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RTCP XR Report Block for Discard metric Reporting
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Status of this Memo

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Abstract

This document defines an RTCP XR Report Block that allows the reporting of a simple discard count metric for use in a range of RTP applications.

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1. Introduction

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1.1. Discard Report 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 in a range of RTP applications. The new block type supports the reporting of the number of packets which are received correctly but are never played out, typically because they arrive too late to be played out (buffer underflow) or too early (buffer overflow). The metric is applicable both to systems which use packet loss repair techniques (such as forward error correction [RFC5109] (Li, A., “RTP Payload Format for Generic Forward Error Correction,” December 2007.) or retransmission [RFC4588] (Rey, J., “RTP Retransmission Payload Format,” July 2006.)) and to those which do not.

This metric is useful for identifying the existence, and characterising the severity, of a packet transport problem which may affect users' perception of a service delivered over RTP.
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," May 2009.) which contains information such as the SSRC of the measured stream, and RTP sequence numbers and time intervals indicating the span of the report.
The Measurement Identity block provides extended sequence numbers for the beginning and end of both Interval and Cumulative reporting periods. This allows systems receiving the report to calculate the number of packets expected.

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," March 2009.) 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," March 2009.).

1.4. Applicability

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This metric is believed to be applicable to a large class of RTP applications which use a jitter buffer.

2. Definitions

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Received, Lost and Discarded

> A packet shall be regarded as lost if it fails to arrive within an implementation-specific time window. A packet that arrives within this time window but is too early or late to be played out shall be regarded as discarded. A packet shall be classified as one of received (or OK), discarded or lost. The Discard Metric counts only discarded packets. The metric "cumulative number of packets lost" defined in [RFC3550] (Schulzrinne, H., “RTP: A Transport Protocol for Real-Time Applications,” July 2003.) reports a count of packets lost from the media stream (single SSRC within single RTP session). Similarly the metric "number of packets discarded" reports a count of packets discarded from the media stream (single SSRC within single RTP session) arriving at the receiver. Another metric defined in [POSTREPAIRLOSS] (Hunt, G., “RTCP XR Report Block for Post-Repair Loss metric Reporting,” May 2009.) is available to report on packets which are not recovered by any repair techniques which may be in use.
>
> For Voice-over-IP applications of the metric, if Voice Activity Detection is used then the proportion of packets lost and discarded shall be determined based on transmitted packets, i.e. packets that contained silence and were not transmitted shall not be considered, because they do not form part of the RTP sequence.

3. Discard Metric Report Block

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3.1. Report Block Structure

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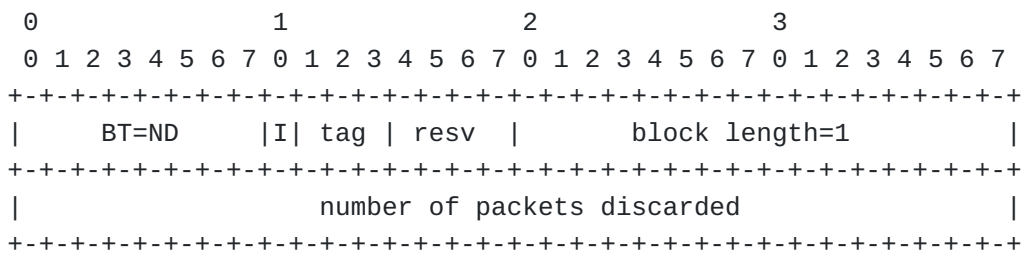

Figure 1: Report Block Structure

3.2. Definition of Fields in Discard Metric Report Block

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block type (BT): 8 bits

> A Discard Metric Report Block is identified by the constant ND.

[Note to RFC Editor: please replace ND with the IANA provided RTCP XR block type for this block.]
Interval Metric flag (I): 1 bit

> This field is used to indicate whether the Discard metric is an Interval or a Cumulative metric, that is, whether the reported value applies 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,” May 2009.) which describes this measurement. The relevant Measurement Identifier block has the same tag value as the Discard Metric block. Note that there may be more than one Measurement Identifier block per RTCP packet.

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 Discard Metric block, the block length is equal to 1.

number of packets discarded: 32 bits

> Number of packets discarded over the period (Interval or Cumulative) covered by this report.
>
> If the measured value exceeds 0xFFFFFFFD, the value 0xFFFFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF SHOULD be reported.
>
> Note that the number of packets expected in the period covered by the metric (whether interval or cumulative) is available from the difference between a pair of extended sequence numbers in the Measurement Identity block, so need not be repeated in this block.

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4. 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.
rtcp-xr-attrib = "a=" "rtcp-xr" ":" [xr-format *(SP xr-format)] CRLF
(defined in RFC3611)
xr-format =/ xr-pd-block
xr-pd-block = "pkt-dscrd"

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5. IANA Considerations

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

5.1. New RTCP XR Block Type value

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This document assigns the block type value ND in the IANA "RTCP XR Block Type Registry" to the "Concealed Seconds Metrics Block". [Note to RFC Editor: please replace ND with the IANA provided RTCP XR block type for this block.]

5.2. New RTCP XR SDP Parameter

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

5.3. Contact information for registrations

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The contact information for the registrations is:
Geoff Hunt (geoff.hunt@bt.com)
Orion 2 PP3, Adastral Park, Martlesham Heath, Ipswich IP5 3RE, United Kingdom

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6. 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.

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7. 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.

8. Changes from previous version

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Changed BNF for SDP following Christian Groves' and Tom Taylor's comments (4th and 5th May 2009), now aligned with RFC 5234 section 3.3 "Incremental Alternatives".
Update references

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9.1. Normative References

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[MEASIDENT]	Hunt, G., “RTCP XR Measurement Identifier Block,” ID draft-ietf-avt-rtcp-xr-meas-identity-02, May 2009.
[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.

9.2. 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-02, March 2009.
[POSTREPAIRLOSS]	Hunt, G., “RTCP XR Report Block for Post-Repair Loss metric Reporting,” ID draft-ietf-rtcp-xr-postrepair-loss-02, May 2009.
[RFC4588]	Rey, J., “RTP Retransmission Payload Format,” RFC 4588, July 2006.
[RFC5109]	Li, A., “RTP Payload Format for Generic Forward Error Correction,” RFC 5109, December 2007.

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