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Concepts, use cases and requirements
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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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2 presented to TSG for approval;

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management, as identified below:

TS 28.404: "Quality of Experience (QoE) measurement collection; Concepts, use cases and requirements";

TS 28.405: "Quality of Experience (QoE) measurement collection; Control and configuration";

TS 28.406: "Quality of Experience (QoE) measurement collection; Information definition and transport";

One main motivation of mobile network evolution is to improve the user experience why the evaluation of the user experience at the UE side is vital to network operators, especially when the operators provide some real-time services which require for example high date rate and low latency like streaming services (typically video services) , where even intermittent quality degradation is very annoying. Many of these streaming services are a significant part of the commercial traffic growth rate, therefore the focus is on the end users' experience .

Quality of Experience (QoE) information collection provides detailed information at call level on a number of UEs.

The capability to log information within a UE, and in particular the QoE of an end user service, initiated by an operator, provides the operator with QoE information. The collected information (specified in 3GPP TS 26.247 [2]) cannot be deduced from performance measurements in the mobile network.

The QoE information is information collected by the end user application in the UE.

The collected QoE information is collected by the management system for analysis and/or KPI calculations.

1 Scope

The present document addresses concepts, business level use cases and requirements for the function Quality of Experience (QoE) measurement collection in UMTS and LTE. The measurements that are collected are DASH [2] and MTSI [3] measurements.

The function includes collecting QoE information from UEs frequenting a specified area .

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 26.247: " Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".

[3] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[4] 3GPP TS 28.307: "Quality of Experience (QoE) measurement collection Integration Reference Point (IRP); Requirements".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

QoE Quality of Experience

4 Concepts and background

4.1 Concepts

A network request session is a session in the mobile network when the network checks for UEs that have the capability to provide requested information.

An UE request session is a session in the network when the network has found an UE that has the capability to provide the requested information and the request is forwarded to the UE.

A recording session is a session in the UE when it initiates recording of the requested end user service/end user service type and record the requested information.

4.2 Background

The collection of QoE information for a specified end user service/end user service type either from UEs in a specified area . The collected information is transported to a collection centre, where it can be analysed and/or KPIs can be calculated.

A collection can be requested by an operator technician via the management system to the traffic network. As the network do not have any knowledge which UEs have the capability to record the requested data, therefore the UEs will report whether they have this capability or not when a session set up. UEs that has this capability that match the request from the management system will be requested to start recording the requested information when the request constraints are met. The UE will make the recorded data available for management system.

5 Business Level Requirements

5.1 Requirements

5.1.1 Collecting QoE information from end user services

REQ-EUSPC-CON-1: The operator shall have a capability to request collection of QoE information per end user service/end user service type for a specified area. The request may include an address of a collection centre to which the collected information shall be delivered.

REQ-EUSPC-CON-2: The application providing the end user service performance information should have the capability to provide this information to a collection centre.

REQ-EUSPC-CON-3: It should be possible to restrict the QoE information collection to a subset of the sessions in a UE using an end user service/end user service type.

REQ-EUSPC-CON-4: Void.

REQ-EUSPC-CON-5: The management system shall have a capability to request collection of end user service performance information for a specific service type provided by specific streaming sources. The request may include information of streaming sources for which the information shall be collected.

REQ-EUSPC-CON-6: The 3GPP network shall have a capability to forward an indication to the management system that a recording session has been started.

REQ-EUSPC-CON-7: The operator shall have a capability to stop the collection of QoE information job.

REQ-EUSPC-CON-8: The operator shall have a capability to order several QoE measurement collections from each UE simultaneously.

REQ-EUSPC-CON-9: The RAN shall have a capability to temporarily stop QoE measurement reporting at RAN overload.

REQ-EUSPC-CON-10: The RAN shall have a capability to restart temporary stopped QoE measurement reporting when RAN overload has ended.

NOTE: The QoE information to be collected are specified in ref. 3GPP TS 26.247 [2] and TS 3GPP TS 26.114 [3].

5.2 Actor roles

See each use case in clause 5.4.

5.3 Telecommunication resources

See each use case in clause 5.4.

5.4 High-level use cases

5.4.1 Collecting QoE information from a specific end user service type

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	Allow the operator to obtain QoE information for an end user service type based on a 5 % of those sessions in a UE(s) in a specified area using a specific end user service type, in a specified collection centre.	
Actors and roles	The operator which is the requester of the QoE information.	
Telecom resources	The management system, the mobile network and the UE.	
Assumptions	The application providing an end user service type is able to provide QoE information about its end user service performance.	
Pre-conditions	Selected end users are using the specified end user service type.	
Begins when	The management system receives a request from the operator.	
Step 1 (M)	The management system receives a request from the operator and transfers it to the mobile network.	
Step 2 (M)	The mobile network receives the request, starts a network request session and starts to check which connections fulfil the request.	
Step3 (M)	When a connection is found that fulfils the request, the mobile network starts an UE request session and transfers the request to the UE.	
Step 4 (M)	When the requested end user service type is started in the UE, it records the requested information for 5% of sessions of the requested service type and sends the recorded information to the specified collection centre.	
Ends when	The network request session expires.	
Exceptions		
Post-conditions	The collected information is present in the specified collection centre.	
Traceability	**REQ-EUSPC-CON-1, REQ-EUSPC-CON-2 and REQ-EUSPC-CON-3**	
NOTE Step 2 to 4 is repeated for all UEs that access the network in the specified area during the network request session.		

5.4.2 Void

5.4.3 Collecting QoE information from end user service type of specific streaming sources

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	Allow the operator to obtain QoE information from end user service type from specific streaming sources.	
Actors and roles	The operator which is the requester of the QoE information.	
Telecom resources	The management system, the mobile network and the UE.	
Assumptions	The application providing streaming video service is able to provide QoE information about its end user performance.	
Pre-conditions	The selected end users are using the specified end user service type from the specified streaming sources.	
Begins when	The operator requests a QoE information collection for a specific service type from specific streaming sources.	
Step 1 (M)	When the management system receives a request from the operator, it transfers the request to the mobile network.	
Step 2 (M)	When the mobile network receives the request it starts a network request session and starts to check which connections fulfil the request.	
Step3 (M)	When a connection is found, the mobile network starts a UE request session and transfers the request to the UE.	
Step 4 (M)	When the specified service type is started in the UE, the UE checks whether the streaming source is consistent with any of the streaming sources set by the request, and if yes, the UE collects relevant QoE information and send to the network.	
Ends when	The network request session expires.	
Exceptions		
Post-conditions	The collected information is present in the specified collection center.	
Traceability	**REQ-EUSPC-CON-2, REQ-EUSPC-CON-3 and REQ-EUSPC-CON-5.**	

5.4.4 Indication of QoE information collection

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	Provide the OAM system with an indication that a recording session has started and subsequently allow the OAM system to modify the QoE measurement configuration e.g. the QoE configured area if the number of sessions are too small or too large. The indication may also be used to determine whether or not to terminate the QoE information collection if sufficient number of recording sessions have been started.	
Actors and roles	The operator which is the requester of the QoE information.	
Telecom resources	The management system and the RAN node.	
Assumptions		

Use case stage	Evolution/Specification	<<Uses>> Related use
Pre-conditions	Selected end users have been requested to provide QoE Information when the specified end user service type is used.	
Begins when	The application layer sends AT command including streaming indication to access stratum.	
Step 1 (M)	When the RAN node receives the streaming indication from the UE access stratum, the RAN node sends an indication to the triggering OAM system that a recording session has been started.	
Ends when	The management system has received the indication that a recording session has been started.	
Exceptions		
Post-conditions	The OAM system is able to decide if the ongoing QoE measurement collection needs modification and if sufficient data has been obtained for analysis. The OAM system can use the indications to trigger evaluation of collected data.	
Traceability	**REQ-EUSPC-CON-6**	

5.4.5 Change collecting QoE information

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	Allow the operator to change an ongoing QoE information collection job.	
Actors and roles	The operator which is the requester of changing the QoE information collection job.	
Telecom resources	The management system, the mobile network and the UE.	
Assumptions	-	
Pre-conditions	The QoE collection job is active.	
Begins when	The operator has information that QoE information collection job needs to have more information as collected data will not be sufficient or that the collected information is enough.	
Step 1 (M)	The management system receives a request from the operator to terminate the ongoing QoE information collection job.	
Step 2 (M)	For all connections where the UE has been requested to start the QoE job, the mobile network transfer the termination request to the UE, which terminates the specified QoE collection information job.	
Step 3 (M)	When all QoE collections are terminated in the UEs for the specified QoE information collection job, the mobile network finish to terminate the QoE information collection job.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Step 4 (O)	If collected information will not be sufficient, the operator initiates a new QoE information collection job.	Collecting QoE information from a specific end user service type, or Collecting QoE information from end user service type from a specific user.
Ends when	The network request session is terminated (when sufficient amount of data is collected), or when the new network request is started (when the collected data will not be sufficient).	
Exceptions		
Post-conditions	The network request session is terminated or the new network request is started .	
Traceability	**REQ-EUSPC-CON-1 and REQ-EUSPC-CON-7**	

5.4.6 Temporary stop and restart of QoE information reporting during RAN overload

Use case stage	Evolution/Specification	<<Uses>> Related use
Goal	At RAN overload RAN may stop or delay the QoE information reporting from the UEs that has started it.	
Actors and roles	The RAN node which is the requester of delaying the QoE information reporting.	
Telecom resources	The RAN node and the UE.	
Assumptions	-	
Pre-conditions	Selected UEs have started QoE information collection.	
Begins when	The RAN node detects that it is overloaded.	
Step 1 (M)	The RAN node sends a request to temporarily stop the reporting to the UEs that has started the QoE information collection. An indication about the temporary stop is sent to the management system.	
Step 2 (M)	When the UE receives the request from the RAN node to temporarily stop reporting, the UE access stratum informs the application that reporting has temporarily been stopped. The application continues any ongoing recording and stores the recorded information until a restart request is received.	

Use case stage	Evolution/Specification	<<Uses>> Related use
Step 3 (M)	When the RAN overload situation is ended, the RAN node sends a request to restart the reporting to the UEs that has temporarily stopped the QoE information reporting. An indication about the restart is sent to the management system.	
Step 4 (M)	When the UE receives the request from the RAN node, the UE access stratum informs the application to restart the QoE information reporting.	
Ends when	The management system has received the indication that a recording session has been restarted.	
Exceptions	The recording time expires before the RAN overload is ended.	
Post-conditions	The QoE information collection is active.	
Traceability	**REQ-EUSPC-CON-9, REQ-EUSPC-CON-10**	

6 Specification level requirements

6.1 Requirements

Specification level requirements for the management of QoE Measurement Collection is specified in [4].

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2019-09	SA#85					Change control version	16.0.0
2019-12	SA#86	SP-191179	0001	-	F	Revise the Introduction	16.1.0
2020-03	SA#87E	SP-200177	0002	-	C	Removing Signalling Based Activation	16.2.0

History

Document history		
V16.2.0	November 2020	Publication