

Audio/Video Transport Working Group  
Internet-Draft  
Intended status: Standards Track  
Expires: December 14, 2012

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June 12, 2012

RTCP XR Report Block for Loss Concealment metric Reporting  
draft-ietf-xrblock-rtcp-xr-loss-conceal-00.txt

## Abstract

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

## Status of this Memo

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">3</a>
<a href="#">1.1.</a>	Loss Concealment Report Block . . . . .	<a href="#">3</a>
<a href="#">1.2.</a>	RTCP and RTCP XR Reports . . . . .	<a href="#">3</a>
<a href="#">1.3.</a>	Performance Metrics Framework . . . . .	<a href="#">4</a>
<a href="#">1.4.</a>	Applicability . . . . .	<a href="#">4</a>
<a href="#">2.</a>	Loss Concealment Block . . . . .	<a href="#">5</a>
<a href="#">2.1.</a>	Report Block Structure . . . . .	<a href="#">5</a>
<a href="#">2.2.</a>	Definition of Fields in Loss Concealment Report Block . . . . .	<a href="#">5</a>
<a href="#">3.</a>	SDP Signaling . . . . .	<a href="#">9</a>
<a href="#">4.</a>	IANA Considerations . . . . .	<a href="#">10</a>
<a href="#">4.1.</a>	New RTCP XR Block Type value . . . . .	<a href="#">10</a>
<a href="#">4.2.</a>	New RTCP XR SDP Parameter . . . . .	<a href="#">10</a>
<a href="#">4.3.</a>	Contact information for registrations . . . . .	<a href="#">10</a>
<a href="#">5.</a>	Security Considerations . . . . .	<a href="#">11</a>
<a href="#">6.</a>	Acknowledgements . . . . .	<a href="#">12</a>
<a href="#">7.</a>	References . . . . .	<a href="#">13</a>
<a href="#">7.1.</a>	Normative References . . . . .	<a href="#">13</a>
<a href="#">7.2.</a>	Informative References . . . . .	<a href="#">13</a>
<a href="#">Appendix A.</a>	Change Log . . . . .	<a href="#">14</a>
<a href="#">A.1.</a>	<a href="#">draft-ietf-xrblock-rtcp-xr-loss-conceal-00</a> . . . . .	<a href="#">14</a>
	Authors' Addresses . . . . .	<a href="#">15</a>

## 1. Introduction

### 1.1. Loss Concealment Report Block

This draft defines a new block type to augment those defined in [\[RFC3611\]](#), for use in a range of RTP applications.

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 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 metric belongs to the class of transport-related terminal metrics

defined in [[MONARCH](#)] (work in progress).

## [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](#)].

Hunt, et al.

Expires December 14, 2012

[Page 3]

---

Internet-Draft

RTCP XR Loss Concealment

June 2012

## [1.3.](#) Performance Metrics Framework

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

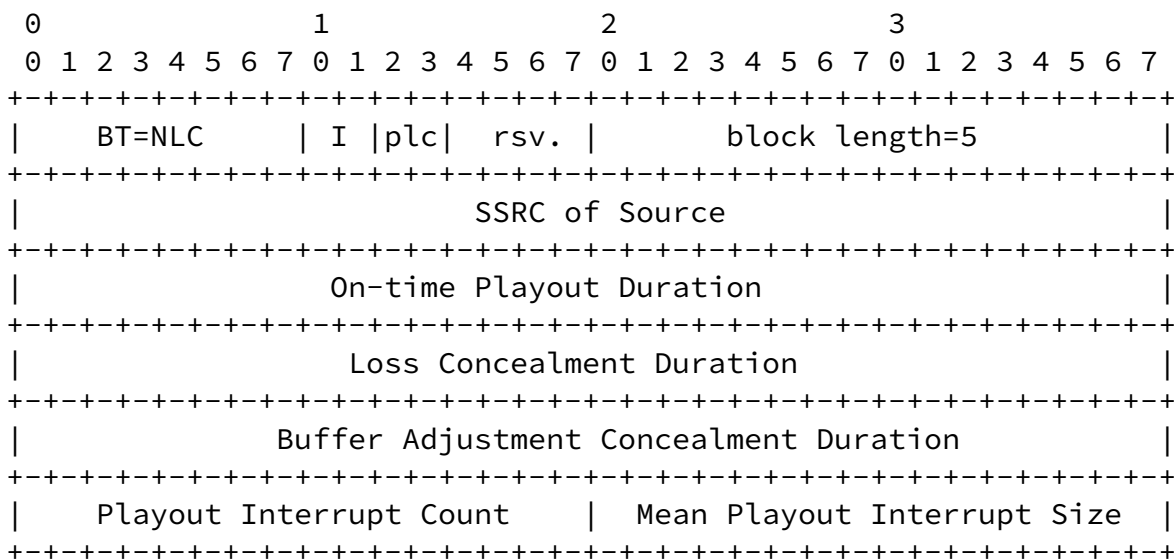
## [1.4.](#) Applicability

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

[2.](#) Loss Concealment Block

[2.1.](#) Report Block Structure

Loss Concealment metrics block



## Figure 1: Report Block Structure

### [2.2.](#) Definition of Fields in Loss Concealment Report 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 Delay metrics are Sampled, Interval or Cumulative metrics, that is, whether the reported values applies to the most recent measurement interval duration between successive metrics reports (I=10) (the Interval Duration) or to the accumulation period characteristic of cumulative measurements (I=11) (the Cumulative Duration) or is a sampled instantaneous value (I=01) (Sampled Value).

Hunt, et al.

Expires December 14, 2012

[Page 5]

---

Internet-Draft

RTCP XR Loss Concealment

June 2012

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 = enhanced

## Other values reserved

Reserved (resv): 4 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 Delay 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 (ms): 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 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 MUST include both speech and silence intervals, whether VAD is used or not. This duration is reported

in millisecond units.

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

#### Loss Concealment Duration (ms): 32 bits

The duration, in milliseconds, 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 0xFFFFFFFFD, the value 0xFFFFFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF SHOULD be reported.

#### Buffer Adjustment Concealment Duration (ms): 32 bits

The duration, in milliseconds, of audio playout corresponding to Buffer Adjustment-type concealment, if known.

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.

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

Mean Playout Interrupt Size (ms): 16 bits

The mean duration, in ms, of interruptions to normal playout which occurred during the reporting period.

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.

### 3. 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.

This section augments the SDP [RFC4566] attribute "rtcp-xr" defined in [RFC3611] by providing an additional value of "xr-format" to signal the use of the report block defined in this document.

```
rtcp-xr-attrib = "a=" "rtcp-xr" ":" [xr-format *(SP xr-format)] CRLF
```

(defined in [RFC3611])

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

```
xr-conceal-block = "loss-conceal"
```

#### [4.](#) IANA Considerations

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

##### [4.1.](#) New RTCP XR Block Type value

This document assigns the block type value NJB in the IANA "RTCP XR Block Type Registry" to the "Loss Concealment Metrics Block".

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

##### [4.2.](#) New RTCP XR SDP Parameter

This document also registers a new parameter "loss-conceal" in the "RTCP XR SDP Parameters Registry".

##### [4.3.](#) Contact information for registrations

The contact information for the registrations is:

Alan Clark (alan.d.clark@telchemy.com)

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## [5.](#) 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.

Hunt, et al.

Expires December 14, 2012

[Page 11]

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Internet-Draft

RTCP XR Loss Concealment

June 2012

## [6.](#) Acknowledgements

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

### [7.1.](#) Normative References

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

### [7.2.](#) Informative References

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ID [draft-ietf-avtcore-monarch-04](#), August 2011.
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Hunt, et al. Expires December 14, 2012 [Page 13]

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Internet-Draft RTCP XR Loss Concealment June 2012

#### [Appendix A](#). Change Log

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

##### [A.1](#). [draft-ietf-xrblock-rtcp-xr-loss-conceal-00](#)

The following are the major changes to previous version :

- o Changed BNF for SDP following Christian Groves' and Tom Taylor's  
comments (4th and 5th May 2009).

- o Updated references.

Hunt, et al. Expires December 14, 2012 [Page 14]

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Internet-Draft RTCP XR Loss Concealment June 2012

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