**3GPP TSG-RAN WG3 Meeting #111-e *R3-21XXXX was R3-210821***

**E-meeting, 25 Jan – 5 Feb 2021**

**Title:** Further discussions on the remaining open issues of QoE report visibility at RAN

**Source:** Huawei

**Agenda item:** 15.2

**Document Type:** other

# 1. Introduction

This paper tries to capture some initial analysis on QoE metrics which could be visible to RAN and might be useful to RAN

# 2. References

1. R3-206732, Discussion of QoE report visibility at RAN (Huawei)

# 3. Annex: TP

### 6.7.1 Initial analysis on RAN visible QoE metrics

The table below takes some QoE parameter for streaming service as an example, and provides some initial analysis of potential benefits to RAN.

As could be seen from the table below, some of QoE metrics may have nothing to do with RAN, e.g. MPD information, some of them may be related with user behaviour, e.g. Rendered viewports, and some may be related with RAN and might be useful, e.g. Buffer level. In general, whether any metric is beneficial for RAN when it is visible to RAN, should be studied per metric in normative phase.

Table 1 Initial analysis on QoE Report visibility at RAN for streaming service

|  |  |  |
| --- | --- | --- |
| Parameters | Description | Initial analysis |
| Round-trip time |  | If Round-trip time is large, RAN could try to compensate based on RAN part delay, but the cost might be significant. RTT is also related with many factors like UE capability, radio quality, radio load, etc., to adjust radio transmission delay for one user may impact other users, and the effect for the whole system performance is unpredictable.  |
| Jitter duration |  | there are other factors affecting jitter, e.g. buffer size available at UE side, processing delay etc., if RAN already fulfil QoS requirement, and Jitter duration is still bad, further analysis are needed to see whether and what RAN could do to improve. |
| Corruption duration | The time period from the NPT time of the last good frame (since the NPT time for the first corrupted frame cannot always be determined) before the corruption, to the NPT time of the first subsequent good frame | If the RAN can know the results of this metric, the RAN can adjust the resource allocation of the UE to satisfy the user experience |
| Average Throughput |  | RAN could measure RAN side throughput by itself and make adjustment accordingly, so this metric has some relation with RAN though, the benefit seems unclear. |
| Initial playout delay | from the fetch of the first media Segment (or sub-segment) and the time at which media is retrieved from the client buffer |  |
| Device information… | a list of device information objects | this metric may have potential privacy issues because it exposes the user information. However, the videoWidth videoHeight in Devise information may reflect the UE expectations of QoE, it is possible that RAN schedule the UE first with higher QoE expectation. |
| Rendered viewports | a list of viewports that have been rendered during the media presentation | This metric may have potential privacy issues because it exposes the user behaviour |
| Codec Information |  |  |
| Buffer level | list of buffer occupancy level measurements during playout at normal speed. | If the RAN can know the results of buffer level, the RAN can adjust the resource allocation of the UE to ensure there is enough buffer for the streaming, this might help to improve the scheduling efficiency. |
| Representation switch events | to record switch events during playing | This metric is also related with user behaviour during playing |
| Play List | A list of playback periods. A playback period is the time interval between a user action and whichever occurs soonest of the next user action, the end of playback or a failure that stops playback | This metric records the user action of playback during playing. The playlist may be used to derive many other metrics, and an example calculation of a few stalling-related metrics The initial stalling, the frequency of stalling, and the stalling duration may reflect UE experience, it is possible that RAN schedule the UE first with bad UE experience to prevent further QoE degradation.  |
| MPD (Media presentation description) Information | This metric can be used to report Representation information from the MPD, so that reporting servers without direct access to the MPD can understand the used media characteristics | Not sure if there are any additional benefits if RAN understands the used media characteristics, anyway RAN should first to behave according to the received QoS parameters which actually reflects media characteristics. |
| Interactivity Summary:  | Summarizes the measurements of interactivity usage according to different metrics such as user consumption of rendered interactivity content or engagement with user interface (UI) functionality, such as viewing, clicking on or selection of hyperlinks, radio buttons, check boxes and other forms of UI displays or controls. | This seems also to be related with user behaviour during playing period. |
| Interactivity Event List | A time-ordered list of interactivity events occurring during the playout of the main program, each containing detailed information on the incidences of interactivity usage during that event, as covered by an instance of the interactivity usage report. | Similar as above |
| … |  |  |