**3GPP TSG- SA4 Meeting #119e *S4-220693***

**Electronic Meeting, 11th to 20th May 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **Psuedo CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.517** | **CR** |  | **rev** | **-** | **Current version:** | **1.1.0** |  |
|  | | | | | | | | |
| *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:*** | [5MBP3]: Clause 6: Object Delivery Method | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson LM | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5MBUSA | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This pCR focuses on corrections and additions around Object Delivery Method. | | | | | | | | |
|  | |  | | | | | | | | |
| ***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:*** | |  | | | | | | | | |

\*\*\*\* First Change \*\*\*\*

# 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.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[4] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[5] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[6] 3GPP TS 26.502: "5G multicast–broadcast services; User Service architecture".

[7] 3GPP TS 26.346: “MBMS; Protocols and Codecs".

[8] IETF RFC 8866: "Session Description Protocol".

[9] W3C: "XML Schema Part 2: Datatypes".

[10] 3GPP TS 23.003: "Numbering, addressing and identification".

[11] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[12] IETF RFC 3926: "FLUTE - File Delivery over Unidirectional Transport".

[13] IETF RFC 2616: "Hypertext Transfer Protocol -- HTTP/1.1".

# 6 Object Delivery Method

Editor’s Note:

1. Specify the stage 3 protocols for the MBS distribution methods (between MBSTF and MBS Client) based on existing MBMS delivery methods.
   1. Object distribution method, based on or reference to clause 7 of TS 26.346.
2. Agreements per S4-220023
3. Object delivery Method that includes:
   1. Download delivery method, File Delivery as defined in TS 26.346, clause 7.
   2. DASH/HLS over MBMS as defined in TS 26.346, clause 5.6 and 5.7.
4. For the object delivery method, it is proposed to differentiate two different cases.
   1. Non-real-time file delivery including Carouselling
      1. Selected properties of this mode include
         1. Scheduled delivery
         2. File repair
         3. Carousel (for example supporting functionalities defined in DSM-CC)
         4. Post-delivery reporting
         5. File delivery QoS
         6. Usage of FEC for file delivery
         7. Support of single large file distribution
      2. On stage-3 it is expected that we use FLUTE as defined in TS 26.346 with the following proposal:
         1. Upgrade to the latest version of ALC, FLUTE and LCT
         2. Keep a legacy version
         3. Profile/remove any non-used functionalities based on MBMS Download Profile in TS 26.346, Annex L.4
   2. Object Streaming addressing DASH/HLS
      1. Selected properties of this mode include
         1. Timed delivery
         2. Object deadline that is relevant for proper application operation.
         3. Concurrent metrics reporting
         4. Usage of FEC for object delivery
         5. Sequence of multiple objects
         6. Possibly multiple flows
         7. Limited size
         8. Partial objects
      2. Enhancements are needed beyond the existing FLUTE.
         1. Resolve and address object timing model (stage-3).

## 6.1 General

## 6.2 Usage of FLUTE for Object Distribution Method

### 6.2.1 General

If FLUTE is used to realise the Object Distribution Method, then the MBS Distribution Session shall conform to the MBMS Download Profile as defined in clause L.4 of TS 26.346 [7] with the additional requirements in this clause 6.2.

The MBS Distribution Session shall be provisioned to accommodate the bit rate of the aggregated object flow during the course of the session, accounting for in-band carriage of metadata units, protocol header overheads, and FEC redundancy (if configured).

The usage of this distribution method is identified in the MBS Session Description metadata unit as defined in clause 6.2.3, in particular by the indication of the protocol being FLUTE/UDP.

The MBSTF shall use the Profiled FDT Schema according to clause L.6 of TS 26.346 [7] to describe the object list currently being transmitted in the MBS Distribution Session.

Clause L.4 of TS 26.346 [7] defines a set of FDT Instance elements and attributes for use with the MBS Object Distribution Method.

Generally, the end of transmission of an object is the expiry time for the latest FDT instance describing the object. Objects shall be described in an FDT instance with the Expires attribute. Depending on the operating mode (clause 6.2.4), different settings of the expiry time and different numbers of objects per FDT instance are recommended.

The addition of the Content-MD5 and File-ETag FDT instance attributes is optional. The File-ETag represents the value of the Etag (entity-tag) as defined in RFC 2616 [13] which mays also serve as the version identifier of the File object described by the FDT Instance.

NOTE

### 6.2.3 Session Description metadata unit

#### 6.2.3.1 General

The Session Description metadata unit contains the needed information to activate the reception of an Object Distribution Method. The Session Description metadata unit is formatted according to the Session Description Protocol [8]. The Session Description metadata unit for the Object Distribution Method is based on the Session Description parameters as defined in clause 7.3 of TS 26.346 [7] with the following restrictions and extensions.

Restrictions:

- The *Mode of MBMS bearer per media* parameter (clause 7.3.2.7 of [7]) shall not be used.

- The *QoE Metrics* (as defined in clauses 7.3.2.0 of [7]) shall not be used

- The *Service-language(s) per media* (clause 7.3.2.9 of [7]) shall not be used. It is assumed that the service languages are described within an application manifest.

- The *Alternative TMGI* (clause 7.3.2.12 of [7]) shall not be used.

- The *Start time* and *End time* (SDP t-line) shall document a superset of the active times documented in the schedule document, if present. If there is no schedule document present both values should be set to zero indicating undefined times.

Extensions:

- When an MBS Session is of MBS Service Type *Broadcast* or when the Multicast MBS Session Type uses a TMGI as MBS Session ID, the *MBS service type of MBS Session* declaration attribute as defined in clause 6.2.3.2 shall be present in the Session Description.

#### 6.2.3.2 MBS service type of MBS Session

An MBS service type declaration attribute is defined which results in, e.g.

- a=mbs-servicetype:broadcast 123869108302929

or:

- a=mbs-servicetype:multicast 123869108302929

The MBS service type declaration attribute shall be used in the Session Description metadata unit to indicate the type of the corresponding MBS Distribution Session as defined in table 6.2.3.2‑1.

Table 6.2.3.2‑1: Assignment of mbs-servicetype attribute value

|  |  |
| --- | --- |
| Attribute value | Meaning |
| multicast | The MBS Distribution Session is delivered using a Multicast MBS Session. |
| broadcast | The MBS Distribution Session is delivered using a Broadcast MBS Session. |

The MBS service type attribute shall be declared at session level in the Session Description metadata unit. The session level attribute applies to all media entries without a media-level occurrence of the mbs-servicetype attribute. The Session Description metadata unit shall include only a single instance of MBS service type declaration attribute.

Definition:

- mbs-service-type-declaration-line = "a=mbs-servicetype:" ("broadcast"/"multicast" SP tmgi) CRLF

- tmgi = 1\*15DIGIT

EXAMPLE:

UK MCC = 234 *(MCC Digit 1 = 2; MCC Digit 2 = 3 and MCC Digit 3 = 4)*.

Vodafone UK MNC = 15.

and, with padding, Vodafone UK MNC = 15F *(MNC Digit 1 = 1; MNC Digit 2 = 5 and MNC Digit 3 = F)*.

MBS Service ID = 70A886.

Therefore, TMGI = 70A886 32F451 (Hex) or 123869108302929 (Decimal)

The Temporary Mobile Group Identity (tmgi) information element is defined in TS 24.008 [11] including the coding of the fields. Octets 3 to 8 (MBS Service ID, MCC and MNC) shall be placed in the tmgi attribute of the MBS service type declaration line, and are encoded as a decimal number. Octet 3 is the most significant octet. Because this is encoded as a decimal number, leading zeros of the MBS Service ID field may be omitted.

#### 6.2.3.3 SDP Examples for MBS Distribution Session using Object Distribution Method

Listing 6.2.3.3‑1 provides a full example of SDP description describing an MBS Distribution Session using the Object Distribution Method with a TMGI as MBS Session Id:

Listing 6.2.3.3‑1: SDP description for MBS Distribution Session using  
Object Distribution Method with TMGI

|  |
| --- |
| v=0  o=user123 2890844526 2890842807 IN IP6 2201:056D::112E:144A:1E24  s=Object Distribution session example  t=2873397496 2873404696  a=mbs-servicetype:broadcast 123869108302929  a=FEC-declaration:0 encoding-id=1  a=source-filter: incl IN IP6 \* 2001:210:1:2:240:96FF:FE25:8EC9  a=flute-tsi:3  m=application 12345 FLUTE/UDP 0  c=IN IP6 FF1E:03AD::7F2E:172A:1E24/1  b=1000  a=FEC:0 |

Listing 6.2.3.3‑2 provides a second example of an SDP description describing an MBS Distribution Session using the Object Distribution Method and which indicates that 25% redundant FEC protection is applied to the FEC encoding of the video Segments of the associated DASH-formatted content:

Listing 6.2.3.3‑2: SDP description for MBS Distribution Session using  
Object Distribution Method with TMGI and 25% FEC redundancy

|  |
| --- |
| v=0  o=user123 2890844526 2890842807 IN IP6 2201:056D::112E:144A:1E24  s=Object Distribution session carrying 2-hour DASH-packaged program  i=More information  t=3615124600 3615131800  a=mbs-servicetype:broadcast 123869108302929  a=FEC-declaration:0 encoding-id=1  a=FEC-redundancy-level:0 redundancy-level=25  a=source-filter: incl IN IP6 \* 2001:210:1:2:240:96FF:FE25:8EC9  a=flute-tsi:5  m=video 10111 FLUTE/UDP 0  c=IN IP6 FF1E:03AD::7F2E:172A:1E24/1  b=2048  a=lang:EN |



### 6.2.4 Operating modes for Object Distribution Method

#### 6.2.4.1 Introduction

The operating modes for the Object Distribution Method are defined in clause 6.1 of TS 26.502 [6]. Operating modes primarily describe the operation of the MBSTF to convert ingest data into an MBS Distribution Session. The following clauses specify how FLUTE is used for each operating mode.

#### 6.2.4.2 Single object operating mode

Single object operating mode (OBJECT\_SINGLE) refers to the case that a single object is distributed via the Object Distribution Method.

No specific aspects beyond the general description apply.

#### 6.2.4.3 Object collection operating mode

Object collection operating mode (OBJECT\_COLLECTION) refers to the case that multiple objects are distributed via the Object Distribution Method.

In this case, the FDT Instance should describe all objects that are part of the collection.

#### 6.2.4.4 Object carousel operating mode

Object carousel operating mode (OBJECT\_CAROUSEL) refers to the case that one or multiple objects are distributed via the Object Distribution Method in a repeated fashion.

The list of objects described in the manifest may be updated over time.

In this case, the FDT Instance should describe all objects that are currently available, considering the potential object update interval.

#### 6.2.4.5 Segment streaming operating mode

Segment streaming operating mode (OBJECT\_STREAMING) refers to the case for which a sequence of objects, typically representing timed segments from a timed presentation, are distributed using the Object Distribution Method. The sequence of objects is referred to as an *object flow*. This operating mode is recommended for streaming DASH or HLS content to a media player in the UE using MBS User Services.

NOTE: This operating mode may also be used for non-media object flows, e.g. in the absence of an Application Service Description.

Properties of the objects associated with the object flow are described in an abstracted way.

For each object associated with the object flow to be delivered in the MBS distribution session the following information shall be maintained by the MBSTF in an object list:

- The URL used by the MBS-Aware Application to request the object, derived from the object ingest URL.

- The object’s *latest availability start time* at the MBS Client. After this time, the MBS-Aware Application may request the full object from the MBSTF Client by using the URL of the object.

This valueis determined for each object based on an availability start time at the point of ingest (i.e. reception of first byte of the object) combined with a configured distribution offset.

- The object’s *earliest availability end time* from the MBSTF Client. After this time, the object may no longer be requested by the MBS-Aware Application.

This valueis determined for each object based on an availability start time at the point of ingest (i.e. reception of first byte of the object) combined with a configured clean-up time.

The object list is typically extended over time, for example as new objects (e.g. media segments) become available.

For the segment streaming operating mode, the MBSTF acts as follows based on the object list:

* The MBSTF shall transmit each object in the object list such that the last packet of the delivered object (inclding any FEC recovery packets, when configured) is available at the MBSTF Client latest at its latest availability start time.
* An FDT Instance object should be sent frequently by the MBSTF describing all objects of the object list that are not yet fully transmitted.
* The **Content-Location** element in the FDT Instance shall match the URL of the corresponding object in the object list. The URL may be rewritten by the MBSTF using the Object distribution base URL property of the MBS Distribution Session.
* The **File**@Expires attribute for each object shall be set such that it is equal to or earlier than its *latest availability start time*.
* The **Cache-Control**@Expires attribute shall be used to indicate the *earliest availability end time.*
* **Content-MD5** and **File-ETag** may optionally be used.

The object list may for example be provided by an explicit object distribution manifest.

NOTE: An object distribution manifest format is not defined in the present document.

The object list may also be defined by a presentation manifest (e.g. DASH MPD), for example in the case of an Application Service, for which the manifest is provided as part of the User Service Description.

When the Application Service Entry Point document is a DASH MPD, this document is used to update the object list. It may be included in the object list and hence be delivered in band with the media segment objects it describes on the same MBS Distribution Session. If the content of the Application Service Entry Point document changes during an MBS User Data Ingest Session the updated document is reflected in the MBS Distribution Session.

\*\*\*\* Last Change \*\*\*\*