

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Y.3109

(04/2021)

SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS,
NEXT-GENERATION NETWORKS, INTERNET OF
THINGS AND SMART CITIES

Future networks

Quality of service assurance-related requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020

Recommendation ITU-T Y.3109

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Recommendation ITU-T Y.3109

Quality of service assurance-related requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020

Summary

Recommendation ITU-T Y.3109 specifies quality of service (QoS) assurance-related requirements and a framework for virtual reality (VR) delivery using mobile edge computing (MEC) in International Mobile Telecommunications-2020 (IMT-2020).

Recommendation ITU-T Y.3109 first provides an introduction to VR delivery using MEC supported by IMT-2020. It then specifies QoS assurance-related function and mechanism requirements and a framework. The QoS planning for VR services, typical VR user cases and guidelines for deployments of VR services are described in appendices.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T Y.3109	2021-04-06	13	11.1002/1000/14396

Keywords

Framework, IMT-2020, mobile edge computing, QoS assurance-related, requirements, virtual reality.

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

FOREWORD

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Recommendation ITU-T Y.3109

Quality of service assurance-related requirements and framework for virtual reality delivery using mobile edge computing supported by IMT-2020

1 Scope

This Recommendation specifies quality of service (QoS) assurance-related requirements and a framework for virtual reality (VR) delivery using mobile edge computing (MEC) supported by International Mobile Telecommunications-2020 (IMT-2020). It summarizes the QoS assurance-related function and mechanism requirements for VR cloud, VR edge, VR client, VR QoS management and control. A high level framework of VR delivery using MEC supported by IMT-2020 is given to assist the understanding of VR QoS assurance-related functions and mechanisms.

This Recommendation refers to MEC only in the context of VR delivery. Therefore, any other use of MEC lies outside the scope of this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T E.860] Recommendation ITU-T E.860 (2002), *Framework of a service level agreement*.
- [ITU-T F.743.10] Recommendation ITU-T F.743.10 (2019), *Requirements for mobile edge computing-enabled content delivery networks*.
- [ITU-T G.1035] Recommendation ITU-T G.1035 (2020), *Influencing factors on quality of experience for virtual reality services*.
- [ITU-T H.264] Recommendation ITU-T H.264 (2019), *Advanced video coding for generic audiovisual services*.
- [ITU-T H.265] Recommendation ITU-T H.265 (2019), *High efficiency video coding*.
- [ITU-T H.266] Recommendation ITU-T H.266 (2020), *Versatile video coding*.
- [ITU-T Y.3102] Recommendation ITU-T Y.3102 (2018), *Framework of the IMT-2020 network*.
- [ITU-T Y.3104] Recommendation ITU-T Y.3104 (2018), *Architecture of the IMT-2020 network*.
- [ITU-T Y.3106] Recommendation ITU-T Y.3106 (2019), *Quality of service functional requirements for the IMT-2020 network*.
- [ITU-T Y.3107] Recommendation ITU-T Y.3107 (2019), *Functional architecture for QoS assurance management in the IMT-2020 network*.



3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 assurance [b-ITU-T X.1500]: The degree of confidence that the process or deliverable meets defined characteristics or objectives.

3.1.2 degree of freedom (DoF) [ITU-T G.1035]: Represents the ways an object can move within a space, which is a key element in helping create the immersive environment for a user.

3.1.3 IMT-2020 [b-ITU-T Y.3100]: Systems, system components, and related aspects that support to provide far more enhanced capabilities than those described in [b-ITU-R M.1645].

NOTE 1 – [b-ITU-R M.1645] defines the framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000 for the radio access network.

NOTE 2 – This definition is based on [b-ITU-R M.2083-0].

3.1.4 mobile edge computing [ITU-T F.743.10]: System which provides an IT service environment and cloud-computing capabilities at the edge of an access network which contains one or more type of access technology, and in close proximity to devices.

NOTE – Based on the definition of multi-access edge computing in [b-ETSI GS MEC 001].

3.1.5 motion-to-photon latency [ITU-T G.1035]: The time it takes between the user moving their head and this motion being reflected on the screen of the head-mounted display (HMD).

NOTE – Definition based on [b-Brandenburg].

3.1.6 network performance [b-ITU-T E.417]: The performance of a portion of a telecommunications network that is measured between a pair of network-user or network-network interfaces using objectively defined and observed performance parameters.

3.1.7 quality of experience (QoE) [b-ITU-T P.10]: The degree of delight or annoyance of the user of an application or service.

NOTE – Recognizing on-going research on this topic, this is a working definition which is expected to evolve for some time. (This note is not part of the definition.)

3.1.8 quality of service (QoS) [b-ITU-T P.10]: The totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service (see [b-ITU-T E.800]).

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 quality of service assurance: Functionalities or mechanisms that enable service providers to make statements with a degree of confidence that the service meets the quality characteristics or objectives specified elsewhere.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

3D	three Dimensional
AF	Application Function
AN	Access Network
ASF	Authentication Server Function
CDN	Content Delivery Network