**F3GPP TSG SA WG4 113-e *S4-210478***

**06-14 April 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **Pseudo CHANGE REQUEST** | | | | | | | | |
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|  | **26.804** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **0.1.1** |  |
|  | | | | | | | | |
| *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 | **X** |

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| ***Title:*** | [FS\_5GMS-EXT] Updated text for Content Preparation | | | | | | | | | |
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| ***Source to WG:*** | Tencent | | | | | | | | | |
| ***Source to TSG:*** | SA4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_5GMS-EXT | | | | |  | ***Date:*** | | | 2021-01-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | The study item description identifies the key topic “Content Preparation”. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding potential open issues. | | | | | | | | |
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| ***Consequences if not approved:*** | | Key topic not addressed | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
| ***56*** | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**===== CHANGE =====**

### 5.2.7 Potential open issues

5.2.7.1 TS 26.512 current supportTS 26.512 section 7.6.3.1 defines the content hosting configuration resource. The partial table is shown below:

Table 5.2.7.1: Definition of ContentHostingConfiguration resource

| Property name | Data Type | Cardinality | Description |
| --- | --- | --- | --- |
| name | String | 1..1 | A name for this Content Hosting Configuration. |
| IngestConfiguration | Object | 1..1 | Describes the 5GMSd Application Provider's origin server from which media resources will be ingested via interface M2d. |
| path | String | 1..1 | The relative path which will be used to address the media resources at interface M2d.  This path is provided by the 5GMSd AF in the case of Push-based ingest. |
| pull | Boolean | 1..1 | Indicates whether to the 5GMSd AS shall use Pull or Push for ingesting the content. |
| protocol | URI String | 1..1 | A fully-qualified term identifier allocated in the name space urn:3gpp:5gms:content-protocol that identifies the content ingest protocol.  The set of supported protocols is defined in clause 8. |
| entryPoint | String | 1..1 | An entry point to ingest the content. The semantics of the entry point are dependent on the selected ingest protocol.  In the case of Push ingest (pull flag is set to False), this parameter is returned by the 5GMSd AF to the 5GMSd Application Provider and indicates the entry point for pushing the content.  In case of Pull (pull flag is set to True), the entryPoint shall be provided to the 5GMSd AF to indicate the location from which content is to be pulled. In this case, the *entryPoint* shall be used as the base URL. A request received by the 5GMSd AS is mapped to a URL using the provided base URL to fetch the content from the origin server. |
| DistributionConfigurations | Array(Object) | 1..1 | Specifies the distribution method and configuration for the ingested content.  More than one distribution may be configured for the ingested content, e.g. to offer different distribution configurations such as DASH and HLS. |
| contentPreparationTemplateId | String | 0..1 | Indicates that content preparation prior to distribution is requested by the 5GMSd Application Provider. It identifies the Content Preparation Template that shall be used as defined in clause 7.4 |
| canonicalDomainName | String | 1..1 | All resources of the current distribution shall be accessible through this default FQDN assigned by the 5GMSd AF. |

As is shown in this table, the IngestConfiguration defines the input format for the content preparation. Currently, two protocols are supported: HTTP pull-based ingest and DASH-IF push-based (TS 26.512 clause 8.2). In the case of HTTP pull, if a request is received in M4d that can’t be satisfied, an HTTP pull request is made through M2.

### 5.2.7.2 Open issues in collaboration scenario 1: Content preparation before downlink streaming

##### Open issue 1: Support of other protocols

The current specification only supports HTTP pull and DASH-IF ingest. Other protocols may need to be added.

##### Open issue 2: HTTP Pull request through M2

In the case where a Content Preparation Template exists, the URL rewrite process must be modified to address more complex use-cases:

1. When a simple rewrite of path is not adequate due to complex content preparation process, and it requires more complex algorithm to calculate the requesting UR.

2. When the content preparation process requires more than one input. Then the reverse address mapping requires two or more address calculations.

3. When (and if) the content preparation process can be cascaded.

##### Open issue 3: Multiple inputs for the Content Preparation Template

Following the call flow of section 5.2.6.1 the following steps are needed:

1. Provisioning.

2. Creating Content Preparation Template (CPT).

3. Creating Content Hosting Configuration .

Each Content Hosting Configuration may include one or more Distribution Configuration, each one with an optional Content Preparation Template. However, the Content Hosting Configuration is currently allowed to include only one Ingest Configuration. Therefore, with the current design, any Contentn Preparation Template may have multiple outputs but only one input.

The following figure shows the current support of content distribution by TS26.512:

M2d

Distribution 1

Distribution 2

Distribution 3

MPD

M2d

Address translation

1

Address translation

2

Address translation

3

Media Segment

Pull

Media SegmentPull

Media SegmentPull

Media SegmentPull

Figure 5.2.7.2-0: Example of media distribution by pull in the current TS26.512

If the content is pushed to the distribution and content preparation is required, then the content preparation has multiple inputs. For example if the inputs are 3 camera videos that the pictures much be stitched together before encoding in multi-rate, then the process looks like the following figure:

M2d

Content Preparation

(stitching + mutli-rate encoding)

Distribution

M2d

Address translation

1

Address translation

2

Address translation

3

Media Segment

Pull

Media SegmentPull

Video 1

Video 2

Video 3

Figure 5.2.7.2-01: Example of the need for multiple address translation due to multiple inputs

If the content needs to be encoded in different formats, then the stitching can be shared among two process:

M2d

Content Preparation 1

(stitching)

Distribution

Video 1

Video 2

Video 3

Content Preparation 2

(HEVC encoding)

Distribution

Content Preparation 3

(VVC encoding)

Figure 5.2.7.2-02: Example of cascading content preparations

##### Open issue 4: Content Preparation Template information

TS 26.512 only mentions that the format of the Contentn Preparation Template is identified by its MIME type. At least one format needs to be defined for the instruction in Content Preparation Template for common services such as multi-rate streaming.

### 5.2.7.2 Open issues in collaboration scenario 2: content preparation after uplink streaming

In addition of the above issues of collaboration scenario 1, the following issues may be considered.

In this case, the content is delivered to the 5GMSu Application Provider through M2u.

##### Open issue 5: Egest protocols

TS 26.512 Table 8.1-1 defines the ingest protocols at M2d. But the egest protocols for M2u are not defined. One possibility is use already defined ingest protocols also as possible egest protocols. However it must be investigated whether the current definitions of these protocols are adequate for egest.

Editor’s Note: We recommend addressing this issue in uplink streaming topic of this study.

##### Open issue 6: Egest Configuration

TS 26.512 Content Hosting Configuration resource defines an Ingest Configuration. It is not clear whether the same resource can be used for Egest configuration and whether the parameters are adequate.

Editor’s Note: We recommend addressing this issue in uplink streaming topic of this study.

### 5.2.7.2 Open issues in collaboration scenario 3: content prepraration between uplink and downlink

Since both uplink and downlink is used, the following issues should be considered.

##### Open issue 7: Signalling the connection between the uplink and downlink

Assuming the previous issues are addressed, then the Content Hosting Configuration resource for uplink and downlink would be separately used in M1u and M1d. The uplink Content Hosting Configuration’s egest configuration should be aligned with the downlink Content Hosting Configuration’s ingest configuration as is shown in the following figure.

The following issues must be addressed:

1. Is the protocol left to the network operator and only direct connection between two Application Servers signaled?

2. Is any (optional) standard protocol needed for the connection? If so, which protocols?

3. Are the current Ingest Configuration’s (and its counterpart for Egest) parameters adequate for setting up the connection between uplink and downlink?

4. Do the connection configuration and 5GMS Application Server’s addresses need to be hidden from the 5GMS Application Provider?