

Audio/Video Transport Working  
Group  
Internet-Draft  
Intended status: Standards Track  
Expires: April 28, 2009

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October 25, 2008

RTCP XR Report Block for Delay metric Reporting  
draft-ietf-avt-rtcp-xr-delay-00.txt

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RTCP XR Delay

October 2008

Abstract

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

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## 1. Introduction

### 1.1. Delay Report Block

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 and maximum values of the network round-trip delay between RTP interfaces in peer RTP end systems as measured, for example, using the RTCP method described in [\[RFC3550\]](#). It also supports reporting of the component of the round-trip delay internal to the local RTP system.

The network metrics belong to the class of packet transport delay metrics defined in [\[MONARCH\]](#) (work in progress).

Instances of this Metrics Block refer by tag to the separate auxiliary Measurement Identity block [\[MEASIDENT\]](#) which contains information such as the SSRC of the measured stream, and RTP sequence numbers and time intervals indicating the span of the report.

### 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 that MUST be used as defined in [\[RFC3550\]](#) and [\[RFC3611\]](#).

### 1.3. Performance Metrics Framework

The Performance Metrics Framework [\[PMOLFRAME\]](#) 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 [\[PMOLFRAME\]](#).

### 1.4. Applicability

This metric is believed to be applicable to all RTP applications.

## [2.](#) Definitions

### Numeric formats

This report block makes use of binary fractions. The terminology used is

S X:Y

where S indicates a two's complement signed representation, X the number of bits prior to the decimal place and Y the number of bits after the decimal place.

Hence 8:8 represents an unsigned number in the range 0.0 to 255.996 with a granularity of 0.0039. S7:8 would represent the range -128.000 to +127.996. 0:16 represents a proper binary fraction with range

$0.0 \text{ to } 1 - 1/65536 = 0.9999847$

though note that use of flag values at the top of the numeric range slightly reduces this upper limit. For example, if the 16-bit values 0xffffe and 0xffff are used as flags for "over-range" and "unavailable" conditions, a 0:16 quantity has range

$0.0 \text{ to } 1 - 3/65536 = 0.9999542$

3. Delay Block

3.1. Report Block Structure

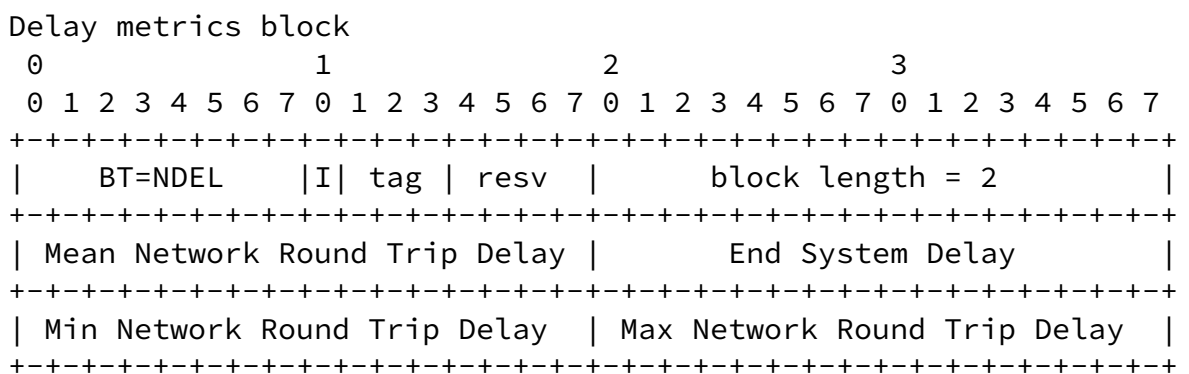


Figure 1: Report Block Structure

3.2. Definition of Fields in Delay Metrics Report Block

block type (BT): 8 bits

A Delay Report Block is identified by the constant NDEL.

[Note to RFC Editor: please replace NDEL 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 Delay metric block is an Interval or a Cumulative metric block, that is, whether the reported values apply 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](#)] which describes this measurement. The relevant Measurement Identifier block has the same tag value as the Delay 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 Delay block, the block length is equal to 2.

Mean Network Round Trip Delay (ms): 16 bits

The Mean Network Round Trip Delay is the mean value of the RTP-to-RTP interface round trip delay in ms over the measurement period, typically determined using RTCP SR/RR.

If only one measurement of Round Trip Delay is available for the

timespan of the report (whether Interval or Cumulative), this single value should be reported as the mean value.

If the measured value exceeds 0xFFFFD, the value 0xFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF SHOULD be reported.

End System Delay (ms): 16 bits

The End System Delay is the internal round trip delay within the reporting endpoint, calculated using the nominal value of the jitter buffer delay plus the accumulation/ encoding and decoding / playout delay associated with the codec being used.

If the measured or estimated value exceeds 0xFFFFD, the value 0xFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF SHOULD be reported.

Min Network Round Trip Delay (ms): 16 bits

The Min Network Round Trip Delay is the minimum value of the RTP-to-RTP interface round trip delay in ms over the measurement period, typically determined using RTCP SR/RR.

If only one measurement of Round Trip Delay is available for the timespan of the report (whether Interval or Cumulative), this single value should be reported as the minimum value.

If the measured value exceeds 0xFFFFD, the value 0xFFFFE SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF SHOULD be reported.

Max Network Round Trip Delay (ms): 16 bits

The Max Network Round Trip Delay is the maximum value of the RTP-to-RTP interface round trip delay in ms over the measurement period, typically determined using RTCP SR/RR.

If only one measurement of Round Trip Delay is available for the timespan of the report (whether Interval or Cumulative), this

single value should be reported as the maximum value.

If the measured value exceeds 0xFFFF, the value 0xFFFF SHOULD be reported to indicate an over-range measurement. If the measurement is unavailable, the value 0xFFFF SHOULD be reported.



[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-format / xr-delay-block

xr-delay-block = "xr-delay"

## [5.](#) IANA Considerations

This document creates a new block type within the IANA "RTCP XR Block Type Registry" called the Delay Block, and a new parameter `xr-delay` within the "RTCP XR SDP Parameters Registry".

## 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

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.](#) References

### [8.1.](#) Normative References

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