

INTERNET-DRAFT  
Intended Status: Standard  
Expires: May 30, 2014

R. Huang  
HUAWEI  
V. Singh  
Aalto University  
November 26, 2013

RTP Control Protocol (RTCP) Extended Report (XR) for Post-Repair  
Loss Count Metrics  
draft-huang-xrblock-post-repair-loss-count-01

Abstract

This document defines an RTP Control Protocol (RTCP) Extended Report (XR) Block that allows reporting of post-repair loss count metrics for a range of RTP applications.

Status of this Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

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."

The list of current Internet-Drafts can be accessed at  
<http://www.ietf.org/lid-abstracts.html>

The list of Internet-Draft Shadow Directories can be accessed at  
<http://www.ietf.org/shadow.html>

Copyright and License Notice

Copyright (c) 2013 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
2	Terminology . . . . .	4
3	Post-Repair Loss Count Metrics Report Block . . . . .	4
4	SDP Signaling . . . . .	6
4.1	SDP rtcp-xr-attrib Attribute Extension . . . . .	6
4.2	Offer/Answer Usage . . . . .	6
5	Security Considerations . . . . .	6
6	IANA Considerations . . . . .	6
6.1	New RTCP XR Block Type value . . . . .	7
6.2	New RTCP XR SDP Parameter . . . . .	7
6.3	Contact Information for registrations . . . . .	7
7	Acknowledgments . . . . .	7
8	References . . . . .	7
8.1	Normative References . . . . .	7
8.2	Informative References . . . . .	8
	Appendix A. Metrics Represented Using the Template from RFC 6390 . . . . .	8
	Authors' Addresses . . . . .	9

## 1 Introduction

RTCP SR/RR [RFC3550] contains some rough statistics about the data received from the particular source indicated in that block. One of them is the cumulative number of packet lost, which is called pre-repair loss metric in this document. This metric conveys information regarding the total number of RTP data packets that have been lost since the beginning of the RTP session. However, this metric is measured on media stream before any loss repair mechanism, e.g., retransmission [RFC4588] and Forward Error Correction (FEC) [RFC5109], is applied. Using a repair mechanism usually results in recovering some or all of the lost packets. Hence, the sending endpoint cannot assess the performance of the repair mechanism by observing the change in fraction loss and the cumulative loss statistics. Consequently, [RFC5725] specifies a post-repair loss Run-length Encoding (RLE) XR report block to address this issue. The sending endpoint is able to infer which packets were repaired from the RLE report block, but at the cost of higher overhead. When applications use multiple XR blocks, the endpoints require more concise reporting to save bandwidth.

This document defines a new XR block type to augment those defined in [RFC3611] and complement the report block defined in [RFC5725] for use in a range of RTP application. This new block type reports the number of RTP packets on the primary source stream that are still lost after applying one or more loss repair mechanisms. When comparing this metric with pre-repair loss metric of RTCP SR/RR, it may bring ambiguity as noted in [RFC5725]: Some packets will not be repaired in current RTCP interval. So in [RFC5725] it is suggested to delay report block to wait for packets to be repaired. However, it is not wise to delay this report block arbitrarily until those packets have been fully repaired. Thus it is RECOMMENDED that this report block should be generated for those source packets that have no further chance of being repaired. But a potential ambiguity may result from sequence number range inconsistent. To address this issue, we use begin sequence number and end sequence number to explicitly indicate the actual sequence number range that the report block reports on. In addition, another metric, repaired loss count, is also introduced in this report block for calculating the pre-repair loss count during the this range. Note that the metrics in this report block MUST NOT be directly compared with the pre-repair loss metric of RFC3550.

The metrics defined in this document belongs to the class of transport-related metrics defined in [RFC6792]. And it is in accordance with the guidelines in [RFC6390] and [RFC6792]. These metrics are applicable to any RTP application, especially those that use loss repair mechanisms.

## 2 Terminology

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 [RFC2119].

## 3 Post-Repair Loss Count Metrics Report Block

This block describes the residual number of packets lost after applying repair mechanisms. The report block is complementary to the RTCP XR metrics defined in [RFC5725] as it uses a non-RLE format.

The post-repair loss count metrics report block has the following format:

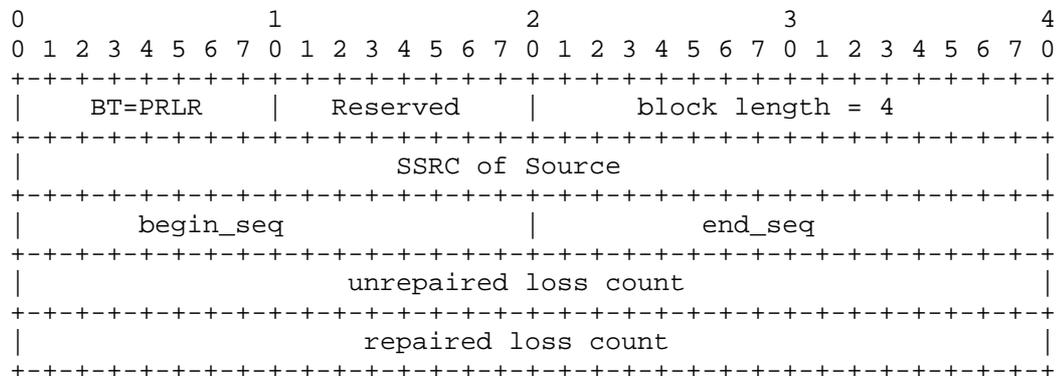


Figure 1: Format for the Post-Repair Loss Count Metrics Report Block

Block Type (BT): 8 bits

A Post-Repair Loss Count Metrics Report Block is identified by the constant PRLR.

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

Reserved: 8 bits

These bits are reserved for future use. They MUST be set to zero by senders and ignored by receivers (see [RFC6709], Section 4.2).

block length: 16 bits

This field is in accordance with the definition in [RFC3611]. In this report block, it MUST be set to 4. The block MUST be discarded if the block length is set to a different value.

SSRC of source: 32 bits

As defined in Section 4.1 of [RFC3611].

begin\_seq: 16 bits

The sequence number of the first packet in the session or the sequence number of the first packet fully repaired that this block reports on.

end\_seq: 16 bits

The sequence number of the last packet fully repaired that this block reports on plus one.

unrepaired loss count: 32 bits

Total number of packets finally lost after one or more loss-repair methods, e.g., FEC and/or retransmission, during this interval. This metric MUST NOT count the lost packets that haven't finished repairing. Note that this metric must be measured in the primary source stream.

repaired loss count: 32 bits

Total number of packets fully repaired after one or more loss-repair methods, e.g., FEC and/or retransmission, during this interval. Note that this metric must be measured in the primary source stream.

## 4 SDP Signaling

[RFC3611] defines the use of SDP (Session Description Protocol) for signaling the use of RTCP XR blocks. However XR blocks MAY be used without prior signaling (see section 5 of [RFC3611]).

### 4.1 SDP rtcp-xr-attr Attribute Extension

This session augments the SDP attribute "rtcp-xr" defined in Section 5.1 of [RFC3611] by providing an additional value of "xr-format" to signal the use of the report block defined in this document.

```
xr-format =/ xr-prlr-block
```

```
xr-prlr-block = "post-repair-loss-count"
```

### 4.2 Offer/Answer Usage

When SDP is used in offer-answer context, the SDP Offer/Answer usage defined in [RFC3611] for unilateral "rtcp-xr" attribute parameters applies. For detailed usage of Offer/Answer for unilateral parameter, refer to section 5.2 of [RFC3611].

## 5 Security Considerations

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

An attacker may put incorrect information in the Post-Repair Loss Count reports, which will be affect the performance of loss repair mechanisms. Implementers should consider the guidance in [I-D.ietf-avtcore-srtp-not-mandatory] for using appropriate security mechanisms, i.e., where security is a concern, the implementation should apply encryption and authentication to the report block. For example, this can be achieved by using the AVPF profile together with the Secure RTP profile as defined in [RFC3711]; an appropriate combination of the two profiles (an "SAVPF") is specified in [RFC5124]. However, other mechanisms also exist (documented in [I-D.ietf-avtcore-rtp-security-options]) and might be more suitable.

## 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 value

This document assigns the block type value PRLR in the IANA "RTP Control Protocol Extended Reports (RTCP XR) Block Type Registry" to the "Post-Repair Loss Count Metrics Report Block".

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

### 6.2 New RTCP XR SDP Parameter

This document also registers a new parameter "post-repair-loss-count" in the "RTP Control Protocol Extended Reports (RTCP XR) Session Description Protocol (SDP) Parameters Registry".

### 6.3 Contact Information for registrations

The following contact information is provided for all registrations in this document:

Rachel Huang (rachel.huang@huawei.com)

101 Software Avenue, Yuhua District  
Nanjing, Jiangsu 210012  
China

## 7 Acknowledgments

The author would like to thank Roni Even for giving valuable comments and suggestions.

## 8 References

### 8.1 Normative References

[KEYWORDS] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3550] Schulzrinne, H., Casner, S., Frederick, R., and V. Jacobson, "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003.

[RFC3611] Friedman, T., Ed., Caceres, R., Ed., and A. Clark, Ed., "RTP Control Protocol Extended Reports (RTCP XR)", RFC 3611, November 2003.

- [RFC5725] Begen, A., Hsu, D., and M. Lague, "Post-Repair Loss RLE Report Block Type for RTP Control Protocol (RTCP) Extended Reports (XRs)", RFC 5725, February 2010.
- [RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", RFC 4566, July 2006.

## 8.2 Informative References

- [RFC6390] Clark, A. and B. Claise, "Guidelines for Considering New Performance Metric Development", BCP 170, RFC 6390, October 2011.
- [RFC6792] Wu, Q., Hunt, G., and P. Arden, "Guidelines for Use of the RTP Monitoring Framework", RFC 6792, November 2012.

## Appendix A. Metrics Represented Using the Template from RFC 6390

### a. Unrepaired RTP Packet Loss Count Metric

- \* Metric Name: Unrepaired RTP Packet Loss Count Metric
- \* Metric Description: Total number of RTP packets still lost after loss repair methods are applied
- \* Method of Measurement or Calculation: It must be measured in the primary source stream. It must be measured for the packets that have no further chance of being repaired.
- \* Units of Measurement: See section 3, unrepaired loss count definition.
- \* Measurement Point(s) with Potential Measurement Domain: See section 3, 1st paragraph.
- \* Measurement Timing: See Section 4 for measurement timing.
- \* Use and Applications: See Section 1
- \* Reporting Model: See RFC3611.

### b. Repaired RTP Packet Loss Count Metric

- \* Metric Name: Repaired RTP Packet Count Metric

- \* Metric Description: The number of RTP packets lost but repaired after applying loss repair methods.
- \* Method of Measurement or Calculation: It must be measured in the primary source stream.
- \* Units of Measurement: See section 3, repaired loss count definition.
- \* Measurement Point(s) with Potential Measurement Domain: See section 3, 1st paragraph.
- \* Measurement Timing: See Section 4 for measurement timing.
- \* Use and Applications: See Section 1
- \* Reporting Model: See RFC3611.

## Authors' Addresses

Rachel Huang  
Huawei  
101 Software Avenue, Yuhua District  
Nanjing 210012  
China

EMail: rachel.huang@huawei.com

Varun Singh  
Aalto University  
School of Electrical Engineering  
Otakaari 5 A  
Espoo, FIN 02150  
Finland

Email: varun@comnet.tkk.fi  
URI: <http://www.netlab.tkk.fi/~varun/>