

Audio/Video Working Group
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RTP Control Protocol Extended Reports (RTCP XR)
VoIP Metrics Management Information Base
draft-ietf-avt-rtcp-xr-mib-04.txt

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This document is a product of the Audio-Visual Transport (AVT) working group of the Internet Engineering Task Force. Comments are solicited and should be addressed to the working group's mailing list at avt@ietf.org and/or the authors.

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines objects for managing Real-Time Transport Control Protocol Extended Reports (RTCP XR) VoIP Metrics ([RFC3611](#)).

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[1.](#) The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7 of RFC 3410](#) [[RFC3410](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

[2.](#) Overview

An "RTP System" may be a host end-system that runs an application

program that sends or receives RTP data packets, or it may be an intermediate-system that forwards RTP packets. RTP Control Protocol (RTCP) packets are sent by senders and receivers to convey information about RTP packet transmission and reception [[RFC3550](#)]. RTCP Extended Report (XR) [[RFC3611](#)] packets are sent by receivers to convey additional information about certain types of RTP packet reception.

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 [RFC 2119](#).

[2.1](#) Components

The RTCP XR MIB is structured around "Session", "Source", "Destination" and "Receiver" conceptual abstractions.

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2.1.1 An RTP Session is an association of two or more participants communicating with RTP. For each participant, the session is defined by a particular pair of destination transport addresses (one network address plus a port pair for RTP and RTCP). The destination transport addresses may be common for all participants, as in the case of IP multicast, or may be different for each, as in the case of individual unicast addresses plus a common port pair," as defined in [section 3 of \[RFC3550\]](#).

2.1.2 A "Sender" is identified within an RTP session by a 32-bit numeric "Synchronization Source," or "SSRC", value and is "...the source of a stream of RTP packets" as defined in [section 3 of \[RFC3550\]](#). The sender is also a source of RTCP Sender Report packets as specified in [section 6 of \[RFC3550\]](#).

2.1.3 A "Receiver" of a "stream of RTP packets" can be a unicast or multicast Receiver as described in 2.1.1, above. An RTP Receiver has an SSRC value that is unique to the session. An RTP Receiver is a source of RTCP Receiver Reports as specified in [section 6 of \[RFC3550\]](#) and RTCP XR VoIP Metrics Reports as specified in [section 4.7 of \[RFC3611\]](#).

[2.2](#) Applicability of the MIB to RTP System Implementations

The RTCP XR MIB may be used in RTP Host Systems (end systems), see [section 3 of \[RFC3550\]](#), that are supporting Voice over IP (VoIP host systems) or in intermediate systems.

2.2.1 VoIP host Systems are end-systems that may use the RTCP XR MIB to collect RTP Voice over IP session data that the host is sending or receiving; these data may be used by a network manager to detect and diagnose faults that occur over the lifetime of a VoIP session as in a "help-desk" scenario.

2.2.2 Monitors of RTP Voice over IP sessions may be third-party or may be located in the RTP host. Monitors may use the RTCP XR MIB to collect Voice over IP session statistical data; these data may be used by a network manager for planning and other network-management purposes. A Monitor may use the RTCP XR MIB to collect data to permit a network manager to diagnose faults in VoIP sessions.

[2.3](#) Relationship to the RTP MIB V2

The RTP MIB V2 [[draft-ietf-avt-mib-rtcp-bis-00.txt](#)] defines a table of session identifying information. The tables in the RTCP XR MIB augment the session data from the RTP MIB V2, providing detailed performance information for RTP sessions transporting Voice over IP. The RTP MIB V2 session table MUST be implemented if the RTCP XR MIB Basic Parameter and Call Quality tables are implemented. The history table in this MIB contains aggregate information and does not have any relationship to the RTP MIB V2 session table. In implementations that use only the RTCP XR history table to report aggregate data, the RTP MIB V2 session table MUST NOT be implemented.

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[2.4](#) Relationship to the RAQMON Architecture

The Real-time Application QoS monitoring (RAQMON) Framework [[RAQMON](#)] defines an architecture that extends the Remote Monitoring (RMON) family of applications for monitoring of application QoS in real time, and an extensible data model with objects carried between RAQMON data sources and RAQMON collectors. The RAQMON work is more generic, and complementary in concept to RTCP-XR, covering a wider range of applications running concurrently, while RTCP-XR focuses on in-depth QoS monitoring of media traffic in VoIP.

The Real-time Application QoS Monitoring (RAQMON) MIB is defined by [xxx] and runs on RAQMON collectors. A performance monitoring application may query (i) RAQMON collectors for RAQMON MIB information about the QoS parameters of multiple concurrent applications (ii) end-points and gateways for in-depth RTCP-XR information about the media QoS of VoIP or (iii) both.

[2.5](#) The Structure of the RTCP XR MIB

There are three tables in the RTCP XR MIB

The `rtcpXrBasicParametersTable` contains basic packet loss, discard and delay related parameters about a session.

The `rtcpXrVoiceQualityMetricsTable` contains information about the call quality of a session

The `rtcpXrHistoryTable` contains aggregate information about a group of sessions.

[2.6](#) Application to multi-party and multicast calls

The RTCP XR MIB may be applied to multi-party calls. The RTP MIB Session table is defined in terms of uni-directional RTP streams from a source to a destination.

For a multi-party IP-IP conference call in which parties are directly interconnected in a mesh network, a row should be created in the session table for each such interconnection.

For a multi-party call in which parties are interconnected via a bridge function and RTP streams are literally or logically terminated at the bridge, a row should be created in the session table for the RTP sessions established to and from each endpoint and the bridge.

For a multicast call in which RTP sessions are terminated in logical IP addresses from they are redistributed, a row in the session table should be created for the source to multicast address RTP session.

```
RTCPXR-MIB DEFINITIONS ::= BEGIN
IMPORTS
```

```
    mib-2, MODULE-IDENTITY, NOTIFICATION-TYPE,
    OBJECT-TYPE, Unsigned32, Integer32,
    Gauge32, Counter32                               FROM SNMPv2-SMI
    OBJECT-GROUP, MODULE-COMPLIANCE,
    NOTIFICATION-GROUP                               FROM SNMPv2-CONF
    TEXTUAL-CONVENTION, RowPointer, DateAndTime
```

SnmpAdminString
ItuPerceivedSeverity
rtpSessionIndex, rtpSessionCallStatus

FROM SNMPv2-TC
FROM SNMP-FRAMEWORK-MIB
FROM ITU-ALARM-TC-MIB
FROM RTP-MIBV2;

rtcpXrMIB MODULE-IDENTITY

LAST-UPDATED "200603040000Z"

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"IETF AVT Working Group"

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DESCRIPTION

"RTCP Extended Reports MIB

Copyright (c) The Internet Society (2005)

This version of the MIB module is part of

RFC nnnn and is based on [RFC3611](#)."

REVISION

"200603040000Z"

DESCRIPTION

"Published as [draft-ietf-avt-rtcp-xr-mib-04.txt](#)"

-- RFC Ed: replace above draft with RFC number and remove this note

::= { mib-2 nnn }

-- IANA: need assignment of a mib-2 OID for this MIB

-- RFC Ed: replace mmm with assigned OID number and remove this note

```
--  
-- RTCP Extended Reports - Voice over IP Metrics  
--  
-- Description  
--   This MIB module provides basic voice quality monitoring  
--   capabilities for Voice-over-packet systems. The MIB contains  
--   3 tables of information that augment the data available in  
--   the RTP MIB V2.  
--       a table of basic parameters for each Stream  
--       a table of call quality metrics for each Stream  
--       a table of aggregate statistics for groups of calls  
--   the indexes to these tables are imported from the RTP MIB V2  
--   and hence this MIB MUST be used in conjunction with at least  
--   the RTP session table from that MIB
```

-- TEXTUAL CONVENTIONS

```
LeveldB ::= TEXTUAL-CONVENTION  
DISPLAY-HINT "d"  
STATUS      current  
DESCRIPTION  
    "Represents a signal level in decibels (dB)."  
SYNTAX      Integer32 (-120..120|127)
```

```
Rfactor ::= TEXTUAL-CONVENTION  
DISPLAY-HINT "d"  
STATUS      current  
DESCRIPTION  
    "Call or transmission quality expressed as an  
    R factor in the range 0 to 120. A value of  
    127 shall be interpreted as NULL or unsupported."  
REFERENCE  
    "ITU-T G.107"  
SYNTAX      Unsigned32 (0..120|127)
```

```
ScaledMOSscore ::= TEXTUAL-CONVENTION  
DISPLAY-HINT "d"  
STATUS      current  
DESCRIPTION  
    "Call or transmission quality expressed as a  
    MOS score scaled by 10. MOS is typically represented  
    as a 1.0 to 5.0 score with a single decimal place and  
    hence in this representation as 10 to 50. A value of  
    127 shall be interpreted as NULL or unsupported."  
REFERENCE  
    "ITU-T P.800"  
SYNTAX      Integer32 (10..50|127)
```

Percentage ::= TEXTUAL-CONVENTION
DISPLAY-HINT "d"
STATUS current
DESCRIPTION
"Percentage expressed as a rounded integer."
SYNTAX Unsigned32 (0..100)

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--

-- OBJECTS

--

rtcpXrEvents OBJECT IDENTIFIER ::= { rtcpXrMIB 0 }
rtcpXrMIBObjects OBJECT IDENTIFIER ::= { rtcpXrMIB 1 }
rtcpXrConformance OBJECT IDENTIFIER ::= { rtcpXrMIB 2 }

--

-- Table of basic RTP stream parameters

--

rtcpXrBaseParamTable OBJECT-TYPE
SYNTAX SEQUENCE OF RtcpXrBaseParamEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Table of basic parameters related to RTP sessions in
the Session table. "
::= { rtcpXrMIBObjects 2 }

rtcpXrBaseParamEntry OBJECT-TYPE
SYNTAX RtcpXrBaseParamEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the table of basic parameters. A row in this table
is created for each RTP session endpoint participating."
INDEX { rtpSessionCallStatus, rtpSessionIndex }
::= { rtcpXrBaseParamTable 1 }

RtcpXrBaseParamEntry ::= SEQUENCE {
rtcpXrBaseParamCodecType OCTET STRING,
rtcpXrBaseParamCodecBitRate Unsigned32,
rtcpXrBaseParamFrameDuration Unsigned32,
rtcpXrBaseParamFramesPerPacket Unsigned32,
rtcpXrBaseParamSampleRate Unsigned32,
rtcpXrBaseParamDurationMs Counter32,

rtcpXrBaseParamNetworkLossRate	Percentage,
rtcpXrBaseParamAvgDiscardRate	Percentage,
rtcpXrBaseParamBurstLossDensity	Percentage,
rtcpXrBaseParamBurstLenMs	Gauge32,
rtcpXrBaseParamGapLossDensity	Percentage,
rtcpXrBaseParamGapLenMs	Gauge32,
rtcpXrBaseParamAvgOWDelay	Gauge32,
rtcpXrBaseParamAvgEndSysDelay	Gauge32,
rtcpXrBaseParamNoiseLeveldBm	LeveldB,
rtcpXrBaseParamSignalLeveldBm	LeveldB,
rtcpXrBaseParamLocalRERLdB	LeveldB,
rtcpXrBaseParamRemoteRERLdB	LeveldB,
rtcpXrBaseParamPlcType	INTEGER,
rtcpXrBaseParamJBuffAdaptMode	INTEGER,
rtcpXrBaseParamJBuffAdaptRate	Unsigned32,
rtcpXrBaseParamJBuffAverageDelay	Gauge32,

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rtcpXrBaseParamJBuffMaximumDelay	Gauge32,
rtcpXrBaseParamJBuffAbsMaxDelay	Gauge32,
rtcpXrBaseParamJitterLevel	Gauge32

}

rtcpXrBaseParamCodecType OBJECT-TYPE
 SYNTAX OCTET STRING (SIZE(0..32))
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Codec type used on this call. The format used shall be
 ITU-T G.7xx, GSM FR, GSM EFR, GSM HR, AMR, AMR WB, iLBC
 or similar. For example 'ITU G.729A'. It is recommended
 that Codecs are described in consistently with SDP."
 ::= { rtcpXrBaseParamEntry 1 }

rtcpXrBaseParamCodecBitRate OBJECT-TYPE
 SYNTAX Unsigned32
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Codec rate in use at the time this data was captured
 expressed in bits per second. For example G.711 would
 have the rate 64000 and G.729 would have the rate 8000."
 ::= { rtcpXrBaseParamEntry 2 }

rtcpXrBaseParamFrameDuration OBJECT-TYPE
 SYNTAX Unsigned32 (0..16384)

UNITS "sample clock ticks"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Companion information to Codec type. This represents the duration of the time interval represented by a frame, which is generally equivalent to the nominal spacing of frames. This is expressed in sample clock ticks as defined under rtxpXrSampleRate.
This parameter may be equated to the SDPptime parameter which is expressed in milliseconds (however which cannot represent certain Codec types, e.g. those with 2.5mS frames)."
 ::= { rtcpXrBaseParamEntry 3 }

rtcpXrBaseParamFramesPerPacket OBJECT-TYPE
SYNTAX Unsigned32 (0..65535)
UNITS "frames per packet"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of Codec frames contained in a single IP packet in this RTP stream at the time of sampling. The duration of speech per IP packet is the product of Frame Duration and Frames Per Packet. This may vary during a call."
 ::= { rtcpXrBaseParamEntry 4 }

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rtcpXrBaseParamSampleRate OBJECT-TYPE
SYNTAX Unsigned32 (0..16777215)
UNITS "samples per second"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Companion information to Codec type. This represents the rate at which media was sampled (e.g. 8000 for narrowband voice, 16000 for wideband voice)."
 ::= { rtcpXrBaseParamEntry 5 }

rtcpXrBaseParamDurationMs OBJECT-TYPE
SYNTAX Counter32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Current duration of call in milliseconds if still active,

duration of call in milliseconds if complete."
 ::= { rtcpXrBaseParamEntry 6 }

rtcpXrBaseParamNetworkLossRate OBJECT-TYPE
SYNTAX Percentage
UNITS "percent"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Average rate of network packet loss."
REFERENCE
"See [RFC3611 Section 4.7.](#)"
 ::= { rtcpXrBaseParamEntry 7 }

rtcpXrBaseParamAvgDiscardRate OBJECT-TYPE
SYNTAX Percentage
UNITS "percent"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Average rate of discards due to jitter."
REFERENCE
"See [RFC3611 Section 4.7.](#)"
 ::= { rtcpXrBaseParamEntry 8 }

rtcpXrBaseParamBurstLossDensity OBJECT-TYPE
SYNTAX Percentage
UNITS "percent"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Density of loss and discarded packets during burst periods."
REFERENCE
"See [RFC3611 Section 4.7.](#)"
 ::= { rtcpXrBaseParamEntry 9 }

rtcpXrBaseParamBurstLenMs OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Average length of bursts in milliseconds."
REFERENCE

"See [RFC3611 Section 4.7.](#)"
 ::= { rtcpXrBaseParamEntry 10 }

rtcpXrBaseParamGapLossDensity OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Density of loss and discarded packets during gap periods."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 11 }

rtcpXrBaseParamGapLenMs OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Average length of gaps in milliseconds."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 12 }

rtcpXrBaseParamAvgOWDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Average (symmetric) one way RTCP delay on call. A value of zero indicates that this value has not yet been determined."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 13 }

rtcpXrBaseParamAvgEndSysDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Average end system delay on call. A value of zero may indicate that this value has not yet been determined."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 14 }

rtcpXrBaseParamNoiseLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Measured received silent period noise level in dBm. A value of 127 indicates that this parameter is not available.

In midpoint applications this parameter may not be available. If this is a midstream device and call quality metrics were calculated using the value of this parameter reported from the endpoint in an RTCP XR payload then the value used in this calculation MAY be reported."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 15 }

rtcpXrBaseParamSignalLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Measured received signal level during talkspurts in dBm. A value of 127 indicates that this parameter is not available.

In midpoint applications this parameter may not be available. If this is a midstream device and call quality metrics were calculated using the value of this parameter reported from the endpoint in an RTCP XR payload then the value used in this calculation MAY be reported."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 16 }

rtcpXrBaseParamLocalRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Residual Echo Return Loss measured at this endpoint, or at the terminating endpoint of this RTP session. This relates to the echo level from the network beyond the terminating endpoint and may be interpreted as either line echo in the case of a gateway or acoustic echo in the case of a handset.

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Note that this echo affects conversational quality as perceived by the user at the originating end of this RTP session.
A value of 127 indicates that this parameter is not available.

In midpoint applications this parameter may not be available. If this is a midstream device and call quality metrics were calculated using the value of this parameter reported from the endpoint in an RTCP XR payload then the value used in this calculation MAY be reported."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 17 }

rtcpXrBaseParamRemoteRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Residual Echo Return Loss measured at originating endpoint of this RTP session (i.e. the remote endpoint if this MIB is implemented in an endpoint).

Note that this affects the conversational quality metrics reported by the terminating (this) endpoint, hence is useful in understanding what has affected the reported call quality metrics

A value of 127 indicates that this parameter is not available.

In midpoint applications this parameter may not be available. If this is a midstream device and call quality metrics were calculated using the value of this parameter reported from the endpoint in an RTCP XR payload then the value used in this calculation MAY be reported."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 18 }

rtcpXrBaseParamPlcType OBJECT-TYPE

SYNTAX INTEGER { disabled(1),
enhanced(2),
standard(3),
unspecified (4)}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Defines type of packet loss concealment used on this call."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 19 }

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rtcpXrBaseParamJBuffAdaptMode OBJECT-TYPE

SYNTAX INTEGER { reserved (1),
nonAdaptive (2),
adaptive (3),
unknown (4) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Defines if jitter buffer is in fixed or adaptive mode."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 20 }

rtcpXrBaseParamJBuffAdaptRate OBJECT-TYPE

SYNTAX Unsigned32 (0..15)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Estimated adaptation rate of jitter buffer."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 21 }

rtcpXrBaseParamJBuffAverageDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Average size of jitter buffer in mS."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 22 }

rtcpXrBaseParamJBuffMaximumDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum delay through jitter buffer at current size in mS."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 23 }

rtcpXrBaseParamJBuffAbsMaxDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Absolute maximum size jitter buffer can reach in mS."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrBaseParamEntry 24 }

rtcpXrBaseParamJitterLevel OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Average jitter level measured according to [RFC3550](#) and represented in terms of milliseconds."

REFERENCE

"See [RFC3550 Section 6.4.](#)"

::= { rtcpXrBaseParamEntry 25 }

-- Table of Call Quality Metrics
--

rtcpXrCallQualityTable OBJECT-TYPE
SYNTAX SEQUENCE OF RtcpXrCallQualityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Table of voice quality metrics. A row is created
in this table for each row in the Session table."
 ::= { rtcpXrMIBObjects 3 }

rtcpXrCallQualityEntry OBJECT-TYPE
SYNTAX RtcpXrCallQualityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry in the table of voice quality metrics. A row in
this table is created for each row in the Session
table."
INDEX { rtpSessionCallStatus, rtpSessionIndex }
 ::= { rtcpXrCallQualityTable 1 }

RtcpXrCallQualityEntry ::= SEQUENCE {
rtcpXrCallQualityRCQ Rfactor,
rtcpXrCallQualityRLQ Rfactor,
rtcpXrCallQualityExternalRCQ Rfactor,
rtcpXrCallQualityMOSCCQ ScaledMOSscore,
rtcpXrCallQualityMOSLQ ScaledMOSscore,
rtcpXrCallQualityRLQestAlgorithm OCTET STRING,
rtcpXrCallQualityRCQestAlgorithm OCTET STRING,
rtcpXrCallQualityMOSLQestAlgorithm OCTET STRING,
rtcpXrCallQualityMOSCCQestAlgorithm OCTET STRING
}

rtcpXrCallQualityRCQ OBJECT-TYPE
SYNTAX Rfactor
UNITS "R factor"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Conversational quality R factor for this call. This value
SHOULD be calculated using ITU G.107 (The E Model) or

extended versions thereof."
REFERENCE
"See [RFC3611 Section 4.7.](#)"
 ::= { rtcpXrCallQualityEntry 1 }

rtcpXrCallQualityRLQ OBJECT-TYPE

SYNTAX Rfactor
UNITS "R factor"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Listening quality R factor for this call. This value
SHOULD be calculated using ITU G.107 (The E Model) or
extended versions thereof."
 ::= { rtcpXrCallQualityEntry 2 }

rtcpXrCallQualityExternalRCQ OBJECT-TYPE

SYNTAX Rfactor
UNITS "R factor"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"External R factor for this call. This value
SHOULD be calculated using ITU G.107 (The E Model) or
extended versions thereof.
The External R factor relates to the quality of an
incoming voice from another network segment. For example
if a conference bridge terminates and re-creates voice
streams then an R factor would be calculated at the bridge
for the endpoint A to bridge segment and relayed to the
subsequent bridge to endpoint B as an External R factor.
This allows endpoint B to estimate the end-to-end call
quality."
 ::= { rtcpXrCallQualityEntry 3 }

rtcpXrCallQualityMOSCCQ OBJECT-TYPE

SYNTAX ScaledMOSscore
UNITS "MOS x 10"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Estimated conversational quality MOS for this call
expressed in MOS x 10 (e.g. 41 = MOS of 4.1). This value
MAY be calculated by converting the R-CQ value to a MOS."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrCallQualityEntry 4 }

rtcpXrCallQualityMOSLQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Estimated listening quality MOS for this call expressed in MOS x 10 (e.g. 41 = MOS of 4.1). This value MAY be calculated by converting the R-CQ value to a MOS."

REFERENCE

"See [RFC3611 Section 4.7.](#)"

::= { rtcpXrCallQualityEntry 5 }

rtcpXrCallQualityRLQestAlgorithm OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..128))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Call quality algorithm used to determine R-LQ factors. For example, 'ITU-T G.107' for the ITU G.107 E model or 'ETSI TS101329-5E' for ETSI TS 101 329-5 Annex E."

::= { rtcpXrCallQualityEntry 6 }

rtcpXrCallQualityRCQestAlgorithm OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..128))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Call quality algorithm used to determine R-CQ factors. For example, 'ITU-T G.107' for the ITU G.107 E model or 'ETSI TS101329-5E' for ETSI TS 101 329-5 Annex E."

::= { rtcpXrCallQualityEntry 7 }

rtcpXrCallQualityMOSLQEstAlgorithm OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..128))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Call quality algorithm used to determine MOS-LQ scores. If any localized parameter scaling is used (for example Japan's TTC MOS scaling) then this MUST also be reported."

```
::= { rtcpXrCallQualityEntry 8 }
```

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```
rtcpXrCallQualityMOSCQEstAlgorithm OBJECT-TYPE
    SYNTAX OCTET STRING (SIZE(0..128))
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Call quality algorithm used to determine MOS-CQ scores.
        If any localized parameter scaling is used
        (for example Japan's TTC MOS scaling) then this
        MUST also be reported."
    ::= { rtcpXrCallQualityEntry 9 }
```

```
--
-- History Table
--
--
```

```
rtcpXrHistoryTable OBJECT-TYPE
    SYNTAX SEQUENCE OF RtcpXrHistoryEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Table of aggregate measurement data for groups
        of RTP sessions. A group may be a flow or any
        other logical association of streams."
    ::= { rtcpXrMIBobjects 4 }
```

```
rtcpXrHistoryEntry OBJECT-TYPE
    SYNTAX RtcpXrHistoryEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An entry in the table of call history records."
    INDEX { rtcpXrHistoryIndex }
    ::= { rtcpXrHistoryTable 1 }
```

```
RtcpXrHistoryEntry ::= SEQUENCE {
    rtcpXrHistoryIndex                Unsigned32,
    rtcpXrHistoryGroupName            OCTET STRING,
```

rtcpXrHistoryStartTime	DateAndTime,
rtcpXrHistoryStopTime	DateAndTime,
rtcpXrHistoryNumOfSessions	Counter32,
rtcpXrHistoryMinDurationMs	Gauge32,
rtcpXrHistoryMaxDurationMs	Gauge32,
rtcpXrHistoryAvgDurationMs	Gauge32,
rtcpXrHistoryMaxNetworkLossRate	Percentage,
rtcpXrHistoryAvgNetworkLossRate	Percentage,
rtcpXrHistoryMaxDiscardRate	Percentage,
rtcpXrHistoryAvgDiscardRate	Percentage,
rtcpXrHistoryMaxBurstLossDensity	Percentage,
rtcpXrHistoryAvgBurstLossDensity	Percentage,
rtcpXrHistoryMinBurstLenMs	Gauge32,
rtcpXrHistoryMaxBurstLenMs	Gauge32,
rtcpXrHistoryAvgBurstLenMs	Gauge32,
rtcpXrHistoryMaxGapLossDensity	Percentage,

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rtcpXrHistoryAvgGapLossDensity	Percentage,
rtcpXrHistoryMinGapLenMs	Gauge32,
rtcpXrHistoryMaxGapLenMs	Gauge32,
rtcpXrHistoryAvgGapLenMs	Gauge32,
rtcpXrHistoryMinOneWayDelay	Gauge32,
rtcpXrHistoryMaxOneWayDelay	Gauge32,
rtcpXrHistoryAvgOneWayDelay	Gauge32,
rtcpXrHistoryOneWayDelayCount	Counter32,
rtcpXrHistoryMinEndSystemDelay	Gauge32,
rtcpXrHistoryMaxEndSystemDelay	Gauge32,
rtcpXrHistoryAvgEndSystemDelay	Gauge32,
rtcpXrHistoryEndSystemDelayCount	Counter32,
rtcpXrHistoryMinJitterLevel	Gauge32,
rtcpXrHistoryMaxJitterLevel	Gauge32,
rtcpXrHistoryAvgJitterLevel	Gauge32,
rtcpXrHistoryMinNoiseLeveldBm	LeveldB,
rtcpXrHistoryMaxNoiseLeveldBm	LeveldB,
rtcpXrHistoryAvgNoiseLeveldBm	LeveldB,
rtcpXrHistoryNoiseLevelCount	Counter32,
rtcpXrHistoryMinSignalLeveldBm	LeveldB,
rtcpXrHistoryMaxSignalLeveldBm	LeveldB,
rtcpXrHistoryAvgSignalLeveldBm	LeveldB,
rtcpXrHistorySignalLevelCount	Counter32,
rtcpXrHistoryMinLocalRERLdB	LeveldB,
rtcpXrHistoryMaxLocalRERLdB	LeveldB,
rtcpXrHistoryAvgLocalRERLdB	LeveldB,
rtcpXrHistoryLocalRERLCount	Counter32,
rtcpXrHistoryMinRemoteRERLdB	LeveldB,

```

rtcpXrHistoryMaxRemoteRERLdB          LeveldB,
rtcpXrHistoryAvgRemoteRERLdB          LeveldB,
rtcpXrHistoryRemoteRERLCount          Counter32,
rtcpXrHistoryMinRCQ                    Rfactor,
rtcpXrHistoryMaxRCQ                    Rfactor,
rtcpXrHistoryAvgRCQ                    Rfactor,
rtcpXrHistoryRCQCount                  Counter32,
rtcpXrHistoryMinRLQ                    Rfactor,
rtcpXrHistoryMaxRLQ                    Rfactor,
rtcpXrHistoryAvgRLQ                    Rfactor,
rtcpXrHistoryRLQCount                  Counter32,
rtcpXrHistoryMinMOSCQ                  ScaledMOSscore,
rtcpXrHistoryMaxMOSCQ                  ScaledMOSscore,
rtcpXrHistoryAvgMOSCQ                  ScaledMOSscore,
rtcpXrHistoryMOSCQCount                Counter32,
rtcpXrHistoryMinMOSLQ                  ScaledMOSscore,
rtcpXrHistoryMaxMOSLQ                  ScaledMOSscore,
rtcpXrHistoryAvgMOSLQ                  ScaledMOSscore,
rtcpXrHistoryMOSLQCount                Counter32,
rtcpXrHistoryCQAlgorithm               OCTET STRING,
rtcpXrHistoryReset                     INTEGER
}

```

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```

rtcpXrHistoryIndex OBJECT-TYPE
    SYNTAX Unsigned32 (0..4294967295)
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Index for this set of aggregate data."
    ::= { rtcpXrHistoryEntry 1 }

rtcpXrHistoryGroupName OBJECT-TYPE
    SYNTAX OCTET STRING (SIZE(0..128))
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "Name of this set of aggregate data. Examples may include
        a flow, an interface or some other logical grouping of
        RTP sessions."
    ::= { rtcpXrHistoryEntry 2 }

```

rtcpXrHistoryStartTime OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Time at which this history was reset or started."
 ::= {rtcpXrHistoryEntry 3 }

rtcpXrHistoryStopTime OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Time at which this history was stopped."
 ::= {rtcpXrHistoryEntry 4 }

rtcpXrHistoryNumOfSessions OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of calls included in this history."
 ::= {rtcpXrHistoryEntry 5 }

rtcpXrHistoryMinDurationMs OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Minimum duration of calls."
 ::= {rtcpXrHistoryEntry 6 }

rtcpXrHistoryMaxDurationMs OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Maximum duration of calls."
 ::= {rtcpXrHistoryEntry 7 }

```

rtcpXrHistoryAvgDurationMs OBJECT-TYPE
    SYNTAX Gauge32
    UNITS "milliseconds"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Average duration of calls within this history."
    ::= {rtcpXrHistoryEntry 8 }

rtcpXrHistoryMaxNetworkLossRate OBJECT-TYPE
    SYNTAX Percentage
    UNITS "percent"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Maximum loss rate occurring on any call in this history."
    ::= {rtcpXrHistoryEntry 9 }

rtcpXrHistoryAvgNetworkLossRate OBJECT-TYPE
    SYNTAX Percentage
    UNITS "percent"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Mean for all calls in this history of the individual
        per call packet loss rate."
    ::= {rtcpXrHistoryEntry 10 }

rtcpXrHistoryMaxDiscardRate OBJECT-TYPE
    SYNTAX Percentage
    UNITS "percent"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Maximum discard rate occurring on any call in this history."
    ::= {rtcpXrHistoryEntry 11 }

```


rtcpXrHistoryAvgDiscardRate OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean for all calls in this history of the individual per call packet discard rate."

::= {rtcpXrHistoryEntry 12 }

rtcpXrHistoryMaxBurstLossDensity OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call average burst densities for any call in this history. A value of 0 shall be reported if no bursts were reported."

::= {rtcpXrHistoryEntry 13 }

rtcpXrHistoryAvgBurstLossDensity OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean for all calls in this history of the individual per call burst density. A value of 0 shall be reported if no bursts were reported."

::= {rtcpXrHistoryEntry 14 }

rtcpXrHistoryMinBurstLenMs OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call burst length for all calls in this history for which a burst length was reported. A value of 0 shall be reported if no bursts were present."

::= {rtcpXrHistoryEntry 15 }

rtcpXrHistoryMaxBurstLenMs OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call burst length for all calls in this history for which a burst length was reported. A value of 0 shall be reported if no bursts were present."

::= {rtcpXrHistoryEntry 16 }

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rtcpXrHistoryAvgBurstLenMs OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call burst length for all calls in this history for which a burst length was reported. A value of 0 shall be reported if no bursts were present."

::= {rtcpXrHistoryEntry 17 }

rtcpXrHistoryMaxGapLossDensity OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call gap density for all calls in this history for which a gap density was reported. A value of 0 shall be reported if no gaps were present."

::= {rtcpXrHistoryEntry 18 }

rtcpXrHistoryAvgGapLossDensity OBJECT-TYPE

SYNTAX Percentage

UNITS "percent"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call gap density for all calls in this history for which a gap density was reported. A value of 0 shall be reported if no gaps were present."

::= {rtcpXrHistoryEntry 19 }

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rtcpXrHistoryMinGapLenMs OBJECT-TYPE

SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Minimum of the per-call gap length for all calls in this
history for which a gap length was reported. A value of
0 shall be reported if no gaps were present."
 ::= {rtcpXrHistoryEntry 20 }

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rtcpXrHistoryMaxGapLenMs OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Maximum of the per-call gap length for all calls in this
history for which a gap length was reported. A value of
0 shall be reported if no gaps were present."
 ::= {rtcpXrHistoryEntry 21 }

rtcpXrHistoryAvgGapLenMs OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Mean of the per-call gap length for all calls in this
history for which a gap length was reported. A value of
0 shall be reported if no gaps were present."
 ::= {rtcpXrHistoryEntry 22 }

rtcpXrHistoryMinOneWayDelay OBJECT-TYPE
SYNTAX Gauge32
UNITS "milliseconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"Minimum of the per-call OW Delays for all calls in this history for which a Delay was reported. A value of 0 shall be reported if no Delay values were reported."
 ::= {rtcpXrHistoryEntry 23 }

rtcpXrHistoryMaxOneWayDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call OW Delays for all calls in this history for which a Delay was reported. A value of 0 shall be reported if no Delay values were reported."

::= {rtcpXrHistoryEntry 24 }

rtcpXrHistoryAvgOneWayDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call OW Delays for all calls in this history for which a Delay was reported. A value of 0 shall be reported if no Delay values were reported."

::= {rtcpXrHistoryEntry 25 }

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rtcpXrHistoryOneWayDelayCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the One Way Delay history values (as Delay may not be available on all calls.)"

::= {rtcpXrHistoryEntry 26 }

rtcpXrHistoryMinEndSystemDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call ES Delays for all calls in this history for which an ES Delay was reported."

::= {rtcpXrHistoryEntry 27 }

rtcpXrHistoryMaxEndSystemDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call ES Delays for all calls in this history for which an ES Delay was reported."

::= {rtcpXrHistoryEntry 28 }

rtcpXrHistoryAvgEndSystemDelay OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call ES Delays for all calls in this history for which an ES Delay was reported."

::= {rtcpXrHistoryEntry 29 }

rtcpXrHistoryEndSystemDelayCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the End System Delay history values (as End System Delay may not be available on all calls.)"

::= {rtcpXrHistoryEntry 30 }

rtcpXrHistoryMinJitterLevel OBJECT-TYPE

SYNTAX Gauge32

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call jitter for all calls in this history for which a jitter value was reported."

```

 ::= {rtcpXrHistoryEntry 31 }

rtcpXrHistoryMaxJitterLevel OBJECT-TYPE
    SYNTAX Gauge32
    UNITS "milliseconds"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Maximum of the per-call jitter for all calls in this
         history for which a jitter value was reported."
    ::= {rtcpXrHistoryEntry 32 }

rtcpXrHistoryAvgJitterLevel OBJECT-TYPE
    SYNTAX Gauge32
    UNITS "milliseconds"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Mean of the per-call jitter for all calls in this
         history for which a jitter value was reported."
    ::= {rtcpXrHistoryEntry 33 }

rtcpXrHistoryMinNoiseLeveldBm OBJECT-TYPE
    SYNTAX LeveldB
    UNITS "dBm0"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Minimum of the per-call Noise Level for all calls in this
         history for which a Noise Level value was reported."
    ::= {rtcpXrHistoryEntry 34 }

rtcpXrHistoryMaxNoiseLeveldBm OBJECT-TYPE
    SYNTAX LeveldB
    UNITS "dBm0"
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Maximum of the per-call Noise Level for all calls in this
         history for which a Noise Level value was reported."
    ::= {rtcpXrHistoryEntry 35 }

```

rtcpXrHistoryAvgNoiseLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call Noise Level for all calls in this history for which a Noise Level value was reported."

::= {rtcpXrHistoryEntry 36 }

rtcpXrHistoryNoiseLevelCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the Noise Level history values (as Noise Level is an optional parameter and may not be present on all calls.)"

::= {rtcpXrHistoryEntry 37 }

rtcpXrHistoryMinSignalLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call Signal Level for all calls in this history for which a Signal Level value was reported."

::= {rtcpXrHistoryEntry 38 }

rtcpXrHistoryMaxSignalLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call Signal Level for all calls in this history for which a Signal Level value was reported."

::= {rtcpXrHistoryEntry 39 }

rtcpXrHistoryAvgSignalLeveldBm OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm0"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call Signal Level for all calls in this history for which a Signal Level value was reported."

::= {rtcpXrHistoryEntry 40 }

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rtcpXrHistorySignalLevelCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the Signal Level history values (as Signal Level is an optional parameter and may not be present on all calls."

::= {rtcpXrHistoryEntry 41 }

rtcpXrHistoryMinLocalRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call local RERL for all calls in this history for which a local RERL value was reported."

::= {rtcpXrHistoryEntry 42 }

rtcpXrHistoryMaxLocalRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call local RERL for all calls in this history for which a local RERL value was reported."

::= {rtcpXrHistoryEntry 43 }

rtcpXrHistoryAvgLocalRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call local RERL for all calls in this

history for which a local RERL value was reported."
 ::= {rtcpXrHistoryEntry 44 }

rtcpXrHistoryLocalRERLCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the Local RERL history values (as Local RERL is an optional parameter and may not be present on all calls."

::= {rtcpXrHistoryEntry 45 }

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rtcpXrHistoryMinRemoteRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call remote RERL for all calls in this history for which a remote RERL value was reported."

::= {rtcpXrHistoryEntry 46 }

rtcpXrHistoryMaxRemoteRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call remote RERL for all calls in this history for which a remote RERL value was reported."

::= {rtcpXrHistoryEntry 47 }

rtcpXrHistoryAvgRemoteRERLdB OBJECT-TYPE

SYNTAX LeveldB

UNITS "dBm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call remote RERL for all calls in this

history for which a remote RERL value was reported."
 ::= {rtcpXrHistoryEntry 48 }

rtcpXrHistoryRemoteRERLCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the Remote RERL history values (as Remote RERL is an optional parameter and may not be present on all calls."

::= {rtcpXrHistoryEntry 49 }

rtcpXrHistoryMinRCQ OBJECT-TYPE

SYNTAX Rfactor

UNITS "R factor"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call R-CQ for all calls in this history for which an R-CQ value was reported."

::= {rtcpXrHistoryEntry 50 }

rtcpXrHistoryMaxRCQ OBJECT-TYPE

SYNTAX Rfactor

UNITS "R factor"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call R-CQ for all calls in this history for which an R-CQ value was reported."

::= {rtcpXrHistoryEntry 51 }

rtcpXrHistoryAvgRCQ OBJECT-TYPE

SYNTAX Rfactor

UNITS "R factor"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call R-CQ for all calls in this

history for which an R-CQ value was reported."
 ::= {rtcpXrHistoryEntry 52 }

rtcpXrHistoryRCQCount OBJECT-TYPE
 SYNTAX Counter32
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Number of sessions included in the R CQ
 history values (as R CQ is an optional
 parameter and may not be present on all calls."
 ::= {rtcpXrHistoryEntry 53 }

rtcpXrHistoryMinRLQ OBJECT-TYPE
 SYNTAX Rfactor
 UNITS "R factor"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Minimum of the per-call R-LQ for all calls in this
 history for which an R-LQ value was reported."
 ::= {rtcpXrHistoryEntry 54 }

rtcpXrHistoryMaxRLQ OBJECT-TYPE
 SYNTAX Rfactor
 UNITS "R factor"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Maximum of the per-call R-LQ for all calls in this
 history for which an R-LQ value was reported."
 ::= {rtcpXrHistoryEntry 55 }

rtcpXrHistoryAvgRLQ OBJECT-TYPE
 SYNTAX Rfactor
 UNITS "R factor"
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "Mean of the per-call R-LQ for all calls in this

history for which an R-LQ value was reported."
 ::= {rtcpXrHistoryEntry 56 }

rtcpXrHistoryRLQCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the R LQ
 history values (as R LQ is an optional
 parameter and may not be present on all calls."

::= {rtcpXrHistoryEntry 57 }

rtcpXrHistoryMinMOSCQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call MOS-CQ for all calls in this
 history for which a MOS-CQ value was reported."

::= {rtcpXrHistoryEntry 58 }

rtcpXrHistoryMaxMOSCQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call MOS-CQ for all calls in this
 history for which a MOS-CQ value was reported."

::= {rtcpXrHistoryEntry 59 }

rtcpXrHistoryAvgMOSCQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call MOS-CQ for all calls in this
 history for which a MOS-CQ value was reported."

::= {rtcpXrHistoryEntry 60 }

rtcpXrHistoryMOSQCCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the MOS CQ history values (as MOS CQ is an optional parameter and may not be present on all calls."

::= {rtcpXrHistoryEntry 61 }

rtcpXrHistoryMinMOSLQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Minimum of the per-call MOS-LQ for all calls in this history for which a MOS-LQ value was reported."

::= {rtcpXrHistoryEntry 62 }

rtcpXrHistoryMaxMOSLQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Maximum of the per-call MOS-LQ for all calls in this history for which a MOS-LQ value was reported."

::= {rtcpXrHistoryEntry 63 }

rtcpXrHistoryAvgMOSLQ OBJECT-TYPE

SYNTAX ScaledMOSscore

UNITS "MOS x 10"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Mean of the per-call MOS-LQ for all calls in this history for which a MOS-LQ value was reported."

::= {rtcpXrHistoryEntry 64 }

rtcpXrHistoryMOSLQCount OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of sessions included in the MOS LQ history values (as MOS LQ is an optional parameter and may not be present on all calls."

```
::= {rtcpXrHistoryEntry 65 }
```

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```
rtcpXrHistoryCQAlgorithm OBJECT-TYPE
    SYNTAX OCTET STRING (SIZE(0..32))
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Call quality algorithm used - if consistent
        for all calls in this history."
    ::= {rtcpXrHistoryEntry 66 }

rtcpXrHistoryReset OBJECT-TYPE
    SYNTAX INTEGER { running (1),
                    stop (2),
                    reset (3)
                  }
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "Status of this row in the history table.
        Writing a value of 2 to this object MUST cause
        history updates to be stopped for this row. Writing
        a value of 3 to this object MUST cause the history
        row to be reset.
        Reads MUST return a value of 1 if the row is still
        being updated or 2 if the row update has stopped."
    ::= {rtcpXrHistoryEntry 67 }

--
-- Notifications
--

rtcpXrVoipThresholdViolation NOTIFICATION-TYPE
    OBJECTS { rtcpXrVoipAlertSeverity, rtcpXrVoipAlertType,
              rtcpXrVoipAlertInfoType, rtcpXrVoipAlertPointer }
    STATUS current
    DESCRIPTION
        "Notification that voice quality has changed
        Sent immediately when the condition is detected."
    ::= { rtcpXrEvents 1}
```

rtcpXrEventParam OBJECT IDENTIFIER ::= { rtcpXrEvents 2 }

rtcpXrVoipAlertType OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Text description of the type of alert. Where possible, this parameter should be populated with the correct rtcpXrVoipEntry or rtcpXrVoipHistory description."

::= { rtcpXrEventParam 1 }

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rtcpXrVoipAlertInfoType OBJECT-TYPE

SYNTAX INTEGER { adminStringOnly (1),
sessionPointer (2),
historyPointer (3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the type of information returned in the rtcpXrVoipAlertInfo parameter."

::= { rtcpXrEventParam 2 }

rtcpXrVoipAlertPointer OBJECT-TYPE

SYNTAX RowPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Pointer to the table of call session information to identify the specific call that triggered the alert."

::= { rtcpXrEventParam 3 }

rtcpXrVoipAlertSeverity OBJECT-TYPE

SYNTAX ItuPerceivedSeverity

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The severity of the alert as defined in ITU-T X.733 and [RFC3877](#)."

REFERENCE

"See Alarm MIB - [RFC3877](#)."
 ::= { rtcpXrEventParam 4 }

--

-- MODULE GROUPS

--

-- There are four types of RTCP XR VoIP Metrics System.

--

-- RTCP XR VOIP Metrics Systems MUST implement one of the four
-- identified types of system and SHOULD NOT implement the
-- rtcpXrMinimalCompliance system, which is included only
-- for reasons of compatibility with [RFC3611](#)'s minimal
-- requirements.

--

rtcpXrCompliances OBJECT IDENTIFIER ::= { rtcpXrConformance 1 }
rtcpXrGroups OBJECT IDENTIFIER ::= { rtcpXrConformance 2 }

rtcpXrFullMetricsCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"Describes the requirements for conformance to the
rtcpXr MIB for VoIP devices that support basic
reporting."

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MODULE -- this module

MANDATORY-GROUPS {

rtcpXrBaseParamGroup,
rtcpXrCallQualityGroup

}

::= { rtcpXrCompliances 1 }

rtcpXrMetricsAlertsCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"Describes the requirements for conformance to the
rtcpXr MIB for VoIP devices that support reporting
and alerts."

MODULE -- this module

MANDATORY-GROUPS {

rtcpXrBaseParamGroup,
rtcpXrCallQualityGroup,
rtcpXrNotificationParmsGroup,


```

                rtcpXrNotificationsGroup
            }
        ::= { rtcpXrCompliances 2 }

rtcpXrMetricsHistoryCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the requirements for conformance to the
         rtcpXr MIB for VoIP devices that support reporting,
         call history and alerts."
    MODULE -- this module
    MANDATORY-GROUPS {
        rtcpXrBaseParamGroup,
        rtcpXrCallQualityGroup,
        rtcpXrMIBHistoryGroup,
        rtcpXrNotificationParmsGroup,
        rtcpXrNotificationsGroup }
    ::= { rtcpXrCompliances 3 }

rtcpXrHistoryCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the requirements for conformance to the
         rtcpXr MIB for VoIP devices that support only
         call history."
    MODULE -- this module
    MANDATORY-GROUPS { rtcpXrMIBHistoryGroup
        }
    ::= { rtcpXrCompliances 4 }

rtcpXrMinimalCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Describes the minimal requirements for conformance to
         the rtcpXr MIB - NOT RECOMMENDED."
    MODULE -- this module

```

```

    MANDATORY-GROUPS {
        rtcpXrBaseParamGroup
    }
    ::= { rtcpXrCompliances 5 }

rtcpXrBaseParamGroup OBJECT-GROUP
    OBJECTS {
        rtcpXrBaseParamCodecType,

```

```

rtcpXrBaseParamCodecBitRate,
rtcpXrBaseParamFrameDuration,
rtcpXrBaseParamFramesPerPacket,
rtcpXrBaseParamSampleRate,
rtcpXrBaseParamDurationMs,
rtcpXrBaseParamNetworkLossRate,
rtcpXrBaseParamAvgDiscardRate,
rtcpXrBaseParamBurstLossDensity,
rtcpXrBaseParamBurstLenMs,
rtcpXrBaseParamGapLossDensity,
rtcpXrBaseParamGapLenMs,
rtcpXrBaseParamAvgOWDelay,
rtcpXrBaseParamAvgEndSysDelay,
rtcpXrBaseParamNoiseLeveldBm,
rtcpXrBaseParamSignalLeveldBm,
rtcpXrBaseParamLocalRERLdB,
rtcpXrBaseParamRemoteRERLdB,
rtcpXrBaseParamPlcType,
rtcpXrBaseParamJBuffAdaptMode,
rtcpXrBaseParamJBuffAdaptRate,
rtcpXrBaseParamJBuffAverageDelay,
rtcpXrBaseParamJBuffMaximumDelay,
rtcpXrBaseParamJBuffAbsMaxDelay,
rtcpXrBaseParamJitterLevel
}

```

STATUS current

DESCRIPTION

"Objects used in rtcpXr VoIP Metrics MIB"

::= { rtcpXrGroups 1 }

rtcpXrCallQualityGroup OBJECT-GROUP

OBJECTS {

```

rtcpXrCallQualityRCQ,
rtcpXrCallQualityRLQ,
rtcpXrCallQualityExternalRCQ,
rtcpXrCallQualityMOSQCQ,
rtcpXrCallQualityMOSLQ,
rtcpXrCallQualityRLQestAlgorithm,
rtcpXrCallQualityRCQestAlgorithm,
rtcpXrCallQualityMOSLQEstAlgorithm,
rtcpXrCallQualityMOSQCQEstAlgorithm
}

```

STATUS current

DESCRIPTION

"Call quality objects used in rtcpXr VoIP Metrics MIB"

::= { rtcpXrGroups 2 }

```
rtcpXrMIBHistoryGroup OBJECT-GROUP
  OBJECTS {
    rtcpXrHistoryGroupName,
    rtcpXrHistoryStartTime,
    rtcpXrHistoryStopTime,
    rtcpXrHistoryNumOfSessions,
    rtcpXrHistoryMinDurationMs,
    rtcpXrHistoryMaxDurationMs,
    rtcpXrHistoryAvgDurationMs,
    rtcpXrHistoryMaxNetworkLossRate,
    rtcpXrHistoryAvgNetworkLossRate,
    rtcpXrHistoryMaxDiscardRate,
    rtcpXrHistoryAvgDiscardRate,
    rtcpXrHistoryMaxBurstLossDensity,
    rtcpXrHistoryAvgBurstLossDensity,
    rtcpXrHistoryMinBurstLenMs,
    rtcpXrHistoryMaxBurstLenMs,
    rtcpXrHistoryAvgBurstLenMs,
    rtcpXrHistoryMaxGapLossDensity,
    rtcpXrHistoryAvgGapLossDensity,
    rtcpXrHistoryMinGapLenMs,
    rtcpXrHistoryMaxGapLenMs,
    rtcpXrHistoryAvgGapLenMs,
    rtcpXrHistoryMinOneWayDelay,
    rtcpXrHistoryMaxOneWayDelay,
    rtcpXrHistoryAvgOneWayDelay,
    rtcpXrHistoryOneWayDelayCount,
    rtcpXrHistoryMinEndSystemDelay,
    rtcpXrHistoryMaxEndSystemDelay,
    rtcpXrHistoryAvgEndSystemDelay,
    rtcpXrHistoryEndSystemDelayCount,
    rtcpXrHistoryAvgJitterLevel,
    rtcpXrHistoryMinJitterLevel,
    rtcpXrHistoryMaxJitterLevel,
    rtcpXrHistoryMinNoiseLeveldBm,
    rtcpXrHistoryMaxNoiseLeveldBm,
    rtcpXrHistoryAvgNoiseLeveldBm,
    rtcpXrHistoryNoiseLevelCount,
    rtcpXrHistoryMinSignalLeveldBm,
    rtcpXrHistoryMaxSignalLeveldBm,
    rtcpXrHistoryAvgSignalLeveldBm,
    rtcpXrHistorySignalLevelCount,
    rtcpXrHistoryMinLocalRERLdB,
    rtcpXrHistoryMaxLocalRERLdB,
    rtcpXrHistoryAvgLocalRERLdB,
    rtcpXrHistoryLocalRERLCount,
    rtcpXrHistoryMinRemoteRERLdB,
    rtcpXrHistoryMaxRemoteRERLdB,
```

```
rtcpXrHistoryAvgRemoteRERLdB,  
rtcpXrHistoryRemoteRERLCount,  
rtcpXrHistoryMinRCQ,  
rtcpXrHistoryMaxRCQ,  
rtcpXrHistoryAvgRCQ,  
rtcpXrHistoryRCQCount,
```

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```
rtcpXrHistoryMinRLQ,  
rtcpXrHistoryMaxRLQ,  
rtcpXrHistoryAvgRLQ,  
rtcpXrHistoryRLQCount,  
rtcpXrHistoryMinMOSCQ,  
rtcpXrHistoryMaxMOSCQ,  
rtcpXrHistoryAvgMOSCQ,  
rtcpXrHistoryMOSCQCount,  
rtcpXrHistoryMinMOSLQ,  
rtcpXrHistoryMaxMOSLQ,  
rtcpXrHistoryAvgMOSLQ,  
rtcpXrHistoryMOSLQCount,  
rtcpXrHistoryCQAlgorithm,  
rtcpXrHistoryReset  
}  
STATUS current  
DESCRIPTION  
    "Objects used in rtcpXr VoIP History MIB"  
 ::= { rtcpXrGroups 3 }  
  
rtcpXrNotificationParmsGroup OBJECT-GROUP  
OBJECTS {  
    rtcpXrVoipAlertSeverity,  
    rtcpXrVoipAlertType,  
    rtcpXrVoipAlertInfoType,  
    rtcpXrVoipAlertPointer  
}  
STATUS current  
DESCRIPTION  
    "Notification parameters emitted by a rtcpXr endpoint."  
 ::= { rtcpXrGroups 4 }  
  
rtcpXrNotificationsGroup NOTIFICATION-GROUP  
NOTIFICATIONS {  
    rtcpXrVoipThresholdViolation  
}  
STATUS current  
DESCRIPTION
```

```
"Notifications emitted by a rtcpXr endpoint."  
 ::= { rtcpXrGroups 5 }
```

END

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[4.](#) Security Considerations

Access to `rtcpXrHistoryReset` can result in resetting the table of aggregate call quality information, which results in the loss of useful management data.

It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt their values when sending them over the network via SNMP.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\], section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate

rights to indeed GET or SET (change/create/delete) them.

5. IANA Considerations

An OID within the mib-2 tree is requested, following which this note may be deleted.

6. Acknowledgements

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8. Normative References

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