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RTCP XR Report Block for One Way Delay metric Reporting draft-wu-xrblock-rtcp-xr-one-way-delay-01.txt

Abstract

This document defines an RTCP XR Report Block that allows the reporting of One Way Delay metrics for use in a range of RTP applications.

Status of this Memo

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

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1. Introduction

1.1. Packet One Way Delay Metrics Block

[I-D.ietf-xrblock-rtcp-xr-delay] defines the new block type supporting the reporting of the mean, minimum and maximum values of the network round-trip delay between media source(source) and media receiver(destination). However none of these metrics allow a receiver to report one way delay from source to destination or the other way around. As described in [RFC2679], the path from a source to a destination may be different than the path from the destination back to the source. Even when the two paths are symmetric, they may have radically different performance characteristics. Therefore the measurement of one-way delay can not be roughly estimated by the round-trip delay for many applications in the asymmetric network or symmetric network.

This draft 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 mean, minimum, maximum values of one way delay between RTP interfaces in peer RTP end systems, as measured, for example, using the method described in [RFC2679].

This metrics belong to the class of transport 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. The use of Extended Report blocks is defined by [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

These metrics are applicable to a range of delay-sensitive RTP applications in which this report block would be useful, such as some IDMS use cases (e.g., video wall, network games, networked loudspeakers, etc., see Draft IDMS [IDMS]).

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].

3. One Way Delay Block

Metrics in this block report on one way packet delay in the stream arriving at the RTP system.

3.1. Report Block Structure

One Way Delay metrics block

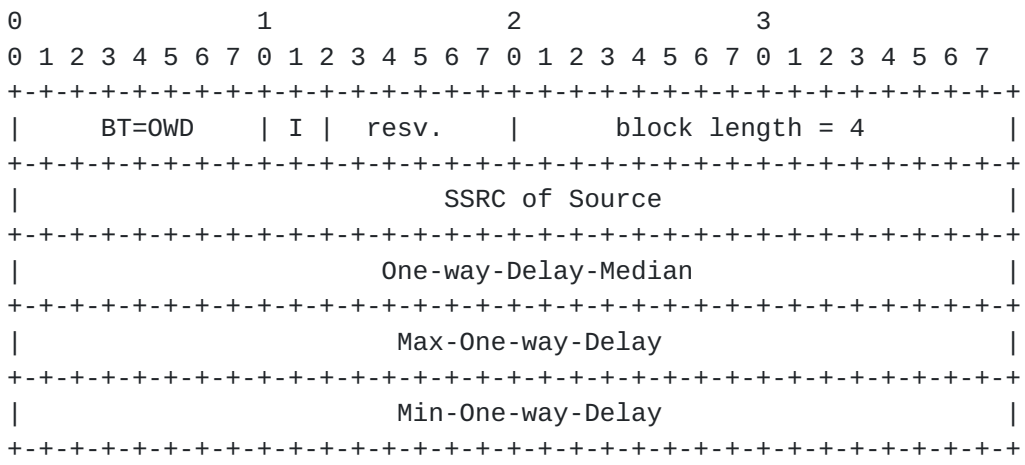

Figure 1: Report Block Structure

3.2. Definition of Fields in One Way Delay Metrics Report Block

Block type (BT): 8 bits

A One way Delay Report Block is identified by the constant OWD.

[Note to RFC Editor: please replace OWD 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 One Way Metrics are Sampled, Interval or Cumulative metrics [MONARCH], that is, whether the reported values applies to the most recent measurement interval duration between successive metrics reports (I=10) (the Interval Duration), to the accumulation period characteristic of cumulative measurements (I=11) (the Cumulative Duration) or is a sampled instantaneous value (I=01).

Reserved (resv): 6 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 4.

SSRC of source: 32 bits

The SSRC of the media source shall be set to the value of the SSRC identifier carried in the RTP header [RFC3550] of the RTP packet to which the XR relates.

One-way-Delay-Median: 32 bits

The Mean One way Delay is the mean value of the RTP-to- RTP interface one way delay in units of 1/65536 seconds over the measurement period, typically determined using RTCP SR/RR. This value is calculated according to section 3.6 of [RFC2679].

Max-One-way-Delay: 32 bits

The Max One Way Delay is the maximum value of the RTP- to-RTP interface one way delay in units of 1/65536 seconds over the measurement period, typically determined using RTCP SR/RR. This value is calculated according to section 3.6 of [RFC2679].

Min-One-way-Delay: 32 bits

The Max One Way Delay is the minimum value of the RTP- to-RTP interface one way delay in units of 1/65536 seconds over the measurement period, typically determined using RTCP SR/RR. This value is calculated according to section 3.6 of [RFC2679].

4. Clock synchronization for one way delay metrics

This subsection provides informative guidance on use of methodology for one way delay metrics measurement.

As specified in the methodology of [RFC2679], it is important for media source (Src) and media receiver (Dst) to synchronize very closely since one way delay values will often be as low as the 100 usec to 10 msec range. In order to arrange Src and Des synchronized before measurement method is applied, a participant at the Dst can indicate which synchronization source is being used at the moment. A participant can also indicate any other synchronization sources available to it. This allows multiple participants in an RTP session to use the same or a similar clock synchronization source for their session.

5. 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-one-way-delay-block

xr-one-way-delay-block ="one way delay"

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 OWD in the IANA "RTCP XR Block Type Registry" to the "One Way Delay Metrics Block".

[Note to RFC Editor: please replace OWD 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 "one way delay" in the "RTCP XR SDP Parameters Registry".

6.3. Contact information for registrations

The contact information for the registrations is:

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101 Software Avenue, Yuhua District
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7. 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.

8. References

8.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", March 1997.

[RFC2679] Almes, G., Kalidindi, S., and M. Zekauskas, "A One-way Delay Metric for IPPM", RFC 2679, September 1999.

[RFC3550] Schulzrinne, H., "RTP: A Transport Protocol for Real-Time Applications", RFC 3550, July 2003.

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

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

8.2. Informative References

[I-D.ietf-xrblock-rtcp-xr-delay]
Hunt, G., Clark, A., Gross, K., and Q. Wu, "RTCP XR Report Block for Delay metric Reporting", ID draft-ietf-xrblock-rtcp-xr-delay-06, May 2012.

[IDMS] Brandenburg, R., Stokking, H., and M. Deventer, "RTCP for inter-destination media synchronization", ID draft-ietf-avtcore-idms-05, June 2012.

[MONARCH] Hunt, G., "Monitoring Architectures for RTP", ID draft-ietf-avtcore-monarch-17, June 2012.

[RFC6390] Clark, A. and B. Claise, "Framework for Performance Metric Development", RFC 6390, October 2011.

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