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RTCP XR Report Block for QoE Metrics Reporting
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Abstract

   This document defines an RTCP XR Report Block that allows the
   reporting of QoE metrics for use in voice, audio and video
   services.

Terminology
   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 [1].

1. Introduction

1.1. QoE Metrics Report Block

   This draft defines a new block types to augment those defined
   in RFC3611 for use in reporting QoE metrics. QoE metrics consider
   the impact of a range of transmission and payload (content)
   related impairments on the quality of a service from the user
   viewpoint.

1.2. RTCP and RTCP XR Reports

   The use of RTCP for reporting is defined in RFC3550 [2].
   RFC3611 [3] 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 [9] 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 [9].

1.4 Applicability

   This memo applies to any application of RTP for which QoE
   measurement algorithms are defined.

2. Definitions

2.1 QoE Metrics

   A QoE ("Quality of Experience") metric is intended to provide a
   measure that is indicative of the user's view of a service.
   This is commonly expressed as a MOS ("Mean Opinion Score") which
   usually (but not always) is a 1.0-5.0 numerical scale in which
   a 1.0 represents "Unacceptable" and 5.0 represents "Excellent".

   True MOS scores are obtained using subjective testing, and tend
   vary from test to test. Subjective testing is also not

suitable for measuring the quality of operational services and
hence it is common practice to use objective algorithms to
estimate subjective quality. During the development of such QoE
algorithms, there is extensive comparison against both subjective
test data and data from other "trusted" objective test tools.

ITU-T Recommendation P.564 defines a methodology for verifying
the performance of QoE estimation algorithms for Voice over IP
services. There is standardization work underway related to

QoE metrics for video and audio. The continuous progression of
work in this area means that new algorithms may be defined in
the future, hence this memo does make provision for new
algorithms. Implementors are advised that IPR disclosures
have been made in respect of most known QoE estimation algorithms
and they should check the IPR disclosure databases and policies of
the relevant standards organizations (for example ITU and ETSI).

2.2 Channel

Certain types of encoder (for example stereo audio codecs)
incorporate multiple audio or video channels into a single encoded
stream which is then packetized and carried in RTP or MPEG
Transport. Within the scope of this memo, the term "channel"
applies to this definition only - if multiple audio or video
streams are carried either in separate RTP sessions (identified
by an SSRC) or MPEG Transport program streams (identified by a
PID) then the Measurement Identifier block MUST be used to
identify the stream to which metrics apply.

3. QoE Metrics Block

3.1 Report Block Structure

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     BT=N       |I|Tag  |       |          block length         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Chan |Dir| Type  | Calc alg     |         QoE Metric            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
..........
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Chan |Dir| Type  | Calc alg     |         QoE Metric            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

   block type (BT): 8 bits

      A Basic Loss/Discard Report Block is identified by the constant
      NWRX.

   [Note to RFC Editor: please replace NWRX 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 Basic Loss/Discard
      metrics are Interval or Cumulative metrics, that is, whether the
      reported values applies 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
      which describes this measurement. The relevant Measurement
      Identifier block has the same tag value as the Basic Loss/Discard
      block. Note that there may be more than one Measurement
      Identifier block per RTCP packet.

   Block length: 16 bits

      The length if this report block in 32-bit words minus one.

   Channel

      The channel number of the audio or video stream to which this
      metric applies

   Direction

   Type

      0000 MOS-LQ - Estimated Listening Quality MOS
      0001 MOS-CQ - Estimated Conversational Quality MOS
      0010 RLQ   - Listening Quality R Factor
      0011 RCQ   - Conversational Quality R Factorv
      0100 MOS-V - Video Quality MOS

```
   0101  PSNR   - Peak Signal to Noise Ratio
   0110  MOS-A  - Audio Quality MOS
   0111 - 1111  - Reserved
```

Calculation Algorithm

```
   0       -    P.564 [5] (Voice)
   1       -    G.107 / ETSI TS 101 329-5 Annex E [6,7] (Voice)
   2       -    TTC JJ201.01 [8] (Japan)
   3-254   -    Reserved
   255     -    Indicated via SDP
```

QoE Metric

   A 8:8 integer scaled representation of the QoE metric value.
   This allows values in the range 0.0 to 255.996 to be represented.

4. SDP Signaling

   RFC3611 [3] defines the use of SDP (Session Description Protocol)

   [4] for signaling the use of XR blocks. XR blocks MAY be used
   without prior signaling.

   This section augments the SDP [4] attribute "rtcp-xr" defined in
   RFC3611[3] by providing a "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 /
             qoe-metrics

   qoe-metrics   = "qoe-metrics" [EQUAL word]
   DIGIT         = %x30-39
   format-ext    = non-ws-string
   non-ws-string = 1*(%x21-FF)
   CRLF          = %d13.10
```


5. IANA Considerations

   This document creates a new block type within the IANA "RTCP XR Block
   Type Registry" called the QoE Metrics, and a new [new-xrblock]
   parameter within the "RTCP XR SDP Parameters Registry".

6. Security Considerations

RTCP reports can contain sensitive information since they can provide information about the nature and duration of a session established between two or more endpoints.

7. Contributors

8. References

Normative

[1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[2] Schulzrinne, H., Casner, S., Frederick, R. and V. Jacobson, "RTP: A Transport Protocol for Real-Time Applications", STD 64, RFC 3550, July 2003.

[3] Friedman, T., Caceres, R., and A. Clark, "RTP Control Protocol Extended Reports (RTCP XR)", RFC 3611, November 2003.

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

[5] ITU-T Recommendation P.564, Conformance testing for narrowband Coice over IP transmission quality assessment models

[6] ITU-T Recommendation G.107, The E Model, a computational model for use in transmission planning

[7] ETSI TS 101 329-5, QoS Measurement for Voice over IP

[8] TTC 201.01 (Japan) A method for speech quality assessment for Coice over IP

Informative

[9] Clark, A. "Framework for Performance Metric Development draft-ietf-pmol-perf-metrics-framework-00.txt

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