**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** |
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|  | **26.517** | **CR** |  | **rev** | **-** | **Current version:** | **1.1.0** |  |
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| *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 |
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| ***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 canbe 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:*** |  |
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| ***Summary of change:*** | This pCR focuses on corrections and additions around Object Delivery Method. |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

# 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 as Object Distribution Method

### 6.2.1 General

If FLUTE is used as 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 usage of this method is identified in the Session Description metadata unit as defined in clause 6.2.3, in particular by the combination of using an MBS service type as defined in clause 6.2.3.2 as well as by the indication of the protocol being FLUTE/UDP.

In order to fetch missing portions of an object, the MBS Client may use the Object Repair services. The Object Repair service is realized as a Byte-Range based File Repair, as specified in clause 9.3.6.2 of TS 26.346 [7].

Editor’s Note: The usage of Alternate-Content-Location-1 and Alternate-Content-Location-2 elements should be supported for backward compatibility.

For MB Sessions, the MBSTF may use the Reduced FDT Schema according to clause L.6.

### 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.

Editor’s Note: The relaxation of the number of FLUTE Sessions as defined in clause 7.3.2.4 is for future study. An alternative/better way would be to allow multiple Object Distribution Sessions within one USD and use a baseUrl for binding.

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 session description metadata unit using one or more MBS broadcast sessions or multicast MBS sessions.

The SDP attribute shall be declared at session level. 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.

When the value of the mbs-servicetype attribute is ‘multicast’, it indicates that the MBS Distribution Session is delivered using a Multicast MBS Session. When the value of the mbs-servicetype attribute is ‘broadcast’, it indicates that the MBS Distribution Session is delivered using a Broadcast MBS Session.

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=0o=user123 2890844526 2890842807 IN IP6 2201:056D::112E:144A:1E24s=Object Distribution session examplet=2873397496 2873404696a=mbs-servicetype:broadcast 123869108302929a=FEC-declaration:0 encoding-id=1a=source-filter: incl IN IP6 \* 2001:210:1:2:240:96FF:FE25:8EC9a=flute-tsi:3m=application 12345 FLUTE/UDP 0c=IN IP6 FF1E:03AD::7F2E:172A:1E24/1b=1000a=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=0o=user123 2890844526 2890842807 IN IP6 2201:056D::112E:144A:1E24s=Object Distribution session carrying 2-hour DASH-packaged programi=More informationt=3615124600 3615131800a=mbs-servicetype:broadcast 123869108302929a=FEC-declaration:0 encoding-id=1a=FEC-redundancy-level:0 redundancy-level=25a=source-filter: incl IN IP6 \* 2001:210:1:2:240:96FF:FE25:8EC9a=flute-tsi:5m=video 10111 FLUTE/UDP 0c=IN IP6 FF1E:03AD::7F2E:172A:1E24/1b=2048a=lang:EN |

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### 6.2.4 Operating modes for Object Distribution Method

#### 6.2.4.1 General

Different operation modes for object distribution are defined according to TS 26.502 [X], clause X.X. Operation modes primarily describe the operation of the MBSTF to convert ingest data into an MBS distribution session.

Common to all object operating modes is the usage of the FLUTE Object distribution method as defined in this clause.

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 operation mode, different usages of the expiry time and different number of objects per FDT instance are recommended.

The addition of the Content-MD5 and File-ETag FDT instance attributes are optional. The *File-ETag* represents the value of the ETag, or entity-tag as defined in RFC 2616 [18] which mays also serve as the version identifier of the file object described by the FDT Instance.

Annex L.4 of TS 26.346 [x] define a set of FDT Instance elements and attributes for MBS Object Distribution.

#### 6.2.4.2 Single object operating mode

Single object operating mode refers to the case that a single object is distributed via the MBS Object Distribution.

No specific aspects beyond the general description apply.

#### 6.2.4.3 Object collection operating mode

Object collection operating mode refers to the case that multiple objects are distributed via the MBS Object Distribution.

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

#### 6.2.4.4 Object carousel operating mode

Object carousel operating mode refers to the case that one or multiple objects are distributed via the MBS Object Distribution in a repeated fashion.

The list of objects may be updated over time.

In this case the FDT should describe all objects that are currently available.

#### 6.2.4.5 Segment streaming operating mode

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

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

It is assumed that for each object associated to the object flow to be delivered in the MBS distribution session the following information is available to the MBSTF in an object list:

* the URL of the object as the MBS-aware application would request it
* its *latest availability start time* at the MBS client. Availability refers that the application can request the full object from the MBS client by using the URL of the object.
* its *earliest availability end time* at the MBS client. After this time, the client may no longer be requested by the MBS-Aware application.

Note that the object list may be dynamically extended over time, for example if objects get available over time.

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

* it shall deliver each object in the object list such that the last packet of the delivered object is available at the MBS Client latest at its *latest start availability time*
* An FDT should be sent frequently. When sent, the FDT should describe all objects of the object list that are not yet fully sent.
* The **Content-Location** element in the FDT for the delivered object shall match the URL in the object list
* The Expires attribute for each object shall be set such that it is equal as or smaller 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 be used optional.

The MBS Distribution Session shall be provisioned to accommodate the aggregated object flow during the course of the session, including protocol header and FEC overhead.

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

NOTE: This specification does not define a formal object distribution manifest at current stage.

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. If the content of the presentation manifest changes during an MBS User Data Ingest Session the updated manifest

* is used to update the object list
* may be part of the object list and hence be delivered in-band with the media segments on the same MBS Distribution Session.

NOTE: It is assumed that these updates occur seldom, for instance once the MBS Distribution Session end time becomes known.

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