



5G;
Typical traffic characteristics of media services
on 3GPP networks
(3GPP TR 26.925 version 17.1.0 Release 17)

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- | | |
|------------------|---|
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| shall not | indicates an interdiction (prohibition) to do something |

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- | | |
|-------------------|--|
| should | indicates a recommendation to do something |
| should not | indicates a recommendation not to do something |
| may | indicates permission to do something |
| need not | indicates permission not to do something |

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- | | |
|---------------|--|
| can | indicates that something is possible |
| cannot | indicates that something is impossible |

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- | | |
|-----------------|--|
| will | indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document |
| will not | indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document |
| might | indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document |

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

Introduction

The document presents typical media traffic characteristics (including bandwidth and latency requirements) that are of importance for 3GPP standardization work. This includes demands based on current services, but also expectations for new services or emerging services, considering developments in the industry in terms of efficiency improvements.

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1 Scope

The present document includes following information:

- Media centric Third-Party and Operator services currently deployed or expected to be deployed until 2025 on 3GPP defined 4G and 5G networks.
- Typical deployment characteristics today, such as bandwidth requirements, client buffered and rate adaptation reception characteristics, codecs, protocols in use and latency requirements.
- An overview on technological developments for existing and emerging services and their impact on typical traffic characteristics of media services, e.g. evolution of compression technologies, new demands for high quality, new experiences, etc.
- A summary on typical characteristics and requirements for different media services on 3GPP networks.
- An identification of the applicability of existing 5QIs for such services and potentially identify requirements for new 5QIs or QoS related parameters.

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.
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- <https://standards.iteh.ai/catalog/standards/sist/69b05d72-96fa-4d76-a82e-0d8efbe9bdba/etsi-tr-126-925-v17-1-0-2022-04>
- [ETSI TR 126 925 V17.1.0 \(2022-04\)](https://standards.iteh.ai/catalog/standards/sist/69b05d72-96fa-4d76-a82e-0d8efbe9bdba/etsi-tr-126-925-v17-1-0-2022-04)
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 - [2] 3GPP TS 26.234: "Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs".
 - [3] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".
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3 Definitions of terms, symbols and abbreviations

3.1 Terms

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].

360 VR: Virtual Reality 360° video and 3D audio content.

720p: a video with an image resolution of 1 280 × 720 pixels.

4K UHD: a video with an image resolution of 3 840 x 2 160 pixels a.k.a. 2160p.

8K UHD: a video with an image resolution of 7680 x 4 320 pixels a.k.a. 4320p.

3.2 Symbols

Void.

3.3 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].

A/V	Audio/Visual
FFS	For Further Study
HD	High Definition
PSS	Packet Switched Streaming
STB	Set-Top-Box
TV	Television
UHD	Ultra High Definition
VR	Virtual Reality

4 Media centric Third-Party and Operator services

4.1 A/V Streaming - Enhanced TV

Live and on-demand audio-visual streaming and enhanced TV services are considered according to 3GPP PSS [2], 3GP-DASH [3], MBMS [4], 5G Media Streaming for downlink [45] and the media profiles in TS 26.116 [5].

4.2 VR 360° Streaming

Live and on-demand VR 360° streaming are considered according to 3GPP PSS [2], 3GP-DASH [3], MBMS [4], 5G Media Streaming [45] and the media profiles in TS 26.118 [6].

4.3 Conversational Multimedia Telephony and Telepresence

Conversational Multimedia Telephony and Telepresence are considered according to MTSI [7] and IMS Telepresence [8].

4.4 Live uplink A/V streaming

Professional and consumer live uplink streaming contribution of A/V content are considered according to FLUS [11] and 5G Media Streaming for uplink [45].

4.5 Cloud gaming

Cloud gaming (a.k.a. game streaming) implies that, while the game is being played by a user on a UE or on a device attached to a UE, game processing and rendering is totally or partly performed in a network entity, potentially at the edge of the network. The traffic typically consists of uplink and downlink game status/control information traffic between a client and a server and of downlink streaming of rendered and encoded 2D or VR360 video.

4.6 XR Media Services

For details on XR Services including AR and VR, refer to 3GPP TR 26.928 [30].

5 Typical current deployment characteristics

5.1 Typical streaming/broadcast video and audio bitrates

These figures are valid for both HDR/non-HDR video:

- 720p HD: 2 - 5 Mbps

NOTE 1: Today typically 3 Mbps for HEVC [15] and 5Mbps for AVC [14], but bitrate reductions expected with better encoding and coding tools. See Clause 6.1.2.

- Full HD: 3 - 12 Mbps

NOTE 2: Today typically 5-7 Mbps for HEVC [15] and 10-12 Mbps for AVC [14], but bitrate reductions expected with better encoding and coding tools. See Clause 6.1.2 as well as TR 26.955 [46].

- 4k UHD: 5- 25Mbps

NOTE 3: Today typically 8-16 Mbps for HEVC [15] and 15-25 Mbps for AVC [14], but bitrate reductions expected with better encoding and coding tools. See Clause 6.1.2 as well as TR 26.955 [46].

- 8k UHD: 25 - 80 Mbps

NOTE 4: Initially up to 80 Mbps for HEVC [15], but bitrate reductions expected with better encoding and coding tools. More advances with new codecs are expected. See Clause 6.1.2.

These figures apply for audio:

- Normal quality audio: mono/stereo: 24-48 kbps
- High quality audio: mono/stereo/immersive 24-512 kbps
- Extreme quality audio: mono/stereo/immersive 512 kbps

5.2 Typical streaming/broadcast 360 VR bitrates

The following bitrates apply for streaming/broadcast 360 VR.

- Basic 360 VR: 2.5 - 25 Mbps

NOTE 1: For viewport agnostic, the 4k UHD numbers as defined in clause 5.1 apply. For viewport dependent, the bitrates likely can be reduced to half.- According to [44], with HEVC at 1080p@30fps between 2.5 - 5 Mbps on average with caps at 5 – 8 Mbps.

- HD 360 VR: 10 - 80 Mbps

NOTE 2: For viewport agnostic, the 8k UHD numbers as defined in clause 5.1 apply. For viewport dependent, the bitrates likely can be reduced to half.

- According to [44], with HEVC at 4K@30fps between 10 - 18 Mbps on average with caps between 15 – 25 Mbps.

- Retinal VR: 15 - 150 MbpsNOTE 3: For viewport agnostic, the 8k UHD numbers multiplied by 4 as defined in clause 5.1 apply. For viewport dependent, the bitrates likely can be reduced to half or even on third.

- According to [44], with HEVC at 8K@30fps between 30 - 35 Mbps on average with caps at 42 Mbps.

NOTE 4 on framerates: cinema content is usually captured and distributed at 24 fps. TV content is usually captured and distributed at 50 or 60 fps depending on the region. The above video bitrates include frame rates of up to 60fps.