Network Working Group
Internet-Draft
Intended status: Standards Track
Expires: October 25, 2014

J. Tong
C. Bi, Ed.
China Telecom
R. Even
Gesher Erove Ltd
Q. Wu, Ed.
R. Huang
Huawei

April 23, 2014

RTP Control Protocol (RTCP) Extended Report (XR) Block for MPEG2 Transport Stream (TS) Program Specific Information (PSI) Decodability Statistics Metrics reporting

draft-ietf-xrblock-rtcp-xr-psi-decodability-02

Abstract

An MPEG2 Transport Stream (TS) is a standard container format used in the transmission and storage of multimedia data. Unicast/Multicast MPEG2 TS over RTP is widely deployed in IPTV systems. This document defines an RTP Control Protocol (RTCP) Extended Report (XR) Block that allows the reporting of MPEG2 TS decodability statistics metrics related to transmissions of MPEG2 TS over RTP. The metrics specified in the RTCP XR Block are related to Program specific information carried in MPEG TS.

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 October 25, 2014.

Copyright Notice

Copyright (c) 2014 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. MPEG2 Transport Stream Decodability Metrics 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. MPEG2 TS PSI Decodability Statistics Metrics Block 4
4. SDP Signaling 8
4.1. SDP rtcp-xr-attrib Attribute Extension 8
4.2. Offer/Answer Usage 8
5. IANA Considerations 8
5.1. New RTCP XR Block Type value 8
5.2. New RTCP XR SDP Parameter 9
5.3. Contact information for registrations 9
6. Security Considerations 9
7. References 9
7.1. Normative References 9
7.2. Informative References 9
Authors' Addresses 10

1. Introduction

1.1. MPEG2 Transport Stream Decodability Metrics

The European Telecommunications Standards Institute (ETSI) has defined a set of syntax and information consistency tests and corresponding indicators [ETSI] that are recommended for the monitoring of MPEG2 Transport Streams [ISO-IEC.13818-1.2007]. The tests and corresponding indicators are grouped according to priority:

- First priority - Necessary for decodability (basic monitoring)
- Second priority - Recommended for continuous or periodic monitoring
- Third priority - Recommended for application-dependent monitoring

This memo is based on information consistency tests and resulting indicators defined by ETSI [ETSI] and defines a new block type to augment those defined in [RFC3611] for use with MPEG2 Transport Stream (TS) [ISO-IEC.13818-1.2007]. The new block type supports reporting of the number of occurrences of each Program Specific Information (PSI) indicator in the first and second priorities that supplements information from PSI independent Decodability Statistics Metrics Block [RFC6990]; third priority indicators are not supported.

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 new report block described in this memo is in compliance with the monitoring architecture specified in [RFC6792] and the Performance Metrics Framework [RFC6390].

1.4. Applicability

These metrics are applicable to any type of RTP application that uses the MPEG2 TS standard format for multimedia data; for example, MPEG4 over MPEG2 TS over RTP. This new block type can be useful for measuring content stream or TS quality by checking TS header information [ETSI] and identifying the existence, and characterizing the severity, of bitstream packetization problems which may affect

users' perception of a service delivered over RTP; it may also be useful for verifying the continued correct operation of an existing system management tool.

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. MPEG2 TS PSI Decodability Statistics Metrics Block

ETSI TR 101290 [ETSI] generally defines metrics related to error events while this document contains counts of those metrics defined in [ETSI]. The block defined in this document reports MPEG2 TS PSI decodability statistics metrics beyond the information carried in the standard RTCP packet format and PSI independent Decodability Metrics Block [RFC6990], which are measured at the receiving end of the RTP stream. It contains counts of six metrics defined in ETSI TR 101290 [ETSI]. Information is reported about basic monitoring parameters necessary to ensure that the TS can be decoded including:

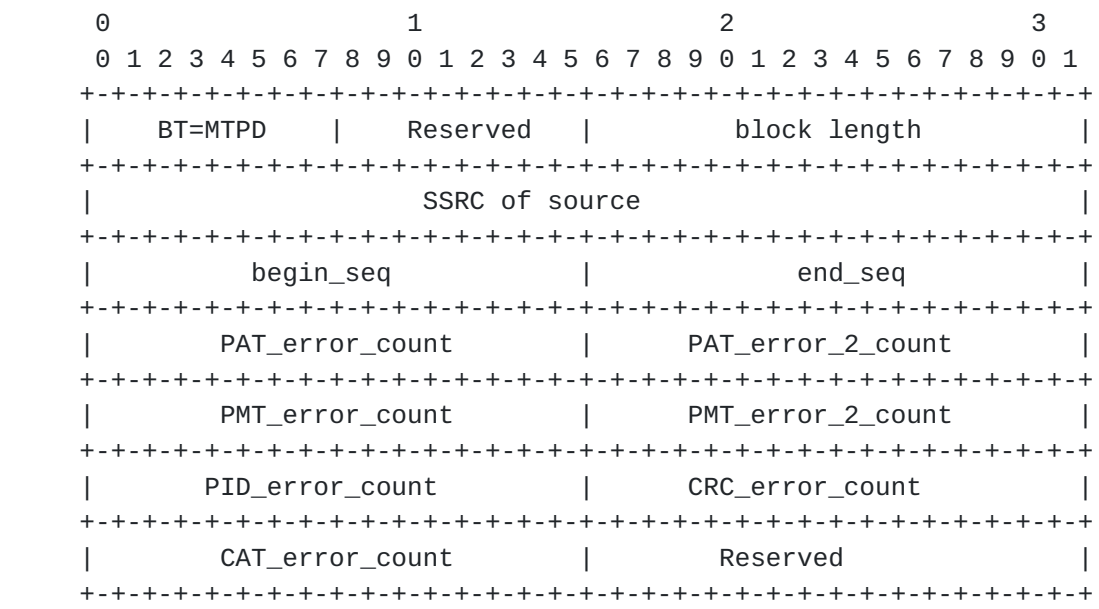
- Program Association Table(PAT) errors
- PAT 2 errors
- Program Map Table(PMT) errors
- PMT 2 errors
- Packet Identifier(PID) errors

and continuous monitoring parameters necessary to ensure the continuous decoding including:

- Cyclic Redundancy Check (CRC) errors
- Conditional Access Table (CAT) errors

The other parameters are ignored since they do not apply to all MPEG2 implementations. For further information on these parameters, see [ETSI].

The MPEG2 TS PSI Decodability Metrics Block has the following format:



block type (BT): 8 bits

The MPEG2 TS PSI Decodability Metrics Block is identified by the constant <MTPD>.

Reserved: 8 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 constant 6, in accordance with the definition of this field in Section 3 of RFC 3611. 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 RFC 3611.

begin_seq: 16 bits

As defined in Section 4.1 of RFC 3611.

end_seq: 16 bits

As defined in Section 4.1 of RFC 3611.

PAT_error_count: 16 bits

A count of the number of PAT errors that occurred in the above sequence number interval. The program association table (PAT) is the only packet with packet ID (PID) 0x 0000. A PAT error occurs when it does not occur at least every 0.5s or the table has an ID other than 0x 00, as defined in section 5.2.1 of [ETSI]. Every program within the MPEG TS stream is listed in the PAT; if it is missing, then no programs can be decoded.

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported. Note that PAT_error_count and PAT_error_2_count MUST NOT be reported at the same time in the same metric block. If PAT_error_count is reported, PAT_error_2_count MUST be set to 0xFFFF.

PAT_error_2_count: 16 bits

A count of the number of PAT2 errors that occurred in the above sequence number interval. A PAT2 error occurs when it does not occur at least every 0.5s or the table has an ID other than 0x 00 or there is more than one table ID 0x 00 inside the packet with the PAT PID, as defined in section 5.2.1 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported. Note that PAT_error_count and PAT_error_2_count MUST NOT be reported at the same time in the same metric block. If PAT_error_2_count is reported, PAT_error_count MUST be set to 0xFFFF.

PMT_error_count: 16 bits

A count of the number of PMT_errors that occurred in the above sequence number interval. A PMT_error occurs when the program map table (PMT) does not come up at least every 0.5s on the PID that is referred to in the PAT, as defined in the section 5.2.1 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported. Note that PMT_error_count and PMT_error_2_count MUST NOT be reported at the same time in the same metric block. If PMT_error_count is reported, PMT_error_2_count MUST be set to 0xFFFF.

PMT_error_2_count: 16 bits

A count of the number of PMT2 errors that occurred in the above sequence number interval. A PMT2_error occurs when the program map table (PMT) does not come up at least every 0.5s on the PID that is referred to in the PAT, as defined in the section 5.2.1 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported. Note that PMT_error_count and PMT_error_2_count MUST NOT be reported at the same time in the same metric block. If PMT_error_2_count is reported, PMT_error_count MUST be set to 0xFFFF.

PID_error_count: 16 bits

A count of the number of PID_errors that occurred in the above sequence number interval. A PID_error occurs when MPEG TS streams are remultiplexed and any PID doesn't refer to an actual data stream, as defined in the section 5.2.2 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported.

CRC_error_count: 16 bits

A count of the number of CRC_errors that occurred in the above sequence number interval. A CRC_error occurs if data corruption occurred in any of the following tables -- CAT, PAT, PMT, Network Information Table (NIT), Event Information Table (EIT), Bouquet Association Table (BAT), Service Description Table (SDT) or Time Offset Table (TOT), as defined in the section 5.2.2 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported.

CAT_error_count: 16 bits

A count of the number of CAT_errors that occurred in the above sequence number interval. A CAT_error occurs when the table has an ID other than 0x 01,as defined in the section 5.2.2 of [ETSI].

The measured value is unsigned value. If the measurement is unavailable, the value 0xFFFF MUST be reported.

Reserved: 16 bits

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

4. SDP Signaling

RFC 3611 defines the use of SDP (Session Description Protocol) [RFC4566] for signaling the use of RTCP 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 session augments the SDP attribute "rtcp-xr" defined in Section 5.1 of RFC 3611 by providing an additional value of "xr-format" to signal the use of the report block defined in this document.

xr-format =/ xr-tpd-block

xr-tpd-block = "ts-psi-decodability"

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 report block types for RTCP XR are subject to IANA registration. For general guidelines on IANA allocations for RTCP XR, refer to Section 6.2 of RFC 3611.

5.1. New RTCP XR Block Type value

This document assigns the block type value MTPD in the IANA " RTP Control Protocol Extended Reports (RTCP XR) Block Type Registry " to the "MPEG2 Transport Stream PSI Decodability Statistics Metrics Block".

[Note to RFC Editor: please replace MTPD 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 "ts-psi-decodability" in the "RTP Control Protocol Extended Reports (RTCP XR) Session Description Protocol (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

This proposed RTCP XR report block introduces no new security considerations beyond those described in RFC 3611.

7. References

7.1. Normative References

[ETSI] ETSI, "Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems", Technical Report TR 101 290, 2001.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, 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)", RFC 3611, November 2003.

[RFC4566] Handley, M., Jacobson, V., and C. Perkins, "SDP: Session Description Protocol", RFC 4566, July 2006.

7.2. Informative References

[ISO-IEC.13818-1.2007] International Organization for Standardization, "Information technology - Generic coding of moving

pictures and associated audio information: Systems", ISO International Standard 13818-1, October 2007.

[RFC6390] Clark, A. and B. Claise, "Guidelines for Considering New Performance Metric Development", BCP 170, RFC 6390, October 2011.

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

[RFC6792] Wu, Q., Hunt, G., and P. Arden, "Guidelines for Use of the RTP Monitoring Framework", RFC 6792, November 2012.

[RFC6990] Wu, Q., "RTP Control Protocol (RTCP) Extended Report (XR) Block for MPEG2 Transport Stream (TS) Program Specific Information (PSI) Independent Decodability Statistics Metrics reporting", RFC 6990, May 2013.

Authors' Addresses

Jiangang Tong
Shanghai Research Institure of China Telecom Corporation Limited
No.1835,South Pudong Road
Shanghai 200122
China

Email: tongjg@sttri.com.cn

Claire Bi (editor)
Shanghai Research Institure of China Telecom Corporation Limited
No.1835,South Pudong Road
Shanghai 200122
China

Email: bijy@sttri.com.cn

Roni Even
Gesher Erove Ltd
14 David Hamelech
Tel Aviv 64953
Israel

Email: ron.even.tlv@gmail.com

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

Email: bill.wu@huawei.com

Rachel Huang
Huawei
101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

Email: rachel.huang@huawei.com