Audio/Video Transport Working Group
Internet-Draft
Intended status: Standards Track
Expires: July 10, 2014

A. Clark
Telchemy
G. Zorn, Ed.
Network Zen
C. Bi
STTRI
Q. Wu, Ed.
Huawei

January 6, 2014

RTCP XR Report Block for Concealment metrics Reporting on Audio Applications
draft-ietf-xrblock-rtcp-xr-loss-conceal-09.txt

Abstract

This document defines two RTCP XR Report Blocks that allows the reporting of concealment metrics for audio applications of RTP.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on July 10, 2014.

Copyright Notice

Copyright (c) 2014 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must

include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction 3
1.1. Loss Concealment and Concealment Seconds Metrics Reporting Block 3
1.2. RTCP and RTCP XR Reports 4
1.3. Performance Metrics Framework 4
1.4. Applicability 4
2. Terminology 5
2.1. Standards Language 5
2.2. Notations 5
3. Loss Concealment Block 6
3.1. Report Block Structure 6
3.2. Definition of Fields in Loss Concealment Metrics Block . . 6
4. Concealment Seconds Block 11
4.1. Report Block Structure 11
4.2. Definition of Fields in Concealed Seconds Metrics Block . 12
5. SDP Signaling 16
5.1. SDP rtcp-xr-attrib Attribute Extension 16
5.2. Offer/Answer Usage 16
6. IANA Considerations 17
6.1. New RTCP XR Block Type values 17
6.2. New RTCP XR SDP Parameters 17
6.3. Contact information for registrations 17
7. Security Considerations 18
8. Contributors 19
9. Acknowledgements 20
10. References 21
10.1. Normative References 21
10.2. Informative References 21
Appendix A. Metrics represented using RFC6390 Template 22
Appendix B. Change Log 29
B.1. draft-ietf-xrblock-rtcp-xr-loss-conceal-09 29
B.2. draft-ietf-xrblock-rtcp-xr-loss-conceal-07 29
B.3. draft-ietf-xrblock-rtcp-xr-loss-conceal-06 29
B.4. draft-ietf-xrblock-rtcp-xr-loss-conceal-05 29
B.5. draft-ietf-xrblock-rtcp-xr-loss-conceal-04 29
Authors' Addresses 30

1. Introduction

1.1. Loss Concealment and Concealment Seconds Metrics Reporting Block

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.

This draft defines two new concealment related block types to augment those defined in [RFC3611] for use in a range of RTP applications. These two block types extend packet loss concealment mechanism defined in section 4.7.6 of RFC3611.

The first block type provides metrics for actions taken by the receiver to mitigate the effect of packet loss and packet discard. Specifically, the first metric (On-Time Playout Duration) reports the duration of normal playout of data which the receiver obtained from the sender's stream. A second metric (Loss Concealment Duration) reports the total time during which the receiver played out media data which was manufactured locally, because the sender's data for these periods was not available due to packet loss or discard. A similar metric (Buffer Adjustment Concealment Duration) reports the duration of playout of locally-manufactured data replacing data which is unavailable due to adaptation of an adaptive de-jitter buffer. Further metrics (Playout Interrupt Count and Mean Playout Interrupt Size) report the number of times normal playout was interrupted, and the mean duration of these interruptions.

Loss Concealment Duration and Buffer Adjustment Concealment Duration are reported separately because buffer adjustment is typically arranged to occur in silence periods so may have very little impact on user experience, whilst loss concealment may occur at any time.

The second block type provides metrics for concealment seconds, which are measured at the receiving end of the RTP stream. 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.

These metrics belongs to the class of transport-related terminal metrics defined in [RFC6792].

1.2. RTCP and RTCP XR Reports

The use of RTCP for reporting is defined in [RFC3550]. [RFC3611] 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] and [RFC3611].

1.3. Performance Metrics Framework

The Performance Metrics Framework [RFC6390] provides guidance on the definition and specification of performance metrics. The RTP Monitoring Architectures [RFC6792] provides guideline for reporting block format using RTCP XR. The Metrics Block described in this document are in accordance with those guidelines.

1.4. Applicability

These metrics are applicable to audio applications of RTP and the audio component of Audio/Video applications in which the packet loss concealment machinery is contained at the receiving end to mitigate the impact of network impairments to user's perception of media quality.

2. Terminology

2.1. Standards Language

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 [RFC2119].

2.2. Notations

This report block makes use of binary fractions. The terminology used is

Numeric formats S X:Y

where S indicates a two's complement signed representation, X the number of bits prior to the decimal place and Y the number of bits after the decimal place.

Hence 8:8 represents an unsigned number in the range 0.0 to 255.996 with a granularity of 0.0039. S7:8 would represent the range -127.996 to +127.996. 0:16 represents a proper binary fraction with range

0.0 to 1 - 1/65536 = 0.9999847

though note that use of flag values at the top of the numeric range slightly reduces this upper limit. For example, if the 16- bit values 0xfffe and 0xffff are used as flags for "over-range" and "unavailable" conditions, a 0:16 quantity has range

0.0 to 1 - 3/65536 = 0.9999542

3. Loss Concealment Block

The metrics block described here are intended to be used as described in this section, in conjunction with information from the Measurement Information block [RFC6776]. Instances of this Metrics Block refer by Synchronization source (SSRC) to the separate auxiliary Measurement Information block [RFC6776] which describes measurement periods in use (see [RFC6776] section 4.2). This Metrics Block relies on the measurement period in the Measurement Information block indicating the span of the report and SHOULD be sent in the same compound RTCP packet as the measurement information block. If the measurement period is not received in the same compound RTCP packet as this Metrics Block, this metrics block MUST be discarded.

3.1. Report Block Structure

Loss Concealment Metrics Block

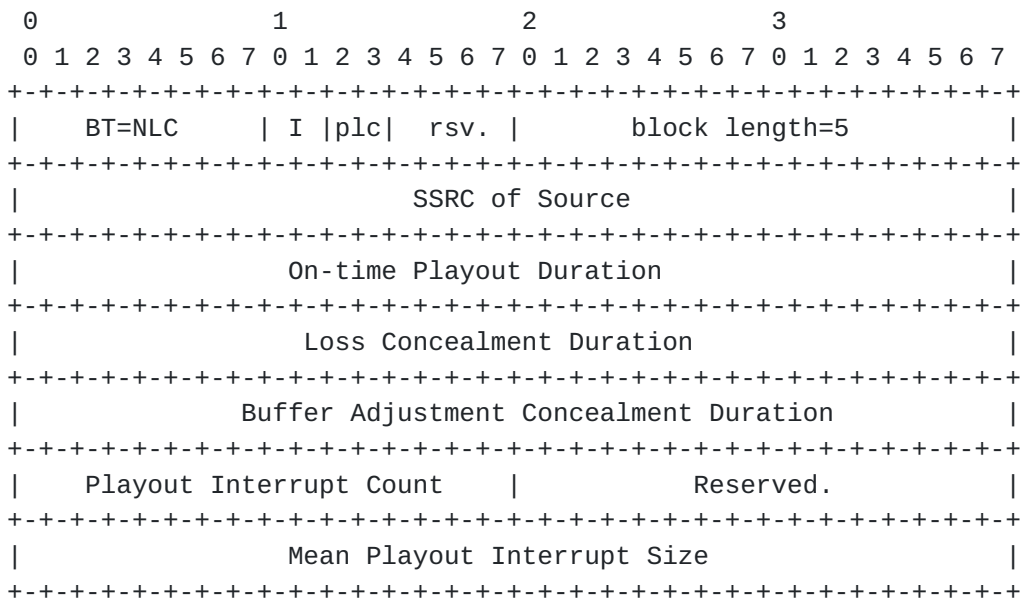


Figure 1: Report Block Structure

3.2. Definition of Fields in Loss Concealment Metrics Block

Block type (BT): 8 bits

A Loss Concealment Metrics Report Block is identified by the constant NLC.

[Note to RFC Editor: please replace NLC with the IANA provided RTCP XR block type for this block.]

Interval Metric flag (I): 2 bit

This field is used to indicate whether the Loss Concealment metrics are Sampled, Interval or Cumulative metrics:

I=10: Interval Duration - the reported value applies to the most recent measurement interval duration between successive metrics reports.

I=11: Cumulative Duration - the reported value applies to the accumulation period characteristic of cumulative measurements.

I=01: Sampled Value - the reported value is a sampled instantaneous value.

In this document, Loss Concealment Metrics can only be measured over definite intervals, and cannot be sampled. Also, the value I=00 is reserved for future use. Senders MUST NOT use the values I=00 or I=01. If a block is received with I=00 or I=01, the receiver MUST discard the block.

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 014-015

0 = silence insertion

1 = simple replay, no attenuation

2 = simple replay, with attenuation

3 = enhancement

Other values reserved

Note that the enhancement method (plc =3)for packet loss concealment offers an improved audio quality and or a better robustness against packet losses [G.711] and is equivalent to enhanced in section 4.7.1 of [RFC3611],

Reserved (resv): 4 bits

These bits are reserved. They MUST be set to zero by senders and ignored by receivers (See [RFC6709] section 4.2).

block length: 16 bits

The length of this report block in 32-bit words, minus one. For the Loss Concealment Block, the block length is equal to 5.

SSRC of source: 32 bits

As defined in Section 4.1 of [RFC3611].

On-time Playout Duration: 32 bits

'On-time' playout is the uninterrupted, in-sequence playout of valid decoded audio information originating from the remote endpoint. This includes comfort noise during periods of remote talker silence, if VAD [VAD] is used, and locally generated or regenerated tones and announcements.

An equivalent definition is that on-time playout is playout of any signal other than those used for concealment.

On-time playout duration is expressed in units of RTP timestamp and MUST include both speech and silence intervals, whether VAD is used or not.

If the measured value exceeds 0xFFFFFFFD, the value 0xFFFFFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST be reported.

Loss Concealment Duration: 32 bits

The duration, expressed in units of RTP timestamp, of audio playout corresponding to Loss-type concealment.

Loss-type concealment is reactive insertion or deletion of samples in the audio playout stream due to effective frame loss at the audio decoder. "Effective frame loss" is the event in which a frame of coded audio is simply not present at the audio decoder when required. In this case, substitute audio samples are generally formed, at the decoder or elsewhere, to reduce audible

impairment.

If the measured value exceeds 0xFFFFFFFD, the value 0xFFFFFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST be reported.

Buffer Adjustment Concealment Duration: 32 bits

The duration, expressed in units of RTP timestamp, of audio playout corresponding to Buffer Adjustment-type concealment, if known.

If the measured value exceeds 0xFFFFFFFD, the value 0xFFFFFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST be reported.

Buffer Adjustment-type concealment is proactive or controlled insertion or deletion of samples in the audio playout stream due to jitter buffer adaptation, re-sizing or re-centering decisions within the endpoint.

Because this insertion is controlled, rather than occurring randomly in response to losses, it is typically less audible than loss-type concealment. For example, jitter buffer adaptation events may be constrained to occur during periods of talker silence, in which case only silence duration is affected, or sophisticated time-stretching methods for insertion/deletion during favorable periods in active speech may be employed.

Concealment events which cannot be classified as Buffer Adjustment-type MUST be classified as Loss-type.

Playout Interrupt Count: 16 bits

The number of interruptions to normal playout which occurred during the reporting period.

If the measured value exceeds 0xFFFD, the value 0xFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF MUST be reported.

Reserved (resv): 16 bits

These bits are reserved. They MUST be set to zero by senders and ignored by receivers (See [RFC6709] section 4.2).

Mean Playout Interrupt Size: 32 bits

The mean duration, expressed in units of RTP timestamp, of interruptions to normal playout which occurred during the reporting period.

If the measured value exceeds 0xFFFD, the value 0xFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF MUST be reported.

4. Concealment Seconds Block

This sub-block described here is intended to be used as described in this section, in conjunction with information from the Measurement Information block [RFC6776] and 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. Instances of this Metrics Block refer by Synchronization source (SSRC) to the separate auxiliary Measurement Information block [RFC6776] which describes measurement periods in use (see [RFC6776] section 4.2). This Metrics Block relies on the measurement period in the Measurement Information block indicating the span of the report and SHOULD be sent in the same compound RTCP packet as the measurement information block. If the measurement period is not received in the same compound RTCP packet as this Metrics Block, this metrics block MUST be discarded.

The following metrics are based on successive one second intervals as declared by a RTP clock. This RTP 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. For example, two loss events occurring 50ms apart could result in either one concealed second or two, depending on the particular one second boundaries used.

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

4.1. Report Block Structure

Concealed Seconds Metrics Block

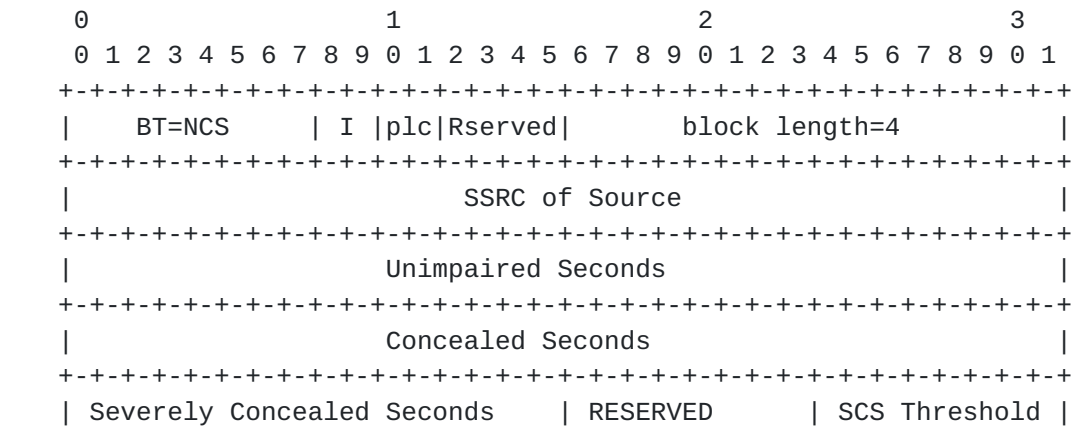


Figure 2: Report Block Structure

4.2. Definition of Fields in Concealed Seconds Metrics Block

Block type (BT): 8 bits

A Concealed Seconds Metrics Report Block is identified by the constant NCS.

[Note to RFC Editor: please replace NCS with the IANA provided RTCP XR block type for this block.]

Interval Metric flag (I): 2 bit

This field is used to indicate whether the Concealment Seconds Metrics are Sampled, Interval or Cumulative metrics:

I=10: Interval Duration - the reported value applies to the most recent measurement interval duration between successive metrics reports.

I=11: Cumulative Duration - the reported value applies to the accumulation period characteristic of cumulative measurements.

I=01: Sampled Value - the reported value is a sampled instantaneous value.

In this document, Concealment Seconds Metrics can only be measured over definite intervals, and cannot be sampled. Also, the value I=00 is reserved for future use. Senders MUST NOT use the values I=00 or I=01. If a block is received with I=00 or I=01, the receiver MUST discard the block.

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 014-015

0 = silence insertion

1 = simple replay, no attenuation

2 = simple replay, with attenuation

3 = enhancement

Other values reserved

Note that the enhancement method (plc =3) for packet loss concealment offers an improved audio quality and or a better robustness against packet losses [G.711] and is equivalent to enhanced in section 4.7.1 of [RFC3611],

Reserved (resv): 4 bits

These bits are reserved. They MUST be set to zero by senders and ignored by receivers (See [RFC6709] section 4.2).

Block Length: 16 bits

The length of this report block in 32-bit words, minus one. For the Concealment Seconds Block, the block length is equal to 4.

SSRC of source: 32 bits

As defined in Section 4.1 of [RFC3611].

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 one second during which no frame loss or discard due to late arrival has occurred. Every second in a session 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 0xFFFFFFFD, the value 0xFFFFFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST 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 one second 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 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.

Loss-type concealment is reactive insertion or deletion of samples in the audio playout stream due to effective frame loss at the audio decoder. "Effective frame loss" is the event in which a frame of coded audio is simply not present at the audio decoder when required. In this case, substitute audio samples are generally formed, at the decoder or elsewhere, to reduce audible impairment.

Buffer Adjustment-type concealment is proactive or controlled insertion or deletion of samples in the audio playout stream due to jitter buffer adaptation, re-sizing or re-centering decisions within the endpoint.

Because this insertion is controlled, rather than occurring randomly in response to losses, it is typically less audible than loss-type concealment. For example, jitter buffer adaptation events may be constrained to occur during periods of talker silence, in which case only silence duration is affected, or sophisticated time-stretching methods for insertion/deletion during favorable periods in active speech may be employed. For these reasons, buffer adjustment-type concealment MAY be exempted from inclusion in calculations of Concealed Seconds and Severely Concealed Seconds.

However, an implementation SHOULD include buffer-type concealment in counts of Concealed Seconds and Severely Concealed Seconds if the event occurs at an 'inopportune' moment, with an emergency or large, immediate adaptation during active speech, or for

unsophisticated adaptation during speech without regard for the underlying signal, in which cases the assumption of low-audibility cannot hold. In other words, jitter buffer adaptation events which may be presumed to be audible SHOULD be included in Concealed Seconds and Severely Concealed Seconds counts.

Concealment events which cannot be classified as Buffer Adjustment- type MUST be classified as Loss-type.

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

If the measured value exceeds 0xFFFFFFFD, the value 0xFFFFFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST be reported.

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 one second 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 0xFFFD, the value 0xFFFE MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF MUST be reported.

Reserved: 8 bits

These bits are reserved. They MUST be set to zero by senders and ignored by receivers (See [RFC6709] section 4.2).

SCS Threshold: 8 bits

The SCS Threshold is defined as the percentage of packets 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 numeric format 0:8 and hence can represent a range of 0.1 to 25.5 percent loss or discard.

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

5. SDP Signaling

[RFC3611] defines the use of SDP (Session Description Protocol) [RFC4566] for signaling the use of XR blocks. XR blocks MAY be used without prior signaling.

5.1. SDP rtcp-xr-attrib Attribute Extension

This section augments the SDP attribute "rtcp-xr" [RFC3611] by providing two additional values of "xr-format" to signal the use of two report blocks defined in this document.

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

xr-conceal-block = "loss-conceal"
xr-conc-sec-block = "conc-sec" ["=" thresh]

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

5.2. Offer/Answer Usage

When SDP is used in offer-answer context, the SDP Offer/Answer usage defined in [RFC3611] applies. Note that "thresh" is declared by the offer.

6. IANA Considerations

New block types for RTCP XR are subject to IANA registration. For general guidelines on IANA considerations for RTCP XR, refer to [RFC3611].

6.1. New RTCP XR Block Type values

This document assigns two block type values in the IANA "RTP Control Protocol Extended Reports (RTCP XR) Block Type Registry ":

Name: LCB
Long Name: Loss Concealment Block
Value <LCB>
Reference: Section 3.1

Name: CSB
Long Name: Concealment Seconds Block
Value <CSB>
Reference: Section 4.1

[Note to RFC Editor: please replace <NLC> and <NCS> with the RTCP XR block type assigned by IANA for this block.]

6.2. New RTCP XR SDP Parameters

This document also registers two new parameters in the "RTP Control Protocol Extended Reports (RTCP XR) Session Description Protocol (SDP) Parameters Registry":

- "loss-conceal"

- "conc-sec"

6.3. Contact information for registrations

The contact information for the registrations is:

Qin Wu (sunseawq@huawei.com)
101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

7. Security Considerations

It is believed that this proposed RTCP XR report block introduces no new security considerations beyond those described in [RFC3611]. This block does not provide per-packet statistics so the risk to confidentiality documented in Section 7, paragraph 3 of [RFC3611] does not apply.

8. Contributors

Geoff Hunt wrote the initial draft of this document.

9. Acknowledgements

The authors gratefully acknowledge reviews and feedback provided 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.

10. References

10.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", March 1997.

[RFC3550] Schulzrinne, H., "RTP: A Transport Protocol for Real-Time Applications", RFC 3550, July 2003.

[RFC3611] Friedman, T., Caceres, R., and A. Clark, "RTP Control Protocol Extended Reports (RTCP XR)", November 2003.

[RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", July 2006.

[RFC6776] Wu, Q., "Measurement Identity and information Reporting using SDES item and XR Block", RFC 6776, August 2012.

10.2. Informative References

[RFC6390] Clark, A. and B. Claise, "Framework for Performance Metric Development", RFC 6390, October 2011.

[RFC6709] Carpenter, B., Aboba, B., and S. Cheshire, "Design Considerations for Protocol Extensions", RFC 6709, September 2012.

[RFC6792] Hunt, G., "Monitoring Architectures for RTP", RFC 6792, November 2012.

[VAD] "http://en.wikipedia.org/wiki/Voice_activity_detection".

Appendix A. Metrics represented using RFC6390 Template

RFC EDITOR NOTE: please change XXXX in [RFCXXXX] by the new RFC number, when assigned.

a. On-time Playout Duration Metric

* Metric Name: On-time Playout Duration

* Metric Description: 'On-time' playout is the uninterrupted, in-sequence playout of valid decoded audio information originating from the remote endpoint. On-time playout Duration is playout duration of any signal other than those used for concealment

* Method of Measurement or Calculation: See section 3. 2, On-time Playout Duration definition [RFCXXXX].

* Units of Measurement: See section 3.2, On-time Playout Duration definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 3rd paragraph [RFCXXXX].

* Measurement Timing: See section 3, 1st paragraph [RFCXXXX] for measurement timing and section 3.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

b. Loss Concealment Duration Metric

* Metric Name: Loss Concealment Duration

* Metric Description: The duration of audio playout corresponding to Loss-type concealment.

* Method of Measurement or Calculation: See section 3.2, Loss Concealment Duration definition [RFCXXXX].

* Units of Measurement: See section 3.2, Loss Concealment Duration definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 3rd paragraph [RFCXXXX].

* Measurement Timing: See section 3, 1st paragraph [RFCXXXX] for measurement timing and section 3. 2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

c. Buffer Adjustment Concealment Duration Metric

* Metric Name: Buffer Adjustment Concealment Duration

* Metric Description: The duration of audio playout corresponding to Buffer Adjustment-type concealment.

* Method of Measurement or Calculation: See section 3. 2, Buffer Adjustment Concealment Duration definition [RFCXXXX].

* Units of Measurement: See section 3.2, Buffer Adjustment Concealment Duration definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 3rd paragraph [RFCXXXX].

* Measurement Timing: See section 3, 1st paragraph [RFCXXXX] for measurement timing and section 3.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

d. Playout Interrupt Count Metric

* Metric Name: Playout Interrupt Count

* Metric Description: The number of interruptions to normal playout which occurred during the reporting period.

* Method of Measurement or Calculation: See section 3. 2, Playout Interrupt Count definition [RFCXXXX].

* Units of Measurement: See section 3.2, Playout Interrupt Count definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 3rd paragraph [RFCXXXX].

* Measurement Timing: See section 3, 1st paragraph [RFCXXXX] for measurement timing and section 3.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

e. Mean Playout Interrupt Size Metric

* Metric Name: Mean Playout Interrupt Size

* Metric Description: The mean duration of interruptions to normal playout which occurred during the reporting period.

* Method of Measurement or Calculation: See section 3. 2, Playout Interrupt Count definition [RFCXXXX].

* Units of Measurement: See section 3.2, Playout Interrupt Count definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 3rd paragraph [RFCXXXX].

* Measurement Timing: See section 3, 1st paragraph [RFCXXXX] for measurement timing and section 3.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

f. Unimpaired Seconds Metric

* Metric Name: Unimpaired Seconds

* Metric Description: A count of the number of unimpaired Seconds that have occurred.

* Method of Measurement or Calculation: See section 4. 2, Unimpaired Seconds definition [RFCXXXX].

* Units of Measurement: See section 4.2, Unimpaired Seconds definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 5th paragraph [RFCXXXX].

* Measurement Timing: See section 4, 1st paragraph [RFCXXXX] for measurement timing and section 4.2 paragraph [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

g. Concealed Seconds Metric

* Metric Name: Concealed Seconds

* Metric Description: A count of the number of Concealed Seconds that have occurred.

* Method of Measurement or Calculation: See section 4. 2, Concealed Seconds definition [RFCXXXX].

* Units of Measurement: See section 4.2, Concealed Seconds definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 5th paragraph [RFCXXXX].

* Measurement Timing: See section 4, 1st paragraph [RFCXXXX] for measurement timing and section 4.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

h. Severely Concealed Seconds Metric

* Metric Name: Severely Concealed Seconds

* Metric Description: A count of the number of Severely Concealed Seconds that have occurred.

* Method of Measurement or Calculation: See section 4. 2, Severely Concealed Seconds definition [RFCXXXX].

* Units of Measurement: See section 4.2, Severely Concealed Seconds definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 5th paragraph [RFCXXXX].

* Measurement Timing: See section 4, 1st paragraph [RFCXXXX] for measurement timing and section 4.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

i. SCS Threshold Metric

* Metric Name: SCS Threshold

* Metric Description: 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.

* Method of Measurement or Calculation: See section 4. 2, SCS Threshold definition [RFCXXXX].

* Units of Measurement: See section 4.2, SCS Threshold definition [RFCXXXX].

* Measurement Point(s) with Potential Measurement Domain: See section 1.1, 5th paragraph [RFCXXXX].

* Measurement Timing: See section 4, 1st paragraph [RFCXXXX] for measurement timing and section 4.2 [RFCXXXX] for Interval Metric flag.

* Use and applications: See section 1.4 [RFCXXXX].

* Reporting model: See RFC3611.

Appendix B. Change Log

Note to the RFC-Editor: please remove this section prior to publication as an RFC.

B.1. draft-ietf-xrblock-rtcp-xr-loss-conceal-09

The following are the major changes to previous version :

- Only Version Number changes.

B.2. draft-ietf-xrblock-rtcp-xr-loss-conceal-07

The following are the major changes to previous version :

- Change units for threshold and units used for reporting in loss concealment block and concealment seconds block.

- Change 16bit "Mean Playout Interrupt Size" into 32bits.

B.3. draft-ietf-xrblock-rtcp-xr-loss-conceal-06

The following are the major changes to previous version :

- Comments in the WGLC are addressed in this version.

B.4. draft-ietf-xrblock-rtcp-xr-loss-conceal-05

The following are the major changes to previous version :

- Add text to clarify the definition of enhanced method.

- Add appendix to apply RFC6390 template to the metrics.

B.5. draft-ietf-xrblock-rtcp-xr-loss-conceal-04

The following are the major changes to previous version :

- Merge Concealment Seconds draft into this draft (i.e.,Loss Concealment draft).

- Updated references.

Authors' Addresses

Alan Clark
Telchemy Incorporated
2905 Premiere Parkway, Suite 280
Duluth, GA 30097
USA

Email: alan.d.clark@telchemy.com

Glen Zorn (editor)
Network Zen
77/440 Soi Phoomjit, Rama IV Road
Phra Khanong, Khlong Toie
Bangkok 10110
Thailand

Phone: +66 (0) 87 502 4274
Email: gwz@net-zen.net

Claire Bi
Shanghai Research Institure of China Telecom Corporation Limited
No.1835,South Pudong Road
Shanghai 200122
China

Email: bijy@sttri.com.cn

Qin Wu (editor)
Huawei
101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

Email: sunseawq@huawei.com