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A. Clark  
Telchemy  
G. Zorn  
Network Zen  
Q. Wu  
Huawei  
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RTP Control Protocol (RTCP) Extended Report (XR) Block for Discard Count  
metric Reporting  
[draft-ietf-xrblock-rtcp-xr-discard-09.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 metric block sent together with Burst gap discard metric block defined in [\[BGDISCARD\]](#) to the media sender or RTP based network management system, information carried in the discard count metric block and Burst gap discard metric 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 [\[MONARCH\]](#).

### **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 [\[MONARCH\]](#) 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 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 too early or late to be played out or thrown away before playout due to packet duplication or redundancy shall be regarded as discarded. 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 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

#### 3.1. Report Block Structure

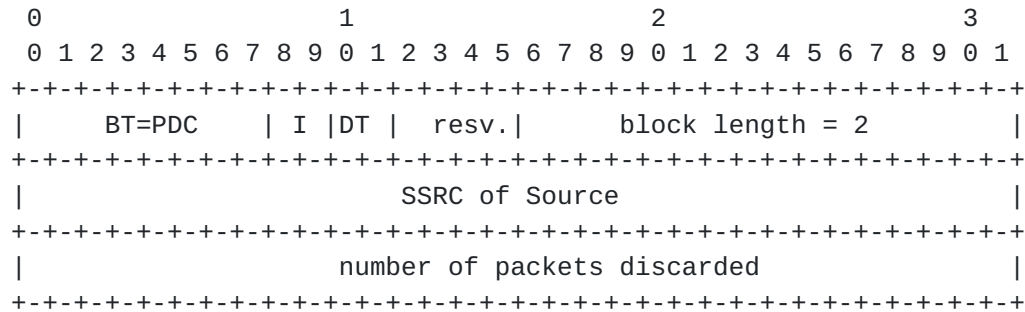


Figure 1: Report Block Structure

#### 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 [[MONARCH](#)]. The Discard Count Metric value can be reported as either an interval metric (I=10) or a cumulative metric (I=11). It does not make sense to report the Discard Count Metric as a sampled metric, so the value I=01 MUST NOT be used. The value I=00 is reserved, and MUST NOT be used.

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.

11: Report the total number of discarded packets due to both early and late to be played out.

An endpoint MAY report only one of the above four discard types blocks in an compound RTCP report in a reporting interval. It MAY also report a combination of discard types in a compound RTCP report but not all combinations are valid. The endpoint MAY report duplicate packet discard (DT=0) block with any other discard (DT=1, 2, or 3) block. Additionally, an endpoint MUST NOT report combined discard (DT=3) block with early discard (DT=1) or late discard (DT=2) report block.

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.

block length: 16 bits

The length of this report block in 32-bit words, minus one. For the Discard Count block, the block length is equal to 2.

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.

If the measured value exceeds 0xFFFFFFFF, the value 0xFFFFFFFF 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 [[MEASI](#)], 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. XR blocks MAY be used without prior signaling.

### **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-dscrd-count"

### **4.2. Offer/Answer Usage**

When SDP is used in offer-answer context, the SDP Offer/Answer usage defined in [RFC3611] applies.





## **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 "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-dscrd-count" in the "RTCP XR SDP Parameters Registry".

### **5.3. Contact information for registrations**

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

Qin Wu (sunseawq@huawei.com)

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.

## [7.](#) Contributors

Geoff Hunt wrote the initial draft of this document.

## **8. Acknowledgments**

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, Kevin Gross, Varun Singh, Claire Bi, Roni Even, Dan Romascanu.

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### **9.1. Normative References**

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- [RFC6390] Clark, A. and B. Claise, "Framework for Performance Metric Development", [RFC 6390](#), October 2011.
- [RTPDUP] Begen, A. and C. Perkins, "Duplicating RTP Streams", ID [draft-ietf-avtext-rtp-duplication-00](#), July 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-discard-09](#)**

The following are the major changes compared to previous version:

- o SDP Duplicated Parameter Deleting.

### **A.2. [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.





Authors' Addresses

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

Email: alan.d.clark@telchemy.com

Glen Zorn  
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

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

Email: sunseawq@huawei.com

