Audio/Video Transport Working Group
Internet-Draft
Intended status: Standards Track
Expires: June 17, 2013

A. Clark
Telchemy
V. Singh
Aalto University
Q. Wu
Huawei

December 14, 2012

# RTP Control Protocol (RTCP) Extended Report (XR) Block for Jitter Buffer Metric Reporting

draft-ietf-xrblock-rtcp-xr-jb-03.txt

## Abstract

This document defines an RTP Control Protocol (RTCP) Extended Report (XR) Block that allows the reporting of Jitter Buffer metrics for 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.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on June 17, 2013.

## Copyright Notice

Copyright (c) 2012 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of

the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction . . . . . 3
1.1. Jitter Buffer Metrics Block . . . . . 3
1.2. RTCP and RTCP XR Reports . . . . . 3
1.3. Performance Metrics Framework . . . . . 3
1.4. Applicability . . . . . 3
2. Terminology . . . . . 4
2.1. Standards Language . . . . . 4
3. Jitter Buffer Metrics Block . . . . . 5
3.1. Report Block Structure . . . . . 5
3.2. Definition of Fields in Jitter Buffer Metrics Block . . . 5
4. SDP Signaling . . . . . 8
4.1. SDP rtcp-xr-attrib Attribute Extension . . . . . 8
4.2. Offer/Answer Usage . . . . . 8
5. IANA Considerations . . . . . 9
5.1. New RTCP XR Block Type value . . . . . 9
5.2. New RTCP XR SDP Parameter . . . . . 9
5.3. Contact information for registrations . . . . . 9
6. Security Considerations . . . . . 10
7. Contributors . . . . . 11
8. Acknowledgments . . . . . 12
9. References . . . . . 13
9.1. Normative References . . . . . 13
9.2. Informative References . . . . . 13
Appendix A. Change Log . . . . . 14
A.1. draft-ietf-xrblock-rtcp-xr-jb-03 . . . . . 14
A.2. draft-ietf-xrblock-rtcp-xr-jb-02 . . . . . 14
A.3. draft-ietf-xrblock-rtcp-xr-jb-01 . . . . . 14
A.4. draft-ietf-xrblock-rtcp-xr-jb-00 . . . . . 14
Authors' Addresses . . . . . 15

# 1. Introduction

## 1.1. Jitter Buffer Metrics 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 provides information on jitter buffer configuration and performance.

The metric belongs to the class of transport-related end system metrics defined in [RFC6792].

Instances of this Metrics Block refer by SSRC to the separate auxiliary Measurement Information block [RFC6776] 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 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. Metrics described in this draft are in accordance with the guidelines in [RFC6390][RFC6792].

## 1.4. Applicability

Real-time applications employ a jitter buffer to smooth out jitter encountered on the path from source to destination. These metrics are used to measure how the jitter buffer behave as a result of the jitter and applicable to a range of RTP applications. These metrics reflect terminal related factor that most affects real-time application quality and useful to provide more precise estimation for user experience to the quality of real-time application performance and also valuable to network manager in troubleshooting network.

## 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. Jitter Buffer Metrics Block

This block describes the configuration and operating parameters of the jitter buffer in the receiver of the RTP end system or RTP mixer which sends the report. Instances of this Metrics Block refer by SSRC to the separate auxiliary Measurement Information block [RFC6776] which contains measurement intervals. This metric block relies on the measurement interval in the Measurement Information block indicating the span of the report and should 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 metric block, this metric block should be discarded.

### 3.1. Report Block Structure

JB Metrics Block

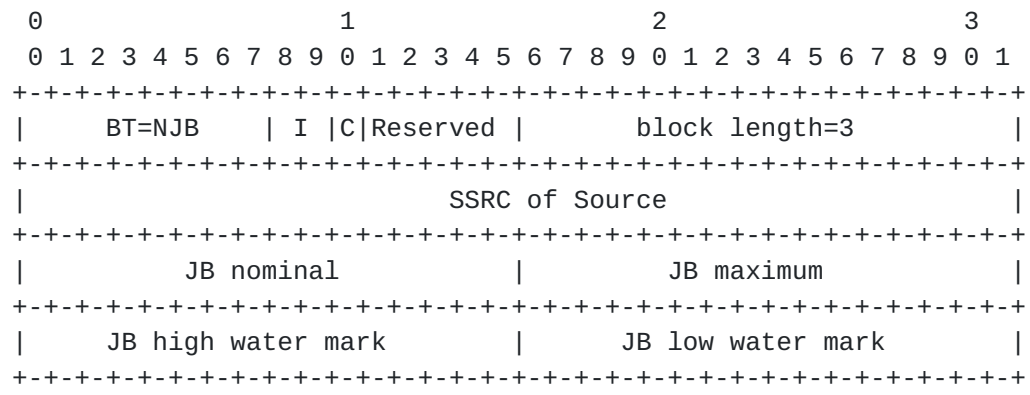



Figure 1: Report Block Structure

### 3.2. Definition of Fields in Jitter Buffer Metrics Block

Block type (BT): 8 bits

A Jitter Buffer Metrics Report Block is identified by the constant NJB.

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

Interval Metric flag (I): 2 bits

This field is used to indicate whether the Jitter Buffer metrics are Sampled, Interval or Cumulative metrics:

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.

Jitter Buffer Configuration (C): 1 bit

This field is used to identify the jitter buffer method in use at the receiver, according to the following code:

0 = Fixed jitter buffer

1 = Adaptive jitter buffer

Reserved: 5 bits

These bits are reserved. They MUST be set to zero by senders ignored by receivers (See [RFC6709] section 4.2).

Block Length: 16 bits

The length of this report block in 32-bit words, minus one and MUST be set to 3, in accordance with the definition of this field in [RFC3611]. The block MUST be discarded if the block length is set to a different value.

jitter buffer nominal delay (JB nominal): 16 bits

This is the current nominal jitter buffer delay in milliseconds, which corresponds to the nominal jitter buffer delay for packets that arrive exactly on time. It is calculated based on the time for packets spent in the jitter buffer. This parameter MUST be provided for both fixed and adaptive jitter buffer implementations.

If the measured value exceeds 0xFFFD, the value 0xFFFE MUST be reported to indicate an over-range measurement. If the

measurement is unavailable, the value 0xFFFF MUST be reported.

jitter buffer maximum delay (JB maximum): 16 bits

This is the current maximum jitter buffer delay in milliseconds which corresponds to the earliest arriving packet that would not be discarded. In simple queue implementations this may correspond to the nominal size. In adaptive jitter buffer implementations, this value may change dynamically. This parameter MUST be provided for both fixed and adaptive jitter buffer implementations.

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

jitter buffer high water mark (JB high water mark): 16 bits

This is the highest value of the jitter buffer nominal delay in milliseconds which occurred at any time during the reporting interval.

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

jitter buffer low water mark (JB low water mark): 16 bits

This is the lowest value of the jitter buffer nominal delay in milliseconds which occurred at any time during the reporting interval.

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

## 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-jb-block

xr-jb-block = "jitter-bfr"
```

### 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 in 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 NJB in the IANA "RTCP XR Block Type Registry" to the "JB Metrics Block".

[Note to RFC Editor: please replace NJB 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 "jitter-bfr" in the "RTCP XR SDP Parameters Registry".

### 5.3. Contact information for registrations

The contact information for the registrations is:

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, Hideaki Yamada,Claire Bi,Colin Perkin and Dan Romascanu.

# 9. References

## 9.1. Normative References

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

[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.

[RFC6709] Carpenter, B., Aboba, B., and S. Cheshire, "Design Considerations for Protocol Extensions", RFC 6709, September 2012.

## 9.2. Informative References

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

[RFC6776] Wu, Q., "Measurement Identity and information Reporting using SDES item and XR Block", RFC 6776, August 2012.

[RFC6792] Hunt, G., Wu, Q., and P. Arden, "Monitoring Architectures for RTP", RFC 6792, November 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-jb-03

The following are the major changes to previous version :

- Reduce the "jb cfg" to 1-bit based on discussion in the WGLC.
- Other editorial change changes aligning with PDV,Delay draft.

### A.2. draft-ietf-xrblock-rtcp-xr-jb-02

The following are the major changes to previous version :

- Add some explaination text in the SDP offer/answer section.
- Add some text in applicability section to explain the use to report jitter buffer metrics.
- Other editorial change changes aligning with PDV,Delay draft.

### A.3. draft-ietf-xrblock-rtcp-xr-jb-01

The following are the major changes to previous version :

- Outdated reference update
- Add one Editor notes to ask clarification on the use of reporting jitter buffer metrics.
- Other Editorial changes.

### A.4. draft-ietf-xrblock-rtcp-xr-jb-00

The following are the major changes to previous version :

- Boilerplate updates.
- references updates
- allocate 32 bit field in report block for SSRC
- Other editorial changes to get alignment with MONARCH draft.

Authors' Addresses

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

Email: alan.d.clark@telchemy.com

Varun Singh
Aalto University
School of Electrical Engineering
Otakaari 5 A
Espoo, FIN 02150
Finland

Email: varun@comnet.tkk.fi

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

Email: sunseawq@huawei.com