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RTP Control Protocol (RTCP) Extended Report (XR) Block for Discard Count
metric Reporting
draft-ietf-xrblock-rtcp-xr-discard-13.txt

Abstract

This document defines an RTP Control Protocol (RTCP) Extended Report (XR) 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

1.1. Discard Count Report Block

This document defines a new block type to augment those defined in [\[RFC3611\]](#) 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 [\[RFC5109\]](#) or retransmission [\[RFC4588\]](#)) and to those which do not.

This metric is useful for identifying the existence, and characterizing the severity, of a packet transport problem which may affect users' perception of a service delivered over RTP.

This block may be used in conjunction with [\[BGDISCARD\]](#) which provides additional information on the pattern of discarded packets. However the metric in [\[BGDISCARD\]](#) may be used independently of the metrics in this block.

In case of Discard Count Metrics Block sent together with Burst Gap Discard Metrics Block defined in [\[BGDISCARD\]](#) to the media sender or RTP based network management system, information carried in the Discard Count Metrics Block and Burst Gap Discard Metrics Block allows them calculate the some bust gap summary statistics, e.g., gap discard rate.

The metric belongs to the class of transport-related end system 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 document defines a new Extended Report block for use with [[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 the guidelines in [[RFC6390](#)] and [[RFC6792](#)].

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[1.4.](#) Applicability

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

Discards due to late or early arriving packets affects user experience. The reporting of discards alerts senders and other receivers to the need to adjust their transmission or reception strategies. The reports allow network managers to diagnose these user experience problems.

The ability to detect duplicate packets can be used by managers to detect network layer or sender behavior which may indicate network or device issues. Based on the reports, these issues may be addressed prior to any impact on user experience.

[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 [RFC 2119](#) [[RFC2119](#)].

In addition, the following terms are defined:

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 either too early to be played out or too late to be played out or thrown away before playout due to packet duplication or redundancy shall be regarded as discarded. A packet shall not be regarded as discarded if it arrives within this time window but is dropped during decoding by some higher layer decoder, e.g., due to a decoding error. A packet shall be classified as one of received (or OK), discarded or lost. The Discard Count Metric counts only discarded packets. The metric

"cumulative number of packets lost" defined in [[RFC3550](#)] reports a count of packets lost from the media stream (single Synchronization source (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 [[RFC5725](#)] is available to report on packets which are not recovered by any repair techniques which may be in use.

[3.](#) Discard Count Metric Report Block

Metrics in this block report on the number of packets discarded in the stream arriving at the RTP end system. The measurement of these metrics is made at the receiving end of the RTP stream. Instances of this metrics block refer by SSRC to the separate auxiliary Measurement Information Block [[RFC6776](#)] which describes measurement Intervals in use. This metrics block relies on the measurement interval in the Measurement Information Block indicating the span of the report and MUST be sent in the same compound RTCP packet as the measurement information block. If the measurement interval is not received in the same compound RTCP packet as this metrics block, this metrics block MUST be discarded.

[3.1.](#) Report Block Structure

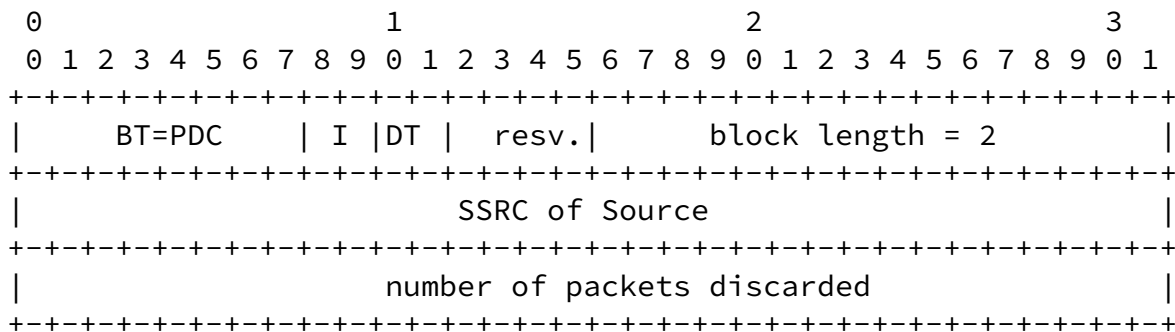


Figure 1: Report Block Structure

3.2. Definition of Fields in Discard Count Metric Report Block

Block type (BT): 8 bits

A Discard Count Metric Report Block is identified by the constant PDC.

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

Interval Metric Flag (I): 2 bits

This field indicates whether the reported metric is an interval, cumulative, or sampled metric [[RFC6792](#)]:

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, the Discard Count Metric can only be measured over definite intervals, and cannot be sampled. Accordingly, the value I=01, indicating a sampled value, MUST NOT be sent, and MUST be discarded when received. In addition, the value I=00 is reserved and also MUST NOT be sent, and MUST be discarded when received.

Discard Type (DT): 2bits

This field is used to identify the discard type used in this report block. The discard type is defined as follows:

00: Report packet discarded or being thrown away before playout due to packets duplication.

01: Report packet discarded due to too early to be played out.

10: Report packet discarded due to too late to be played out.

The value DT=11 is reserved for future definition and MUST NOT be Sent, and MUST be discarded when received.

An endpoint MAY report any combination of discard types in each reporting interval by including several Discard Count Metric Report Blocks in a single RTCP XR packet.

Some systems send duplicate RTP packets for robustness or error resilience. This is NOT RECOMMENDED since it breaks RTCP packet statistics. If duplication is desired for error resilience, the mechanism described in [[RTPDUP](#)] can be used, since this will not cause breakage of RTP streams or RTCP statistics.

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, in accordance with the definition in [[RFC3611](#)]. This field MUST be set to 2 to match the fixed length of the report block. 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 \[RFC3611\]](#).

number of packets discarded: 32 bits

Number of packets discarded over the period (Interval or Cumulative) covered by this report.

The measured value is unsigned value. If the measured value exceeds 0xFFFFFFFF, the value 0xFFFFFFF0 MUST be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFFFFFF MUST be reported.

Note that the number of packets expected in the period associated with this metric (whether interval or cumulative) is available from the difference between a pair of extended sequence numbers in the Measurement Information block [[RFC6776](#)], so need not be repeated in this block.

[4.](#) SDP Signaling

[RFC3611] defines the use of SDP (Session Description Protocol) [[RFC4566](#)] for signaling the use of XR blocks. However XR blocks MAY be used without prior signaling (see [section 5 of RFC3611](#)).

[4.1.](#) SDP rtcp-xr-attrib Attribute Extension

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.

```
xr-format =/ xr-pdc-block  
xr-pdc-block = "pkt-discard-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.](#) IANA Considerations

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

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

This document assigns the block type value PDC in the IANA " RTP Control Protocol Extended Reports (RTCP XR) Block Type Registry " to the "Discard Count Metrics Block".

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

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

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

[5.3.](#) Contact information for registrations

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

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101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

[6.](#) 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.

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[7.](#) Contributors

Geoff Hunt wrote the initial draft of this document.

[8.](#) Acknowledgments

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[9.1.](#) Normative References

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Protocol Extended Reports (RTCP XR)", November 2003.

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9.2. Informative References

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- [RFC5109] Li, A., "RTP Payload Format for Generic Forward Error Correction", [RFC 5109](#), July 2006.
- [RFC5725] Begen, A., "RTCP XR Report Block for Post-Repair Loss metric Reporting", [RFC 5725](#), February 2010.
- [RFC6390] Clark, A. and B. Claise, "Framework for Performance Metric Development", [RFC 6390](#), October 2011.
- [RFC6792] Wu, Q., "Monitoring Architectures for RTP", [RFC 6792](#), November 2012.
- [RTPDUP] Begen, A. and C. Perkins, "Duplicating RTP Streams", ID [draft-ietf-avtext-rtp-duplication-02](#), March 2013.

Appendix A. Metrics represented using [RFC6390](#) Template

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

a. Number of packets discarded Metric

- * Metric Name: Number of RTP packets discarded Metric
- * Metric Description: Number of RTP packets discarded over the period covered by this report.
- * Method of Measurement or Calculation: See [section 3.2](#), number of packets discarded definition [RFCXXXX].
- * Units of Measurement: See [section 3.2](#), number of packets discarded definition [RFCXXXX].
- * Measurement Point(s) with Potential Measurement Domain: See [section 3](#), 1st 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](#).

[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-discard-13](#)

The following are the major changes compared to previous version:

- o Some editorial changes to get in line with burst gap drafts.

[B.2. draft-ietf-xrblock-rtcp-xr-discard-12](#)

The following are the major changes compared to previous version:

- o Incorporate some changes to burst gap draft that applies to this document.
- o Use [RFC6390](#) template to the metrics in the appendix.

[B.3. draft-ietf-xrblock-rtcp-xr-discard-11](#)

The following are the major changes compared to previous version:

- o Editorial change t based on SDP Directorate and Colin's Review.

[B.4. draft-ietf-xrblock-rtcp-xr-discard-10](#)

The following are the major changes compared to previous version:

- o Editorial change to get in line with recently discussed drafts.
- o Remove DT=3 based on the discussion to summary statistics draft.

[B.5. draft-ietf-xrblock-rtcp-xr-discard-09](#)

The following are the major changes compared to previous version:

- o SDP Duplicated Parameter Deleting.

[B.6. draft-ietf-xrblock-rtcp-xr-discard-08](#)

The following are the major changes compared to previous version:

- o Outdated reference update.
- o Editorial changes based on comments that applied to PDV and Delay

drafts.

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