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RTCP XR Report Block for Concealed Seconds metric Reporting draft-ietf-avt-rtcp-xr-concsec-00.txt

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Abstract

This document defines an RTCP XR Report Block that allows the reporting of Concealed Seconds metrics primarily for audio applications of RTP.

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1. Introduction

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1.1. Concealed Seconds Block

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This draft defines a new block type to augment those defined in [\[RFC3611\] \(Friedman, T., "RTP Control Protocol Extended Reports \(RTCP XR\)," November 2003.\)](#), for use primarily in audio applications of RTP. At any instant, the audio output at a receiver may be classified as either 'normal' or 'concealed'. 'Normal' refers to playout of audio payload received from the remote end, and also includes locally generated signals such as announcements, tones and comfort noise. Concealment refers to playout of locally-generated signals used to mask the impact of network impairments or to reduce the audibility of jitter buffer adaptations.

The new block type provides metrics for concealment. Specifically, the first metric (Unimpaired Seconds) reports the number of whole seconds occupied only with normal playout of data which the receiver obtained from the sender's stream. The second metric (Concealed Seconds) reports the number of whole seconds during which the receiver played out any locally-generated media data. A third metric (Severely Concealed Seconds) reports the number of whole seconds during which the receiver played out locally-generated data for more than SCS Threshold (ms). The metric belongs to the class of transport-related terminal metrics defined in [MONARCH] (work in progress).

Instances of this Metrics Block refer by tag to the separate auxiliary Measurement Identity block [\[MEASIDENT\] \(Hunt, G., "RTCP XR Measurement Identifier Block," August 2008.\)](#) which contains information such as the SSRC of the measured stream, and RTP sequence numbers and time intervals indicating the span of the report.

1.2. RTCP and RTCP XR Reports

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The use of RTCP for reporting is defined in [\[RFC3550\] \(Schulzrinne, H., "RTP: A Transport Protocol for Real-Time Applications," July 2003.\)](#). [\[RFC3611\] \(Friedman, T., "RTP Control Protocol Extended Reports \(RTCP XR\)," November 2003.\)](#) defined an extensible structure for reporting using an RTCP Extended Report (XR). This draft defines a new Extended Report block that MUST be used as defined in [\[RFC3550\] \(Schulzrinne, H., "RTP: A Transport Protocol for Real-Time Applications," July 2003.\)](#) and [\[RFC3611\] \(Friedman, T., "RTP Control Protocol Extended Reports \(RTCP XR\)," November 2003.\)](#).

1.3. Performance Metrics Framework

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The Performance Metrics Framework [\[PMOLFRAME\] \(Clark, A., "Framework for Performance Metric Development," July 2008.\)](#) provides guidance on the definition and specification of performance metrics. Metrics described in this draft either reference external definitions or define metrics generally in accordance with the guidelines in [\[PMOLFRAME\] \(Clark, A., "Framework for Performance Metric Development," July 2008.\)](#).

1.4. Applicability

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This metric is primarily applicable to audio applications of RTP.
EDITOR'S NOTE: are there metrics for concealment of transport errors for video?

2. Concealed Seconds Metrics Block

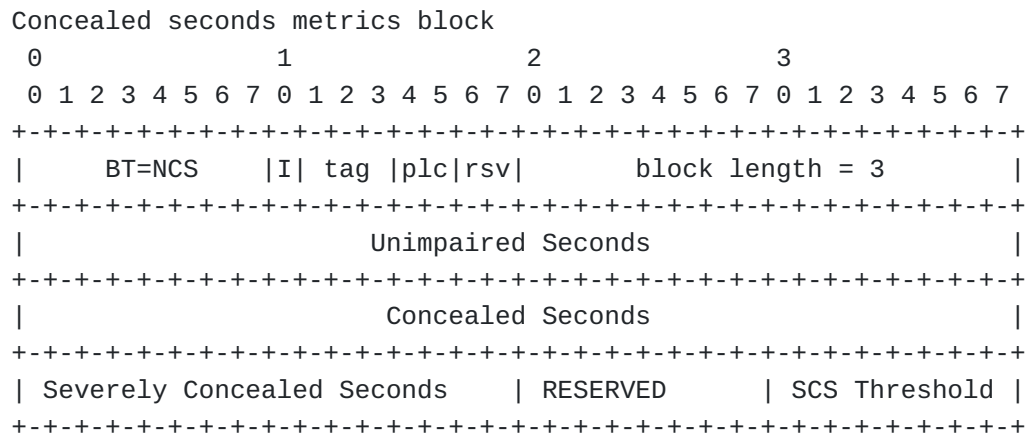
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This sub-block provides a description of potentially audible impairments due to lost and discarded packets at the endpoint, expressed on a time basis analogous to a traditional PSTN T1/E1 errored seconds metric.

The following metrics are based on successive one second intervals as declared by a local clock. This local clock does NOT need to be synchronized to any external time reference. The starting time of this clock is unspecified. Note that this implies that the same loss pattern could result in slightly different count values, depending on where the losses occur relative to the particular one-second demarcation points.

The seconds in this sub-block are not necessarily calendar seconds. At the tail end of a call, periods of time of less than 1000ms shall be incorporated into these counts if they exceed 500ms and shall be disregarded if they are less than 500ms.

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This field is used to indicate whether the Concealed Seconds metric block is an Interval or a Cumulative report, that is, whether the

reported values apply to the most recent measurement interval duration between successive metrics reports (I=1) (the Interval Duration) or to the accumulation period characteristic of cumulative measurements (I=0) (the Cumulative Duration). Numerical values for both these intervals are provided in the Measurement Identifier block referenced by the tag field below.

Measurement Identifier association (tag): 3 bits

This field is used to identify the Measurement Identifier block [MEASIDENT] (Hunt, G., "RTCP XR Measurement Identifier Block," August 2008.) which describes this measurement. The relevant Measurement Identifier block has the same tag value as the Concealed Seconds Metrics block. Note that there may be more than one Measurement Identifier block per RTCP packet.

Packet Loss Concealment Method (plc): 2 bits

This field is used to identify the packet loss concealment method in use at the receiver, according to the following code:

bits 0-3

- 0 = silence insertion
- 1 = simple replay, no attenuation
- 2 = simple replay, with attenuation
- 3 = enhanced
- Other values reserved

Reserved (rsv): 2 bits

These bits are reserved. They SHOULD be set to zero by senders and MUST be ignored by receivers.

block length: 16 bits

The length of this report block in 32-bit words, minus one. For the Concealed Seconds block, the block length is equal to 3.

Unimpaired Seconds: 32 bits

A count of the number of unimpaired Seconds that have occurred.

An unimpaired Second is defined as a continuous period of 1000ms during which no frame loss or discard due to late arrival has occurred. Every second in a call must be classified as either OK or Concealed.

Normal playout of comfort noise or other silence concealment signal during periods of talker silence, if VAD is used, shall be counted as unimpaired seconds.

If the measured value exceeds 0xFFFFFFFFD, the value 0xFFFFFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF SHOULD be reported.

Concealed Seconds: 32 bits

A count of the number of Concealed Seconds that have occurred.

A Concealed Second is defined as a continuous period of 1000ms during which any frame loss or discard due to late arrival has occurred.

Equivalently, a concealed second is one in which some Loss-type concealment (defined in Section 3.6) has occurred. Buffer adjustment-type concealment SHALL not cause Concealed Seconds to be incremented, with the following exception. An implementation MAY cause Concealed Seconds to be incremented for 'emergency' buffer adjustments made during talkspurts.

For clarification, the count of Concealed Seconds MUST include the count of Severely Concealed Seconds.

If the measured value exceeds 0xFFFFFFFFD, the value 0xFFFFFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF SHOULD be reported. The duration, in milliseconds, of audio playout corresponding to Loss-type concealment.

Severely Concealed Seconds: 16 bits

A count of the number of Severely Concealed Seconds.

A Severely Concealed Second is defined as a non-overlapping period of 1000 ms during which the cumulative amount of time that has been subject to frame loss or discard due to late arrival, exceeds the SCS Threshold.

If the measured value exceeds 0xFFFFD, the value 0xFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF SHOULD be reported.

RESERVED: 8 bits

These bits are reserved. They SHOULD be set to zero by senders and MUST be ignored by receivers.

SCS Threshold: 8 bits

The SCS Threshold defines the amount of time corresponding to lost or discarded frames that must occur within a one second period in order for the second to be classified as a Severely Concealed Second. This is expressed in milliseconds and hence can represent a range of 0.1 to 25.5 percent loss or discard.

A default threshold of 50ms (5% effective frame loss per second) is suggested.

3. SDP Signaling

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[RFC3611] (Friedman, T., "RTP Control Protocol Extended Reports (RTCP XR)," November 2003.) defines the use of SDP (Session Description Protocol) [RFC4566] (Handley, M., "SDP: Session Description Protocol," July 2006.) for signaling the use of XR blocks. XR blocks MAY be used without prior signaling.

This section augments the SDP [RFC4566] (Handley, M., "SDP: Session Description Protocol," July 2006.) attribute "rtcp-xr" defined in [RFC3611] (Friedman, T., "RTP Control Protocol Extended Reports (RTCP XR)," November 2003.) by providing an additional value of "xr-format" to signal the use of the report block defined in this document.

The SDP attribute for the block has an additional optional parameter, "thresh", used to supply a value for the SCS Threshold parameter. If this parameter is present, the RTP system receiving the SDP SHOULD use this value for the current session. If the parameter is not present, the RTP system SHOULD use a locally configured value.

rtcp-xr-attrb = "a=" "rtcp-xr" ":" [xr-format *(SP xr-format)] CRLF
(defined in [RFC3611] (Friedman, T., "RTP Control Protocol Extended Reports (RTCP XR)," November 2003.))

xr-format = xr-format / xr-conc-sec-block

xr-conc-sec-block = "xr-concsec" ["=" thresh]

thresh = 1*DIGIT ; threshold for SCS (ms)
DIGIT = %x30-39

4. IANA Considerations

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This document creates a new block type within the IANA "RTCP XR Block Type Registry" called the Concealed Seconds Metrics Block, and a new parameter xr-concsec within the "RTCP XR SDP Parameters Registry".

5. Security Considerations

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It is believed that this proposed RTCP XR report block introduces no new security considerations beyond those described in [\[RFC3611\]](#) (Friedman, T., "RTP Control Protocol Extended Reports (RTCP XR)," November 2003.). This block does not provide per-packet statistics so the risk to confidentiality documented in Section 7, paragraph 3 of [\[RFC3611\]](#) (Friedman, T., "RTP Control Protocol Extended Reports (RTCP XR)," November 2003.) does not apply.

6. Contributors

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The authors gratefully acknowledge the comments and contributions made by Bruce Adams, Philip Arden, Amit Arora, Bob Biskner, Kevin Connor, Claus Dahm, Randy Ethier, Roni Even, Jim Frauenthal, Albert Higashi, Tom Hock, Shane Holthaus, Paul Jones, Rajesh Kumar, Keith Lantz, Mohamed Mostafa, Amy Pendleton, Colin Perkins, Mike Ramalho, Ravi Raviraj, Albrecht Schwarz, Tom Taylor, and Hideaki Yamada.

7. References

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7.1. Normative References

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[MEASIDENT]	Hunt, G., "RTCP XR Measurement Identifier Block," ID draft-ietf-avt-rtcp-xr-measid-00, August 2008.
[RFC2119]	Bradner, S., " Key words for use in RFCs to Indicate Requirement Levels ," RFC 2119, BCP 14, March 1997.
[RFC3550]	Schulzrinne, H., " RTP: A Transport Protocol for Real-Time Applications ," RFC 3550, July 2003.
[RFC3611]	Friedman, T., " RTP Control Protocol Extended Reports (RTCP XR) ," RFC 3611, November 2003.
[RFC4566]	Handley, M., " SDP: Session Description Protocol ," RFC 4566, July 2006.

7.2. Informative References

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[MONARCH]	Hunt, G., "Monitoring Architectures for RTP," ID draft-hunt-avt-monarch-01, August 2008.
[PMOLFRAME]	Clark, A., "Framework for Performance Metric Development," ID draft-ietf-pmol-metrics-framework-00, July 2008.

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