3GPP TSG SA WG-4 Meeting #132 S4-250776

Fukuoka, Japan, May 19 – 23 2025 In revision of S4-250553

**Source: Huawei, HiSilicon**

**Title: New SID on Characterization and Identification of Dynamically Changing Traffic Characteristics in Media Applications and Services**

**Document for: Agreement**

**Agenda Item: 17.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Characterization and Identification of Dynamically Changing Traffic Characteristics in Media Applications and Services

Acronym: FS\_Dynamic\_Traffic\_MED

Unique identifier: xxxx

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-20

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x |  |  |  |
| No |  |  | x | x | x |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a study

|  |  |
| --- | --- |
| x | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

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| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| N/A |  |  |  |

### 2.3 Other related Work Items and dependencies

FS\_XRTraffic defined traffic models and quality evaluation methods for media and XR Services in the 5G Network (see TR 26.926). FS\_TyTrac studied Typical Traffic Characteristics of Media Services, and defined the generic traffic characteristics such as bit-rate, file format and provides a summary of the work in 3GPP on QoS (see TR 26.925). Neither documents present a study on dynamically changing traffic characteristics in common media applications and services with a link to exploiting them using the features available in the 5GS that support this.

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| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 870013 | FS\_XRTraffic | Modelling and evaluation of end to end XR services in 5G network |
| 810005 | FS\_TyTrac | Defines the basic (aggregate) traffic characteristics such as bit-rate media format etc. for XR services |
| 1030000 | FS\_5G\_RTP\_PH2 | Studied some of the dynamically changing traffic characteristics for the case of RTP |
| 960046 | 5G\_RTP | Defined some of the user plane signaling for dynamic traffic characteristics in RTP |

# 3 Justification

Additional support for transmission of content with QoS for dynamically changing traffic characteristics was added to the 5G System, see Table 1 for an overview of these features from TS 23.501 for dynamically changing traffic characteristics.

Table 1 5GS QoS features from 23.501 for dynamically changing traffic characteristics available

|  |  |  |
| --- | --- | --- |
| **Feature** | **Reference** | Benefit |
| a) Data Burst Size | 23.501 clause 5.37.10.1 | Exploit data burst for improved scheduling of the transmission |
| b) Time To Next Burst | 23.501 clause 5.37.10.2 | Exploit time to next burst for improved transmission and resource saving |
| c) Expedited data transfer with reflective QoS | 23.501 clause 5.37.10.3  | Improve data transmission by using alternative QoS enabling expedited data transfer |
| d) End of Data Burst indication | 23.501 clause 5.37.8.2 | Improved power saving and potentially improved transmission |
| e) policy for multi-modal service | 23.501 clause 5.37.2 | Policy for multi-modal services |

Both XR and Non-XR Media applications and services can benefit from these features, but support and understanding of their usage in media workflows is currently limited. The detection and identification of such dynamically changing traffic characteristics is not well understood and documented for media applications and services. Therefore, 3GPP SA4 should provide additional support for enabling these features in different media applications and services and study how and if these features can provide benefits.

NOTE: Work on PDU Set Based Handling and End of Data Burst indication was already done in Release 18, the aim of this study is on additional guidelines for using these features in media applications and services based on the type of dynamically changing traffic characteristics that originate from these applications and services beyond the PDU Set Based QoS handling feature.

Some examples of how the UE or Network features from Table 1 related to dynamically changing traffic characteristics can benefit media services and applications are given as follows:

1. Variable bit-rate support in encoders using expedited data transfer, i.e. (c) from Table 1
2. Exploiting time to next burst ((b) from Table 1) in live and video on demand or live streaming scenarios.
3. Exploiting data burst size indication in real time communication services, i.e (a) and (d) from Table 1
4. Supporting a-periodic media streams with high burst frequency, low burst data volume exploiting the data burst feature, i.e (a) from Table 1.
5. Supporting aspects related to multi-modality and relationships between streams can be studied and the related support in the 3GPP network as to improve QoS and QoE framework for multi-modal applications, including (e) from Table 1.

In addition, dynamically changing traffic characteristics occurring in relevant scenarios will be documented and the test framework/setup to obtain these results as well. Further characterization and identification can be useful for subsequent normative work. Such normative work could result in:

* Specification of the dynamically changing traffic characteristics and their link to features from 23.501 in Table 1.
* Updates to related 3GPP SA 4 specifications in the context of media applications and services.
* Signalling to support dynamically changing traffic characteristics.
* Additional improvements to QoE and QoS frameworks.

Current SA4 reports on dynamic traffic characteristics focus on stationary characteristics such as aggregate bit-rate, protocol format, resolution. For meaningful usage of features from Table 1 non-stationary dynamically changing traffic characteristics also need to be taken into account.

These aspects are relevant for both low-bitrate and high bit-rate applications. For example, in the Study of haptic media, traffic characteristic evaluation has highlighted that the bit-stream includes larger bursts but overall, it has a very low bandwidth. In AR/VR services animation and/or pose streams may have irregular trafficpattern with low bitrate and burst characteristics. In high bit-rate conversations and XR streams patterns of data busts and aperiodicity have also been identified in 5G RTP Ph2 and FS\_XR\_Traffic. The test setup and framework can also be used to extend these studies with additional behavior of these media applications and services.

# 4 Objective

The objectives are:

1. Identify common media application and service scenarios, that may exhibit dynamically changing traffic characteristics such as:
	1. Real-Time Communication for conversational, XR and/or gaming applications and services.
	2. Video on demand streaming and progressive download
	3. Live Streaming
	4. Short form video download
	5. Optionally, other potential relevant media services (e.g. AI model delivery for media services, graphics delivery, AI inference media data used for inference).
2. Develop test setups and a framework to evaluate these scenarios (based on 3GPP specifications or configuration or industry best practices). The framework and test setups will collect network traffic traces in real network and emulated network conditions with loss/delay impairments possibly corresponding to 3GPP 5QI configurations. Also the framework/test setup will give some quality indications in some of these cases. The test setups and framework will be documented to enable reproducing similar experiments. The tests will be based on real and existing implementations and possible network emulation.
3. Characterize and document dynamically changing traffic characteristics observed in these scenarios, and relate them to QoS related features in the 3GPP system if available (e.g. see Table 1) when possible.
4. Develop call flows for the different scenarios exploiting features available in the 5G System from Table 1.

NOTE: This can be based on 5GMS or RTC architectures available in SA4.

1. Develop potential normative identification of dynamically changing traffic characteristics:
	1. Define the dynamically changing traffic characteristics for the selected media applications and services and potentially link them to features in the 5G system e.g. as defined Table 1.
	2. Explore other relevant cases of signaling such characteristics in media related work flows, for example in the 3GPP file format or ISO BMFF file format to assist intended use cases if needed.
	3. Document possible QoE and QoS framework improvements for single or multi-modal streams. For example, the matching of QoS to dynamic traffic pattern characteristics may be different from current QoS features supported.
	4. Optionally develop stage 2 requirements for related architectures such as 5GMS or RTC when needed for enabling usage of QoS and dynamically changing traffic characteristics.
2. Inform other working groups as needed both inside and outside of 3GPP
3. Identify normative work.

# 5 Expected Output and Time scale

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| --- |
| New specifications  |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| TR 26.xxx |  | Characterization and Identification of dynamically changing traffic characteristics in media applications and services | SA#111 (Mar ´26) | *SA#112*(June ´26) | TBD |

|  |
| --- |
| Impacted existing TS/TR  |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TR 26.926 | Additional information on dynamically changing traffic characteristics | SA#112 (June ’26) | Add additional updates and finding of this study to report 26.926 |
| TR 26.925 | Additional information about dynamically changing traffic characteristics | SA#112(June ’26) | Add additional updates and finding of this study to report 26.925 |
| *TR 26.822* | *Study on 5G Real-time Transport Protocol Configurations, Phase 2* | *SA#112 (June ’26)* | *Optional in case there are updates relating to 5G RTP* |

# 6 Work item Rapporteur(s)

*Rufael Mekuria Rufael.mekuria@huawei.com*

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

*SA2 on possible architectural aspects and signaling*

*RAN 2 on optional clarification of* RAN 2 related features

*MPEG/IETF* for potential format related issues

# 9 Supporting Individual Members

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| Supporting IM name |
| Huawei |
| HiSilicon |
| Interdigital |
| Peng Cheng Laboratory |
| Meta |
| CMCC |
| CATT |