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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document defines protocols and formats for 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].

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".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.247 [5], TS 26.502 [6] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

3.2 Symbols

Void.

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
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

4 System overview

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.

5.1 MBS User Service Description data model

5.1.1 General

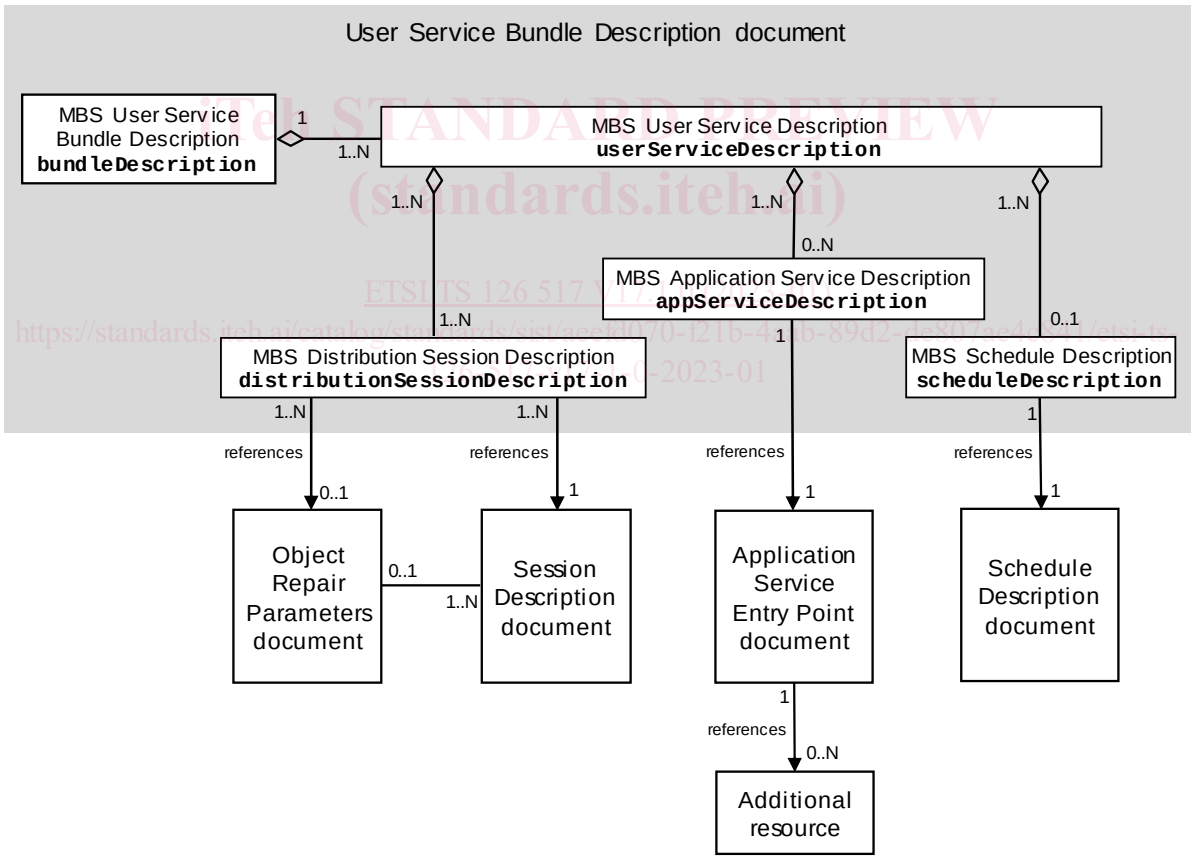
An MBS User Service Description is described by a set of metadata documents that are delivered as described in clause 4.3.2 of TS 26.502 [3]. The data model defined in this clause subdivides the parameters defined in [3] and groups them into a set of *metadata documents*.

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 shall select only one on the basis of a distinct MIME content type indicated in the Application Service Description.

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.

5.2 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 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.

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 `@serviceId` attribute and this shall be of URI format.

The **`userServiceDescription`** element may contain one or more **`name`** child elements. The purpose of a **`name`** element 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 **`serviceLanguage`** element 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.

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.

The **`distributionSessionDescription`** element shall contain a `@conformanceProfile` attribute 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 @objectRepairParametersURI attribute referencing an Object Repair Parameters document.

The **distributionSessionDescription** element may contain a @dataNetworkName attribute 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**, **mbsFSAId** 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 **radioFrequency** element 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.