DM_V1_2, URL:http://www.openmobilealliance.org/

[ISO8601] ISO 8601:2004, Data elements and interchange formats -- Information interchange -- Representation of dates and times. URL:http://www.iso.ch/

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[RFC3261] "SIP: Session Initiation Protocol", June 2002, URL: http://www.ietf.org/rfc/rfc3261.txt

[RFC3326] "The Reason Header Field for the Session Initiation Protocol (SIP)", December 2002, URL: http://tools.ietf.org/html/rfc3326

[RFC3986] "Uniform Resource Identifier (URI): Generic Syntax", January 2005, URL: http://www.ietf.org/rfc/rfc3986.txt

[RFC5481] "Packet Delay Variation Applicability Statement", March 2009, URL: http://tools.ietf.org/html/rfc5481

[SCRRULES] "SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/

2.2 Informative References

[DMSTDOBJ1_3] "OMA Device Management Standardized Objects, Version 1.3". Open Mobile Alliance™. OMA-TS-DM_StdObj-V1_3. URL:http://www.openmobilealliance.org/

[OMADICT] "Dictionary for OMA Specifications", Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_9, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Please consult [OMADICT] for all definition used in this document

3.3 Abbreviations

VoLTE: Voice over Long Term Evolution

Please consult [OMADICT] for all other abbreviations used in this document.

4. Introduction

The DiagMon version 1.2 enabler provides an interface between a Management Authority and Devices, based on OMA DM, which allows collection and retrieval of device diagnostic information and performance metrics.

The DiagMon Function specification defines a number of standardised instantiations of the DiagMon Management Object Framework [DiagMonTS] for the purposes of obtaining diagnostics and monitoring information in a predictable and consistent manner. The DiagMon VoLTE Function specification defines an additional instantiation of the DiagMon Management Object Framework specifically for obtaining diagnostic and performance information related to Voice over LTE (VoLTE).

4.1 DiagMon Version 1.0 Functionality

The DiagMon Management Object V1.0 Enabler supports the following functionality.

1) **Diagnostics Policies Management:** support for specification and enforcement of policies related to the management of diagnostics features and data.
2) **Fault Reporting: e**nable the device to report faults to the network as the trouble is detected at the device.
3) **Performance Monitoring:** enable the device to measure, collect and report key performance indicators (KPIs) data as seen by the device such as on a periodic basis.
4) **Device Interrogation:** enable the network to query the device for additional diagnostics data in response to a fault
5) **Remote Diagnostics Procedure Invocation:** enable management authorities to invoke specific diagnostics procedures embedded in the device to perform routine maintenance and diagnostics.
6) **Remote Device Repairing:** enable management authorities to invoke specific repairing procedures based on the results of diagnostic procedures.

4.2 DiagMon Version 1.1 Functionality

OMA DiagMon MO V1.1 introduces the initial set of functions that can be used on top of the framework provided by DiagMon MO 1.0:

- Application Monitoring
- Battery Info
- Browsing Usage
- Data Call and Data Session
- Memory
- Trap Event
- Panic Logs
- Restart
- RF Metrics
- SMS Options and Usage
- MMS Usage
- NFC
- User Equipment Setting

- Phone Book

4.3 DiagMon Version 1.2 Functionality

OMA DiagMon MO V1.1 introduced an initial set of functions that can be used to collect application usage metrics, obtain device status and performance statistics, and gather information to diagnose and fix problems with a mobile device. DiagMon MO 1.2 contains enhancements to the existing DiagMon MO 1.1 functions and adds new diagnostic functions for common device capabilities that are not currently covered by DiagMon MO 1.1:

- QoS
- Sensor
- Built-in Device Test
- Device Location
- Web Browsing Monitoring
- Application Execution Information

It also extends the DiagMon Framework adding the Trap Events Framework, and a list of Trap Events which are part of other specifications.

This specification is a superset as it includes all DiagMon functions from DiagMon MO V1.1 - whether they were enhanced or not - as well as the functions newly defined in DiagMon MO V1.2.

5. VoLTE Metrics

5.1 Introduction

If the device exposes VoLTE Metrics functionality to the DiagMon Client, then the DiagMon Client MUST support this function. The DiagMon Server MUST support this function.

This function allows the DiagMon Server to retrieve VoLTE Metrics parameters, measured by the device, that provide information about VoLTE performance at the time of function invocation. This function is only applicable to 3GPP LTE devices.

This function MUST be invoked explicitly. The status of this DiagMon Function can be reported asynchronously, using the Generic Alert mechanism [DM] or it can be stored in the DM Tree for later retrieval.

5.2 Non-applicable nodes from DiagMon MO definition

None.

5.3 Function Description

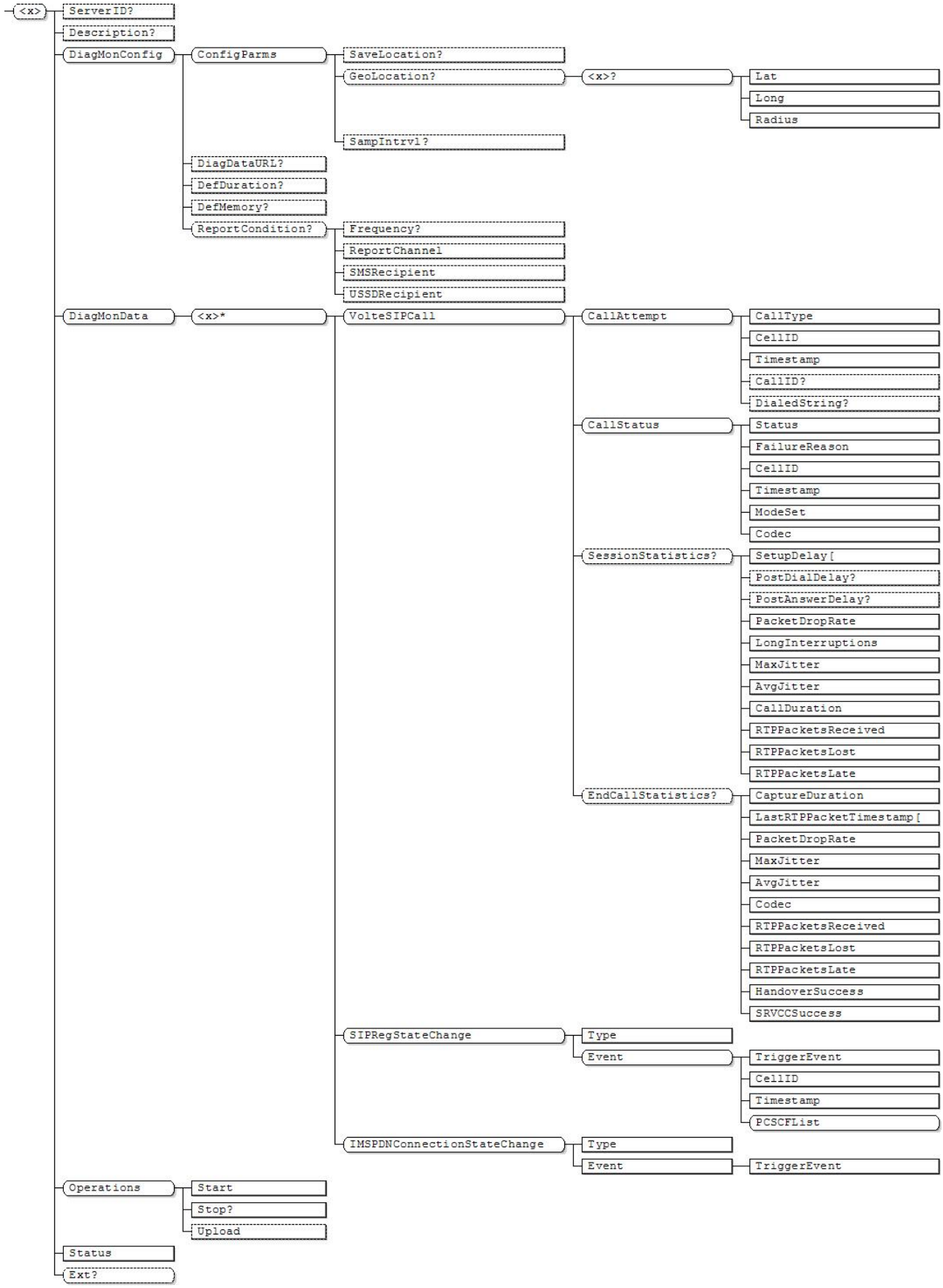

Figure 1: VoLTE Metrics Function

…/<x>

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	node	Get

This interior node is a placeholder for the VoLTE Metrics MO. Management Object Identifier for the VoLTE Metrics MO MUST be: "`urn:oma:mo:oma-diag:volte_metrics:1.0`".

<x>/ServerID

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

The ServerID leaf node is used to identify the DiagMon Server where the alert and collected VoLTE Metrics SHALL be sent if the node is present. The value of this node MUST be compliant with URI format as in [RFC3986]

<x>/Description

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This optional leaf node provides a description of the VoLTE Metrics function.

<x>/DiagMonConfig

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is a placeholder for the configuration information associated with behaviour of the VoLTE Metrics Function, including the invocation and reporting.

<x>/DiagMonConfig/ConfigParms

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node is a placeholder for any extensions to the configuration information associated with the VoLTE Metrics function.

<x>/DiagMonConfig/ConfigParms/SaveLocation

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	bool	Get, Replace

This leaf node indicates whether the location information is requested to be saved. If the device is not able to determine the location, it is not required to save it.

<x>/DiagMonConfig/ConfigParms/GeoLocation

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This node acts as a placeholder for circular geographic locations.

<x>/DiagMonConfig/ConfigParms/GeoLocation/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrOne	node	Get

This node acts as a placeholder for one or more circular geographic locations.

<x>/DiagMonConfig/ConfigParms/GeoLocation/<x>/Lat

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bin	Get, Replace

This leaf node contains the latitude of the circular area as defined in [3GPP-TS_23.032], section 6.1.

<x>/DiagMonConfig/ConfigParms/GeoLocation/<x>/Long

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bin	Get, Replace

This leaf node contains the longitude of the circular area as defined in [3GPP-TS_23.032], section 6.1.

<x>/DiagMonConfig/ConfigParms/GeoLocation/<x>/Radius

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bin	Get, Replace

This leaf node contains the radius of the circular area as defined in [3GPP-TS_23.032], section 6.6.

<x>/DiagMonConfig/ConfigParms/SampIntrvl

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This leaf node contains an integer value indicating the sampling interval in seconds at which Diagnostics and Monitoring data are collected on the device.

<x>/DiagMonConfig/DiagDataURL

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This leaf node contains the URL [RFC3986] of an alternate data server that the client MAY use to deliver the DiagMon Data. This node MUST exist when the node '<x>/Operations/Upload' exists.

<x>/DiagMonConfig/DefDuration

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node specifies the time limit threshold for the running of the VoLTE Metrics function. When the time limit threshold is exceeded, the DiagMon Client MUST stop the VoLTE Metrics function. This time is expressed in seconds and presented as a 32-bit, unsigned, non-negative integer.

<x>/DiagMonConfig/DefMemory

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This optional node specifies the DiagMon memory-size-limit threshold for running the VoLTE Metrics function. When the memory-size-limit is exceeded, the DiagMon Client MUST stop the VoLTE Metrics function. The amount of memory is expressed in bytes, presented as a 32-bit, unsigned, non-negative integer.

<x>/DiagMonConfig/ReportCondition

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node acts as a placeholder to contain different reporting conditions which indicate when the DiagMon data are to be reported back to the DiagMon Server (and/or the alternate data server if **<x>/DiagMonConfig/DiagDataURL** is present).

<x>/DiagMonConfig/ReportCondition

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This leaf node contains an integer value indicating the frequency at which alerts about DiagMonData are reported back to the DiagMon System. The DiagMon Server MAY use a Get command on the '`DiagMonData`' node to retrieve diagnostics data. If this node does not exist, then the DiagMon Client MUST send a generic alert as soon as practical to the DiagMon Server when all of diagnostic data has been completely collected, and the DiagMon Client SHOULD NOT send any more generic alerts to the DiagMon Server.

Values	Description
0	The DiagMon Client SHOULD NOT send generic alert to the DiagMon Server when the set of diagnostics data has been completely collected.
positive integer value n	The DiagMon Client MUST send generic alert as soon as practical to the DiagMon Server after the n^{th} set of diagnostics data has been completely collected.

<x>/DiagMonConfig/ReportCondition/ReportChannel

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	int	Get, Replace

The value of this node indicates the channel(s) which SHOULD be used by the DiagMon Client to report DiagMon Data to the DiagMon Server. If multiple channels are to be indicated, the sum of their numeric value MUST be indicated: for instance, if the DiagMon Server would like to indicate to send DiagMon data using Generic Alert Package and USSD channels, the node value is 10 (2+8).

The following table contains the numeric value associated with each report channel.

Values	Channel
0	Report Channel is disabled
1	Generic Alert Package without DiagMon data
2	Generic Alert Package containing DiagMon data
4	SMS
8	USSD

Note: in case the value of the node is 0 (disabled) or the node does not exist, no report from the DiagMon Client is required but the DiagMon data can still be retrieved by the DiagMon Server using suitable DM Commands during a normal DM Session.

<x>/DiagMonConfig/ReportCondition/SMSRecipient

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	chr	Get, Replace

If the value of the <x>/DiagMonConfig/ReportCondition/ReportChannel node indicates the DM Client is to use SMS channel, this node MUST contain the SMS recipient (i.e. MSISDN).

<x>/DiagMonConfig/ReportCondition/USSDRecipient

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	chr	Get, Replace

If the value of `<x>/DiagMonConfig/ReportCondition/ReportChannel` node indicates the DM Client is to use USSD channel, this node MUST contain the USSD recipient.

<x>/DiagMonData

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This node is a placeholder for the data associated with the VoLTE Metrics function. Devices MUST support the adding of leaf nodes under this node.

<x>/DiagMonData/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrMore	node	Get

This required node is a placeholder for the various collected VoLTE Metrics data sets. The node name is constructed as the time the VoLTE Metrics measurements were taken, encoded per [ISO8601]

<x>/DiagMonData/<x>/VolteSIPCall

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains VoLTE Metrics data associated with a VoLTE SIP call

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains VoLTE SIP call data associated with a call attempt

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt/CallType

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the SIP call type, with “O” indicating a mobile originated call and “T” indicating a mobile terminated call

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt/CellID

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains the eNodeB cell identity when the VoLTE SIP call is placed or received, the “CellGlobalIDEutra” as defined in [3GPP-TS_36.331]

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt/Timestamp

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the time and date at which the VoLTE SIP call is placed or received, expressed as a UTC based [ISO8601] basic format.

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt/CallID

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This optional leaf node contains the Call ID, as defined in [RFC 3261]

<x>/DiagMonData/<x>/VolteSIPCall/CallAttempt/DialedString

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This optional leaf node contains the dialed string for a mobile originated call

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains VoLTE SIP call status data

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node indicates the VoLTE SIP call status at the time of measurement. The value MUST be one of the following values:

Value	Description
1	During call setup
2	Call setup failed
3	In conversation
4	End with eSRVCC HO
5	Released normally
6	Released abnormally

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/FailureReason

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This optional leaf node contains the reason for failure when a call setup fails or a call is dropped. The value of this node SHOULD be one of the following, which are case-insensitive:

Data	Description
SIP Cause = xyz; Reason Phrase = 'string'	SIP error code (1xx to 6xx) and reason phrase as specified in [RFC3326]
CSF - SIP Invite timeout	Call setup failure
CSF - Failed to establish SIP bearer	Call setup failure
CSF - Failed to establish voice bearer	Call setup failure
CSF - Radio link failure	Call setup failure
CSF - SRVCC	Call setup failure
CD – Radio link failure	Call drop
CD – Handover failure	Call drop
CD – Voice bearer failure mid-call	Call drop
CD – SRVCC failure	Call drop
CD – Disconnect from network; Reason Phrase = 'string'	Call drop. Reason phrase as specified in [RFC3326]
CD – UE initiated due to reason 'string'	Call drop. Reason string left to implementation or blank if not available

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/CellID

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains the eNodeB cell identity when the VoLTE SIP call status event occurs, the "CellGlobalIDEutra" as defined in [3GPP-TS_36.331]

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/Timestamp

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the time and date at which the VoLTE SIP call status event occurs, expressed as a UTC based [ISO8601] basic format.

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/ModeSet

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the mode set selected for the codec in use.

<x>/DiagMonData/<x>/VolteSIPCall/CallStatus/Codec

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the codec negotiated when the VoLTE SIP call status event occurs.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node contains data associated with VoLTE SIP call sessions statistics.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/SetupDelay

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the VoLTE SIP call setup delay, defined as the time interval for a mobile-originated call between when the dialling is complete (ie, when SIP INVITE is sent from the originating UE) and when call setup is complete (ie, when the originating UE receives the “200 (OK)” from the destination UE).

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/PostDialDelay

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	float	Get

This node contains post-dial delay for a mobile originated call, defined as the time interval for a mobile-originated call between when the dialling is complete (ie, when SIP INVITE is sent from the originating mobile) and when the originating UE receives the “180 (RINGING)” signal.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/PostAnswerDelay

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	float	Get

This node contains post-answer delay for a mobile terminated call, defined as the time interval for a mobile-terminated call between when the user accepts a call request to the time when the terminating mobile receives the ACK for the Call Setup Complete signal.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/PacketDropRate

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the percentage of RTP packets that are dropped by the network or de-jitter buffer

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/LongInterruptions

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains the number of intervals containing more than 8 consecutive packet drops during the session.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/MaxJitter

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the maximum one-way RTP packet delay variation, in msec., as defined in [RFC5481], Section 4.2.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/AvgJitter

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the average one way RTP packet delay variation, in msec., as defined in [RFC5481], Section 4.2.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/CallDuration

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the duration of the VoLTE SIP call, in seconds.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/RTPPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets received.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/RTPPacketsLost

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets lost by the network.

<x>/DiagMonData/<x>/VolteSIPCall/SessionStatistics/RTPPacketsLate

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets that arrive late and are dropped by the de-jitter buffer.

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node contains data associated with VoLTE SIP call statistics for the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/CaptureDuration

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Replace

This node contains the duration, in seconds, for capturing the EndCallStatistics at the end of a VoLTE call.

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/LastRTPPacketTimestamp

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the time and date at which the last RTP Packet prior to a call drop/failure was received, expressed as a UTC based [ISO8601] basic format.

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/PacketDropRate

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the percentage of RTP packets that are dropped by the network or de-jitter buffer during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/MaxJitter

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the maximum one way RTP packet delay variation, in msec,during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration), as defined in [RFC5481], Section 4.2

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/AvgJitter

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the average one-way RTP packet delay variation, in msec,during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration), as defined in [RFC5481], Section 4.2

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/Codec

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node describes the codec used.

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/RTPPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets received during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/RTPPacketsLost

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets lost by the network during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/RTPPacketsLate

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains a count of the RTP packets that arrive late and are dropped by the de-jitter buffer during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/HandoverSuccess

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the percentage of Handover success during the last ‘n’ seconds of a VoLTE call (where ‘n’ is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/VolteSIPCall/EndCallStatistics/SRVCCSuccess

Status	Tree Occurrence	Format	Min. Access Types
Required	One	float	Get

This node contains the percentage of SRVCC procedure success during the last 'n' seconds of a VoLTE call (where 'n' is defined by EndCallStatisticsCaptureDuration).

<x>/DiagMonData/<x>/SIPRegStateChange

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains data related to a VoLTE SIP registration state change

<x>/DiagMonData/<x>/SIPRegStateChange/Type

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains an indication of the type of a VoLTE SIP registration state change. The value MUST be one of the following values:

Value	Description
0	From unregistered to registered
1	From registered to unregistered

<x>/DiagMonData/<x>/SIPRegStateChange/Event

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains data related to the SIP registration state change event

<x>/DiagMonData/<x>/SIPRegStateChange/Event/TriggerEvent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains a description of the event that triggered a SIP registration state change, such as "IMS registration success," "IMS registration timeout," "IMS registration reject," "Network initiated de-registration," "UE initiated de-registration," etc. Specific contents of this node are left to implementation.

<x>/DiagMonData/<x>/SIPRegStateChange/Event/CellID

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains the eNodeB cell identity when the SIP registration state change occurs, the "CellGlobalIDEutra" as defined in [3GPP-TS_36.331]

<x>/DiagMonData/<x>/SIPRegStateChange/Event/Timestamp

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the time and date at which the SIP registration state change occurs, expressed as a UTC based [ISO8601] basic format.

<x>/DiagMonData/<x>/SIPRegStateChange/Event/PCSCFList

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains the The P-CSCF list at the time of the state change, with the primary P-CSCF appearing first in the list.

<x>/DiagMonData/<x>/IMSPDNConnectionStateChange

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node contains data related to the IMS PDN Connection state change.

<x>/DiagMonData/<x>/ IMSPDNConnectionStateChange/Type

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

This node contains an indication of the type of IMS PDN Connection state change. The value MUST be one of the following values:

Value	Description
0	From detached to attached
1	From attached to detached

<x>/DiagMonData/<x>/IMSPDNConnectionStateChange/Event

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This interior node contains data related to the IMS PDN Connection state change event.

<x>/DiagMonData/<x>/ IMSPDNConnectionStateChange/Event/TriggerEvent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This node contains a description of the event that triggered a IMS PDN Connection state change, such as EPS Mobility Management (EMM) cause information element.

<x>/Operations

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This node is a placeholder for operations that can be executed on the VoLTE Metrics function

<x>/Operations/Start

Status	Tree Occurrence	Format	Min. Access Types
Required	One	null	Exec

This leaf node is the target of an 'Exec' command to start the VoLTE Metrics function resident on the device.

<x>/Operations/Stop

Status	Tree Occurrence	Format	Min. Access Types
Required	ZeroOrOne	null	Exec

This leaf node is the target of an 'Exec' command to stop the VoLTE Metrics function resident on the device.

<x>/Operations/Upload

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	null	Get, Exec

This leaf node is the target of an 'Exec' command to upload the data associated with the VoLTE Metrics function. If this node exists, '`<x>/DiagMonConfig/DiagDataURL`' MUST exist too. The Server SHOULD set a valid URL on '`<x>/DiagMonConfig/DiagDataURL`' before performing Exec on '`<x>/Operations/Upload`' node. If the Upload operation fails, the result code '1400 (Operation Failed)' MUST be returned.

<x>/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

This leaf node specifies the operational state of the VoLTE Metrics Function. The value of this node MUST be one of the following:

State	Meaning
Stopped	The VoLTE Metrics function is stopped.
Running	The VoLTE Metrics function is running, following explicit invocation.
Continuous	The VoLTE Metrics function is a continuously available function that is always running. Running and Stopped states are not applicable.

<x>/Ext

Status	Tree Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node is a placeholder for platform or vendor specific extensions.

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-TS-DiagMon_VoLTE_Function-V1_0	19 Nov 2013	All	First draft version, according to OMA-DM-DiagVoLTE-2013-0002-INP_DiagMon_VoLTE_Function_TS_Skeleton
	15 May 2014	5.1	Incorporate CR: OMA-DM-DiagVoLTE-2014-0004-CR_VoLTE_Metrics_EndCall_Stats
	19 Jun 2014	2.1 4.0 4.1 5.1 5.3	Incorporate CRs: OMA-DM-DiagVoLTE-2014-0006-CR_Addition_to_VoLTE_Metrics_EndCall_Stats; OMA-DM-DiagVoLTE-2014-0007R01-CR_VoLTE_Metrics_References; OMA-DM-DiagVoLTE-2014-0008R01-CR_VoLTE_Metrics_ConfigParms; OMA-DM-DiagVoLTE-2014-0009R02-CR_VoLTE_Metrics_DiagMonData
	29 Jul 2014	Contents Figures 2.1 5.1 5.3	Incorporate CR: OMA-DM-DiagVoLTE-2014-0010-CR_VoLTE_Metrics_TS_Cleanup
	17 Oct 2014	5.3	Incorporate CRs: OMA-DM-DiagVoLTE-2014-0013R01-CR_TI_CONR_comments_solution OMA-DM-DiagVoLTE-2014-0014R01-CR_CONR_A001_Resolution
Candidate Version OMA-TS-DiagMon_VoLTE_Function-V1_0	25 Nov 2014	n/a	Status changed to Candidate by TP TP Ref # OMA-TP-2014-0267-INP_DiagVoLTE_V1_0_RRP_for_Candidate_Approval

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1 SCR for DiagMon Client (VoLTE)

Item	Function	Reference	Requirement

B.2 SCR for DiagMon Server (VoLTE)

Item	Function	Reference	Requirement