**3GPP TSG- Meeting #**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network |  | Core Network |  |

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| ***Title:*** | New clause 5.X QUIC-based Media Delivery | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | FS\_AMD includes a new topic about opportunities with QUIC for segmented streaming (topic “m)”). After updating the clause on HTTP/3 (clause 5.4) of TR 26.804 with up-to-date information since some parts are common to the new topic, we introduce a new section with QUIC-specific media delivery aspects. | | | | | | | | |
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| ***Summary of change:*** | | The following changes are proposed:   * Add clause X.X QUIC-based Media Delivery | | | | | | | | |
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| ***Consequences if not approved:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

Change #1

5.X QUIC-based media delivery

5.X.1 Description

5.X.1.1 General

QUIC is a transport protocol built on top of UDP [32]. It is widely available and its impact on media streaming requires further study. In this clause we study QUIC-specific media streaming, not necessarily based on HTTP/3 that is studied in clause 5.4.

A QUIC client establishes a connection with a server, and within this connection can transport data through multiple streams. A QUIC connection is established faster than a TCP + TLS connection, therefore reducing initialization time. Additionally, by allowing logical streams to be multiplexed into a single QUIC connection, they can run independently of each other, each with its own separate congestion windowand because QUIC is layered on top of UDP [32], a stall in one stream does not block progress in any others. Similarly, packet loss in one logical stream does not affect the progress of data transfer in other streams multiplexed in the same QUIC connection. Finally, QUIC, like HTTP/2 [4], supports prioritisation capabilities at a stream level.

Editor's Note: Further content to be provided.

5.X.2 Collaboration scenarios

Editor's Note: Further content to be provided - in TDoc S4-241571.

5.X.3 Architecture mapping

5.X.3.1 General

Editor's Note: Mapping against 4.1.2 Generalized Media Delivery architecture of TS26.501 [15] is to be provided.

5.X.4 High-level call flow

5.X.4.1 General

Editor's Note: Further content to be provided.

5.X.5 Gap analysis and requirements

5.X.5.1 Introduction

Even though QUIC solves many issues compared to TCP (and HTTP/3 compared to HTTP/2 respectively), there are some open issues and shortcomings when it comes to media content delivery.

5.X.5.2 QUIC API

Typically access to QUIC is mediated through a QUIC-enabled application protocol such as HTTP/3 [5] or WebTransport [105]. For that reason, the set of QUIC features available to an application is the subset exposed by the chosen application protocol (typically invoked via a library API). This approach facilitates efficient application development and integration of new features but at the cost of limiting management of the connections and streams.

5.X.5.3 Stream prioritization

Even though QUIC supports prioritisation at a stream level, the way this prioritisation is applied is not standardised and it is left to implementation. Additionally, stream priority is nominated by the sender, and as such neither the network nor the recipient are aware of the applied mechanism.

5.X.5.4 Connection and stream management

Since most applications use QUIC because they are using HTTP/3, the mechanism for handling connections and streams are opaque and the application does not have control over them [106]. The alternative to HTTP/3, i.e. using WebTransport allows management of connections and streams without however being studied in the context of segmented media delivery [105].

Editor's Note: Further content to be provided.

5.X.6 Candidate Solutions

Editor’s Note: Provide candidate solutions (including call flows) for each of the identified issues.

5.X.7 Summary and Conclusions

The study of this Key Issue has explored the ways in which QUIC can be deployed to support the 5G Media Streaming architecture, and the potential open issues arising from this deployment.

Editor's Note: Further content to be provided.

END OF CHANGE #1

Change #2

[105] W3C Working Draft: "WebTransport", [https://www.w3.org/TR/webtransport/#web-transport](https://www.w3.org/TR/webtransport/%23web-transport), May 2024

[106] IETF RFC 9114: "HTTP/3", June 2022.

END OF CHANGE #2

Change #3

[2] Akamai Blog, "A QUICk Introduction to HTTP/3", April 2020, <https://www.akamai.com/blog/developers/a-quick-introduction-http3>

END OF CHANGES