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R. Huang
Q. Wu
Huawei
H. Asaeda
NICT
G. Zorn, Ed.
Network Zen
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**RTP Control Protocol (RTCP) Extended Report (XR) Block for MPEG
Transport Stream (TS) Program Specific Information (PSI) Independent
Decodability Statistics Metric reporting**
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Abstract

An MPEG Transport Stream (TS) is a standard container format used in the transmission and storage of multimedia data. Unicast/Multicast/Broadcast MPEG-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 MPEG TS Program Specific Information (PSI) Independent decodability statistics metrics related to transmissions of MPEG-TS over RTP.

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1. Introduction

1.1. MPEG 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 MPEG-2 Transport Streams [ISO-IEC.13818-1.2007]. The tests and corresponding indicators are grouped according to priority:

- o First priority - Necessary for de-codability (basic monitoring)
- o Second priority - Recommended for continuous or periodic monitoring
- o Third priority - Recommended for application-dependant 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 Freidman, et al. [RFC3611] for use with MPEG 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) Independent indicator in the first and second priorities; 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 MPEG-TS standard format for multimedia data; for example, MPEG4 TS content 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. MPEG TS PSI Independent Decodability Statistics Metric Block

This block reports MPEG TS PSI Independent decodability statistics metrics beyond the information carried in the standard RTCP packet format, which are measured at the receiving end of the RTP stream. It describes eight metrics specified in ETSI TR 101 290. Information is reported about basic monitoring parameters necessary to ensure that the TS can be decoded including:

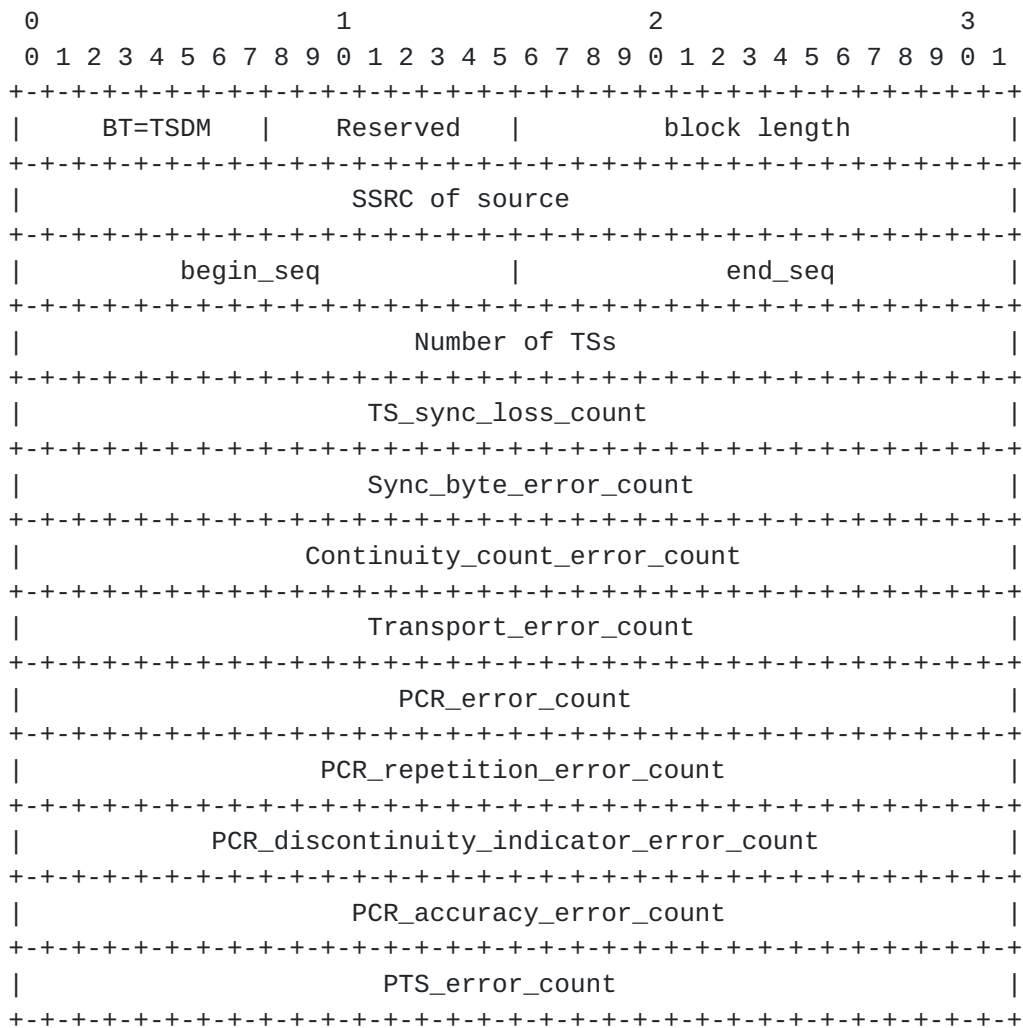
- o Transport Stream Synchronization Losses
- o Sync byte errors
- o Continuity count errors

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

- o Transport errors
- o Program Clock Reference (PCR) errors
- o PCR repetition errors
- o PCR discontinuity indicator errors
- o PCR accuracy errors
- o Presentation Time Stamp (PTS) errors

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

The MPEG-TS PSI Independent Decodability Metrics Block has the following format:



block type (BT): 8 bits

The MPEG-TS PSI Independent Decodability Metrics Block is identified by the constant <MPID>.

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 12, 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](#).

Number of TSs: 32 bits

Number of TS in the above sequence number interval.

TS_sync_loss_count: 32 bits

Number of TS_sync_loss errors in the above sequence number interval. It is calculated based on the occurrence of errors for "TS_sync_loss" parameter defined in the [section 5.2.1](#) of ETSI TR 101 290 (See [section 5.5.1](#) of ETSI TR 101 290).

Sync_byte_error_count: 32 bits

Number of sync_byte_errors in the above sequence number interval. It is calculated in the same way as TS_sync_loss_count, i.e., based on the occurrence of errors for "Sync_byte_error" parameter defined in the [section 5.2.1](#) of ETSI TR 101 290.

Continuity_count_error_count: 32 bits

Number of Continuity_count_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "Continuity_count_error" parameter defined in the [section 5.2.1](#) of ETSI TR 101 290.

Transport_error_count: 32 bits

Number of Transport_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "Transport_error" parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

PCR_error_count: 32 bits

Number of PCR_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "PCR_error"parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

PCR_repetition_error_count: 32 bits

Number of PCR_repetition_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "PCR_repetition_error"parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

PCR_discontinuity_indicator_error_count: 32 bits

Number of PCR_discontinuity_indicator_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "PCR_discontinuity_indicator_error"parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

PCR_error_count: 32 bits

Number of PCR_accuracy_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "PCR_accuracy_error"parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

PTS_error_count: 32 bits

Number of PTS_errors in the above sequence number interval. Similarly, it is calculated based on the occurrence of errors for "PTS_error"parameter defined in the [section 5.2.2](#) of ETSI TR 101 290.

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-nptd-block

xr-nptd-block = "non-psi-ts-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 MPID in the IANA " RTP Control Protocol Extended Reports (RTCP XR) Block Type Registry " to the " MPEG Transport Stream PSI Independent Decodability Statistics Metric Block".

[Note to RFC Editor: please replace MPID 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 " non-psi-ts-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. Acknowledgements

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Authors' Addresses

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

Email: rachel.huang@huawei.com

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

Email: bill.wu@huawei.com

Hitoshi Asaeda
National Institute of Information and Communications Technology
4-2-1 Nukui-Kitamachi
Koganei, Tokyo 184-8795
Japan

Email: asaeda@nict.go.jp

Glen Zorn (editor)
Network Zen
227/358 Thanon Sanphawut
Bang Na, Bangkok 10260
Thailand

Phone: +66 (0) 909-201060
Email: glenzorn@gmail.com

