3GPP TSG SA4 Meeting #111e S4-201574

Still At Home, 11. – 20. November 2020

**Agenda item:** 8.6

**Source:** Ericsson LM

**Title:** Discussion on Nmbsf: review of xMB-C wrt user-plane properties

**Document for:** Discussion

# 1 Introduction

According to the SA2 LS and TR 23.757, the MBSF-C and MBSF-U entities are considered “an BM-SC evolution”. This paper starts reviewing the BM-SC user-plane functions and their configuration via xMB. The assumption here is that the new MBSF entities will continue offering the same IP Multicast related functionality, i.e. FLUTE / MBMS Download Delivery (Clause 7 in TS 26.346), RTP / Streaming Delivery Method (Clause 8 in TS 26.346) and transparent delivery (Clause 8b in TS 26.346).

Note, usage of unicast bearers (e.g. OMA PUSH, FLUTE unicast with RTSP or RTP unicast with RTSP) is excluded from consideration in this paper. The focus is on multicast-related user plane functionality.

At this stage, the paper is presented “as inspiration” to trigger discussions.

# 2 Model of a BM-SC User-Plane Function

The model below assumes that a FLUTE function according to MBMS Download Delivery (Clause 7 in TS 26.346) is mapped into an MBSF-U. Similar models can be created for RTP streaming and transparent delivery, however, likely not needed.

The idea of this simplified model is helping to identify the xMB-C parameters (xMB Service and Session Parameters), needed to configure an MBSF-U.



Figure 1: Simplified User Plane model for FLUTE (as a MBSF-U function)

The model depicts some key functions, from an xMB-U ingest to an MB-UPF ingest (N6). In the case of MBMS Download (e.g. used for DASH or HLS over MBMS or generic file delivery), the data plane ingest via xMB-U ingest is HTTP-based, either using HTTP Pull (the MBSF-U pulls resources representing media segments from an HTTP server) or HTTP Push (the MBSF-U receives resources using HTTP PUT). xMB-C is used to: In case of Pull, to provide individual file URLs to get pulled and transmitted or in case of Push, provide an base URL to the API invoker for publishing HTTP resources to the MBSF-U.

The MBSF-U may use a **file cache** to store partial or complete resources as local files. Optimized implementations may pipe the resource through with only minor buffering/caching.

The HTTP metadata such as Content-Location (file URL), Content-Length (file size) and Content-Type (MIME media type) is provided by the **HTTP File Receiver** to the FDT Instance creation function. This acts as input (with other xMB‑C parameters) to form the FDT Instance XML file.

The **File partitioning** function puts a file into one or more packet payloads. In the case where Raptor FEC (RFC 5053) or No Code FEC (RFC 3695) is additionally configured, there are recommended file partitioning schemes and parameters to partition a file (or blob of data) into a sequence of packet paylods (called “encoding symbols”). An FDT Instance is also partitioned into one or more packet payloads.

The **FLUTE packet creation** function inserts FLUTE header specific parameters like the TSI, sequence number (FEC Symbol ID), etc. As result, a complete UDP packet payload is created, which can be written into a UDP socket at time of transmission.

The **Streamer & Pacer** function sends the packets according to the defined bitrate to the configured MP-UPF ingest point, which can be an MB2-U tunnel, some direct multicast, or similar.

# 3 Review of xMB

This section contains a copy of the xMB service (Clause 5.3.7) and Session (Clause 5.4.6) properties. The green marking is used, when these properties are related to the user-plane handling, e.g. defining the xMB-U ingest, etc. Yellow and white means “unsure” and “likely not”.

Clause 5.3.7 of TS 26.348:

### 5.3.7 List of Service Properties

All Service Properties, except for the resource id, are always carried in a HTTPS message body. The access-token is always carried as part of HTTP Headers. Except for the service creation request (where the id is not present), the resource id shall be present in the URL of all requests that relate to a specific service.

In the Table 5.3-1, the following assertions are made:

- Table header: C stands for Create Service Procedure, G is for Get Service Procedure, U is for Update Service Procedure and T is for Terminate Service Procedure. "I", and "O" respectively denote "request" (going **I**nto the BM-SC), and response (going **O**ut of the BM-SC).

- Optional ("O") means that the property may or may not be sent/received during a REST transaction. It does not necessarily mean that the property is optional. It is possible, for example, that a session is not yet started because the Content Provider has not set the property in any previous Update transaction using the PUT or PATCH HTTP method, as opposed to representing a hint on the importance of the property for the BM-SC.

- A property marked as optional (O) in a request message may be present in the request. When not present in the request body, the property, if present in the BM-SC, will not be updated.

- A property marked as optional (O) in a response message is only present in the response when a value is assigned by the BM-SC.

- A property marked as mandatory (M) in a response message is always present in the response. The BM-SC provides defaults, which may be modified subsequently by the content provider.

- A blank cell in the table means "forbidden" (the property cannot be added to the request or returned by the BM-SC, depending on the transaction direction).

Table 5.3-1: List of Service Properties

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| id | Identifier of the Service Resource. Shall be systematically present in the message URL to identify the resource in the BM-SC.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer  | None  | N/A |

 |  | M |  |  |  |  |  |
| ServiceID | ServiceId, set by the BM-SC to identify the MBMS User Service as defined in Clause 11.2.1.1 of TS 26.346 [2].

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | N/A |

 |  |  |  | M |  |  |  |
| Service Class | The service class that service belongs to (see *serviceClass* element in Clause 11.2.1.2) of TS 26.346 [2].

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | (operator defined default) |

 |  |  |  | M | O |  |  |
| Service Languages | List of languages of the service content (see *serviceLanguage* element in Clause 11.2.1.1) of TS 26.346 [2].

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| List of String  | None  | Empty list |

 |  |  |  | O | O |  |  |
| Service Names | List of Service Names (see *name* element in Clause 11.2.1.1) of TS 26.346 [2].

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| List of String  | None  | Empty List |

 |  |  |  | O | O |  |  |
| Receive Only Mode | When set to 'true', the Content Provider indicates that the service is a Receive Only Mode service.

|  |  |  |
| --- | --- | --- |
| Type | Name | Default |
| Boolean  | Enabled  | False |

 |  |  |  |  | O |  |  |
| Service Announcement Mode | Enumeration of Service Announcement Mode. Additional service announcement modes may be added in future.- **SACH**: BM-SC performs the Service Announcement for the current service using the SACH channel (cf. Annex L.2, L3 of TS 26.346 [2]).**- Content Provider**: Content Provider performs the Service Announcement to an (not necessarily 3GPP-defined) MBMS User Agent function in the UE. The MBMS User Agent performs a similar role to but is a separate entity from the MBMS client, the latter of which is not involved in Service Announcement reception. The BM-SC shall provide the service announcement information to content provider.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | SACH |

 |  |  |  | M | O |  |  |
| Consumption Reporting Configuration | The content provider wishes to collect consumption reports.

|  |  |  |
| --- | --- | --- |
| Type | Name | Default |
| Boolean  | Enabled  | False |
| Integer | Sample Percentage | 10 (in %) |
| Integer | Reporting Interval | 3600 (in seconds) |

 |  |  |  | O | O |  |  |
| Push Notification URL | The content provider provides Notification URL over which it will receive notifications "pushed" by the BM-SC. The Notification procedure is described in Clause 5.4.6 of TS 26.346 [2].

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | – None –  | "" |

 |  |  |  | O | O |  |  |
| Push Notification Configuration | If the content provider enables push delivery of notifications, then the content provider may provide notification filters. This parameter contains a comma separated list of Classes it wishes to receive among the following options: **Critical**, **Warning**, **Information**, **Service**, **Session**, or **All** to get all types of notification.The notification message shall be sent immediately to the content provider upon becoming available.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | All |

 |  |  |  | O | O |  |  |

Note: It is assumed that the BM-SC can derive the required UE capabilities from the provided service and session properties.

From TS 26.348, Clause 5.4.6:

### 5.4.6 Session Properties

All Session properties, except for the resource id, are carried in the HTTPS message body. The access-token is always carried as part of HTTP Headers. Except for the session creation request (where the resource id is not present), the resource id shall be present in the URL of all requests that relate to a specific session.

In the table below, the following assertions are made:

- Table header: C stands for Create Session, G is for Get Session, U is for Update Session and T is for Terminate Session. "I", and "O" respectively denote "request" (going **I**nto the BM-SC), and response (going Out of the BM-SC).

- Optional ("O") means that the property may or may not be sent/received during a REST transaction. It does not necessarily mean that the property is optional. It is possible, for example, that a session is not yet started because the Content Provider has not set it in any Update transaction using the PUT or PATCH HTTP method as opposed to representing a hint on the importance of the property for the BM-SC.

- A property marked as optional (O) in a request message may be present in the request. When not present in the request body, the property, if present in the BM-SC, will not be updated.

- A property marked as optional (O) in a response message is only present in the response when a value is assigned in the BM-SC.

- A property marked as mandatory (M) in a response message is always present in the response. The BM-SC provides default values for the session, which may be modified subsequently by the content provider.

- A blank cell in the cell shall means "forbidden" (the property cannot be added to the request or returned by the BM-SC, depending on the transaction direction).

Table 5.4-1: List of Session Properties

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| id | Resource Id of the Session.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer  | None  | N/A |

 |  | M |  |  |  |  |  |
| Session start | Start time when the MBMS Bearer become active.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer  | UTC Date timestamp (with second precision) | Session creation date + 1h |

 |  |  |  | M | O |  |  |
| Session stop | End time at which the MBMS bearer becomes inactive.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer  | UTC Date timestamp (with second precision) | Session start + 1h |

 |  |  |  | M | O |  |  |
| Max Bitrate | The requested bitrate excludes FEC overhead and transport overhead. The BM-SC calculates the MBMS Bearer bitrate from it, considering overhead like FEC and other transport overheads. The session bitrate is always larger or equal to the payload bitrate.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer | kbps | 0 |

 |  |  |  | M | O |  |  |
| Max Delay | Specifies the maximum delay the MBMS System should add, i.e. from the time a packet is received by the BM-SC to the time by when the packet is received by the MBMS client.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer | ms | -1 |

 Note, that the value -1 indicates that the content provider has no specific delay requirement. |  |  |  | O | O |  |  |
| Session State | The BM-SC may automatically change the state of the session.Possible states: Session Idle, Session Announced, Session Active

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None | Idle |

 |  |  |  | M |  |  |  |
| Service Announcement start time | When present, this time at which the BM-SC shall start service announcement. If absent, the BM-SC may automatically start service announcement when it has all data needed to perform such service announcement.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer  | UTC Date timestamp (with second precision) | None |

 |  |  |  | O | O |  |  |
| Geographical Area | Geographical Area, at which the service is to be provided, either through unicast or through MBMS Bearers. The BM-SC derives the MBMS Service Area and the SAI list for the availability information from Geographical Area as provided by the content provider.The Geographical Area contains the following information:

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| List of String  | None  | Empty list |

The content of each string item is left to the business agreement between the Content Provider and the Operator. |  |  |  | M | O |  |  |
| QoE Reporting | List of QoE metrics that the content provider recommends the BM-SC to collect. The QoE metrics shall be derived from the QoE metrics in Clause 8.4 of TS 26.346 [2] and in Clause 10.2 of 26.247 [4] and depend on the delivery method that is used for the session. |  |  |  | O | O |  |  |
| QoE Report URL | Resource location at which the BM-SC will provide the QoE reports.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None | Operator selected default |

 |  |  |  | O |  |  |  |
| Session Type | The Session Type represents the method used by the content provider in providing content to the BM-SC (via xMB-U). The BM-SC shall select the appropriate delivery method based on the Session Type value.Valid values: Streaming, Files, Application, Transport-ModeWhen Session Type is set to Streaming, the BM-SC expects a Streaming type input (RTP) whose format is compliant to MBMS streaming (as defined in TS 26.346).When Session Type is set to Files, the BM-SC expects generic files as input. The files can be provided either by on-request pull interactions or continuous push ingest. When Session Type is set to Application, then the ingest method depends on the application service description. When the Application Service Description pertains to DASH, the BM-SC expects an MPD and optionally one or more Initialization Segments. The content is assumed to be 3GP-DASH compliant (as defined by 26.247 [4]). The BM-SC may either pull the media segments from the content provider or the content provider continuously pushes segments into the BM-SC.When Session Type is set to Transport-Mode, the BM-SC shall provide transport of data/TV content according to the Transparent delivery method as described in clause 8B of TS 26.346[2]. The content provider may provide some of the session properties for the broadcast distribution. The Session Type shall be extensible for further session types.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None | Files |

 |  |  |  | M | O |  |  |
| Header Compression | Requests the BM-SC to enable ROHC [8] and [9] on the input flow to save overhead space.When this property is present, then header compression shall be processed on each described input flow. Each flow to be processed shall contain following parameters:- Flow Description: Typically the IP/port of the input flow.- Periodicity: number denoting the target periodicity for ROHC full header packets in units of seconds.- Profile: Applicable ROHC profile (see IETF RFC 5795 [8].When the Content Provider does not explicitly set this property, the BM-SC decides on the usage. |  |  |  | O | O |  |  |
| FEC | When present, requests the BM-SC to perform FEC protection of the input flow(s) when transmitting over the MBMS channel using the provided SDP.The SDP should include FEC scheme according to the used delivery method as defined in TS 26.346.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None | SDP description of FEC framework configuration information |

When the Content Provider does not explicitly set the property, the BM-SC decides on the usage and amount of FEC redundancy. |  |  |  | O | O |  |  |

When the Session Type is set to "Transport-Mode", then the additional properties as defined in Table 5.4-2 apply. The properties in Table 5.4-2 are only present when the Session Type is set to "Transport-Mode".

Table 5.4-2: Additional properties for Transport-Mode

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Session Description Parameters for User Plane | This property provides information to the BM-SC on where and how to access the user plane content from the content provider, and comprises one or more of the following components:- **Type**: the type of the content associated with the target resource, for example the Internet Media Type of the resource as identified by an HTTP/S URL. **Type** with the value "embedded" is defined in this version of the specification, as an indication that the xMB-U user plane parameters are embedded in the User Plane Parameters object described below.- **Access URL**: A URL that enables BM-SC access to and possibly control of the ingest session. The URL could be, for example, a) an RTSP URL, b) a reference to an SDP that describes a multicast stream associated with the ingest session, or c) an HTTP/S URL to retrieve an already-packaged MPEG2-TS stream. - **User Plane Parameters**: Object provided by the Content Provider to the BM-SC, which when set to "embedded", contains the session description information for the following purposes:- If the *property* Delivery Mode Configuration for user plane is set to **Forward Only**, the **User Plane Parameters** object may contain a ready-made Session Description and the indication of a single xMB-U reception UDP port, in which case the BM-SC shall use it for Service Announcement over SACH. - If such Session Description is not present in this object, the Content Provider is directly performing the Service Announcement, i.e., it corresponds to the case where *Service Announcement Mode* property, as defined in Table 5.3-1, is set to **Content Provider**.- If this property *Delivery Mode Configuration for user plane* is set to **Proxy**, the object shall contain a Session Description template and a list of the transmitted UDP flows to be forwarded on the established MBMS bearer for the session. For each list entry, the content provider shall indicate whether a) this UDP flow is directly associated with a media description entry in the Session Description Template – i.e., an "m=" line is present in the template and which contains a port field, or b) this UDP flow is related to a media description entry – e.g., it corresponds to an RTCP flow affiliated with the RTP flow as described by the RTP/AVP profile). If the flow is directly associated with a media description entry, then the BM-SC shall modify the port field of the media description entry in the Session Description Template. If the flow is related to a media description entry, then the BM-SC shall simply forward the flow onto a port whose value is equal to the port of the related media session plus an offset.Note the BM-SC may get input on session properties from the content provider, e.g. bitrate, depending on the ingest session.  |  |  |  | O | O |  |  |
| Delivery Mode Configuration for user plane | This property defines how the session needs to be delivered to the application, i.e. it basically establishes the delivery mode.- Mode Enumeration: Specifies the delivery mode.- **Forward-only**: The BM-SC receives complete IP Multicast packets for to be forwarded. The content provider will create the IP multicast packets.- **Proxy**: The BM-SC proxies the incoming UDP payloads to the outgoing UDP payloads. The BM-SC will create the IP multicast packets.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | – None – | Forward-only |

 |  |  |  | M | O |  |  |
| Delivery Session Description Parameters | The contents of this property depend on the setting of the *Service Announcement Mode* property as defined in Table 5.3-1. If *Service Announcement Mode* is set to **Content Provider**, then at minimum the following session parameters shall be provided by the BM-SC:- TMGI of the MBMS BearerNote that additional parameters may be provided, based on the configuration options of the delivery method when *Session Type* is set to **Transport-Mode**. |  |  |  | O |  |  |  |

When the Session Type is set to "Streaming", then the additional properties as defined in Table 5.4-3 apply. The properties in Table 5.4-3 are only present when the Session Type is set to "Streaming".

Table 5.4-3: Additional properties for Streaming

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| SDP URL | A URL to the SDP that describes the streaming session between the content provider and the BM-SC which will be used for ingesting the streaming session via xMB-U. The SDP shall include the RTSP links for every media session as part of the "a=control" attribute to enable RTSP control of the session. The SDP shall also contain the required bitrate for each of the media sessions.The content shall conform to the constraints of the present document.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | – None –  | "" |

Note that the session will not be activated without a valid SDP URL. |  |  |  | M | O |  |  |
| TimeShifting | Indicates if and for how long time shifting access to the content (using unicast) may be provided for this session.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer | second | 0 |

If not set (so defaulted to 0), there shall be no time shifting access. |  |  |  | O | O |  |  |

The BM-SC starts the streaming session when the session state becomes active. When the BM-SC adds FEC redundancy, then the BM-SC may start the ingest session sufficiently earlier.

When the Session Type is set to "Application", then the additional properties as defined in Table 5.4-4 apply. The properties in Table 5.4-4 are only present when the Session Type is set to "Application".

Table 5.4-4: Additional properties for Application, incl. DASH Service Descriptions

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Application Service Description | MIME type of the Application Service, for example application/dash+xml for DASH.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | MIME type | application/dash+xml |

 |  |  |  | M | O |  |  |
| Ingest Mode | The ingest mode enumerates how resources are ingested into the BM-SC via xMB-U.**Pull**: The BM-SC pulls the resources as described by the application entry point document. **Push**: The content provider pushes resources. The BM-SC needs to provide a push URL.In case of DASH, resources are media segments: **Pull**: The BM-SC pulls the media segments as described by the segment availability start time from a DASH MPD. **Push**: The content provider pushes media segments, so that the media segment is available on the BM-SC according to segment availability start time. The BM-SC needs to provide a push URL.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None  | Push |

 |  |  |  | M | O |  |  |
| Application Entry Point URL | The application entry point refers to an MPD when Application Service Description pertains to DASH.When the Ingest Mode is set to **Push**, then the MPD Url refers to a DASH MPD which should be fetched, optionally conditioned and inserted into Service Announcement. When the Ingest Mode is set to **Pull**, then the BM-SC starts fetching the segments using unicast.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None  | "" |

Note that if not set to a valid URL, the session will not be started. |  |  |  | M | O |  |  |
| Push URL | A resource locator for ingesting media segments using HTTPS via xMB-U. The content provider may create additional sub-resources using WebDAV procedures. This is a read-only property managed by the BM-SC and only present when Ingest Mode is set to Push.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | "" |

This property is mandatory if the Session type is set to **Application** and Ingest Mode is set to **Push**. |  |  |  | O |  |  |  |
| Unicast Delivery | Indicator whether the content is also available for unicast retrieval.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Boolean  | None  | False |

 |  |  |  | M | O |  |  |
| Components | List of Components of the application, which are recommended to be made available on MBMS Bearers.In case of DASH, each component is identified by a representation identifier.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| List of String  | None  | Empty list |

 |  |  |  | O | O |  |  |

When the Session Type is set to "Files", then the additional properties as defined in Table 5.4-5 apply. The properties in Table 5.4-5 are only present when the Session Type is set to "Files".

Table 5.4-5: Additional properties for Files

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ingest Mode  | The ingest mode enumerates how resources are ingested into the BM-SC via xMB-U.**- Push**: The Content Provider shall push the file to the BM-SC that will immediately process and deliver as soon as it is ready. The BM-SC may be configured to ignore all files that are pushed before session active time, or stage them. In case of Push mode, the BM-SC shall provide back to the content provider the URL the Content Provider shall use to push the files.**- Pull**: In this case, the Content Provider provides the resource location from which the BM-SC will fetch the file. The Content Provider may tell the BM-SC when to start fetching the file

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | Pull |

 |  |  |  | M | O |  |  |
| File List  | List of files to be sent. In the **Push** mode, the file list is not used since the BM-SC will monitor its push folder and send the files it receives on a first-come first-served basis.In **Pull** mode, the file list contains the following information per file entry:**- file URL**: the URL to the file the BM-SC will use to fetch the content**- file display UR**L: the URL to the file as seen by the UE**- file earliest fetch time**: The BM-SC shall fetch the file no sooner than this UTC timestamp. If absent, then the file shall be present on the Content Provider server and the BM-SC may fetch it at a time of its choosing.**- file latest fetch time**: The BM-SC shall fetch the file no later than this UTC timestamp. If absent, then the file shall be present on the Content Provider server and the BM-SC may fetch it at a time of its choosing.**- file size (optional):** Thecontent provider may provide the precise or a file size estimate as input. The BM-SC may update the file size once it has started to fetch the file. **- file status:** Enumeration stating the state of the file. Possible values are pending, fetching, fetched, fetch failed, preparing, prepared, prepare failed, in transmission queue, transmitting, transmission failed, sent.**- Target reception completion time (on the MBMS Client):** hinton the target time, when the file should be completely received by the UE. The BM-SC should schedule and order the transmission etc accordingly.**- Keep Update Interval:** The BM-SC checks the file resources with the given interval for changes. **- Unicast availability**: Indication that the file is also available for unicast retrieval by the application at a Content Provider server whose location is given by the HTTP(S) URL corresponding to the value of "file display URL".**- byteRange (optional):** If present and set to “true”, indicates that the HTTP(S) URL given in the fileDisplayURL parameter can be used for Byte-Range-Based file repair (subclause 9.3) otherwise fileDisplayURL parameter should not be used for Byte-Range-Based file repair **- ETag (optional):** represents the value of the ETag as defined in RFC 2616 [18] which may also serve as the version identifier for the file in the Byte-Range-Based file repair requests. The ETag should only be supplied by the 3rd party content provider if it is expected that it is different from the one provided over xMB-U when fetching the file.**- File repetition (optional):** The number of times the file shall be sent on the session (a value of 1 means the file shall be sent only once). This counter shall be decreased each time the file has been transmitted. When equals to zero, no more file repeat is scheduled. The BM-SC may send FEC instead of source information. Default value is 1.- Note that the expected behavior is that the BM-SC will first send all files in the order of the File List, then decrement the file repetition counter for each file, and subsequently retransmit the list again (only files with counter > 0 are transmitted). This is repeated until all repetitions are completed, or the session stop time has elapsed, whichever event occurring first. |  |  |  | O | O |  |  |
| Carousel Mode | Provides information on carousel activation and mode. Possible values are none, back-to-back, scheduled.When carousel is enabled, file repetition is ignored.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None  | none |

 |  |  |  | O | O |  |  |
| Carousel Scheduled Interval | When carousel mode is set to Scheduled, time interval between two consecutive sessions.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Integer | Seconds  | 3600 |

 |  |  |  | O | O |  |  |
| File delivery manifest URL | Alternative to the file list. The resource may additionally describe scheduling information for the file.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String | None  | "" |

 |  |  |  | O | O |  |  |
| Push URL | A resource locator for ingesting content using HTTPS via xMB-U. This is a read-only property managed by the BM-SC and only present when Ingest Mode is set to Push.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | "" |

 |  |  |  | O |  |  |  |
| Display Base URL | When ingest mode is set to Push, the Base URL is seen by the UE.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| String  | None  | "" |

 |  |  |  | O | O |  |  |
| SA file URL | When the service announcement mode is set to "Content provider", the BM-SC returns the URL of the SA file announcing the session. The BM-SC shall follow the profile 1c (Annex L.3 of 3GPP 26.346 [2]) |  |  |  | O |  |  |  |

For the xMB mission critical extension, the additional properties as defined in Table 5.4-6 apply. The properties *TMGI* and *QoS‑Information* in Table 5.4-6 are only present when the *MC-Extension* property is set to true.

Table 5.4-6: Additional properties in the xMB mission critical extension

| Property Name | Property Description | CI | CO | GI | GO | UI | UO | TI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MC-Extension | (Optional) Set to true to use the mission critical extension.

|  |  |  |
| --- | --- | --- |
| Type | Unit | Default |
| Boolean  | None  | False |

 | O |  |  | O |  |  |  |
| TMGI | TMGI of the MBMS session, as returned by the MBMS Session start procedure (3GPP TS 29.061 [13]). |  |  |  | M |  |  |  |
| QoS‑Information | Provides the QoS parameters for the MBMS bearer. The list of QoS parameters matches the composition of the QoS Information AVP specified in 3GPP TS 29.468 [14]: GBR, ARP, QCI.The difference between the **Max Bitrate** (Table 5.4-1)and GBR can be used by the BM-SC as a budget for FEC. |  |  |  | M | O |  |  |

# 4. Summary and Proposal

In this paper, we briefly checked existing xMB-C parameters with respect to “user plane applicability”. As result, a high depree of xMB-C properties are related to the Multicast userplane. Thus, the same or similar parameters would need to be exposed by an Nmbsu API.

Note, this is not a suggestion / proposal to re-use the xMB-C properties and procedures as is for Nmbsfu. It is just a review and an identification, that many parameters are already known. So, detail call flows are needed to work out the API procedures.

During the exercice, it became clear that N6 / MB2-U configuration information is needed by the MBSF-U in order to ingest the user plane traffic into the correct MB-UPF (assuming there are several MP-UPFs in the system) and using the correct protocol stack (e.g. see SGi-mb options or MB2-U).

It seems to be clear, that the MBSF-U does not need to know a TMGI / MBS Session identifier. For the MBSF-U, the MP-UPF ingest parameters are likely enough.

The MBSF-U may need to provide an SDP file or an SA file, containing the relevant parameters to enable service receiption, back to the API invoker.