**3GPP TSG-WG SA4 Meeting #117E e-meeting  *S4-220283***

**Elbonia, February 14th – 23rd, 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **26.247** | **CR** | **0169** | **rev** | **1**  | **Current version:** | **16.5.1** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | Add support of per-slice QoE measurement |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | SA4 |
|  |  |
| ***Work item code:*** | NR\_QoE-Core |  | ***Date:*** | 2022-02-08 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | In the LSes from RAN3 (R3-214477, R3-216225), the slice ID is agreed to be added into the QoE reports for per-slice QoE reporting and evalution. Therefore, alignments are needed from the SA4 perspective. |
|  |  |
| ***Summary of change:*** | Add slice id into the QoE reports for QMC based QoE configuration and reporting. |
|  |  |
| ***Consequences if not approved:*** | Per-slice QoE measurements are not supported. |
|  |  |
| ***Clauses affected:*** | 2, 10.6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

# 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 TS 22.233: "Transparent End-to-End Packet-switched Streaming Service; Stage 1".

[2] 3GPP TS 26.233: "Transparent end-to-end Packet-switched Streaming service (PSS); General description".

[3] 3GPP TS 26.234: "Transparent end-to-end packet switched streaming service (PSS); Protocols and codecs".

[4] 3GPP TS 26.244: "Transparent end-to-end packet switched streaming service (PSS); 3GPP file format (3GP)".

[5] 3GPP TS 26.245: "Transparent end-to-end packet switched streaming service (PSS); Timed text format".

[6] 3GPP TS 26.246: "Transparent end-to-end packet switched streaming service (PSS); 3GPP SMIL Language Profile".

[7] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[8] IETF STD 0007: "Transmission Control Protocol", Postel J., September 1981.

[9] IETF RFC 2616: "Hypertext Transfer Protocol – HTTP/1.1", Fielding R. et al., June 1999.

[10] Open Mobile Alliance, Service and Content Protection for Mobile Broadcast Services, Approved Version 1.0, February 2009.

[11] ISO/IEC 14496-12:2012 | 15444-12:2012 "Information technology - Coding of audio-visual objects - Part 12: ISO base media file format" | "Information technology - JPEG 2000 image coding system - Part 12: ISO base media file format".

[12] IETF RFC 2818: "HTTP Over TLS", E. Rescorla, May 2000.

[13] IETF RFC 5646: "Tags for Identifying Languages", A. Phillips, M. Davis, September 2009.

[14] (void)

[15] Open Mobile Alliance: "DRM Content Format V 2.0".

[16] Open Mobile Alliance: "DRM Content Format V 2.1".

[17] IETF RFC 3986: "Uniform Resource Identifiers (URI): Generic Syntax", Berners-Lee T., Fielding R. and Masinter L., January 2005.

[18] IETF RFC 1952: "GZIP file format specification" version 4.3,P. Deutsch, May 1996.

[19] IETF RFC 1738: "Uniform Resource Locators (URL)", December 1994.

[20] (void)

[21] (void)

[22] OMA-ERELD-DM-V1\_2-20070209-A: "Enabler Release Definition for OMA Device
+Management, Approved Version 1.2"

[23] 3GPP TS 33.310: "Network Domain Security (NDS); Authentication Framework (AF)".

[24] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

[25] IETF RFC 2231: "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations".

[26] IETF RFC 6381: "The 'Codecs' and 'Profiles' Parameters for "Bucket" Media Types," August 2011.

[27] Void.

[28] IEEE 1003.1-2008, IEEE Standard for Information Technology - Portable Operating System Interface (POSIX), Base Specifications, Issue 7

[29] IETF RFC 4337, "MIME Type Registration for MPEG-4," March 2006

[30] IETF RFC 3023, "XML Media Types," January 2001.

[31] 3GPP TS 23.203: "Policy and charging control architecture".

[32] 3GPP TS 29.213: "Policy and Charging Control signalling flows and Quality of Service (QoS) parameter mapping".

[33] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[34] void

[35] ITU-T Recommendation H.264 (04/2013): "Advanced video coding for generic audiovisual services".

[36] 3GPP TR 26.946: "Multimedia Broadcast/Multicast Service (MBMS); User service guidelines".

[37] IETF RFC 3629: "UTF-8, a transformation format of ISO 10646," November 2003.

[38] IETF RFC 4288: "Media Type Specifications and Registration Procedures," December 2005.

[39] IETF RFC 4648: "The Base16, Base32, and Base64 Data Encodings," October 2006.

[40] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF", Crocker D. and Overell P., January 2008.

[41] 3GPP TR 26.905: "Mobile stereoscopic 3D video".

[42] 3GPP TS 26.346: " Multimedia Broadcast/Multicast Service (MBMS);Protocols and codecs"

[43] ISO/IEC 23009-1:2020/Amd. 1" Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 1: Media presentation description and segment formats".

[44] ISO/IEC 23009-3 "Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 3: Implementation and Deployment Guidelines".

[45] ISO/IEC 23009-2 " Information technology -- Dynamic adaptive streaming over HTTP (DASH) -- Part 2: Conformance and Reference Software".

[46] 3GPP TR 26.938: "Packet-switched Streaming Service (PSS); Improved support for dynamic adaptive streaming over HTTP in 3GPP".

[47] ISO/IEC 23001-7:2015: "Information technology -- MPEG systems technologies -- Part 7: Common encryption in ISO base media file format files".

[48] IETF RFC 7164, "RTP and Leap Seconds", March 2014.

[49] ITU-T P.1203 (11/2016), "Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport".

[50] ITU-T P.910 (04/2008), "Subjective video quality assessment methods for multimedia applications".

[51] "Mobile Location Protocol (MLP) ", Open Mobile Alliance, OMA-LIF-MLP-V3\_1, Approved Version 3.1 – 20 Sep 2011.

[52] IEEE 1003.1-2008 "IEEE Standard for Information Technology - Portable Operating System Interface (POSIX(R))".

[53] 3GPP TS 25.331 "Radio Resource Control (RRC); Protocol specification".

[54] ISO/IEC 23009-5:2017: "Information Technology — Dynamic adaptive streaming over HTTP (DASH) — Part 5: Server and network assisted DASH (SAND)".

[55] 3GPP TR 26.957: "Study on Server And Network-assisted DASH (SAND) for 3GPP Multimedia Services".

[56] IETF RFC 6455: "The WebSocket Protocol".

[57] 3GPP TS 23.003: "Numbering, addressing and identification".

[58] 3GPP TS 26.116: "Television (TV) over 3GPP services; Video profiles".

[59] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[60] 3GPP TS 26.347: " Multimedia Broadcast/Multicast Service (MBMS); Application Programming Interface and URL".

[61] 3GPP TS 27.007: " Technical Specification Group Core Network and Terminals; AT command set for User Equipment (UE)".

[62] DASH Industry Forum: "DASH Player’s Application Events and Timed Metadata Processing Model and APIs", see under <https://dashif.org/guidelines/>.

[63] 3GPP TS 28.405; "Management of Quality of Experience (QoE) measurement collection; Control and configuration"

[64] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[65] 3GPP TS 26.511: "5G Media Streaming (5GMS); Profiles, codecs and formats".

[66] 3GPP TS 26.512: " 5G Media Streaming (5GMS); Protocols".

[67] ISO/IEC 23000-19: "Information Technology Multimedia Application Format (MPEG-A) – Part 19: Common Media Application Format (CMAF) for segmented media".

[68] DASH Industry Forum – Guidelines for Interoperability: "DASH Low Latency Modes", see <https://dashif.org/guidelines/>.

 [X] 3GPP TS 24.526: " User Equipment (UE) policies for 5G System (5GS); Stage 3".

\* \* \* \* Second change \* \* \* \*

### 10.6.2 Report Format

The QoE report is formatted as an XML document that complies with the following XML schema:

|  |
| --- |
| <?xml version="1.0"?><xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="urn:3gpp:metadata:2011:HSD:receptionreport"xmlns:sup="urn:3gpp:metadata:2016:PSS:SupplementQoEMetric"xmlns:sv="urn:3gpp:metadata:2016:PSS:schemaVersion" xmlns="urn:3gpp:metadata:2011:HSD:receptionreport" elementFormDefault="qualified">  <xs:element name="ReceptionReport" type="ReceptionReportType"/> <xs:complexType name="ReceptionReportType"> <xs:choice> <xs:element name="QoeReport" type="QoeReportType" minOccurs="0" maxOccurs="unbounded"/> <xs:any namespace="##other" processContents="skip" minOccurs="0" maxOccurs="unbounded"/> </xs:choice> <xs:attribute name="contentURI" type="xs:anyURI" use="required"/> <xs:attribute name="clientID" type="xs:string" use="optional"/> </xs:complexType> <xs:complexType name="QoeReportType"> <xs:sequence> <xs:element name="QoeMetric" type="QoeMetricType" minOccurs="1" maxOccurs="unbounded"/> <xs:element ref="sup:supplementQoEMetric" minOccurs="0" maxOccurs="1"/> <xs:element ref="sv:delimiter"/> <xs:any namespace="##other" processContents="skip" minOccurs="0" maxOccurs="unbounded"/> </xs:sequence> <xs:attribute name="periodID" type="xs:string" use="required"/> <xs:attribute name="reportTime" type="xs:dateTime" use="required"/> <xs:attribute name="reportPeriod" type="xs:unsignedInt" use="required"/> <xs:attribute name="qoeReferenceId" type="xs:hexBinary" use="optional"/> <xs:attribute name="recordingSessionId" type="xs:hexBinary" use="optional"/><xs:attribute name="dnn" type="string" use="optional"/> <xs:attribute name=”snssai” type=”unsignedLong” use=”optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="QoeMetricType"> <xs:choice> <xs:element name="HttpList" type="HttpListType"/> <xs:element name="RepSwitchList" type="RepSwitchListType"/> <xs:element name="AvgThroughput" type="AvgThroughputType" maxOccurs="unbounded"/> <xs:element name="InitialPlayoutDelay" type="xs:unsignedInt"/> <xs:element name="BufferLevel" type="BufferLevelType"/> <xs:element name="PlayList" type="PlayListType"/> <xs:element name="MPDInformation" type="MpdInformationType" maxOccurs="unbounded"/> <xs:element name="PlayoutDelayforMediaStartup" type="xs:unsignedInt"/> </xs:choice> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="HttpListType"> <xs:choice> <xs:element name="HttpListEntry" type="HttpListEntryType" maxOccurs="unbounded"/> </xs:choice> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="HttpListEntryType"> <xs:choice> <xs:element name="Trace" type="HttpThroughputTraceType" maxOccurs="unbounded"/> </xs:choice> <xs:attribute name="tcpid" type="xs:unsignedInt" use="optional"/> <xs:attribute name="type" type="ExtensibleHttpEntryResourceType" use="optional"/> <xs:attribute name="url" type="xs:string" use="required"/> <xs:attribute name="actualUrl" type="xs:string" use="optional"/> <xs:attribute name="range" type="xs:string" use="optional"/> <xs:attribute name="trequest" type="xs:dateTime" use="required"/> <xs:attribute name="tresponse" type="xs:dateTime" use="required"/> <xs:attribute name="responsecode" type="xs:unsignedInt" use="optional"/> <xs:attribute name="interval" type="xs:unsignedInt" use="optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:simpleType name="HttpEntryResourceType"> <xs:restriction base="xs:string"> <xs:enumeration value="MPD"/> <xs:enumeration value="MPDDeltaFile"/> <xs:enumeration value="XLinkExpansion"/> <xs:enumeration value="InitializationSegment"/> <xs:enumeration value="IndexSegment"/> <xs:enumeration value="MediaSegment"/> </xs:restriction> </xs:simpleType> <xs:simpleType name="StringPatternType"> <xs:restriction base="xs:string"> <xs:pattern value="x:\S.\*"/> </xs:restriction> </xs:simpleType> <xs:simpleType name="ExtensibleHttpEntryResourceType"> <xs:union memberTypes="HttpEntryResourceType StringPatternType"/> </xs:simpleType> <xs:complexType name="HttpThroughputTraceType"> <xs:attribute name="s" type="xs:dateTime" use="required"/> <xs:attribute name="d" type="xs:unsignedInt" use="required"/> <xs:attribute name="b" type="UnsignedIntVectorType" use="required"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="RepSwitchListType"> <xs:choice> <xs:element name="RepSwitchEvent" type="RepSwitchEventType" maxOccurs="unbounded"/> </xs:choice> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="RepSwitchEventType"> <xs:attribute name="to" type="xs:string" use="required"/> <xs:attribute name="mt" type="xs:duration" use="optional"/> <xs:attribute name="t" type="xs:dateTime" use="optional"/> <xs:attribute name="lto" type="xs:unsignedInt" use="optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="AvgThroughputType"> <xs:attribute name="numBytes" type="xs:unsignedInt" use="required"/> <xs:attribute name="activityTime" type="xs:unsignedInt" use="required"/> <xs:attribute name="t" type="xs:dateTime" use="required"/> <xs:attribute name="duration" type="xs:unsignedInt" use="required"/> <xs:attribute name="accessbearer" type="xs:string" use="optional"/> <xs:attribute name="inactivityType" type="InactivityType" use="optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:simpleType name="InactivityType"> <xs:restriction base="xs:string"> <xs:enumeration value="Pause"/> <xs:enumeration value="BufferControl"/> <xs:enumeration value="Error"/> </xs:restriction> </xs:simpleType> <xs:complexType name="BufferLevelType"> <xs:choice> <xs:element name="BufferLevelEntry" type="BufferLevelEntryType" maxOccurs="unbounded"/> </xs:choice> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="BufferLevelEntryType"> <xs:attribute name="t" type="xs:dateTime" use="required"/> <xs:attribute name="level" type="xs:unsignedInt" use="required"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="PlayListType"> <xs:choice> <xs:element name="Trace" type="PlayListEntryType" maxOccurs="unbounded"/> </xs:choice> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="PlayListEntryType"> <xs:choice> <xs:element name="TraceEntry" type="PlayListTraceEntryType" maxOccurs="unbounded"/> </xs:choice> <xs:attribute name="start" type="xs:dateTime" use="required"/> <xs:attribute name="mstart" type="xs:duration" use="required"/> <xs:attribute name="startType" type="StartType" use="required"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="PlayListTraceEntryType"> <xs:attribute name="representationId" type="xs:string" use="optional"/> <xs:attribute name="subrepLevel" type="xs:unsignedInt" use="optional"/> <xs:attribute name="start" type="xs:dateTime" use="required"/> <xs:attribute name="sstart" type="xs:duration" use="required"/> <xs:attribute name="duration" type="xs:unsignedInt" use="required"/> <xs:attribute name="playbackSpeed" type="xs:double" use="optional"/> <xs:attribute name="stopReason" type="StopReasonType" use="optional"/> <xs:attribute name="stopReasonOther" type="xs:string" use="optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:simpleType name="StartType"> <xs:restriction base="xs:string"> <xs:enumeration value="NewPlayoutRequest"/> <xs:enumeration value="Resume"/> <xs:enumeration value="OtherUserRequest"/> <xs:enumeration value="StartOfMetricsCollectionPeriod"/> </xs:restriction> </xs:simpleType> <xs:simpleType name="StopReasonType"> <xs:restriction base="xs:string"> <xs:enumeration value="RepresentationSwitch"/> <xs:enumeration value="Rebuffering"/> <xs:enumeration value="UserRequest"/> <xs:enumeration value="EndOfPeriod"/> <xs:enumeration value="EndOfContent"/> <xs:enumeration value="EndOfMetricsCollectionPeriod"/> <xs:enumeration value="Failure"/> <xs:enumeration value="Other"/> </xs:restriction> </xs:simpleType> <xs:complexType name="MpdInformationType"> <xs:choice> <xs:element name="Mpdinfo" type="RepresentationType" maxOccurs="unbounded"/> </xs:choice> <xs:attribute name="representationId" type="xs:string" use="required"/> <xs:attribute name="subrepLevel" type="xs:unsignedInt" use="optional"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:complexType name="RepresentationType"> <xs:attribute name="codecs" type="xs:string" use="required"/> <xs:attribute name="bandwidth" type="xs:unsignedInt" use="required"/> <xs:attribute name="qualityRanking" type="xs:unsignedInt" use="optional"/> <xs:attribute name="frameRate" type="xs:double" use="optional"/> <xs:attribute name="width" type="xs:unsignedInt" use="optional"/> <xs:attribute name="height" type="xs:unsignedInt" use="optional"/> <xs:attribute name="mimeType" type="xs:string" use="required"/> <xs:anyAttribute processContents="skip"/> </xs:complexType> <xs:simpleType name="DoubleVectorType"> <xs:list itemType="xs:double"/> </xs:simpleType> <xs:simpleType name="StringVectorType"> <xs:list itemType="xs:string"/> </xs:simpleType> <xs:simpleType name="UnsignedIntVectorType"> <xs:list itemType="xs:unsignedInt"/> </xs:simpleType></xs:schema> |
|  |

The following schema is an extension to allow additional QoE metrics.

<?xml version="1.0" encoding="UTF-8"?>

<xs:schema

 xmlns="urn:3gpp:metadata:2016:PSS:SupplementQoEMetric"

 xmlns:xs="http://www.w3.org/2001/XMLSchema"

 targetNamespace="urn:3gpp:metadata:2016:PSS:SupplementQoEMetric"

 elementFormDefault="qualified">

 <xs:element name="supplementQoEMetric" type="SupplementQoEMetricType"/>

<xs:complexType name="SupplementQoEMetricType">

 <xs:sequence>

 <xs:element name="deviceinformation" type="DeviceInformationType" minOccurs="0"/>

 <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>

 </xs:sequence>
 </xs:complexType>

 <xs:complexType name="DeviceInformationType">
 <xs:choice>
 <xs:element name="Entry" type="DeviceInformationEntryType" maxOccurs="unbounded"/>
 </xs:choice>
 <xs:anyAttribute processContents="skip"/>
 </xs:complexType>

 <xs:complexType name="DeviceInformationEntryType">

 <xs:attribute name="start" type="xs:dateTime" use="required"/>
 <xs:attribute name="mstart" type="xs:duration" use="required"/>
 <xs:attribute name="videoWidth" type="xs:unsignedInt" use="required"/>
 <xs:attribute name="videoHeight" type="xs:unsignedInt" use="required"/>
 <xs:attribute name="screenWidth" type="xs:unsignedInt" use="required"/>
 <xs:attribute name="screenHeight" type="xs:unsignedInt" use="required"/>

 <xs:attribute name="pixelWidth" type="xs:double" use="required"/>
 <xs:attribute name="pixelHeight" type="xs:double" use="required"/>

 <xs:attribute name="fieldOfView" type="xs:double" use="required"/>
 <xs:anyAttribute processContents="skip"/>

 </xs:complexType>

</xs:schema>

<?xml version="1.0" encoding="UTF-8"?>

<xs:schema xmlns="urn:3gpp:metadata:2016:PSS:schemaVersion"

 xmlns:xs="http://www.w3.org/2001/XMLSchema"

 targetNamespace="urn:3gpp:metadata:2016:PSS:schemaVersion"

 elementFormDefault="qualified">

 <xs:element name="schemaVersion" type="xs:unsignedInt"/>

 <xs:element name="delimiter" type="xs:byte"/>

</xs:schema>

Note: If a supplementQoEMetric needs to be sent when no ordinar QoEMetric are due, a dummy MPDInformation metric shall be sent with codecs="none", bandwidth=0, mimeType="none", representationId="none".

Note: If the attribute qoeReferenceId was defined in the QMC configuration (see clause L.2), the value shall be copied into each QoE report, to facilitate network-side correlation (see [63]). If this attribute was defined the attribute recordingSessionId shall also be returned for each QoE report. The recordingSessionId is a two-byte octet defined by the client. It shall remain the same for all QoE reports belonging to the same streaming session, and it should be different for QoE reports belonging to different streaming sessions.

Note: For QMC scheme, the DASH client should include the S-NSSAI and DNN that correspond to the report data for support of per-slice QoE reporting and evaluation in OAM. This information may be retrieved via the AT Command +CGDCONT [61]) or the specific traffic mapping with URSP rule[X].

\* \* \* \* End of changes \* \* \* \*