**3GPP TSG- Meeting #**

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

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| ***Work item code:*** |  | | | | |  | ***Date:*** | | | 2023-02.14 |
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| ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Several missing aspects.  Inconsistent implementation of semantics | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adds bug fixes  Adds tables for semantics | | | | | | | | |
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| ***Consequences if not approved:*** | | Missing features | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.3, 3.4, 4, 5, 6.2.1, 6.2.2.2, 7.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | **Revision history from Telcos in draft CRs**   |  |  |  |  | | --- | --- | --- | --- | | [**S4aI221370**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI221370.zip) | [5MBP3] Miscellaneous Corrections and Updates | Qualcomm incorporated | Thomas Stockhammer |   **Revisions**   * none   **Presenter**: Thomas Stockhammer (Qualcomm)  **Discussion**:   * Thomas: Why must a client select only one entry point (clause 5.1)? * Thomas: Proposal of a different schema extension mechanism (clause 5.2.1) more similar to DASH. * Thomas: Problem if normative text in clause 5.2.x doesn’t match schema. * Thorsten: Maybe text is non-normative. * Thomas: Maybe better as a table. * Richard: Table format in clause 5.2.x would make it more technology-neutral, then annexes provide XML schema and JSON schema. * Thomas: Limit clause 5.2.x to semantic definitions only? * Thomas: RFC 2616 is obsoleted by new HTTP RFCs. * Thorsten: What are the consequences of the new RFCs? * Thorsten: (Off topic) If we bump to the new FLUTE RFC, older implementations would ignore new packets. * Richard: Is it OK for FLUTE-over-MBS not to be binary-compatible with FLUTE-over-eMBMS. * Thorsten: Keen to hear opinions from device manufacturers. * Spencer: RFC 2616 is obsoleted by [RFC 7230](https://datatracker.ietf.org/doc/rfc7230/), [RFC 7231](https://datatracker.ietf.org/doc/rfc7231/), [RFC 7232](https://datatracker.ietf.org/doc/rfc7232/), [RFC 7233](https://datatracker.ietf.org/doc/rfc7233/), [RFC 7234](https://datatracker.ietf.org/doc/rfc7234/), [RFC 7235](https://datatracker.ietf.org/doc/rfc7235/) - if we are going to update specifications to reflect RFC 2616 being obsoleted, that’s not just changing the RFC number to a new one. * Thorsten: Significant misalignment between language in TS 26.502 and TS 26.517 (raised by CT3/CT4) will need change. * Richard: Syntax errors in JSON format of service announcement also need fixing.   **Decision**:   * To be revised by the author for the next call.   **S4aI221370** is **revised to S4aI221380.**   |  |  |  |  | | --- | --- | --- | --- | | [**S4aI221380**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI221380.zip) | [5MBP3] Miscellaneous Corrections and Updates | Qualcomm incorporated | Thomas Stockhammer |   **Presenter**: Thomas Stockhammer (Qualcomm)  **Discussion**:   * Richard - in principle your tabular approach is reasonable and allows you to add missing details. * Deleted sentence on page 12 is for different entry points, but Thomas is questioning whether the MMS needs to make this distinction at all. * Richard - Suggest retaining the sentence, but downgrading SHALL to MAY, and maybe make it an explanatory NOTE?   **Decision**:   * Will be revised.   **S4aI221380** is **revised to S4aI221394.**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | [S4aI221394](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/3GPP_SA4_AHOC_MTGs/SA4_MBS/Docs/S4aI221394.zip) | [5MBP3] Miscellaneous Corrections and Updates | Qualcomm incorporated | Thomas Stockhammer | 2.8 |   **Presenter**: Thomas Stockhammer (Qualcomm)  **Discussion**:   * Thorsten confirms that table form is good.   **Decision**:   * Agreed on introduction of tables and the principles way forward. * Drafting will continue on this matter   **S4aI221394** is **agreed.**   |  |  |  |  | | --- | --- | --- | --- | | [**S4-221306**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_121_Toulouse/Docs/S4-221306.zip) | [5MBP3] General Updates and Corrections | Qualcomm incorporated | Thomas Stockhammer |     **E-mail Discussion:**  **Revisions:**   * ftp://3gppmeeting@toulouse2022.3gpp.org/SA/SA4/Inbox/Drafts/MBS/S4-221306\_BBC.docx   **Presenter:** Thomas Stockhammer (Qualcomm)  **Online Discussion:**   * BBC version presented. * Thorsten: The issue is that we already have the XML and the JSON in the specification. We need to find a way of working to indicate to CT groups the schemes are OK. Second point, we don’t need XML and JSON, it is a nightmare to maintain. * Frederic: We can consider removing XML for Rel-18. * Richard: I removed the diagram in the BBC version to facilitate the maintenance. A reference is preferable.   **Decision:**   * Agree to use this as basis for further work. Revised to 1482. 1482 is endorsed.   **S4-221306** is **revised to S4-221482.**   |  |  |  |  | | --- | --- | --- | --- | | [**S4-221**](https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_121_Toulouse/Docs/S4-221306.zip)**482** | [5MBP3] General Updates and Corrections | Qualcomm incorporated | Thomas Stockhammer |     **Decision:**   * Agree to use this as a basis for further work.   **S4-221482** is **endorsed.**  **This CR progresses some of the work.** | | | | | | | | |

**===== 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".

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## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.247 [4] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

CMAF Common Media Application Format

FFS For Further Study

FLUTE File Delivery over Unidirectional Transport

MBS Multicast–Broadcast Services

MB‑SMF Multicast–Broadcast Session Management Function

MB‑UPF Multicast–Broadcast User Plane Function

MBSF Multicast–Broadcast Service Function

MBSTF Multicast–Broadcast Service Transport Function

PCF Policy and Charging Function

NEF Network Exposure Function

SDP Session Description Protocol

TMGI Temporary Mobile Group Identity

UE User Equipment

UML Unified Markup Language

XML eXtensible Markup Language

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

## 3.4 Syntax documentation conventions

The following conventions apply to normative descriptions of syntax in the present document:

1. Elements in an XML document are identified by a lowercase first letter and in boldface as element. To express that an element element1 is contained in another element element2, the following format is used: element2.element1. If an element's name consists of two or more combined words, camelcasing is typically used, e.g. importantElement.

2. Attributes in an XML document are identified by a lowercase first letter as well as they are preceded by an '@'-sign, e.g. @attribute. To point to a specific attribute @attribute contained in an element element, one may write element@attribute. If an attribute's name consists of two or more combined words, camel-casing is typically used after the first word, e.g. @veryImportantAttribute.

3. Namespace qualification of elements and attributes is used as per XML standards, in the form of namespace:element or @namespace:attribute. The fully qualified namespace is provided in the schema fragment associated with the declaration.

4. XML datatypes defined in the context of the present document are specifically highlighted with codestyle*,* e.g. element1type.

5. Structures that are defined as part of the hierarchical data model are identified by an uppercase first letter and *italics*, e.g. *MBS User Service Description*.

6. The cardinality of XML elements is specified as *<minOccurs>*..*<maxOccurs>*. The value N denotes an unbounded number of elements.

7. The following key is used to specify the cardinality of XML attributes:

- M denotes a mandatory attribute.

- O denotes an optional attribute.

- OD denotes an optional attribute with a default value.

- CM denotes a conditionally mandatory attribute.

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

# 4 System overview

The present document defines protocols and formats for MBS User Services as defined in TS 26.502 [6] and conveyed using the 5G Multicast–Broadcast capabilities of the 5G System defined in TS 23.501 [2], TS 23.502 [3] and TS 23.247 [5].

MBS User Services enable high-level applications to make use of the low-level features of the MBS System. An MBS User Service is provided by the MBSF and MBSTF working in combination to support configuration option 2 and configuration option 3 defined in annex A of TS 23.247 [5]. The MBS User Services architecture is defined in clause 4.2.2 of TS 26.502 [6] and shows the MBS-related entities involved in providing MBS User Services delivery and control.

The MBSF and MBSTF offer service layer functionality for sending MBS data via MBS Sessions. The MBSF offers control plane functionality while the MBSTF offers user plane functionality. The MBSTF acts as a User Plane anchor when it sources IP multicast traffic. Clause 4.3.1 of TS 26.502 [6] defines the set of functional entities involved in supporting MBS User Services, including client functions in the UE.**===== CHANGE =====**

# 5 MBS User Service Announcement

## 5.0 Overview

MBS User Service Announcement is needed in order to advertise MBS User Services in advance of, and potentially during, the MBS User Service Sessions described. MBS User Service Announcement (as defined in clauses 4.5.7 and 4.5.8 of TS 26.502 [3]) is provided by means of an *MBS User Service Description*, the syntax of which is defined in this clause.

The MBS User Service Announcement is aligned with the MBMS User Service announcement as defined in TS 26.346 [7], but it is simplified and extended for the needs of MBS.

## 5.1 MBS User Service Description data model

### 5.1.1 General

An MBS User Service Description is described by a set of metadata documents that are delivered as described in clause 4.3.2 of TS 26.502 [3]. The data model defined in this clause subdivides the parameters defined in [3] and groups them into a set of *metadata documents*.

Each metadata document is divided into *metadata units*. A metadata unit is a single uniquely identifiable block of metadata. The metadata itself describes details of services. An obvious example of a metadata unit would be a single SDP document [8].

The metadata consists of:

- An *MBS User Service Bundle Description* metadata unit (see clause 5.2.2) describing a bundle of one or more MBS User Services, and containing one or more:

- *MBS User Service Description* metadata unit (see clause 5.2.3) describing an MBS User Service Session that is associated with:

- One or more *MBS Distribution Session Description* metadata units (see clause 5.2.4), each of which references a Session Description document [8] that may be packaged with the MBS User Service Bundle Description, and each of which may optionally reference an Object Repair Parameters document (see clause 5.2.7) describing the object repair parameters for the MBS Distribution Session.

- Zero or more *MBS Application Service Description* metadata units (see clause 5.2.5), each of which references an Application Service Entry Point document that may be packaged with the MBS User Service Bundle Description. Additional resources referenced by the entry point document may also be packaged with the MBS User Service Bundle Description.

- Zero or one *MBS Schedule Description* metadata unit (see clause 5.2.6) advertising the delivery schedule for the MBS User Service Session.

Figure 5.1‑1 illustrates the relationships between these metadata units using UML for a single MBS User Service Bundle.



NOTE: “N” means any number in each instance.

Figure 5.1-1: User Service Data Model simple description

An MBS User Service Bundle Description document shall contain one or more instances of the MBS User Service Description metadata unit, each of which describes a single MBS User Service Session within the MBS User Service Bundle.

Each instance of the MBS User Service Description metadata unit shall include at least one *MBS Distribution Service Description* metadata unit describing the set of MBS Distribution Sessions currently associated with the MBS User Service Session.

- The MBS Distribution Session Description metadata unit shall refer to one *Session Description document*.

- Each MBS Distribution Session Description metadata unit may contain a reference to an *Object Repair Parameters document*.

Each instance of the MBS User Service Description metadata unit may include zero or more *MBS Application Service Description* metadata units, each one referencing an Application Service Entry Point document (e.g. a DASH MPD, HLS Master Playlist or HTML document) which describes the root of the Application Service associated with this MBS User Service. When multiple Application Service Entry Point documents are referenced, an MBS Client may select only one on the basis of a distinct MIME content type indicated in the Application Service Description.

NOTE: Whether one or multiple Application Service documents are processed by the MBS Client depends on whether it is servicing, for example, multiple clients requiring different entry point documents.

Each instance of the MBS User Service Description metadata unit may include an *MBS Schedule Description* metadata unit. If included, the MBS Schedule Description shall refer to a *Schedule Description document*, and the UE can expect to receive MBS User Service data during the time periods described in the Schedule Description document.

In the case of the Object Distribution Method, the Schedule Description document may include an object transmission schedule for objects associated with the MBS User Service Session. The UE may select which objects to receive based on the object transmission schedule information published in the Schedule Description document.

## 5.1A Encoding

### 5.1A.1 General

The MBS User Service Announcement shall have one of the following representations:

1. An XML instance document formatted according to the schema in clause A.1.

2. A JSON instance document formatted according to the schema in clause A.2. This is the recommended representation.

### 5.1A.2 XML-based representation

In the case of an XML-based representation:

- The MIME type of the MBS User Service Description document is defined in annex C.

- The encoding of the MBS User Service Description document shall be UTF-8 as defined in IETF RFC 3629 [X]. All data provided in extension namespaces shall be UTF-8 as defined in IETF RFC 3629 [X]. If binary data needs to be added, it shall be included in Base64 as described in IETF RFC 4648 [Y] within a UTF-8 encoded element with a proper name space or identifier, such that an XML parser knows how to process or ignore it.

- The extension of the schemas specified in clause A.1, in particular the addition of XML attributes or elements in the 3GPP namespace, is reserved to 3GPP.

- The XML-based MBS User Service Announcement shall be constructed such that, after XML attributes or elements in the 3GPP namespace but not in the schema specified in clause A.1 are removed, the result is a valid XML instance document formatted according to that schema, and which conforms to the present document.

- In addition, the XML instance document shall be constructed such that, after XML attributes or elements in namespaces other than those defined in the schema specified in clause A.1 are removed, the result is a valid XML instance document formatted according to that schema and which conforms to the present document.

NOTE: Based on the last two paragraphs, if MBS Clients remove all XML attributes and elements from the User Service Description in the namespace and in other namespaces that are not in the XML schema specified in clause A.1, the User Service Description document results in a valid XML instance document that complies with the present document.

### 5.1.2.2 JSON-based representation

In the case of a JSON-based representation:

- The MIME type of the MBS User Service Description document is defined in annex C.

- The encoding of the MBS User Service Description document shall be UTF-8 as defined in IETF RFC 3629 [X].

- The extension of the schemas specified in clause A.2, in particular the addition of information elements, is reserved to 3GPP.

- Additional rules for schema extension are for future study.

## 5.2 Semantics

### 5.2.1 General

The following description in this clause presumes XML encoding of the metadata units comprising the MBS User Service Announcement.

### 5.2.2 MBS User Service Bundle Description metadata unit

The MBS User Service Bundle Description metadata unit provides a metadata unit that carries one or more MBS User Service Description metadata units.

The root element of the MBS User Service Bundle Description metadata unit is bundleDescription. This element is of type *bundleDescriptionType*. The bundleDescription element contains one or several userService‌Description child elements.

Table 5.2.2-1 provides the detailed semantics for the bundleDescription element.

Table 5.2.2-1: Semantics of bundleDescription element

| Element or Attribute Name | | Use | Description |
| --- | --- | --- | --- |
| bundleDescription | |  | Root element of the MBS User Service Bundle Description metadata unit. |
|  | userServiceDescription | 1..N | One or multiple MBS User Service Description metadata units that are announced in this bundle (see clause 5.2.3). |

### 5.2.3 MBS User Service Description metadata unit

The root element of the MBS User Service Description metadata unit is the userServiceDescription element. Each userServiceDescription element shall signal a unique identifier in its @serviceIdattribute and this shall be of URI format.

The userServiceDescription element may contain one or more name child elements. The purpose of a nameelement is to communicate a human-readable title of the MBS User Service. For each name element, the language shall be specified according to XML datatypes (XML Schema Part 2 [9]).

The userServiceDescription element may contain one or more serviceLanguage child elements. Each serviceLanguageelement represents the available languages of the MBS User Service. The language shall be specified according to XML datatypes (XML Schema Part 2 [9]) using the @xml:lang attribute.

Table 5.2.3-1 provides the detailed semantics for the userServiceDescription element.

Table 5.2.3-1: Semantics of userServiceDescription element

| Element or Attribute Name | | | Use | Description |
| --- | --- | --- | --- | --- |
| userServiceDescription | | |  | MBS User Service Description metadata unit. |
|  | @serviceId | | M | A globally unique service identifier defined by a URI. |
|  | name | | 0..N | Human-readable name of the MBS User Service. One or multiple of these elements may be present. |
|  |  | @lang | M | Language of the service name according to XML Schema Part 2 [9]. |
|  | serviceLanguage | | 0..N | The languages present in the MBS User Service, specified according to XML Schema Part 2 [9] using the @xml:lang attribute. |
|  | distributionSessionDescription | | 1..N | One or multiple MBS Distribution Session Description metadata units (see clause 5.2.4). |
|  | **scheduleDescription** | | 0 .. 1 | Schedule Description metadata unit, for details refer to clause 5.2.7. |

### 5.2.4 MBS Distribution Session Description metadata unit

Each MBS User Service Description metadata unit shall reference at least one MBS Distribution Session Description.

ThedistributionSessionDescription element shall contain a @conformanceProfileattribute indicating the set of features that the MBS Distribution Session conforms to and which the MBS Client needs to support in order to fully receive the MBS Distribution Session. The value of this attribute shall be a fully-qualified term identifier URI from the controlled vocabulary defined in Annex C.

The distributionSessionDescription element shall contain a @sessionDescriptionURI attribute which references a *Session Description* document. The element may also contain an @objectRepairParametersURIattribute referencing an *Object Repair Parameters* document.

ThedistributionSessionDescription element may contain a @dataNetworkNameattribute indicating a Data Network Name (DNN) as defined in TS 23.003 [10]. When this attribute is present, the MBS Client shall use the given DNN for interactions with the MBSF at reference point MBS‑5 and with the MBS AS at reference point MBS‑4‑UC. If this attribute is not present, the MBS UE shall use a default PDU Session for these network interactions.

The userServiceDescription element may include an availabilityInfo child element providing additional information pertaining to the availability of the MBS Distribution Session within the 5G Network. If present, the availabilityInfo element shall include one or more infoBinding child elements. The infoBinding element shall contain the child elements serviceArea and radiofrequency:

- The serviceArea element declares the one or more service areas in which the MBS Session corresponding to this MBS Distribution Session is currently available.

- In the case of a broadcast MBS Session corresponding to this MBS Distribution Session, the mbsFSAId element identifies a preconfigured area within which, and in proximity to, the cell(s) announce the MBS FSA ID and its associated frequency.

NOTE: This is used to guide frequency selection by the UE for a broadcast MBS Session.

- The radioFrequencyelement indicates the one or more radio frequencies in the NG-RAN downlink which transmit the MBS Session corresponding to this MBS Distribution Session in the service area(s) identified by the serviceArea element.

Table 5.2.4-1 provides the detailed semantics for the userServiceDescription element.

Table 5.2.4-1: Semantics of userServiceDescription element

| Element or Attribute Name | | | | Use | Description |
| --- | --- | --- | --- | --- | --- |
| distributionSessionDescription | | | |  | MBS Distribution Session Description metadata unit. |
|  | @conformanceProfile | | | M | A list of profiles indicating the set of features that the MBS Distribution Session conforms to and which the MBS Client needs to support in order to fully decode the MBS Distribution Session. The value of this attribute shall be a fully-qualified term identifier URI from the controlled vocabulary defined in annex C.  The values in the controlled vocabulary shall conform to either the pro-simple or pro-fancy productions of IETF RFC 6381, section 4.5, without the enclosing DQUOTE characters, i.e. including only the unencodedv or encodedv elements respectively.  The identifier of a profile shall not contain any comma.  Profile identifiers defined in the present document are URNs and shall conform to IETF RFC 8141. Externally defined profiles may use profile identifiers that are URNs or URLs. When a URL is used, it should also contain a month-date in the form mmyyyy; the assignment of the URL must have been authorized by the owner of the domain name in that URL on or very close to that date, to avoid problems when domain names change ownership. |
|  | @sessionDescriptionURI | | | M | Provides a reference a Session Description document and is of type URL. |
|  | @dataNetworkName | | | O | Indicates a Data Network Name (DNN) as defined in TS 23.003 [10]. |
|  | availabilityInfo | | | 0..1 | Provides information pertaining to the availability of the MBS Distribution Session within the 5G System. |
|  |  | infoBinding | | 1..N |  |
|  |  |  | serviceArea | 1..N | Declares the one or more service areas in which the MBS Session corresponding to this MBS Distribution Session is currently available. |
|  |  |  | **mbsFSAId** | 1 | Identifies a preconfigured area within which, and in proximity to, the cell(s) are currently announcing the MBS FSA ID and its associated frequency. |
|  |  |  | radioFrequency | 1..N | Indicates the one or more radio frequencies in the NG-RAN downlink which transmit the MBS Session corresponding to this MBS Distribution Session in the service area(s) identified by the serviceArea element |

### 5.2.5 Session Description metadata unit

The @sessionDescriptionURI attribute of the MBS User Service Bundle Description references a Session Description metadata unit. Each Session Description metadata unit shall describe one MBS Distribution Session. The Session Description metadata unit is conveyed in a Session Description document that shall be formatted according to RFC 8866 [8]. The Session Description document may be packaged in the same MBS User Service Bundle.

- The session description for the MBS Object Distribution Method is specified in clause 6.2.3

- The session description for the MBS Packet Distribution Method is specified in clause 7.2.3.

### 5.2.6 MBS Application Service Description metadata unit

In order to support application services in MBS, the MBS User Service Bundle Description metadata unit shall contain an appServiceDescription element referencing an *Application Service Entry Point* document which contains the descriptive information of the resources delivered via MBS and/or unicast distribution. That *Application Service Entry Point* document shall be formatted according to the value of the @mimeType attribute.

If the *MBS User Service Description* contains a reference to an *Application Service Entry Point* document, then:

1) At least one *MBS Distribution Session Description* of type Object Distribution Method shall be present, i.e. the MBS User Service Description shall include at least one distributionSessionDescription element referencing a Session Description Document that describes an Object Distribution Method as defined in clause 7.

2) When multiple MBS Distribution Session Descriptions of type Object Distribution Method are present, the appServiceDescription element shall define a mapping between the Application Service Entry Point document and the associated MBS Distribution Session.

3) The MBS Distribution Session described by the Session Description document shall deliver objects that are directly or indirectly referenced by the Application Service Entry Point document.

4) When the Application Service Entry Point document is a DASH MPD, then all of the following shall hold:

a) The MBS Distribution Session shall deliver the objects such that the last packet of the delivered object is available to the MBS Client by no later than its availability time as announced in the DASH MPD.

b) The Content-Location element in the FLUTE File Delivery Table for the delivered object shall match the URL in the DASH MPD.

Editor’s Note: Bullets 4 and 5 should be moved to Clause 7.

5) If an update to the Application Service Entry Point document is delivered as a FLUTE transmission object then the Content-Location element in the FLUTE File Delivery Table for the delivered object shall match the URL of the referenced Application Service Entry Point document.

In the case of 3GP-DASH formatted content, the appServiceDescription element may refer to a unified media manifest document which describes Representations available for both MBS reception and unicast retrieval, and this shall be used by MBS Clients compliant with this specification. In practical deployments, different subsets of the Representations described by the unified manifest document and referenced by such appServiceDescription may be specified for:

- Availability via MBS delivery only,

- Availability via both unicast and MBS delivery,

- Availability via unicast only, and the Representation is redundant in MBS area coverage, i.e. the usage of these resources does not provide an improved user experience. As an example, this may be a lower bitrate Representation of a media component for which a higher bitrate is available over MBS distribution, and

- Availability always via unicast, and the Representation is supplementary in MBS area coverage, i.e. even in MBS area coverage these resources provide an improved user experience. As an example, this may be a secondary language that is only accessible over unicast.

All resources that are directly or indirectly referenced in the Application Service Entry Point document of this metadata unit that are expected to be retrieved by HTTP GET shall be delivered by at least one of the MBS Distribution Sessions associated with the MBS User Service Description.

### 5.2.7 MBS Schedule Description metadata unit

Availability of the Schedule Description metadata unit is indicated by the presence of the scheduleDescription element in the MBS User Service Bundle Description metadata unit. The URI of the Schedule Description instance document is provided by the @scheduleDescriptionURI attribute in the scheduleDescription element.

A Schedule Description instance document describes the distribution schedule of the MBS User Service and the availability of content via unicast delivery for an MBS User Service in terms of:

- Start/stop lists,

- Recurrence information,

- The service ID or service class to which the schedule may apply,

An MBS User Service containing multiple content components may be carried on a single MBS Distribution Session, or on multiple MBS Distribution Sessions. The MBS Client can expect to receive MBS data during the described time period(s) when at least one of the MBS Distribution Sessions for the MBS User Service is active.

A Schedule Description instance document may also include a schedule of when the objects are intended to be transmitted as part of an MBS Distribution Session using the Object Distribution Method. The object schedule information is defined in terms of:

- The service ID or service class to which the object schedule applies.

- An object transmission schedule listing for each object:

- Object URI.

- A list of start and end times for distribution of the object via MBS.

The Schedule Description metadata unit may be delivered to the MBS Client:

- prior to the MBS Distribution Session as part of the MBS User Service Announcement along with the Session Description metadata unit (out-of-band of that session); or

- in band within an MBS Distribution Session as a separate Schedule Description instance document; or

- via an MBS Distribution Session dedicated to the transport of Schedule Description instance documents.

The most recently delivered Schedule Description instance document shall take priority, such that schedule parameters received prior to – and out-of-band of – the MBS Distribution Session they apply to are regarded as "initial defaults", and schedule parameters received in-band with the MBS Distribution Session overwrite the earlier received schedule parameters.

The Schedule Description instance document is clearly identified using a URI, to enable cross-referencing by the MBS Client of instance documents delivered in band and out of band.

The session schedule and object transmission schedule are described in the Schedule Description instance document respectively by the sessionSchedule and objectSchedule elements.

- The start and stop time of a single sessionSchedule is specified by the start and stop elements.

- The start and stop time of a single objectSchedule is specified by the @start and @endattributes.

In both cases the time is specified as the absolute date and UTC time. The duration may be determined by subtracting the start time from the stop time.

The MBS Distribution Session shall be available to the MBS Client during the time interval(s) announced by the session schedule (i.e. scheduleDescription/serviceSchedule/sessionSchedule element of the Schedule Description instance document), for either unicast or MBS reception. In particular, for unicast reception, the Schedule Description is indicative of the time availability for unicast access of an MBS User Service while the TMGI for the MBS Distribution Session is not activated, as well as for unicast fallback reception when the MBS Client is not located in the MBS coverage area for the service.

The MBS Client may activate reception of that MBS Distribution Session only within the sessionSchedule (and the objectSchedule if present) time window.

When an objectSchedule element is present in a serviceSchedule element, then:

- The MBS Client should not expect that an object described by an objectSchedule will be updated during a time window instance, defined by @start and @end attributes, within a deliveryInfo element of that objectSchedule.

- There shall be only one object version (as defined in the @File-ETag attribute in the FLUTE File Delivery Table) transmitted in a time window defined by the @start and @end attributes within a deliveryInfo element for a given objectSchedule element.

- If objectETag attribute is not present, the objects transmitted in the time windows from different deliveryInfo elements in an objectSchedule should not be expected to be the same object version.

- If the @objectETag attribute is present, there shall be only one object version transmitted in all of the time windows delimited by the start and end attributes of each of the one or more deliveryInfo elements.

- In-band Schedule Description instance document updates can be used to provide a dynamic schedule update to override the existing delivery schedule, such as using the @cancelled attribute mechanism specified in this clause.

- A sessionSchedule element in the same serviceSchedule element shall be present, and its start and stop elements shall specify a time window that completely overlaps the time windows specified in each of the objectSchedule elements of the same serviceSchedule.

When a sessionSchedule is present and there are no objectSchedule child elements in a serviceSchedule, then the MBS Client should download each new object, independently of whether the MBS Distribution Session uses the MBS Object Distribution Method or the MBS Packet Distribution Method.

The objectSchedule element specifies details about the objects to be delivered during an MBS Distribution Session. The @sessionId attribute, if present, identifies the MBS Distribution Session for each object. If not present, an MBS Client shall instead determine the MBS Distribution Session by examining the Session Description metadata unit for the MBS Distribution Session. The @objectETag attribute of the objectSchedule element is the version identifier of the object. If present, the purpose of this entity tag is to enable an MBS Client to determine if an object has changed since a prior reception without having to download the object.

The scheduleUpdate element specifies a time after which MBS Client shall seek to update its schedule information by acquiring the latest available Schedule Description instance document.

An @index attribute is included as a child of the sessionSchedule element. If the sessionSchedule does not describe any session reoccurrence, then the index corresponds to the single session occurrence. If the sessionSchedule describes one or more reoccurrences the @index is the starting index of the first session occurrence with the index value increased by one for each session reoccurrence.

A @cancelled attribute is defined as a child of the objectSchedule/objectURI element.

- If the @cancelled attribute is set to "true" or "1", then the transmission of the object identified by the objectURI element is cancelled, and the MBS Client shall cancel any applicable repair and/or reception reporting procedures for that object.

If this object schedule-level cancellation indication in the updated schedule description is received after the associated object has already been delivered, then any related repair or reception reporting for that object (associated with its parent service), either in progress or yet to occur, shall be aborted.

- If the @cancelled attribute is set to "false" or "0" or is absent, then normal object transmission and associated delivery procedures, if applicable, shall occur.

A sessionScheduleOverride element is defined as a child of the serviceSchedule element. If present, the sessionScheduleOverride element indicates either the cancellation of the session occurrence, or schedule override, as follows:

- If the @cancelled attribute (a child of sessionScheduleOverrideelement) is set to "true" or "1", then the transmission of the MBS Distribution Session identified by the index attribute (a child of sessionScheduleOverrideelement) is cancelled, and the MBS Client shall cancel any applicable repair and/or reception reporting for all objects belonging to that MBS Distribution Session.

If this session schedule-level cancellation indication in the updated schedule description is received after any of the associated objects have already been delivered, then any related repair or reception reporting for those objects (associated with their parent service(s)), either in progress or yet to occur, shall be aborted.

- If the @cancelled attribute (a child of sessionScheduleOverrideelement) is set to "false" or "0" or is absent, then the start and stop time elements (children of sessionScheduleOverrideelement) shall override the nominal start and stop time of the transmission schedule of the session as identified by the @index attribute (a child of sessionScheduleOverrideelement).

The value of the @index attribute in the sessionScheduleOverride element corresponds to any of the value of the index element in the reoccurenceStartStopType in the sessionSchedule element.

Schedule information received in the Schedule Description metadata unit shall take precedence over timing information that may have been received in the Session Description metadata unit (t and/or r lines in the SDP).

Table 5.2.7-1 provides the detailed semantics for the scheduleDescription element.

Table 5.2.7-1: Semantics of scheduleDescription element

| Element or Attribute Name | | | | Use | Description |
| --- | --- | --- | --- | --- | --- |
| **scheduleDescription** | | | |  | Schedule Description metadata unit |
|  | @scheduleDescriptionURI | | | M | Reference to Schedule Description instance document |
|  | sessionSchedule | | | 0 .. 1 |  |
|  |  | start | | 1 |  |
|  |  | stop | | 1 |  |
|  |  | **objectSchedule** | |  |  |
|  |  |  | @start |  |  |
|  |  |  | @end |  |  |
|  |  |  | **deliveryInfo** |  |  |
|  |  | | |  |  |
|  |  |  | |  |  |
|  |  |  | |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

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

### 6.2.1 General

If FLUTE [12] is used to realise the Object Distribution Method, 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 clause 6.2 of the present document.

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 FLUTE/UDP in combination with the MBS service type.

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.

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.

Inclusion of the @Content-MD5 and @File-ETag FDT Instance attributes is optional. The @File-ETag represents the value of the HTTP entity tag as defined in section 3.11 of RFC 2616 [13] which may also serve as the version identifier of the File object described by the FDT Instance.

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].

NOTE: The use of Alternate-Content-Location-1 and Alternate-Content-Location-2 as defined in TS 26.346 [7] is not supported in MBS User Services.

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

#### 6.2.2.2 MBS service type of MBS Session

A new MBS service type declaration attribute mbs-servicetype 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 to indicate the type of the corresponding MBS Distribution Session as defined in table 6.2.2.2‑1.

Table 6.2.2.2‑1: 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.

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

#### 6.2.3.3 Object collection operating mode

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

In this operating mode, each FDT Instance delivered in the session should describe all objects that are part of the current collection.

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

### 7.2.1 General

The Packet Distribution Method combines three different delivery methods of TS 26.346 [7] (namely the MBMS Streaming Delivery Method, Group Communication Delivery Method and Transparent Delivery Method) into a single distribution method, with a set of modifications.

For the Packet Distribution Method, the MBSTF may handle the ingested content on two different protocol layers according to the operating mode provisioned for the MBS Distribution Session:

- *Proxy mode:* The MBSTF handles UDP packet payloads and forwards UDP packet payloads from ingest into the MBS Distribution Session. The MBSTF may use different UDP ports for the MBS Distribution Session. The MBSTF re-uses the Proxy Mode of the Transparent Delivery Method as defined in clause 8B of [7].

- *Forward-only mode:* The MBS receives complete IP packets and forwards the ingested packets as MBS PDUs. The MBSTF re-uses the Group Communication Delivery Method as defined in clause 8A of [7] and the Forward-Only Mode of the Transparent Delivery Method as defined in clause 8B of [7].

NOTE: A specific treatment of RTP sessions, for example as provided by the MBMS Streaming Delivery Method, is not provided by MBS User Services. However, RTP sessions may be delivered in proxy or forward-only mode.